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**Karnataka State Open  
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Manasagangotri  
Mysore 570 006

**B. Ed. CC-04**  
**TECHNOLOGY OF TEACHING**

**B. Ed. - ODL PROGRAMME**

SCHOOL OF EDUCATION  
25/2, Ballygunge Circular Road, Kolkata-700019

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## **PREFACE**

Netaji Subhas Open University is one of the premier State Open Universities in India established in the year 1997 by a State Act (W. B. Act XIX) of 1997 and recognized by the University Grants Commission and Distance Education Council. Consequent upon the RTE Act 2009, the Govt. of West Bengal in its Higher and School Education Departments has decided to introduce B.Ed. programme in the Open and Distance Learning mode (ODL) to train up the in-service untrained teachers teaching at the upper primary level in the State. Accordingly by its Memo No. 180-Edn. (U)/1U-97 / 12 Dated 5th February, 2013 the Govt of West Bengal identified Netaji Subhas Open University (NSOU) as the only nodal University Capable of implementing the programme all over the state of West Bengal. The Govt. of West Bengal also decided to adopt the Curriculum, Syllabus and Self Instructional Materials (SIM) of a reputed University who has the updated curriculum, syllabus and standard SIMs. Therefore, NSOU approached the National Council for Teacher Education authorities for their approval of the programme and they were kind enough to accord their approval vide no. 48-18/2012/NCTE/N&S;Dtd. 19. 03. 2013. After rigorous exercise at the national level the curriculum, syllabus and SIMs of Karnataka State Open University (KSOU) have been identified and accordingly adopted through the signing of a tripartite MoU among KSOU, Department of Higher Education, Govt. W.B and NSOU. NSOU further approached NCTE for their approval for using the KSOU course curriculum and self learning materials and the authorities of NCTE were kind enough to allow NSOU to use the study materials of KSOU vide no. 48-18/2012/NCTE/NS Dt.9th July, 2013. The study materials as received are reprinted at our end. The study materials are reproduced for exclusive use by the Counsellors and Student Teachers of the pogramme. It is expected that Counsellors, Student Teachers and all concerned will take benefit from it and make the most of it.

Teacher Education is an important discipline gaining further momentum as both Govt. of India and Govt. of West Bengal are laying increasing emphasis on it as only quality teacher education can ensure quality instruction and consequently produce learners with a good understanding of the subjects. The quality of teacher education

not only depends on professionally sound and relevant curriculum, but also on the way the curriculum is transacted in the institutions. Hence, it is our earnest request to fellow faculties and dear student teachers to take advantage of this special programme of ODL and make a success of it. After completing of the course, the student teachers will go back to their classrooms, and then try to make it vibrant, instil imagination in children and ignite curiosity in them.

I am thankful to the Hon'ble Minister in Charge, Department of Higher and School Education, Govt. of West Bengal for his continuous guidance and support. Shri Vivek Kumar IAS, Secretary Higher Education Department has been a perpetual source of encouragement and he extended all sorts of cooperation and guidance as and when required. We are thankful to the authorities of the Ministry of Human Resource Development (MHRD), Govt. of India for their unstinted support. We must acknowledge the instant gesture of cooperation and help extended by KSOU authorities to share course curriculum and study materials with us. The authorities of Paschim Banga Sarva Siksha Mission (PBSSM) were very generous to provide financial support to make the project possible. My colleagues at the School of Education have made it possible to reprint the SIMs within such a short period of time. They have taken care of proof corrections, prepared the printing lay-outs and other things needed for printing. The Publication Department has also taken the initiative to print such a quantum of self learning materials within a very short period of time. The initiative must be appreciated. I sincerely believe that the Self Instructional Materials as reprinted will be appreciated by all. Any objective suggestion for its improvement from the users will be appreciated useful.



**Professor Subha Sankar Sarkar**  
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## **B. Ed. –ODL PROGRAMME**

*(Bachelor of Education Programme through  
Open and Distance Learning Mode)*

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**COMPULSORY COURSE 04 (CC-04)  
TECHNOLOGY OF TEACHING**

**BLOCK 01  
SYSTEMS APPROACH AND  
CONTENT ANALYSIS**

# **B.Ed. CC-04 : TECHNOLOGY OF TEACHING**

## **Block 1**

### **SYSTEMS APPROACH AND CONTENT ANALYSIS**

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# **BLOCK 01 : SYSTEMS APPROACH AND CONTENT ANALYSIS**

## **INTRODUCTION**

Recent advancements in communication media and information technology have influenced all branches of knowledge tremendously. We can notice the impact of this advancement in every profession. Invention of Computers and other electronic media have necessitated systematization of knowledge and information. Every task now is considered as a process system consisting of many interrelated components.

According to Webster Dictionary a System is some whole form in structure or operation, concept or function composed of united or integrated parts. A System is a unified whole, function, process or content with interrelated component leading to a goal. In information technology the concept of System is very much used. Considering a set of concepts, functions or processes helps in clearly understanding their dynamics and helps in processing storing and communicating the information. Now the concepts of system used in all branches of knowledge and in all professions.

Analysing a system into its components is known as Systems Analysis. Application of Systems Analysis to understand a system is known as systems Approach. In this approach a problem is taken as a whole and an attempt is made to understand its various components and the interrelationship between these parts. Teaching - learning process is now considered as a system consisting of many interrelated sub-processes. In this Block you will study about the concepts of System and Systems Analysis and how these concepts are applied to understand instruction. If we consider instruction as a system, the question is what its components are. You will study about an Instructional System in the Units of this Block.

There are six Units in this Block. **Unit-I** explains the concept of Technology and meaning of Technology. In **Unit-2** you will learn about the meaning of a System. The meaning and the procedure of Systems Analysis are explained in **Unit-3**. In **Unit-4** you will understand about the nature of an Instructional System.

Analysing the content to be taught in a logical and sequential manner is very essential in teaching meaningfully and effectively. This process is known as Content Analysis which is explained in the next two Units. **Unit-5** explains how to analyse the content of a Course. In **Unit-6** how to analyse the content of a Unit is explained.

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## **UNIT - 1 □ CONCEPT OF TECHNOLOGY AND TECHNOLOGY OF TEACHING**

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### **Structure**

- 1.1 Introduction**
- 1.2 Objectives**
- 1.3 Concept of Technology**
- 1.4 Concept of Teaching**
- 1.5 Technology of Teaching**
  - 1.5.1 Meaning**
  - 1.5.2 Nature and Scope of Technology of Teaching**
  - 1.5.3 Importance**
- 1.6 Let Us Sum-Up**
- 1.7 Answers to ‘Check Your Progress’**
- 1.8 Unit-End Exercises**
- 1.9 References**

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### **1.1 Introduction**

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You know most developed or less developed countries are development minded today because every country has a quest to move forward in their own way. For all these development, ‘education’ is the basic factor. So, consequently, teachers face challenges to meet the increasing needs of society. Every individual in our society needs to be developed and their potentialities must be best utilized.

Without developing human potential, it is unthinkable to ensure economic growth and welfare of society. The stability of our future economy will largely depend upon how effectively we make use of our natural resources. According to the Education Commission Report, “If the pace of national development is to be accelerated there is need for a well defined, bold and imaginative educational policy and determined vigorous action to vitalize, expand and improve education”.

If education is to play such a dominant role, our teachers should be concerned with helping future generations acquire the knowledge, skills and attitudes necessary to build the nation. In order to make the best use of our resources it is necessary that all

teachers should understand the mechanics and dynamics of teaching technology and provide best possible education to their pupils.

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## 1.2 Objectives

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After studying this unit, you will be able to:

- Define Technology
- Understand the concept of Teaching
- Explain the meaning and nature of Technology of Teaching
- Bring out the importance of Technology of teaching

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## 1.3 Concept of Technology

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You know that technology has yielded many new machines, materials and media which have great potentiality for use in education. A judicious use of these together with new functions and roles of education personnel can bring about more efficient and effective learning. Technology has provided us with a method of storing information in a short space and its quick and efficient retrieval as and when necessary.

Using mass media it is now possible to provide good education to children and adults in remote and inaccessible areas. The services of experts and competent teacher can be made available at any place in the country without their physical presence.

The word 'Technology' is derived from Greek word techno, meaning art or skill and 'login', meaning science or study. A wide definition of Technology means science of art or skill or study of art or skill. This word 'Technology' is differentially interpreted in different contexts. Engineers, doctors, scientists, economists and politicians, whether they are practitioners or academicians, have their own usage and understanding.

Naughton, J. (1986) in his book 'Technology in Schools', has opined that Technology can be defined in two ways, Technology as things and Technology as social process. 'Technology of things' is the application of scientific knowledge to practical tasks by organization that involves in 2 M's - Men and Machines.

Technology of social processes is the application of scientific and other organized knowledge to practical tasks by hierarchically ordered social systems that involved men and machines. That is why technology is not only a 'tool' for development of science but also a 'change' in the social process. The interaction of technology and society is one of ends and means, the society opts for certain ends for which technology provides means, conversely, technology influences the solution of inputs resulting in the out puts society need and requires.

Following are some of the important definitions that justify for the above said statement. Hierra, A (1973) “Technology is the set of instruments and skills which is used to satisfy the needs of community”. Alexander, R. J. (1980) “Technology describes a process - something that people do to solve problems or to achieve aims and products” - such as instruments and tools. Technology is something that is tangible that exists and can be used to satisfy the needs of the community.

### **‘Check Your Progress’ - 1**

1. Define Technology.

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2. Technology of social process brings the changes in the

- a) Society      b) human being      c) animals      d) none of them

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## **1.4 Concept of Teaching**

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So, far you have understood about technology. Now you will understand more about teaching. The concept of teaching is very complex, because of that reason; it may be understood in the following ways.

- i. By analysing and studying the definitions of the term Teaching.
- ii. By examining the various notions about the nature and characteristics of Teaching.
- iii. By analysing how it is related to other related or synonymous terms.

As you are aware, teaching is an art as well as a science. As an art it portrays the imaginative and artistic abilities of the teacher in creating worth-while situation in the class room in which the learners learn and achieve the immediate and ultimate goals of education.

As a science, it points out logical, mechanical, and procedural steps to be followed to attain an effective accomplishment of goals. Teaching is a complex activity carried out in the complex situation of the school by human beings (teachers) directed towards more complex human beings (students) who are constantly undergoing complex changes.

Therefore it becomes clear that teaching is the area where there is no clear cut conceptual understanding. In this context, Barr (1961) said that “teaching means many

different things, that is the teaching act varies from person to person and from situation to situation”.

1. The concept of teaching can be understood as follows-

- i. Little Oxford Dictionary “Preach; impart knowledge or skill; give instruction or lesson; instill inspire with”.
- ii. According to Morrison, H. C. (1934) “Teaching initiates contact between a more mature personality and less mature which is designed to further the education of the latter.
- iii. According to Smith, B. O. (1963) “Teaching is a system of actions involving an agent, a situation, an end-in-view, and two sets of factors in the situation - one set over which the agent has not control (for example, size of classroom and physical characteristics of pupils and another set which the agent can modify with respect to the end-in-view. (for example assignments, the ways of asking questions)”.
- iv. Bubacher, J. (1939) “Teaching is arrangement and manipulation of a situation in which there are gaps or abstractions which an individual will seek to overcome and from which he will learn on the course of doing so”.

According to Morrison (1934) “Teaching is disciplined social process in which teacher by virtue of his ideas, position, status, knowledge and experiences influences the behavior of the less experienced pupil and helps him to develop according to needs and ideals of society. Here teachers are center of imparting knowledge and children are blind followers and passive listeners. The definition given by Bubacher (1939) states that “teaching is a process in which pupils play the central role”. Teacher’s task is to create learning situations; here students have the freedom to select the things and learn. This type of teaching may lead pupils to be independent in learning and problem solving”.

The definition given by Smith, B. O. is rather more pragmatic in approach. He considers teaching as a tripolar process involving

- i. an agent (the source, human or material that tries to produce learning)
- ii. a goal or target or end in view to be achieved by the students through the process of teaching.
- iii. The intervening variable consisting of learning or learning situation or environment. It involves physical things or human beings and instructional methods.

It is very clear that we do not find any definition which gives complete idea of teaching. Each definition stresses some aspect of teaching but to the purpose of each clarity we must consider the as definition given by Smith, B. O. most comprehensive “Teaching is tripolar process involving an agent of teaching, student and set of activities designed and manipulated primarily to bring change in the behavior of the student.”

### **‘Check Your Progress’ - 2**

1. According B. O. Smith teaching is a
  - a) Bipolar process
  - b) Tripolar process
  - c) Unipolar process
  - d) Multipolar process
2. In the definition of teaching given by B.O. Smith agent means
  - a) Student
  - b) teacher
  - c) guide
  - d) counselor

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## **1.5 Technology of Teaching**

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### **1.5.1. Meaning**

As you already know, teaching is an art and as well as science. The scientific consideration of teaching has led to the evolution of the concept technology of teaching. Davies, Gage, Bruner and Gagne have contributed significantly in this area of teaching technology.

Technology of Teaching has fundamental principles.

- i. Teaching is a scientific process and its major components are content, communication and feedback.
- ii. There is a close relationship between teaching and learning.
- iii. It is possible to modify, improve and develop the teaching and learning activities
- iv. The technical behaviour of the learner in terms of learning structure can be established by appropriate teaching environment.
- v. Teaching skills can be developed and strengthened by means of feedback devices with or without sophisticated techniques.
- vi. Pre-determined learning objectives can be achieved by signing suitable teaching activities.
- vii. Use of achievement motivation techniques enhances the output of the teacher and learner.

Technology of Teaching means know how teaching takes place under specific conditions, understanding about mechanism of instruction process in the classroom situations, levels of teaching, principles and conditions - operations etc.

It has well defined components. (i) man power, (ii) methods, (iii) materials, (iv) media.

Methods means while teaching we can make use of few devices, such as models

of teaching programmed learning, team teaching, micro teaching, personalized system of instruction. A material means instructional materials comprising programmed text-book, manuals, guides, written/print-materials. Media means use of audio-visual or both audio-visual media such as radio, tape recorder, films, television teaching aids which will supplement for effective teaching and learning process. Last component that is manpower is very essential because what ever may be the method, material, media, which need stabled manpower to operate and function. So that conducive learning and teaching environment can be created. Thus these four methods constitute the inputs for technology of teaching.

### **1.5.2 Nature and Scope of Technology of Teaching**

- a. Davies and Glaser (1962) studied the scope of technology of teaching in four main points.
- b. Planning of teaching which includes - content analysis, identification of objectives writing in terms of behavioral terms.
- c. Organisation of teaching - teaching strategies for achieving objectives of teaching.
- d. Teaching process which includes, use communication strategies for teacher and student.
- e. Controlling/managing teaching which focuses on the assessment of learning objectives in terms of student performance, and this gives feedback to the students as well as teachers.

### **1.5.3 Importance**

Technology of teaching is most important in the field of teaching and learning because it is different from traditional teaching.

- a. Based on modern scientific principles and discoveries.
- b. It enhances the thinking power of students or learner.
- c. Uses team-teaching.
- d. It develops team spirit, group activities.
- e. Uses techniques for individualized instruction.
- f. Objectives were clearly defined in behavioral terms.
- g. Materials for teaching are well prepared and organized.
- h. Time required for master the material may vary across students.

- i. Teacher's role is not only teaches but, he has to create conducive environment and manage instruction, diagnose students, and use the available resources effectively and make teaching-learning process effective.
- j. Teaching technology includes not only man power, it includes, and new media, new measurement techniques and both should be used in coordinate way.
- k. Objectives of instruction are subject to review.
- l. The purpose of student evaluation is help the students and give feed back for their strength and weakness and providing information for making decisions such as extra help.
- m. Teaching technology is student centered students will enjoy the freedom and environment is student friendly.

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## 1.6 Let Us Sum Up

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You have already understood that technology is study or science of art. It is the application of scientific knowledge to the practical tasks by organisation. It involves men, and machines. Technology is also application of scientific knowledge to social process so that there is change in the social pattern.

Teaching is a tripolar process which involves an agent of teaching, student, set of objectives designed and manipulated primarily to bring change in the behaviour of the students. Teaching technology means -know how teaching occurs under specific conditions and understanding about mechanism of instruction process in the class room situation levels of teaching, principles and conditions, operations, etc. It has well defined components - man power, methods, materials and media.

Nature of teaching technology -

- planning of teaching, organization of teaching.
- teaching process, controlling/managing teaching.

Importance of teaching technology -

- Teaching based on modern scientific technology principles and discoveries.
- Uses team teaching, group activities.
- Uses modern techniques for individualized instruction.
- Objectives were clearly defined and teaching material is well organised and prepared for achievement of objectives.
- Teacher's role is not only to teach, he should plan, organise, diagnose students, and use effective resources control and manage teaching.

- Teaching includes man power, media, methods and materials for teaching.
- The teaching is student centered.
- The purpose of evaluation is to help the students to know their strengths and weakness.
- So teaching is complex activity by the application of technology. It is made easier to bring desirable changes among students for the achievement of educational objectives as well as all round development of students by enhancing effectiveness of teacher using different methods media, materials that are easily available in the society.

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## **1.7 Answers to ‘Check Your Progress’**

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### **‘Check Your Progress’ -1**

1. Technology is the study or science of art or skill technology is the set of instruments and skills which are used to satisfy the needs of community
2. (a)

### **‘Check Your Progress’ - 2**

1. (b)
2. (b)

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## **1.8 Unit-End Exercises**

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1. Define technology.
2. What is teaching?
3. What is the meaning of Technology of Teaching?
4. Explain the importance of Technology of Teaching.

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## **UNIT - 2 □ SYSTEM - AN INTRODUCTION**

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### **Structure**

- 2.1 Introduction**
- 2.2 Objectives**
- 2.3 Concept of a System**
- 2.4 Types of System**
- 2.5 Let Us Sum-Up**
- 2.6 Answers to ‘Check Your Progress’**
- 2.7 Unit-End Exercises**
- 2.8. References**

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### **2.1 Introduction**

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We all come across many systems, without system, no activity will complete. Take for example of human being. When body has to work effectively and efficiently the body system means every part of it i.e., eyes, nose, respiratory system etc., of human being should work completely. So in every system such as car system, economic system, political system, social system like wise every system in our society, made society completely fulfilled and self satisfied.

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### **2.2 Objectives**

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After studying this unit, you will be able to:

- Define System
- Describe the concept of System
- Name the types of Systems.

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### **2.3 Concept of a System**

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Let us try to understand what is meant by a system. For this we will take an example of bicycle. What are the different parts a Bicycle? The Breaks, handles, chain paddle

etc. Yes there are many more parts like wheels, Battery for break, back break etc. one can ask why we need all these parts, because all these parts are essential for the bicycle to work properly hence these are called components of the bicycle.

Suppose the break is not working the bicycle will not work. If there no air in the wheel the bicycle will not be able to function. It affects the functioning of all other components. This shows that components are inter related and inter dependent operating towards the effective functioning of a bicycle.

Most of you have observed so many things in the above example that is bicycle has to perform certain functions. It has number of components, these components are interrelated and inter dependent of effective functioning of bicycle.

### ***Definition of System***

“A system has a number of components operating together in an interrelated and interdependent manner towards the attainment of certain functions”

Websters, New International Dictionary defines a system, as “an aggregation or assemblage of objects united by some form of regular interaction or inter dependence; a group of diverse units so combined by nature or art as to form an integrated whole which function. Operate or move in unison and, after in obedience to some form of control; an organic or organized whole; as to view the universe as a system, the solar system, as new telegraph system”.

Bertalanffy (1951) defines system as an “arrangement or combination, as of parts or elements in a whole”

Ackoff (1971) defines system is a set of interacted elements.

Bonathy (1968) claims that systems are assemblages of parts that are designed and built by man into an organized whole for the attainment of specific purposes.

Silver (1972) defines a system as “simply the structure or organisation of an orderly whole clearly showing the interrelation of the parts of each other and to the whole itself”.

Fill back (1974) defined a system as an object or an event which is divisible into separate parts or phases, with the entire assemblage of parts or phases functioning more or less in synchrony and the functional relationship existing for the purpose.

Now on the basis of these definitions, you can understand that a

- i. System is an entity, conceptual or physical, which consisted of interrelated, inter dependent interacting parts.
- ii. In function elements are regarded as separate but they are dependent on the environment in which it exists.

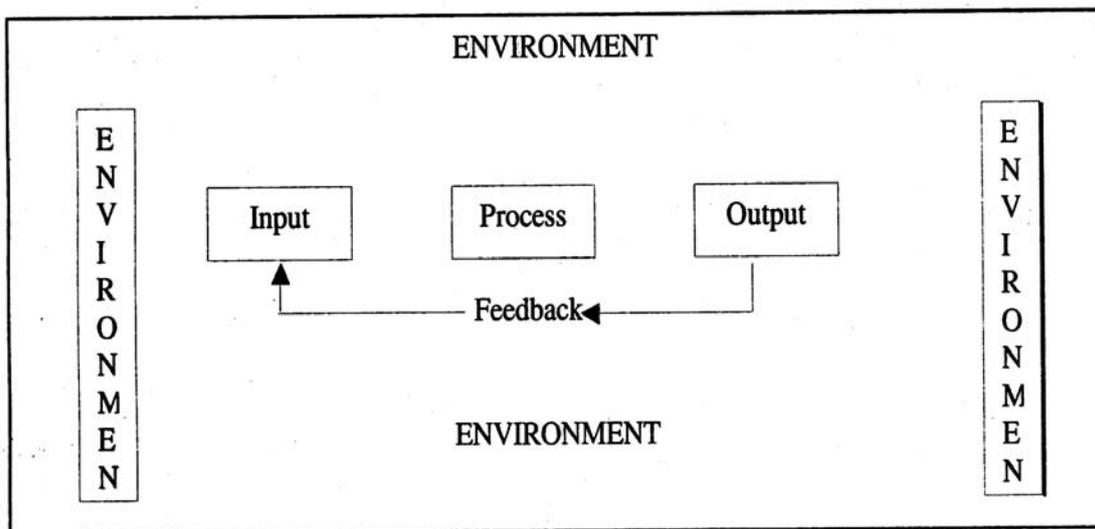
- iii. Every system has sub system. For example human body is complex organism including skeletal system, blood circulatory system, nervous system. This is same for school, hospital, bank, office etc.
- iv. All sub systems are interrelated.
- v. System work as a whole for accomplishment of mission of entity.
- vi. Every system has purpose to achieve.

Therefore, attention must be given to develop systematic bodies of knowledge organized in to complex 'whole'. Within which sub parts or sub-systems may be interrelated. So emphasis must laid on the over all system which will provide better picture of the net work of subsystems and interrelated parts which together form a complex whole.

***Parameters of a System***

Any system has basic 4 parameters. (i) input, (ii) process, (iii) output and environment context, (iv) feedback.

Input means what is put into the system for example in educational system, men (or students), materials, money were put into the system. Process refers to what is goes on in a system, media, method etc., Output is product of the system, environment is the condition in which system operates, and feedback is one which will make alternation in the product. They are shown in diagram.



**Parameters of the System**

**‘Check Your Progress’ -1**

1. Give one definition of System

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2. Give example of System

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3. Identify the parts of System.

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**2.4 Types of Systems**

Now you have learnt about system and let us learn more about the types of systems.

**Closed Systems**

Closed systems means one which does not accept new information and which is detached from interfacing with other systems out side or when the boundary is impermeable the system is called closed system.

**Open System**

Now let us consider the bicycle along with the rider as one system. In this case the system becomes better to react with out side environment such systems are called open system. Most of the systems are always open. They interchange with environment open system which has got following characteristics. They differentiate the closed systems.

(i) Open systems interact with the environment; therefore they have inputs and outputs.

- ii. Open systems tend to maintain themselves in a steady state. A steady state means a constant ratio being maintained among the components of the system.
- iii. Open systems are self regulating.
- iv. In Open systems, identical results can be obtained from different initial conditions.
- v. Open system maintain their steady state through dynamic inter play of subsets operating as functional process.
- vi. Open system maintains a steady state through feed-back processes. Feed-back refers to that portion of the output of a system which is feedback to the input and after succeeding output.

### **‘Check Your Progress’ - 2**

State whether true or false.

1. (a) Closed systems are those which will interact with environment.  
(b) Open systems are those which will not interact with environment
2. Open system maintain a steady state through
  - i) feed-back                      ii) support of human being
  - iii) Counseling                  iv) active involvement

## **2.5 Let Us Sum Up**

Now you have learnt that

- A system has a number of components operating together in an interrelated and interdependent manner towards the attainment of certain functions.
- System will not be independent of environment.
- System has sub-system and is interrelated.
- System work as whole to achieve some stipulated objectives. So they have purpose.

There are two types of systems - open system and closed system. Open system is one which will interact with environment and maintain co-ordination among components to result in steady state closed system will not interact with environment the boundary is intermediate.



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## **UNIT - 3 □ SYSTEMS APPROACH AND SYSTEMS ANALYSIS**

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### **Structure**

- 3.1 Introduction**
- 3.2 Objectives**
- 3.3 Systems Approach**
  - 3.3.1 Meaning**
  - 3.3.2 Types**
- 3.4 Systems Analysis**
  - 3.4.1 Systems Analysis - Concept**
  - 3.4.2 Types of System Analysis**
- 3.5 Steps in Systems Approach**
- 3.6 Applicability to Instructional Context**
- 3.7 Let Us Sum-Up**
- 3.8 Answers to ‘Check Your Progress’**
- 3.9 Unit-End Exercises**
- 3.10 References**

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### **3.1 Introduction**

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As you know, all people living in this world face some problem or the other. These problems are now minimized by using some of the techniques available. We need to search for a new approach which looks into the problems concerned to man industry society taking into consideration the problem as a whole called as ‘systems approach’. A systems approach enables us to design complex systems by the efficient use of resources in the form of men, money, machine, material, and time.

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### **3.2 Objectives**

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After studying the unit, you will be able to:

- Explain the meaning of Systems Approach

- Name the types of Systems Approach
- Describe the concept of Systems Analysis
- Identify the types of Systems Analysis
- Analyze the steps involved in Systems Approach
- Comprehend their applicability to Instructional Context

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### **3.3 Systems Approach**

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#### **3.3.1 Meaning**

The term systems approach came into existence in World War II. The idea of scientific approach to decision-making also emerged thereafter. During Second World War II, a team of scientists worked systematically for Great Britain and America to solve the problems faced by first Nazi bombings. Later this approach was introduced to industry and expanded to other non-military government agencies. Today this scientific, systematic approach to problem solving, decision making and planning is widely used in social services and educational professions.

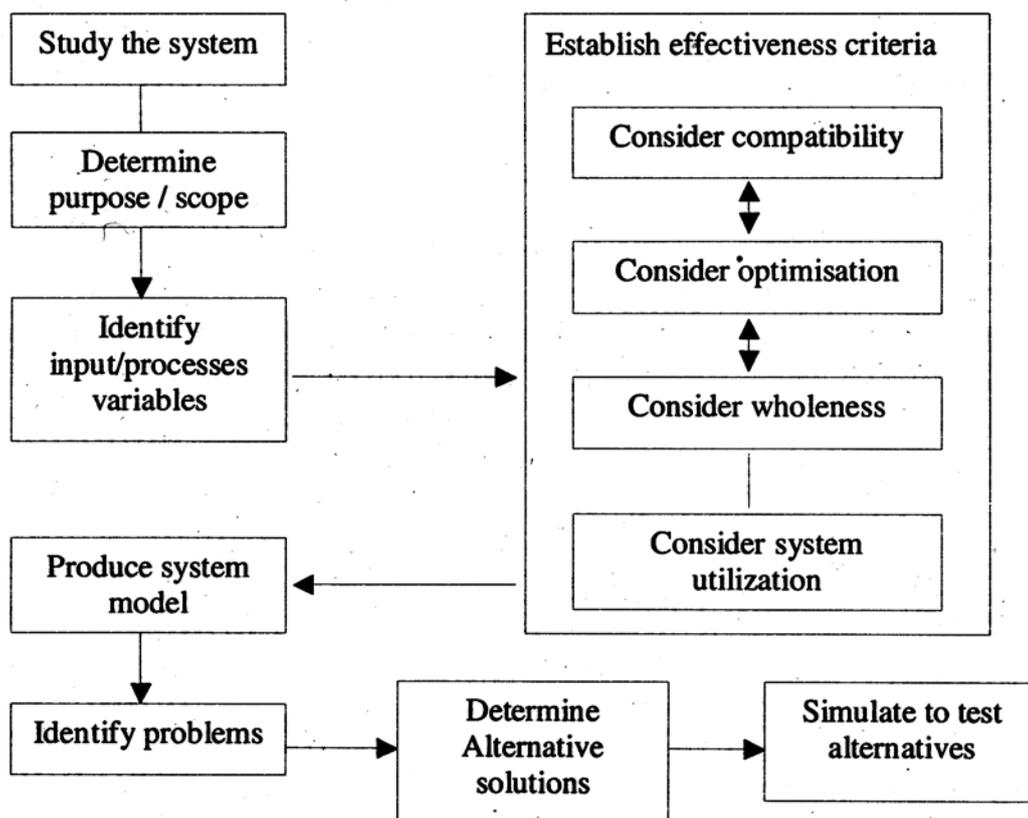
The system approach refers to a scientific method of problem-solving, decision-making and planning.

In this unit you will understand some of the definitions. Churchman, (1968) defined systems approach as a procedure for characterizing the nature of the system, so that decision making might be logical and Coherent fashion, and performance of a system might be described.

Bertalanffy, (1968) elaborated the concept to say that “systems approach involved a consideration of alternative solutions and of choosing those promising optimization at maximum efficiency and minimum cost in a complex network of interactions.

A system approach is an operational concept which referees to a scientific rational method of optimizing the outcome of systems through the implementation of a set of sequentially related activities for studying existing systems deriving solutions to problems, and developing new or modified entities. In order to make modified entities it makes use of available resources.

Now you will understand the mode of systems approach.



### 'Check Your Progress' - 1

1. Define system approach

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### 3.3.2 Types

According to the application of systems approach you will know many number of types of systems approach.

- i. Systems approach to organization
- ii. Systems approach to management.
- iii. Systems approach to curriculum development and instruction.

- iv. Systems approach to teaching and learning process.
- v. Systems approach to training programmes.
- vi. Systems approach to non-formal education.

We now use this approach to achieve effective and efficient working while intending to work towards objectives.

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## **3.4 Systems Analysis**

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Now you have understood the meaning and types of systems approach. Systems approach contains three major components they are:

- i. Systems analysis
- ii. Design of solution (synthesis)
- iii. Implementation and evaluation

### **3.4.1 Systems Analysis - Concept**

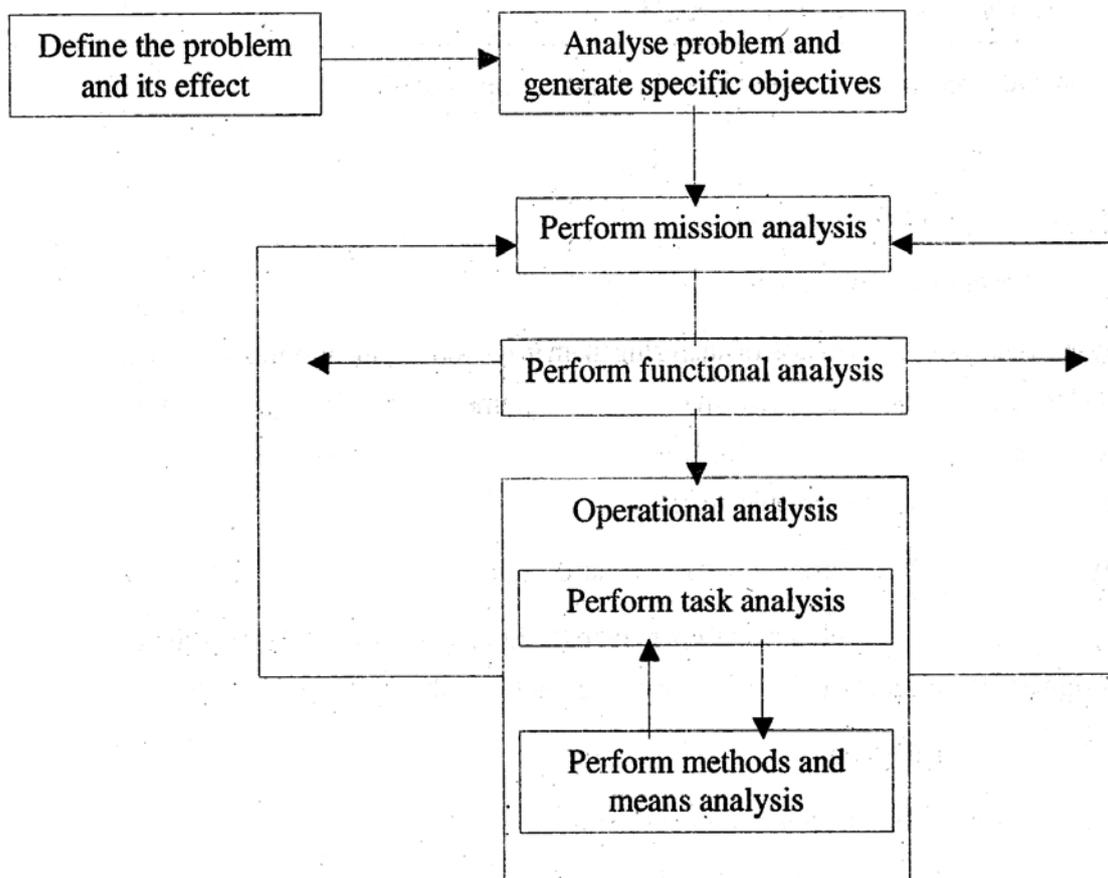
The needs of the systems, the resources available, and constraints present are analyzed in details on the basis of analysis the objectives were defined i.e., problem is stated in terms of objectives. This stage involved two steps (i) stating objectives, (ii) and determination of ends that are to be achieved system analysis answers two question (i) what is it? and what is required? so, here analyst forms the objectives, keeping in mind the constraints of environment, discusses interactions in the system and between the system and its environment describes, structures, functions, roles, identify constraints and out lines alternative courses of action.

### **3.4.2 Types of System Analysis**

There are three types system analysis. They are:

- i. Mission Analysis
- ii. Functional Analysis
- iii. Operational Analysis

Which is represented through the figure.



**Systems Analysis Flow-chart**

**'Check Your Progress' - 2**

1. What is System Analysis?

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2. What are the types of System Analysis?

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### **3.5 Steps in Systems Approach**

There are three major steps involved in a systems approach

- i. systems analysis
  - ii. system design and development
  - iii. systems operation and evaluation
- System analysis involves the task of analyzing them in the form of identifying its elements, organisation of elements, functions and performance of these elements, need for adjustment for achievement of objectives. These steps also involved the identification of environmental constituents which interfere in the attainment of system objectives.

By analyzing the problems the designer will formulate objectives specific to the particular system to achieve.

- System design and development step involves tasks of synthesizing. Here designer will attempt to design and develop strategies necessary for completing the first step i.e., systems analysis.

The main activities in the step

- i. Understanding different objectives of systems.
- ii. Solution of appropriate devices methods strategies and approaches for the achievement of objectives.
- iii. On the basis of these elements he prepares integrated action plan or designs the systems in terms of input, process (procedures and transactions within the system including decision and control mechanisms i.e., feedback) and output.
- iv. In order to improve the internal validity of the system, a number of feedbacks are used.

#### **‘Check Your Progress’ - 3**

1. Name three steps of Systems Approach.

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### **3.6 Applicability to Instructional Context**

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Systems approach is rational problem solving method of analyzing the educational process and making it more effective. It will take whole educational system components namely pupils teachers, curriculum context, instructional materials, instructional strategy, physical environment and evaluation.

The system approach to instruction is an integrated, programmed complex on instructional media hardware and personnel whose components are structured as a single unit with schedule of time and sequential phasing. In the instructional context teacher on instructor and resources made use of by him are included as a component of system. There is provision for continuous evaluation and self correction for realizing the stated objectives.

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### **3.7 Let Us Sum Up**

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As you know systems approach is a scientific method of problem solving decision making and planning. In accordance with the applicability systems approach has member of types, systems approach to economic, systems approach to industry, education, instruction, management etc.

Systems approach involves three components:

- i. Systems Analysis
- ii. design of solution of problem
- iii. implication and evaluation

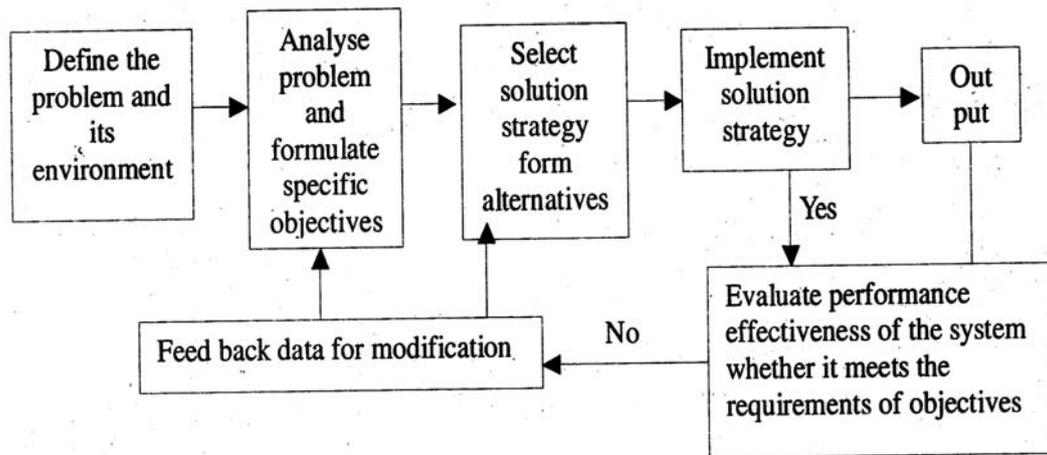
This step is concerned with system operation and its evaluation with respect to the stipulated objectives for providing necessary feedback to bring desirable improvement and modification of the system meet the requirements of the norms or objectives. If any kind of discrepancies arise between these two designers, you can use some ways to improve the system by using certain steps given below.

- i. By manipulation of elements, or making certain changes in inputs of the system.
- ii. And making certain modification in the functions like strategies, media method etc.
- iii. By making modifications in the process pail of the system, i.e., changing interaction styles in particular elements.
- iv. And also finding the constraints of the system in the environment.

These are the steps which may be restructured or reorganized for better functioning

of the system. This process of operation evaluation feedback modification, restructuring re-operation is continued till the aim to get best economic results in terms of stipulated objectives with greater precision and accuracy is not achieved.

Steps of the systems approach



Systems analysis means analyzing the systems in terms of its resources, needs, constraints and on the basis of this formulate objections. It involves three types of analysis.

- i. Analysis of mission - environment
- ii. Analysis of functions
- iii. Operational analysis which involve task analysis, methods and means analysis

Systems approach involve three steps

- i. Systems analysis
- ii. System design and development
- iii.. System operation of evaluation

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## 3.8 Answers to Check Your Progress

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### 'Check Your Progress' - 1

1. Systematic and scientific method of problem solving decision making and planning

### **‘Check Your Progress’ - 2**

1. Analysing needs resources constraints of the system in order to generate objectives.
2. Three types of analysis are:
  - i. Mission Analysis
  - ii. Functional Analysis
  - iii. Operational Analysis

### **‘Check Your Progress’ - 3**

1. Three steps of System Approaches are:
  - i. Systems Analysis
  - ii. System Design and Development
  - iii. Systems Operation and Evaluation

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## **3.9 Unit-End Exercises**

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1. What is systems approach?
2. Explain the types of systems approach.
3. What is systems analysis? Describe.
4. Draw a flow chart showing systems analysis
5. What are the steps involved in systems approach?
6. How Systems approach is applied to instruction? Explain.

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## **3.9 References**

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2. Mangal, S. K. (1992) *Fundamentals of Educational Technology*. Ludhiana, Prakash Brothers.
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## **UNIT - 4 □ INSTRUCTIONAL SYSTEM**

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### **Structure**

- 4.1 Introduction**
- 4.2 Objectives**
- 4.3 Concept of Instruction and Instructional System.**
- 4.4 Components of Instructional System**
- 4.5 Steps involved of Instructional System**
- 4.6 Let Us Sum Up**
- 4.7 Answers to ‘Check Your Progress’**
- 4.8 Unit-End Exercises**
- 4.9 References**

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### **4.1 Introduction**

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The word ‘instruction’ is explained in number of ways. So call it as guidelines given in a home regarding its working and some others take it as the directions given by an army commander to his subordinates. With reference the education instruction means all the experiences that organized in such a way that which brings expected learning among the students. Sometimes, we call ‘teaching as instruction’ but the teaching is some time used as narrow term, teaching may bring learning or may not, but instruction which always changes the behaviour of the students according to stipulated words, so educationists thinks that ‘instruction’ is the better word for bringing learning.

The present unit explains the various aspects of instruction and development of instructional system.

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### **4.2 Objectives**

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After the study of this unit, you will be able to:

- State the meaning of Instruction, instructional System;
- Interpret the concept of Instruction and Instructional System;
- Interpret the instructional System Units its components
- Enumerate the various stages involved in the System Approach to Instruction

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### 4.3 Concept of Instruction and Instructional System

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Sometimes instruction is also numbered among the family of activities related to teaching. But it is not the case because there are many instances of teaching which do not involve instruction. The concept of instruction involve a kind of conversation, the object which is to give reason, weigh evidence justify, explain conclude. So on and so forth. It is an activity, of teaching allied more closely to the acquisition of knowledge and belief. In brief we say instruction is closely related to just for understanding. The pursuit of truth is teaching because giving instruction is central to it. Instruction is essentially related to the search for truth.

So, instruction involves provision of controlled environment with which the individuals interact leading towards the attainment of certain pre-specified learning outcomes or instructional objectives.

Instructional system - the teacher or instructor and the resources used by him are included as components of a system there is provision for continuous evaluation and self correction for realizing stated objectives.

In instructional system teacher has to plan using available resources and classroom activities. According to individual differences in their learning capacities and plan accordingly. Robb (1974), analysing instructional systems said that each instructional system should be designed to include ten functions in proper balance. He decides these ten into three phases. They are planning, execution, and evaluation.

#### **'Check Your Progress' - 1**

1. What is Instruction ?

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2. Instruction System involves ...
  - i. Planning      ii. Planning execution
  - iii. Evaluation    iv. Planning, execution, evaluation

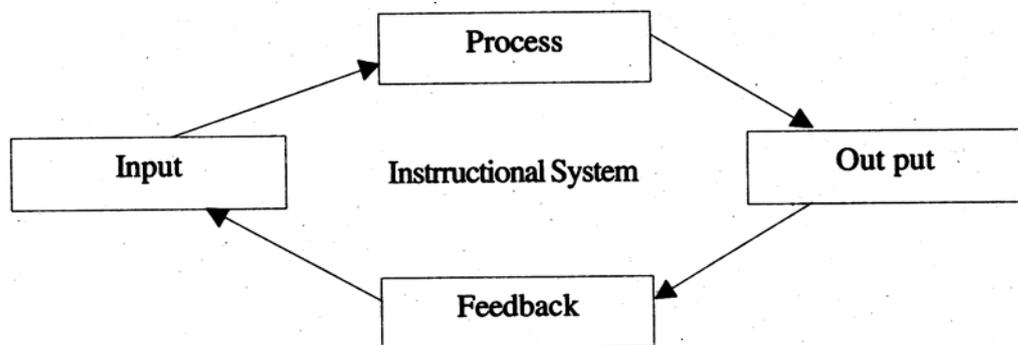
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## 4.4 Components of Instructional System

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Instructional system approach involves four main components, input, output, process and feedback.

- Inputs means, what is put into the system. If we consider, the instructional system, here teacher or instructor is asked to plan and organize the use of all learning resources including audio-visual aids to achieve desirable objectives. The planned input and process involve structural learning materials and methods suitably geared to the needs of the particular group of students.
- Output means what will be product that comes from the system - these are also called as explicitly stated standards of output performance including sequence behaviour objectives post test.
- Process means what goes on in a system. It means whatever input we put in system it will be processed by using some strategies media methods so expected output will come out.
- Feedback is used to revise, improve, evaluate, the instructional system, providing feedback to teachers and students by giving feedback some kind of control can be established for the system to work effectively and efficiently to achieve expected goals or objectives. The components of the systems shown in figure.



**Flow chart on Instructional System**

### **'Check Your Progress' - 2**

1. Components of instructional system
  - i) Input, output
  - ii) Input, process
  - iii) Process, output
  - iv) Input, process, output, feedback
2. Output means
  - i) Process
  - ii) Product
  - iii) Input
  - iv) Feedback

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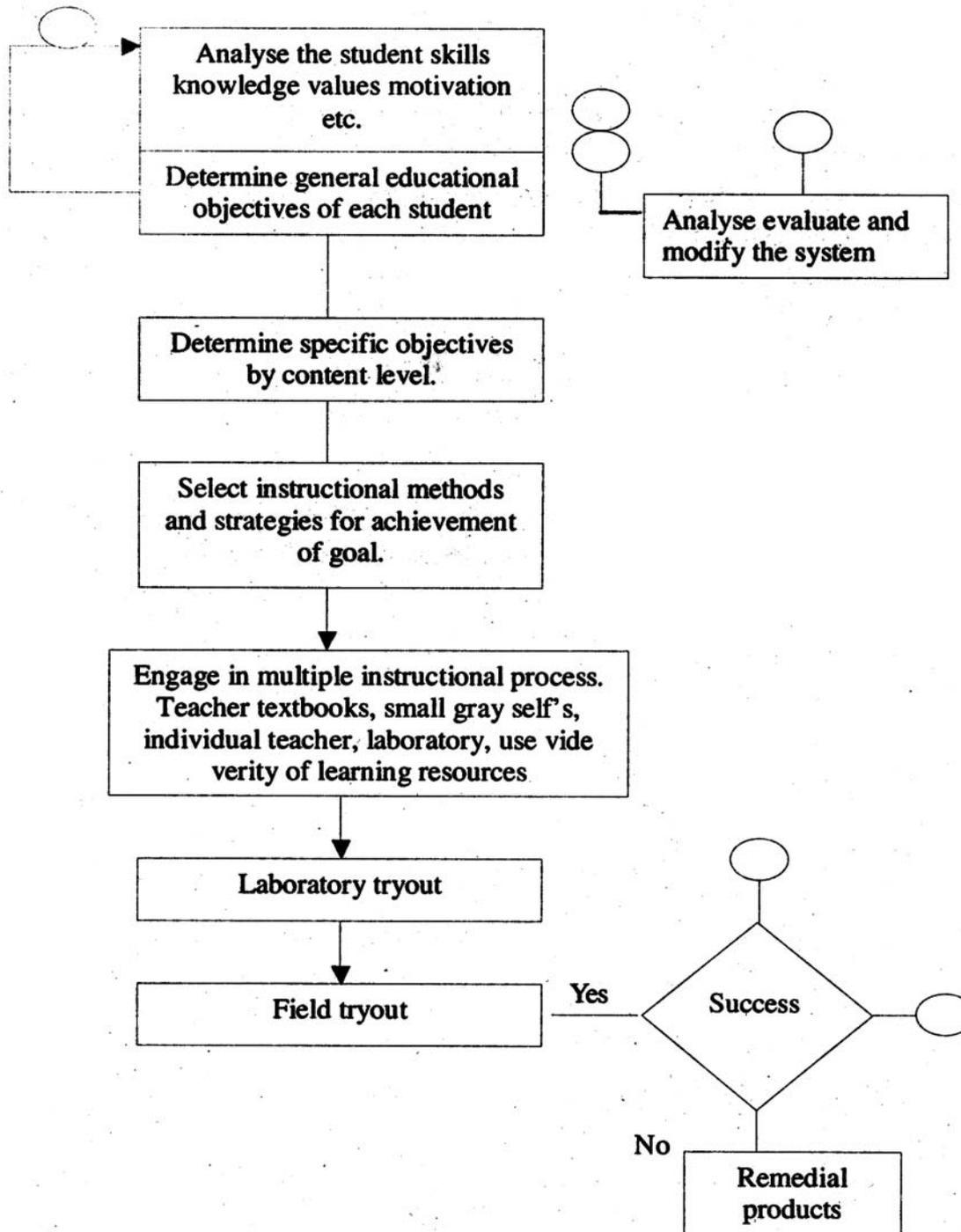
## 4.5 Steps involved in Instructional System

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The components of instructional system are “essential for the systems to achieve its objectives. There are steps which involved in the efficient and effectiveness of instructional system they are:

1. **Formulation of objectives:** In this step specify exactly what is to be taught and kinds of learning experiences students will be expected to undergone, and also identify what are expected outcomes.
2. **Pre assessment:** By using certain reference test as pre-test, define the entry level of students before entering to the learning environment. This is to know what the students have already learnt and what is to be taught.
3. Specify appropriate approaches and methods with respect to the context, nature of learner traits of the population instructor has to select strategies. So that maximizes optimum student learning and achievement objectives.
4. **Select materials and media:** As per the demands of the strategies and methods select material and media and develop learning experiences for students and provide them academic environment.
5. **Define / design personnel rules:** Identify students define the various roles of teachers and professionals involved in the instructional system and help the students achieve the pre-determined objectives.
6. **Laboratory tryout:** Now we have decided the components of the system and necessary materials. But how do we know that it would work? So, after the development of instructional system is ‘effective’ in terms of achievement of objectives - effectiveness of developed instructional system should be determined by testing phase in the development process of an instructional strategy. Thus the initial testing of system is called laboratory testing or laboratory tryout. Here, the sample was small, but it is representation of the population for which instructional system formed.
7. **Field tryout:** After small sample tryout or laboratory tryout the system is tried on a large sample we shift it to real field this called as field tryout. If any mistakes found they were rectified on the basis of this system is revised.
8. **Revision and outcome:** Revision takes us to the final form of the instructional system. However, after every implementation of the system, as per the information obtained from its functioning the system is modified this process is continuous process.

These steps were represented through flow chart.



**‘Check Your Progress’ - 3**

1. What is laboratory tryout?

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2. Inputs of System selected on the basis of .....

- i. students      ii. teachers      iii. Objectives      iv. output

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**4.6 Let Us Sum Up**

Instruction is a process which brings learning. Instructional system is application systems approach components, input process, output to the instruction to make effective and efficient of objectives.

Steps in the instructional system

- formulation of objectives
- pre-assessment
- specify appropriate approaches and methods
- select material and media
- define design - personnel rules
- laboratory tryout
- field tryout
- revision and outcome

---

**4.7 Answers to Check Your Progress**

**‘Check Your Progress’ - 1**

1. Instruction is a process which brings learning
2. Instructional system involve - planning, execution, evaluation.

**‘Check Your Progress’ - 2**

1. (iv) Input, process, output, feedback
2. (ii) Product

### **‘Check Your Progress’ - 3**

1. Laboratory tryout means the system is tried on small sample which is representative of the population
2. (iii) objectives

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## **4.8 References**

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## **UNIT - 5 □ ANALYSIS OF COURSE CONTEXT**

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### **Structure**

- 5.1 Introduction**
- 5.2 Objectives**
- 5.3 Analysis of the Course Content into Units**
- 5.4 Analysing the Course Content Units into Lessons of One Class  
Periods each**
- 5.5 Let Us Sum Up**
- 5.6 Answers to ‘Check Your Progress’**
- 5.7 Unit-End Exercises**
- 5.8 References**

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### **5.1 Introduction**

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The steps in planning course includes more than one topic and covers wider period involving weeks or months. Essentially, courses are to be designed to enable the students to achieve components. The competencies must be related to vocation or specific intellectual skill, attitudinal, or value oriented goals. One should ‘analyse’ such competencies or goals rather than just depend on textbooks course involve many units. They should be ‘analysed’ according to the stipulated objectives. Then from particular course the students will get the necessary knowledge, skills and develop favourable attitude towards them.

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### **5.2 Objectives**

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After studying this Unit you will be able to:

- to understand the course content into units.
- give reasons for analysing course content into units.
- analyse the courses into units.
- analyse the unit into lessons for one period

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### 5.3 Analysis of the Course Content into Units

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The course content analysis depends upon

- i. the instructional objectives of the particular course.
- ii. the competences and / or goals and needs of the students
- iii. their entry behaviour and their abilities and interests
- iv. instructional material available for the particular course
- v. the course is analysed by team of teachers
- vi. the course contents should be sequencing and time allocation to different topics
- vii. the weightages given to the different units they should decided in terms of their contribution to the over all objectives and not an availability of the classroom etc.,

Take for example the course is divided into two to four blocks these blocks again divided into units.

Steps in the analysis of the course content are:

- Title
- Target group
- Duration of the course
- Formation of objectives
- Specification of the course content - based on need analysis
- Classification the course content into blocks'
- Classification the blocks into number of units
- Reference books

Course content analysis example -

Title : A course in mathematics

Target group: B.Ed. students

Duration : 1 year

Objectives : After learning this course students will be able to

- i. understand the nature and scope of mathematics
- ii. identify principles of curriculum construction in mathematics and new trends in curriculum construction
- iii. from instructional objectives of teaching mathematics with its behavioural changes
- iv. know methods of teaching mathematics

- v. teacher-students will be able to use resources for teaching mathematics
- vi. teacher-students will understand the evaluation process in teaching mathematics

Course content is analysed according to the need analysis of the students:

- i. Intellectual development of the students
- ii. Emotional development of the students
- iii. Social development of the students
- iv. Physical development of the students
- v. Aesthetic and Spiritual development of the students
- vi. Spiritual development of the students

The course content is analysed into 6 blocks:

Block 1: Introduction to teaching of mathematics

Block 2: Curriculum in mathematics

Block 3: Instructional objectives in mathematics

Block 4: Methods of teaching mathematics

Block 5: Resources to teach mathematics

Block 6: Evaluation in mathematics

The blocks are again divided into number of units.

Block 1: Curriculum in mathematics

Unit - 1: Recent development in mathematics curriculum in India - objectives, content methodology.

Unit - 2: Revision in SMP - A review

Unit - 3: Revisions in Nuffield curriculum - A review

Unit - 4: Critical analysis of Karnataka secondary school mathematics curriculum- content selection, securing, approach.

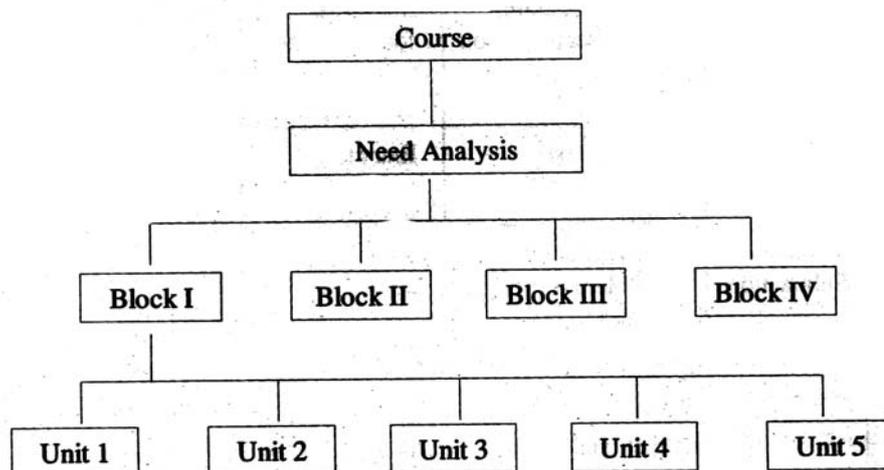
Unit - 5: Content analysis of mathematics curriculum of secondary school of Karnataka- 1.

- Commercial arithmetic
- Commercial mathematics
- Statistics

- Computer
- Algebra
- Geometry

Unit - 6: Content analysis mathematics curriculum of secondary schools of Karnataka-

- Conventional arithmetic
- Commercial mathematics
- Statistics
- Computers
- Algebra
- Geometry



**‘Check Your Progress’ - 1**

1. Course content is divided in to:
  - i. Blocks
  - ii. Units
  - iii. Lessons
  - iv. Paragraphs
2. Blocks were divided in to
  - i. lessons
  - ii. Paragraphs
  - iii. Units
  - iv. Sentences

**5.4 Analysing the Course Content Units into Lessons of One Class Period each**

We will now try to include in the lesson planning context - planning session or lesson includes 45 minutes duration usually in such a limited period you will be able

cover a topic or lesson. Now, see the steps involved in particular lesson, 'fraction'.

Topic - Fraction

Target group - VIII standard students

Entry behaviour - Students have studied the numbers and representation of numbers. Duration - 45 minutes

I	II	III	IV	V
Instructional	Teaching points	Methods during and offer the lesson	Materials focusing prior to during and offer lesson	Evaluation test (formative)
Statement see in Box 1	Function meaning - Types. - Addition Subtraction	- Entry test - Inductive deductive approach - Problems salving method	Entry test transferences Solved examples	Solve problem see in Box 2

<p>Box – 1</p> <p>Instructional objectives on the topic – Fraction</p> <p>i) students will be able to</p> <p>a) understand the meaning of fraction</p> <p>b) identify denominator, numerator</p> <p>c) classify the types of fractions</p> <p>d) understand addition of fractions</p> <p>e) understand subtraction of fractions</p>
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<p>Box – 2</p> <p>(i) Entry behaviour is measured the knowledge of students regarding numbers/facts about fraction</p> <p>(ii) This is oral test. revising the necessary information</p>
--

<p>Box – 3</p> <p>Post test</p> <p>i. Students were given problems and able them identify types of fractions.</p> <p>ii. Students were given addition of fraction, subtraction of fraction.</p>
---

A teacher of Mathematics or any other subject must plan. Similarly the objectives of teaching different subjects is completely varies also methods of teaching. Lesson plan is a blue print, it gives systematic steps for the teacher to form his lesson. It can be tried out on students and modifications may be made in materials and methodology

### **‘Check Your Progress’ - 2**

1. The components involved in plan are
  - i. 5    ii. 4    iii. 3    iv. 2    v. 6
2. Minimum time for achieving objectives of lesson in
  - i. 45 minutes    ii. 60 minutes    iii. 120 minutes    iv. 90 minutes

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## **5.5 Let Us Sum Up**

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You are aware that the course content analysis is the main task of the beginning of any new course. Here course is analysed according to the need analysis of the students and that is divided in to blocks and blocks are again divided into units.

Unit is a larger concept than the lesson, which includes number of lessons. These lessons are planned for 45 minutes duration which include 5 components - (i) statement of objectives, (ii) teaching points, (iii) methods, (iv) materials for using prior during and after the lesson, (v) evaluation test which is of formative type.

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## **5.6 Answers to ‘Check Your Progress’**

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### **‘Check Your Progress’s - 1**

1. Course content is divided into (i) blocks
2. Blocks were divided into (iii) units

### **‘Check Your Progress’ - 2**

1. The components involved in the lesson plan are (v) 5. (instructional objectives, teaching points, methods, materials, evaluation).
2. Minimum time for achievement of objectives of lesson is (i) 45 minutes

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## **5.7 Unit-End Exercises**

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1. What are steps of analysing course content?

2. What are components of lesson planning?
3. Prepare one lesson plan for period of 45 minutes.

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## **5.8 References**

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1. Dale, E. (1954) *Audio-visual Methods in Teaching*. New York: Holt Rinehart and Winston.
2. Kulkarni, S. S. (1986) *Introduction to Educational Technology*. Bombay, Oxford and IBH, Publishing Company.
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## **UNIT - 6 □ ANALYSIS OF UNIT CONTENT**

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### **Structure**

- 6.1 Introduction**
- 6.2 Objectives**
- 6.3 Content Analysis - Meaning, Importance**
- 6.4 Analysing the Content (Viz. into Facts, Concepts, Generalization etc.,)**
- 6.5 Sequencing the Analyzed Elements - Maxims of Teaching**
- 6.6 Let Us Sum-Up**
- 6.7 Answers to ‘Check Your Progress’**
- 6.8 Unit-End Exercises**
- 6.9 References**

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### **6.1 Introduction**

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The curriculum of the formal education has specific function to do that is arranging content. So that desired goals and objectives are most effectively achieved. The main task curriculum development is to determine what to teach, from the growing knowledge in the subject area and then organise it into logical sequences to serve all learners. Poor organisation and selection of objectives lead to disorganized educational effort. So it is very important for an educator to give attention to the content analysis with reference to objectives and nature of subject matter and sequential development of course.

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### **6.2 Objectives**

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After learning this unit, you will be able to:

- Explain the meaning and importance of Content Analysis
- Organise the content into facts, concepts and generalizations.
- Sequence elements according to maxims of Teaching

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### **6.3 Content Analysis - Meaning and Importance**

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As we see in the introduction, content is necessary for the curriculum planners, because without content the teaching-learning process will not get the idea of how to

teach and what to teach. So now we shall study the meaning of the content.

Saylor and Alexander define: “Content is those facts, observations, data, perceptions, discernments, sensibilities, designs and solutions drawn from what the minds of men have comprehended from experience and those constructs of the mind that reorganize and rearrange these products of experiences into lore, ideas concepts, generalizations, principles, plans and solutions”.

Hyman (1973) defined content as knowledge (i.e., facts explanations, principles, definitions, skills and process (i.e., reading, writing, calculating, dancing, critical thinking, decision making, communicating) and values (i.e., the beliefs, about matters concerned with good and bad, right and wrong, beautiful and ugly)”.

Curriculum content involves three elements identified above. Thus it is necessary include these elements - knowledge, process and value. But we restrict the meaning of ‘content’ as substantive information, ideas, concepts, generalizations principles and the like.

The object of content analysis is to measure the content by classifying it in terms of defined criteria which could relate to many qualities, subject matter, pedagogy, suggested, underlying value system, and so on.

Content analysis means classifying the content according to the objectives, structure and nature of the subject. So that sequential arrangement or organized development of subject matter is possible, this will lead to learning among the students.

The importance of content analysis is that

- The teacher can form definite objectives to be achieved in the course.
- The teacher can organise the content systematically logically and psychologically.
- The teacher can put all the bits of information in meaningful manner.
- If teacher gives organised information the students will get better understanding of the content.
- Content analysis will give the idea to relate different facts, generalizations and concepts.
- Sequencing of the content will lead the students to attend and take interest in particular subject.
- Teaching will become more interesting and arousing motivation in students to learn.
- Students will engage in the activities of the class.

### **‘Check Your Progress’ - 1**

1. Content analysis means.....
  - i. Classification
  - ii. Discrimination
  - iii. Organization
  - iv. Accumulation
2. Content analysis leads the teacher
  - i. to teach monotonously
  - ii. to give more organized information
  - iii. not to take interest in teaching
  - iv. give information in illogical order

---

## **6.4 Analysing the Content (Viz. into Facts, Concepts, Generalization etc.,)**

---

In a well structured and sequenced course, the learner is in a better position to understand and comprehend the lesson and determines the related parts of the subject. So, teacher has to organise the content thoroughly for this one should understand the analysis of the content. It involves three major components, facts, concepts, and generalizations.

Facts are the components of content analysis. It is not easy to define in concrete terms. Paul D. Eggen, defines fact as the types of content which singular occurrence, which have occurred in the past or exist in present and they are not predictions acquired solely through process of direct observation of the event. For example, experiments in laboratory, getting information from the reliable sources or primary sources from dictionaries, encyclopedias, etc., so these can be analysed while, analysing the content ex. Newton’s laws of motion, equations of motion.

### **Concepts**

Concepts are the norms given to the categories formed as a result of classifying factual data. Concepts are the norms given in order to make sense of various stimuli in the world. Concepts involve certain attributes that are giving to make concept meaningful. In order to analyse the concept learns pay attention to likeliness, ignore differences, and place similar objects in the some categories. So, identification of attributes is main aim in identifying the concepts.

Generalizations are students, that generally link two or more concepts are known as generalizations these generalizations are predictive in character and involve more than one element. They are dependent upon the proofs by providing dimension to simple

facts because of that they need additional data to prove the accuracy. For example, if we make two situations, one is that the teacher teaches more interestingly, another situation teacher will not teach interestingly. These two generalizations need more data to weigh their accuracy these two situations are predictions, and they need proof because teaching involved many elements.

So, facts, concepts and generalizations make up larger part of content. So teacher has to sequence and organise in effective manner. Then teaching becomes more systematic and planned.

### **‘Check Your Progress’ - 2**

- I . The major components of the content analysis.
  - i. Concepts
  - ii. Generalizations
  - iii. Facts
  - iv. Facts concept generalizations
2. Fact is based on
  - i. indirect observation
  - ii. direct observation
  - iii. Thinking
  - iv. Generalizing things

---

## **6.5 Sequencing the Analysed Elements - Maxims of Teaching**

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You may note that content analysis involves three major components, that are facts, concept and generalizations. They take larger part of the content of the instruction. Once the teacher analysed these he/she must ask some questions while sequencing and selecting and organising the content of instruction.

- a) What are the facts which are most relevant and accurate?
- b) Which concepts are familiar to students and which need to be explained?
- c) How do students make generalizations or predict the things into generalizations?

It is not analysis of the content is that important but, it is also most important how to organise and present. According, to Ausubel’s theory, learning begins with simplest idea and develops greater specificity. So sequencing is putting the elements facts concepts generalization analysed arranging contents or arranging the content in orderly manner, orderly means so subjects arranged chronologically or thematically when planning instruction or make it mere effective sequencing must be clone according to the maxims of teaching. Maxims - of teaching are those which will make the instruction by arranging

the content according to them. Maxims of arranging the facts concepts and generalization from (i) simple to complex and (ii) known facts into unknown facts, (iii) examples to generalization, (iv) concrete to abstract, (v) definite to indefinite etc., with this inter disciplinary approach must be used which means the facts and concepts, generalizations were integrated into different field of studies. HildaTaba (1962) said that “it is recognised that learning is more effective when the facts and principles from one filed can re related to another, especially when applying this knowledge. While using foster disciplinary approach teacher must use correlation approach.

**‘Check Your Progress’- 3**

1. Sequencing of content means.....
  - i. facts generalization concepts in orderly manner
  - ii. not arranging orderly
  - iii. keeping facts one by one
  - iv. writing content step wise
2. Give two examples of maxims of sequencing content

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**6.6 Let Us Sum Up**

The content of curriculum of the formal educations has specific functions. To achieve the objectives of the education, the teacher has to organise the content logically and systematically. The teacher’s most effective work is to organise the content. If he wants to organize, he must make content analysis which gives him idea to organise his content and make his teaching effective and efficient. The object of content analysis means classifying the content by classifying with respect to objectives structure and nature of the discipline.

Content analysis involves three major components namely are facts, concepts and generalizations. A teacher has to analyse the content in to facts, concepts generalizations. After analysing the content, it is teachers’ responsibility to proper sequencing of the content which is most important task of teacher. Sequencing of content has done using maxims of teaching known to unknown, simple to complex.

All these steps give systematic perspective about the arranging organising subject (content) and make his teaching effective.

---

## 6.7 Answers to ‘Check Your Progress’

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### ‘Check Your Progress’ - 1

1. (i) classification of elements
2. (ii) to give more organised information

### ‘Check Your Progress’ - 2

1. facts, concepts, generalizations
2. (ii) direct observation

### ‘Check Your Progress’ - 3

1. (i) Arranging facts, concepts generalizations in orderly manner
2. “simple to complex, known to unknown”

---

## 6.8 Unit-End Exercises

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1. Define content analysis. Give two examples of content analysis.
2. What are the major components of content analysis?
3. What is the meaning of concepts generalization? Give examples.
4. How do you sequence the content using maxims of teaching?
5. Take a topic on your choice and analyse content into facts, concepts, generalizations.

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**COMPULSORY COURSE 04 (CC-04)  
TECHNOLOGY OF TEACHING**

**BLOCK 02  
WRITING INSTRUCTIONAL OBJECTIVES**



# **B.Ed. CC-04 : TECHNOLOGY OF TEACHING**

## **Block**

## **2**

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## **BLOCK 02 : WRITING INSTRUCTIONAL OBJECTIVES**

### **INTRODUCTION**

Teaching is a meaningful, purposive and goal-directed activity. Hence, teaching pre-supposes certain goals. Without specific goals and purposes teaching may turn it to a useless, purpose activity. Hence, before embarking to teach a group of students, a teacher should ask himself some questions like. Why am I doing this activity of teaching? To whom I am teaching? With what purposes am I teaching? What changes do I expect in students? What do I expect from a student? What does the teaching-learning process offer? What content has to be taught? These questions relate to deciding. In education, these goals of teaching or instruction are termed as Instructional objectives.

Why do teachers need Instructional objectives? Because Instructional Objectives fix the goal towards which the instructional process to be directed. They help the teacher in planning his teaching which includes assessing the background of learning selection confident decoding about teaching strategies, selections and providing appropriate learning experiences to students. Instructional objectives also help teachers to evaluate these students achievement in hearing and to evaluate the degree of effectiveness of their teaching. These objectives provide feedback to students to assess as to what extent they have learnt. Hence formulating instructional objectives is a very essential stage of planning teaching learning activities.

This Block consists of six Units. In **Unit-7** the general aims and objectives are explained. These general aims and objectives have to be formulated in specific terms depending upon the content to be taught. Such objectives are known as Instructional Objectives. These are explained in **Unit-8**. In **Unit-9** and **Unit-10** you will study about the classification of Instructional Objectives.

Writing Instructional Objectives is an important skill which every teacher should possess. Objectives must be formulated in specific and concrete terms. In **Unit-11** you learn about the formulation of instructional objectives.



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## **UNIT - 7   □   AIMS AND OBJECTIVES OF EDUCATION**

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### **Structure**

- 7.1 Introduction**
- 7.2 Objectives**
- 7.3 General Aims / Goals of Education**
- 7.4 General Objectives of a Subject / Course**
- 7.5 Goals/General Aims of Education, General Objectives of Teaching a Subject/ Course-Relationship**
- 7.6 Introduction to Terminology**
  - 7.6.1 Aims and Objectives**
  - 7.6.2 General Aim and Specific Aim**
  - 7.6.3 Long Range Objective and Short Range Objectives.**
  - 7.6.4 Instructional Objective and Specification (as used by Bloom *et al.*)**
  - 7.6.5 Learning Outcomes, Anticipated Learning Outcome, Terminal Behaviour**
- 7.7 Let Us Sum-Up**
- 7.8 Answers to ‘Check Your Progress’**
- 7.9 Unit-End Exercises**
- 7.10 References**

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### **7.1 Introduction**

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Behind every man’s achievement there is definite target. The target needs to be achieved with full efforts. So, Vivekananda great saint of India encouraged our young generation by his words awake, arise, stop not till the goal is reached. These words, brought the message that every person should have some goals, or objectives to achieve. By attaining those goals and objectives he / she will become model to others. Likewise in education also, the students should have certain goals to achieve. Those goals may be achieved in one class, or one day or it may take more time through education only

national and international aims could be achieved. The process of education has certain aims and objectives because teaching-learning act aims that every teacher must be aware of terms, goals, aims and objectives. So, that the teacher can accomplish the task successfully and give direction to the activity.

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## 7.2 Objectives

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After studying this Unit, you will able to:

- State the goals/aims of education;
- Understand the general aims of teaching a subject/of education course;
- Establish relation between general aims, general objectives of subject/course;
- Explain meaning terms, aims, and objectives;
- Differentiate between general aims and specific aim;
- Perceive long range objectives and short range objectives; and
- Analyse the specifications of each objective.

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## 7.3 General Aims / Goals of Education

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Education is necessary for every human being and survival of the society. What is it that the education should be trying to do? What are its goals, aims and objectives? Without determining the aims of education it is not possible to plan the curriculum and the methods of imparting the education. Goals / aims are defined in very general, broad and abstract terms expressing noblest aspirations of man, society nation and the world. They give the vision and direction pointing to an end to be achieved. They act like traffic lights along the highway of education giving all clear signals for strategies conducted and reduce deviations.

With explosion of knowledge, the rise of new science and technology, the content and extent of education has become more complex. In this context, goals / aims eliminate the non-essentials and accidentals, and identify priorities and make the people to achieve those goals/aims.

They are useful in stating purposes of education and curriculum, in expressing the philosophy or point of view underlying the curriculum in communicating with lay persons, in identifying priorities, and in education structure, administration planning programming methods, aids techniques research.

Goals are yardsticks of measurement against which programme can be evaluated,

renewed, revised and recreated. Goals have permanence of values, so educators must cultivate the spirit goals, which make all those involved with the educational system conscious of the importance of working within their, specified area.

**Here are some representative goal statements.**

- To develop wholesome self-concept.
- To develop critical thinking and decision making process
- To develop vocational skills so that each student can find a place in the world of work.
- To develop an appreciation of the arts and ways in which they enrich life.
- To develop ethical attitudes and behaviour based on a sense of moral and spiritual values.
- To develop an understanding and appreciation of the values, goals, and processes of a democratic living.

**‘Check Your Progress’ -1**

1. Goals are defined in ..... items
  - a. Specific/small
  - b. general broad
  - c. flourish/vague
  - d. good/general
2. Give two goals of Education

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**7.4 General objectives of teaching a subject/course**

General objectives are combination of specific objectives. By achieving several specific objectives we achieve more general objective, which in turn contributes to the accomplishment of a still more general objective. Such general objectives may be hoped to achieve ultimate goals of the entire educational programme. For example:

As a result of schooling, the students will be good citizens; think clearly and rationally; use their leisure time worthily, develop healthier life; earn a good living at

their vocations; appreciate beauty in art; nature and the community.

Such objectives are called as general objectives which will change according to the subject/course or disciplines.

Examples of general objectives of particular subject/course of cognitive domain.

- **Knowledge**

1. Knows common terms of the subject
2. Knows specific facts of the subject
3. Knows methods and procedures to deal with subject
4. Knows basic concepts
5. Knows principles

- **Understanding**

1. Understands facts and principles
2. Interprets verbal materials
3. Interprets charts and graphs
4. Translates verbal material to mathematical formula.
5. Estimates consequences implied in data.
6. Justifies methods and procedures.

- **Application**

1. Applies theories to practical situations
2. Applies principled to new situations
3. Solves mathematical problems
4. Constructs charts and graphs
5. Demonstrate correct use of a procedure

- **Analysis**

1. Recognizes unstated assumptions
2. Recognizes logical fallacies in reasoning
3. Distinguishes between facts and inferences
4. Evaluates the relevance of data
5. Analyses the organizational structure of a work (Art, Music, Writing)

- **Synthesis**

1. Writes a well-organised theme
2. Gives well organised speech
3. Writes creative short story or poem
4. Proposes plan for an experiment

5. Integrates learning from different areas, into a plan for solving problems
6. Formulates new scheme for classifying objective

- **Evaluation**

1. Judges the consistency of written material
2. Judges the adequacy with which conclusions are supported by data

**‘Check Your Progress’- 2**

1. General objectives of subject/course achieved by.....
  - a. Instructional objectives                      b. subject/course
  - c. Closed objectives                              d. aims
2. Write two general objectives of cognitive domain objective of Bloom

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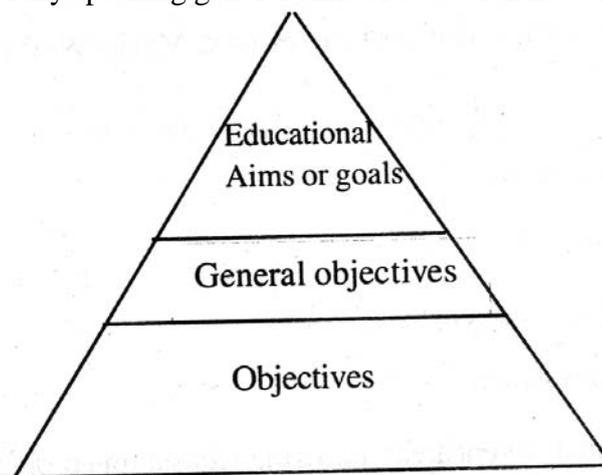
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**7.5 Goals/General Aims of Education, General Objectives of Teaching a Subject/Course-Relationship**

General aims of education can be achieved through general objectives of teaching/subject course. Generally speaking general aims of education have broad purposes and



**Fig. 1 : Hierarchal order of objectives**

they always usually serve the general purposes of education. ex. Development of democratic citizenship. Vocational efficiency, national integration, secularism, etc. are some of the general aims of education. They are made to serve the individual society. They differ from nation to nation and society to society.

General aims of education help in proper development of the cognitive and affective domains of lesson being through general theme of education and long term planning.

Infact educational aims general objectives and teaching-learning objectives represent the hierarchical order shown above fig.1.

The general objectives of teaching are the medium between broad undefinable statements or long range aims. And un manageable lists of specific types behavioural objective.

When developing a list of general objectives for a course our aim is to obtain list of aims of education to work to word and not specific types of behaviour to be attained by all students.

Each general objective will needs to be defined further by a sample of specific types of behaviour that characterize each objective.

The following verbs were used in the stating general objectives.

1. Applies
2. Comprehends
3. Knows
4. Understands
5. Uses

These will give desired level of generality for our major objectives.

In order to define general objectives, some of the suggestions are given below.

1. Begin each general objective with a verb (knows, understands, appreciates etc.)
2. State each objective in terms of student performance (rather than teacher performance)
3. State each objective as learning product
4. State each objective so that it indicates terminal behaviour
5. State each objective so that it includes only one general learning one come (rather combination of several objectives)
6. State each objective at proper level of generality, that is, at a level of generality that clearly indicates the expected learning out come and that is readily definable by specific types of student behaviour

### **'Check Your Progress' - 3**

1. General aims of education have achieved through
  - a. general objectives
  - b. specific objectives

- c. short term objectives d, long term objectives
2. Begin general objectives with verb.....
- a. knows b. converts c. computes d. identifies

## 7.6 Introduction To Terminology

### 7.6.1 Aims and Objectives

Aims are broad and general expressions purposes, or desired out comes. They are useful in stating the purposes of education and purpose of an area of the curriculum in expressing the philosophy or point of view underlying the curriculum in communicating with lay persons, in identifying priorities, and in policy planning related to the allocation of resources to various components of the educational program. These statements assist the teacher in communicating program which aims to portents, administrates, and students and conceptualizing desired out comes for the year.

Objectives are statements of specific outcomes of instruction, they are indicative of desired student behaviour or performance. They are related to aims but their specificity is needed to plan and evaluate instruction a function not served by aims.

#### Differences between Aims/Objectives

Aims	Objectives
1. Directions in education without which education cannot progress in a desirable direction	1. It is point sharing the possible achievement in that direction
2. Achievement of aims is beyond the scope of the schedule programme	2. Objective can be achieved in short time.
3. Aims of education cannot change from subject to subject	3. Objectives changed from subject to subject.
4. The attainment of objectives takes us to achievement of aims	4. Objectives originate from aims
5. They line broad and avoid not help in selecting content of subject	5. Objectives do help in this regard and not only that but they also help the classroom teacher.
6. They are meaning has to classroom teacher	6. While objectives being specific become meaningful to teacher

### 7.6.2 General Aim and Specific Aim

General aims are combination of specific aims. By achieving several specific aims we achieve more general aim. General aim is a direction in education. Specific aim is the specifically learning outcomes which will help the classroom teacher to plan his instructional to achieve specific aim.

### 7.6.3 Long Range Objectives and Short Range Objectives

- Long-range objectives are related directly to goals and they are used to check progress at the end of a unit. Goals could relate to course, school year, or designated level of instruction or performance. For example, by the end of the year, 90 percent of all students will write the 100 words spellings with 100 percent accuracy.
- Short range objectives are derived from long range instructional objectives and are designated as short range objectives which are going to guide short range instruction. For example, students will write from memory the correct 10 spellings accurately.

### 7.6.4 Instructional Objectives and Specification (as used by Bloom *et al.*)

Instructional objectives are behavioural statements of standards or norms that students are regularly expected to meet. Specification is desirable specific learning outcome starts with verb that indicates observable behaviour and which is stated before the students undergo learning experience. Specification determines the limits of the scope of each instructional objective.

Bloom, et al. classified the instructional objectives into three domains. They are cognitive, affective and psychomotor domain. According to Bloom, the instructional objectives include knowledge, comprehension, application, analysis, synthesis and evaluation. He has stated specification for each objective which is given below in table 7.1

**Table-7.1: Objectives and Specifications**

<b>Objectives</b>	<b>Specification Specific learning outcomes</b>
1 Knowledge	1. Recall 2. Recognize
2 Comprehension	1. See relationship 2. Cite example 3. Discriminate

Objectives	Specification Specific learning outcomes
	4. Classify 5. Verify 6. Generalize
3 Application	1. Reason 2. Formulate 3. Establish 4. Infer 5. Predict
4 Analysis	analysis
5 Synthesis	Synthesis
6 Evaluation	Evaluate

### 7.6.5 Learning Outcome, Anticipated Learning Outcome, Terminal Behaviour

Learning out come, means, every statement of an objective should describe the kind of change or growth expected in each child when the objectives are realized. We call it as learning out come, which is expressed in terms of change in behaviour.

The anticipated learning out come is derived observable behaviour that occurs earlier in time than the terminal behaviour i.e., it becomes the entering or prerequisite behaviour for the terminal behaviour. Just as addition to multiplication.

Terminal behaviour is a desired outcome of learning experiences expressed in terms of the observable behaviour of learner. According to Magar (1962) "It is description of a pattern of behaviour we want the learner to be able to demonstrate.

It is overt and is recognizable at the end of a specified time. Output objectives and task descriptions are other terms used synonymously in meaning by writers like Gagne (1965).

#### **'Check Your Progress' - 4**

1. Define aims.

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## 2. Define objectives

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### **7.7 Let Us Sum Up**

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“Education is essential for every human being for the individual progress and as well as society. So goals/ aims and objectives really provide directions to plan curriculum for particular education. Goals/aims are broad and are called traffic lights along the high way of education in order to reduce deviations. General objectives are combination of specific objectives. By achieving several specific objectives we achieve more general objective.

The general objectives of teaching are the medium between broad indefinable statements or long range Aims and unmanageable specific objectives. Aims are broad and general expressions purposes; they are useful for stating purposes of education. Objectives are statement of specific outcomes of instruction. They are indicators of desired student behaviour.

Long range objects are directly related to goal but short range objectives are derived from long range objectives which guide the instruction. Instructional objectives are behavioural statements of standards or norms that students are expected to meet. Specification is observable behaviour which is stated before the students undergo learning experience that limits the scope of each instructional objective.

Learning outcome is statement which describes the kind of change in behaviour Terminal behaviour after undergoing learning experience the change in behaviour is terminal behaviour. It is overt and observable.

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### **7.8 Answers to ‘Check Your Progress’**

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#### **‘Check Your Progress’- 1**

1. (b) General broad
2. Two goals of Education are
  - i. To develop whole some self concept
  - ii. To develop ethical attitudes and behaviour based on a sense of moral and spiritual value.

### **‘Check Your Progress’ - 2**

1. (a) instructional objectives
2. i. Applies, ii. Understands

### **‘Check Your Progress’ - 3**

1. (a) General Objectives
2. (a) Knows,

### **‘Check Your Progress’ - 4**

1. Aims are broad and expressed in General terms they give direction to education.
2. Objectives specific behavioural statements that students are regularly expected to meet.

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## **7.9 Unit-End Exercises**

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1. Define goals of education and give two examples
2. Explain the differences between the following briefly:
  - i. Aims and Objectives
  - ii. Long range objectives and short range objectives
  - iii. Anticipated learning outcome and Terminal behaviour
3. What is an Instructional Objective? Explain specification.

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## **UNIT - 8 □ INSTRUCTIONAL OBJECTIVES**

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### **Structure**

- 8.1 Introduction**
- 8.2 Objectives**
- 8.3 Meaning of Instructional Objectives**
  - 8.3.1 General Instructional Objectives**
  - 8.3.2 Instructional Objectives of a Unit**
  - 8.3.3 Instructional Objectives of a Lesson (of one class period)**
- 8.4 Need and Importance of Instructional Objectives**
- 8.5 Relationship between General Objectives of a Teaching Subject, Instructional Objectives of Teaching a Unit and a Lesson**
- 8.6 Let Us Sum-Up**
- 8.7 Answers to ‘Check Your Progress’**
- 8.8 Unit-End Exercises**
- 8.9 References**

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### **8.1 Introduction**

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If we think instruction is a simple task, it may be possible to list all the types of behaviour directly and to include them all in evaluation of student performance. At the end of instruction, this is characteristic of the teaching-learning process at the training level. For higher levels of instruction, however, it-is possible to list only sample of the specific types of behaviour which representative of instructional objectives and these guide teaching learning process and testing. But instruction is not only depends on small sample of behaviour it includes larger domain of behaviour.

So learning outcomes in higher level should have two step-process.

1. To state the instructional objectives as general learning out comes.
2. To list under each object specific sample of behaviour which is an indicator of the attainment of objective.

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## 8.2 Objectives

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After studying this Unit you will be able to

- Explain the meaning of instructional objectives
- Describe instructional objectives for a Unit
- Mention instructional objectives for a Lesson
- Bring out the need and importance of instructional objectives
- Find out relationship between general instructional objectives and instructional objectives of a unit and a lesson

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## 8.3 Meaning of Instructional Objectives

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Instructional objectives are statements of specific outcomes of instruction that intend to bring out desired behaviour or performance among the students. They are related to goals but their specificity is needed to plan and evaluate instruction.

### 8.3.1 General Instructional Objectives

The first step in defining instructional objectives is to state the general learning outcomes we expect from our teaching. While writing general objectives the following points are to be kept in mind.

- a. Begin each general instructional objective with a verb. (knows, understands, appreciates, etc.) (For example, students apply the knowledge of motion to day to day life situation)
- b. State each objective in terms of student performance.
- c. State each objective as learning product
- d. State the objective so that it includes only one general learning outcome.
- e. State each objective so that it indicates terminal behaviour
- f. State each objective at the proper level of generality. It should indicate the expected learning outcome and is readily definable by specific types of student behaviour.

### 8.3.2 Instructional Objectives of a Unit

Motion and its Types, Equations, Newton's Laws of Motion

- i. Student understands the concept of motion.

- ii. Student knows the types of motion.
- iii. Student understands the equations of motion.
- iv. Student applies the knowledge of motion to day-to-day life situations.
- v. Student knows the types of motion in day-to-day life.
- vi. Student understands the Newton's first law of motion.
- vii. Student analyse first law of motion in day to day activities
- viii. Student understands the Newton second law of motion.
- x i Student interprets the second law of motion.
- x. Student understands the Newton third law of motion.
- xi. Student appreciates the use of third law motion in launching satellites.

### **8.3.3 Instructional Objectives of a Lesson (of one class period)**

Motion and Types of Motion

- a. Students recall the definition of motion.
- b. Students recognise the types of motion, rotation, circulation, straight motion.
- c. Students classify the examples of motion according to their types.
- d. Students explain rotation with examples.
- e. Students explain oscillation with examples.
- f. Students find difference between the types of motion.

#### **'Check Your Progress' -1**

1. The verbs used in writing general objectives are
  - a. Knows      b. Identifies      c. classifies      d. recalls
2. The verbs used for stating instructional objectives for one Lesson.
  - a. Recalls      b. Knows      c. Understands      d. Applies.

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## **8.4 Need and Importance of Instructional Objectives**

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Objectives are the starting points of all the educational ventures. They are statements which express scenically and in 'measurable term' an attitude that will be developed or it may be cognitive or it may be psycho-motor. Skills that students would be able to demonstrate after providing specific treatment, method or mode of instruction.

Instructional objectives give directions for the teacher to organise learning

experiences. They give directions to evaluation the learning experience provided to students. Psychology is the basis of instructional objectives. Instructional objectives are very specific which bring desirable change among the students.

They are beginning steps for educational objectives.

The teacher's work becomes more systematic in teaching and evaluation of students. So instructional objectives are inevitable for the teachers as educationists without these the will be blind planners in education ventures.

1. Objectives worth pursuing can be more distinguished from those not worth pursuing when specific outcomes are indicated.
2. Teachable and learning elements related to goals can be identified and arranged in instructional sequences.
3. Individual needs of students and special needs of groups of students can be identified, planned for and evaluated more effectively.
4. Learning activities and instructional materials can be selected and used to attain clearly defined out comes.
5. Evaluation of outcomes of instruction can be improved because observable behaviour or a product of behaviour is specified.
6. Desired outcomes of instruction can be communicated more effectively to students and to parents.
7. The operation of accountability programs can be improved because clearly defined objectives are specified, and
8. Policy making can be facilitated because more adequate data on educational needs and the strengths and weaknesses of instruction are provided. Instructional objectives should be viewed as tools that are useful in improving teaching and learning process. Not as a set of arbitrary and rigid requirements that hinder creative teaching and learning.

**'Check Your Progress' - 2**

1. State the importance of instructional objectives.

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## **8.5 Relationship between General Objectives of a Teaching Subject, Instructional Objectives of Teaching a Unit and a Lesson**

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Instructional objectives of teaching a unit or lesson demands clear element of general objectives of teaching subject in terms of general learning outcomes by using terms knows, understands, applies, appreciates, and thinkers. Instructional objectives of teaching a lesson are specific learning act without which general objective are fuzzy notion of learning outcomes.

For example, general objectives of teaching subject know specific facts about Indian History Instructional objectives of lesson.

- i. **Identifies** important dates, places and persons.
- ii. **Describes** the characteristics of a given historical period.
- iii. **Lists** important events in chronological order.
- iv. **Relates** events to their most probable causes.

So these verbs, identifies, describes, Lists, Relates, describe the specific instructional objectives which exhibit evidence that students has achieved general objectives knows specific facts.

### **‘Check Your Progress’ - 3**

1. Give one example of your choice about general objective and instructional objectives of lesson.

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## **8.6 Let Us Sum Up**

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Instructional objectives are statements of a specific outcome of instruction. They are the indicators of student’s desired behaviour or performance. They are related to goals. But their specificity needed to plan and evaluate instruction. Instructional objectives must be initially stated in general objectives and next with specific behaviour objectives.

### **Importance of Instructional Objectives.**

1. Objectives worth pursuing scan be more distinguished from those not worth pursuing when specific outcomes are indicated.

2. Teachable and learning elements related to goals can be identified and arranged in instructional sequences.
3. Individual needs of students and special needs of groups of students can be identified, planned for and evaluated more effectively.
4. Learning activities and instructional materials can be selected and used to attain clearly defined outcomes.
5. Evaluation of outcomes of instruction can be improved because observable behaviour, or a product of behaviour is specified.
6. Desired outcomes of instruction can be communicated more effectively to students and to parents.
7. The operation of accountability programs can be improved because clearly defined objectives are specified, and
8. Policy planning and decision-making can be facilitated because more adequate data on educational needs and the strengths and weaknesses of instruction are provided. Instructional objectives should be viewed as tools that are useful in improving teaching and learning process. Not as a set of arbitrary and rigid requirements that hinder creative teaching and learning.

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## **8.7 Answers to ‘Check Your Progress’**

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### **‘Check Your Progress’- I**

1. (a) Knows
2. (a) Recalls

### **‘Check Your Progress’ - 2**

1. The two important instructional objectives are:
  - Learning activities and instructional materials can be selected and used to attain clearly defined outcomes.
  - Evaluation of outcomes of instruction can be improved.

### **‘Check Your Progress’ - 3**

1. General instructional objectives of unit.  
The students understand duties of citizens.

**Instruction objectives of a lesson.**

- i. The student recalls the duties of citizens.
- ii. The student discriminates between rights and duties.
- iii. The student interprets the duties of citizen in day to day activities.
- iv. The student relates the duties of citizen in day to day life activities.

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**8.8 Unit-End Exercises**

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1. Define instructional objective
2. Need and importance of instructional objectives.
3. Write general objectives of one unit.
4. Write instructional objectives lesson.

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**8.9 References**

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1. Aggarwal J. C. (1995) *Essentials of Educational Technology, Teaching and Learning* New Delhi, Vikas Publishing House Pvt. Ltd.
2. Gronlund N. E. (1970) *Stating Behavioural Objectives for Classroom Instruction*. The Macmillan Company Cavalier-Macmillan, London.
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## **UNIT-9 □ CLASSIFICATION OF INSTRUCTIONAL OBJECTIVES - 1**

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### **Structure**

- 9.1 Introduction**
- 9.2 Objectives**
- 9.3 Taxonomy-Need and Importance**
- 9.4 Taxonomy of Instructional Objectives by Bloom A Bird's Eye View**
- 9.5 NCERT Classification System**
- 9.6 Let Us Sum Up**
- 9.7 Answers to 'Check Your Progress'**
- 9.8 Unit-End Exercises**
- 9.9 References**

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### **9.1 Introduction**

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You have learnt about instructional objectives, their need and importance in education. Teaching or learning objectives specify the outcomes of teaching act which may be grouped or categorised into relatively broad groups of categories known as educational objectives. These are related to three domains of individual behaviour such as cognitive, effective and psychomotor. So educational objectives also classified under these categories then the learning out comes becomes more specific to specific human behaviour and the behavioural changes may be easily evaluated under these three domains.

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### **9.2 Objectives**

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After studying this unit, you will be able to:

- Explain the meaning of instructional objective
- Bring out the need and important of instructional objectives
- Elaborate the taxonomy of instructional objectives by bloom
- Describe the NCERT classification system

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## 9.3 Taxonomy - Need and Importance

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One of the most useful guides in identifying and defining instructional objectives is Taxonomy of Educational Objectives.

The taxonomy provides a classification of educational objectives which is similar to classification scheme used for plants and animals.

Taxonomy means the analysis of instructional objectives in terms of specific and precise teaching outcome or learning appropriate to classroom action.

### Need and Importance

1. Well defined taxonomy is great help in defining and evaluating educational standards of a school.
2. To establish the accuracy of communication regarding the objectives of education.
3. The logical nature of classification helps in identifying and grading teaching learning situations which can be an important source of selecting appropriate testing situation too.
4. Curriculum development and preparation of instructional materials can profit from such a scheme of classification in several ways.
5. Identification, areas and their interrelationships may well establish.
6. The well defined criteria and classification provide a bridge for further communication among teachers, evaluators, research workers.
7. The taxonomy has opened new areas of research.
8. To stay clear from the ambiguity of loosely defined terms and concepts and to find a meaningful relationship among them.
9. To establish common understanding about hierarchical classification of objectives.

### **'Check Your Progress.' - 1**

1. What is Taxonomy?

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2. Write the significance of taxonomy of educational objectives.

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## 9.4 Taxonomy of Instructional Objectives by Bloom-A Bird's Eye view

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Several attempts have been made by educationists in preparing the taxonomy of educational objectives.

The word "Taxonomy of Instructional Objectives" is closely related with the name B.S. Bloom. He has explained them extraordinarily in 1956. It is accepted by teachers, educationists and test developers. It also offers systematic evaluation of the whole range of cognitive processes and its impact on curriculum development and teaching methods. It further lays emphasis on processes rather than contents.

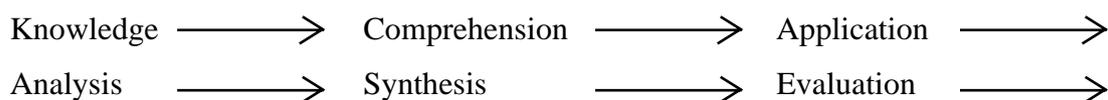
It has maintained the proper balance between lower and higher cognitive process.

Bloom's Taxonomy has inspired the majority of other taxonomies uses four basic principles.

- a. The major distinction should reflect the ways teachers state educational objectives (methodological principle).
- b. The taxonomy should be consistent with our present understanding of psychological phenomena (Psychological principle).
- c. The taxonomy should be logically developed and internally consistent (logical principles).
- d. The hierarchy of objectives does not correspond to hierarchy of values (objective principle).

The taxonomy itself comprises six cognitive levels.

Hierarchy



1. Knowledge is defined as recall of specifics and universal which is lowest level in cognitive development.
2. Comprehension involves understanding or previewing which means processing of information.
3. Application involves using something in a specific manner.
4. Analysis - involved breaching down or the separation of a whole into its component parts.
5. Synthesis - it is apposite to analysis. It involves combining together a number of demerits in order to form a coherent whole.
6. Evaluation - It is highest level in the taxonomy which is combination of all the 5 categories which is concerned with making judgement about value.

**‘Check Your Progress’ - 2**

1. The name associated with taxonomy of education objectives is.
  - a. Krathwhole
  - b. Horrow and Amitha
  - c. Bloom
  - d. Guilford.
2. Bloom classified domain concerned to
  - a. Affective
  - b. Cognitive
  - c. Psychomotor
  - d. None of the Above

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## **9.5 NCERT Classification System**

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National Council for Educational Research and Training established was in New Delhi in 1961. It classified educational objectives into three main categories which are condensed form of Bloom’s “Taxonomy”.

1. Knowledge
2. Understanding / Comprehension
3. Applications.

The specifications of these objectives are

1. **Knowledge**

The pupil

- i. Recalls
- ii. Recognises

**2. Understanding / Comprehension.**

The pupil

- a. Translates
- b. Identifies relationship
- c. Compares
- d. Interprets
- e. Cites examples
- f. Detects error
- g. Classifies
- h. Explains

**3. Application**

The pupil

- a. Analyses
- b. Suggests methods and materials
- c. Hypothesises
- d. Establishes relationships
- e. Reasons out
- f. Generalizes or draws conclusions.
- g. Predicts
- h. Judges adequacy, consistency and relevance etc.

Table E.1

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**MAJOR CATEGORIES IN THE COGNITIVE DOMAIN OF THE TAXONOMY  
OF EDUCATIONAL OBJECTIVES (BLOOM, 1956)**

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**Descriptions of the major categories in the cognitive domain**

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1. **Knowledge:** Knowledge is defined as the remembering of previously learned material. This may involve the recall of a wide range of material, from specific facts to complete theories, but all that is required is the bringing to mind of the appropriate information. Knowledge represents the lowest level of learning outcomes in the cognitive domain.

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  2. **Comprehension:** Comprehension is defined as the ability to grasp the meaning of material. This may be shown by translating material from one form to another (words to numbers), by interpreting material (explaining or summarizing), and by estimating future trends (predicting consequences or effects). These learning outcomes go one step beyond the simple remembering of material, and represent the lowest level of understanding than under comprehension.

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  3. **Application:** Application refers to the ability to use learning material in new and concrete situations. This may include the application of such things as rules, methods, concepts, principles, laws and theories. Learning outcomes in this area require a higher level of understanding than those under Comprehension.

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  4. **Analysis:** Analysis refers to the ability to break down material into its component parts so that its organizational structure may be understood. This may include the identification of the parts, analysis of the relationships between parts, and recognition of the organisational principles involved. Learning outcomes here represent a higher intellectual level than comprehension and application because they require an understanding of both the content and the structural form of the material.

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  5. **Synthesis:** Synthesis refers to the ability to put parts together to form a new whole. This may involve the production of a unique communication (theme or speech), a plan of operations (research proposal), or a set of abstract relations (scheme for classifying information). Learning outcomes in this area stress creative behaviors, with major emphasis on the formulation of new patterns or structure.
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6. **Evaluation:** Evaluation is concerned with the ability to judge the value of material (statement, novel, poem, research report) for a given purpose. The judgements are to be based on definite criteria. These may be internal criteria (organization) or external criteria (relevance to the purpose) and the student may determine the criteria or be given them. Learning outcomes in this area highest in the cognitive hierarchy because they contain elements of all of the other categories, plus conscious value judgements based on clearly defined criteria.
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**Table E.3**

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**MAJOR CATEGORIES IN THE AFFECTIVE DOMAIN OF THE  
TAXONOMY OF EDUCATIONAL OBJECTIVES (KRATHWOHL, 1964)**

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**Descriptions of the major categories in the affective domain**

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1. **Receiving:** Receiving refers to the student's willingness to attend to particular phenomena or stimuli (classroom activities, textbook, music, etc.) From a teaching standpoint, it is concerned with getting, holding, and directing the student's attention. Learning outcomes in this area range from the simple awareness that a thing exists to selective attention on the part of the learner. Receiving represents the lowest level of learning outcomes in the affective domain.
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2. **Responding:** Responding refers to active participation on the part of the student. At this level he not only attends to a particular phenomenon but also reacts to it in some way. Learning outcomes in this area may emphasize acquiescence in responding (reads assigned material), willingness to respond (voluntarily reads beyond assignment), or satisfaction in responding (reads for pleasure or enjoyment). The higher levels of this category include those instructional objectives that are commonly classified under "interest"; that is, those that stress the seeking out and enjoyment of particular activities.
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3. **Valuing:** Valuing is concerned with the worth or value a student attaches to a particular object, phenomenon, or behavior. This ranges in degree from the more simple acceptance of a value (desires to improve group skills) to the more complex level of commitment (assumes responsibility for the effective functioning of the group). Valuing is based on the internalization of a set of specified values, but clues to these values are expressed in the student's overt behaviour. Learning outcomes in this area are concerned with behavior that is consistent and stable enough to make the value clearly identifiable. Instructional objectives that are commonly classified under "attitude" and "appreciation" would fall into this category.
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**4. Organisation:** Organization is concerned with bringing together different values, resolving conflicts between them, and beginning the building of an internally consistent value system. Thus the emphasis is on comparing, relating and synthesizing values. Learning outcomes may be concerned with the conceptualization of a value (recognizes the responsibility of each individual for improving human relations) or with the organization of a value system (develop a plan that satisfies his need for both economic security and social service). Instructional objectives relating to the development of a philosophy of life would fall into this category.

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**5. Characterization by a Value or Value Complex:** At this level of the affective domain, the individual has a value system that has controlled his behavior for a sufficiently long time for him to have developed a characteristic “life style”. Thus the behaviour is pervasive, consistent, and predict-able. Learning outcomes at this level cover a broad range of activities, but the major emphasis is on the fact that the behavior is typical or characteristic of the student. Instructional objectives that are concerned with the student’s general patterns of adjustment (personal, social, emotional) would be appropriate here.

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**‘Check Your Progress’ - 3**

1. NCERT classified objectives into  
a. Two Areas      b. Three areas      c. Four Areas      d. Six Areas.
2. Recognizes the specification of  
a. Knowledge objective      b. Comprehensive  
c. Application      d. analysis.

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**9.6 Let Us Sum Up**

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Taxonomy is the classification of educational objectives. The name associated with Taxonomy is Benjamin S. Bloom in 1956. He has classified objectives of cognitive Domain in to six categories namely:

1. Knowledge - Lowest level in the category
2. Understanding

3. Application
4. Analysis
5. Synthesis
6. Evaluation

Taxonomy is useful for curriculum development methods to be used for imparting knowledge and evaluation become more objective. In the basis of this NCERT classified educational objectives in three categories.

1. Knowledge
2. Comprehension
3. Application

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## **9.7 Answers to ‘Check Your Progress’**

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### **‘Check Your Progress’- 1**

1. Classification of objectives into categories is called taxonomy.
2. The uses of taxonomy is that
  - i. Evaluation becomes more objective
  - ii. Organising materials according to the development of cognitive domain.

### **‘Check Your Progress’ - 2**

1. (c) Bloom
2. (b) Cognitive

### **‘Check Your Progress’ - 3**

1. (a) Three Areas
2. (a) Knowledge objective

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## **9.8 Unit-End Exercises**

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1. Discuss the need and importance of taxonomy
2. Explain Bloom’s Taxonomy of educational objectives.
3. How NCERT classified the educational objective, write specification for each objective.

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## 9.9 References

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1. Aggarwal J. C. (1995) *Essentials of Educational Technology, Teaching and Learning* New Delhi, Vikas Publishing House Pvt. Ltd.
2. Gronlund N. E. (1970) *Stating Behavioural Objectives for Classroom Instruction*. The Macmillan Company Cavalier-Macmillan, London.
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## **UNIT-10 □ CLASSIFICATION OF INSTRUCTIONAL OBJECTIVES - II**

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### **Structure**

- 10.1 Introduction**
- 10.2 Objectives**
- 10.3 Meaning and Verbs that Describe Classes/Subclasses of Objectives of cognitive, affective and psychomotor domain**
  - 10.3.1 Cognitive Domain**
  - 10.3.2 Affective Domain**
  - 10.3.3 Psychomotor Domain**
- 10.4 Let Us Sum Up**
- 10.5 Answers to ‘Check Your Progress’**
- 10.6 Unit-End Exercises**
- 10.7 References**

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### **10.1 Introduction**

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You have understood the taxonomy of educational objectives. This concept was explained by B.S. Bloom in 1956. The taxonomy is divided into three parts.

1. Cognitive Domain
2. Affective Domain
3. Psychomotor Domain

The cognitive domain includes those objectives that emphasize intellectual outcomes, such as knowledge, understanding, thinking skills etc. Affective domain includes those objectives which emphasize emotion and feeling such as interests, attitudes, appreciation, adjustments. The psychomotor includes those objectives that emphasize motor skills such as hand writing, typing and swimming. In the following chapter you will understand the meaning of three domains and respective verbs which describe the classes/sub classes of objectives of cognitive, affective and psychomotor domain.

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## 10.2 Objectives

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After studying this Unit you will be able to:

- Explain the meaning of cognitive domain objectives.
- Write the verbs, describe the classes and categories of objectives of Cognitive Domain, Affective Domain and Psycho-motor Domain

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## 10.3 The meaning of verbs that describe classes and sub-classes of cognitive, affective and psychomotor domain

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### 10.3.1 Cognitive Domain

Cognitive Domain objectives were classified into 6 major classes and it is based on 4 principles (a) Major distinction should reflect the ways teacher state educational objectives (methodological principles). (b) The Taxonomy should be consistent with our present understanding of psychological phenomena (psychological principle). (c) Taxonomy should be logically developed and internally consistent (logical principle); (d) The hierarchy of objectives does not correspond to the hierarchy of values. (objective principle).

6 major classes were arranged in the hierarchical order on the basis of complexity of task and arranged in simple to complex behaviour. The classes are (1) Knowledge, (2) Comprehension, (3) Application, (4) Analysis (5) Synthesis and (6) Evaluation.

#### Table for writing objectives in cognitive Domain Describing verbs of classes / sub classes of objectives Knowledge as a Product

1) Knowledge: Knowledge involves the rather elementary skill of recalling. Or remembering specific information or experiences. The information recalled may include specific pieces of information terminology and facts. A higher level form of knowledge involves knowing the ways or means of dealing with information. This includes conventions, as well as trends and trends and sequences, classifications and categories, criteria methodology. The highest level of all involves knowledge of universals and abstractions. This includes knowledge of principles and generalizations, as well as theories and structures. The organizing principles behind these three broad sub-categories of knowledge is from highly specific and concrete knowledge to more	to describe to recall to define to state to identify to recognize to enumerate to underline to reproduce to measure to label to write
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<p>2) <i>Comprehension:</i> Comprehension involves understanding or perceiving. It includes taking in, grasping, insight, and as such is highly stresses in school learning. In many ways, comprehension necessitates the processing of information, which many include changing that information into some parallel from more meaningful to the learner. Three subcategories of comprehension are recognized, translation (changing something into another form), interpretation (elucidate or clarify meaning),</p>	<p>to comprehend to understand to develop insight to predict to interpolate to extrapolate to interpret to translate to illustrate</p>
<p>3) <i>Application:</i> Applications involves using something in a specific manner .As such it includes relevancy, as well as the capacity for close attention to detail. Diligence and effort are also involved. The two lower categories of knowledge and comprehension are prerequisites to application. Interestingly enough application involves an element of creativity. Since it involves seeing how particular phenomena can be used in a new situation to which there is no specified solution. The skill of application underlies a great part of school learning and is intimately concerned with some of the primary objectives of education.</p>	<p>to apply to show to demonstrate to use to perform to relate to develop to transfer to construct to explain to interpret</p>
<p>4) <i>Analysis:</i> Analysis involves the breaking down, or the separation of a whole into its component parts, it is a process of reasoning or thinking. In its simplest form, analysis a simple listing of elements. A higher level of analysis involves determining the nature of the relationships between these elements. The highest form of analysis includes identifying the organizing principle or principles behind the actual material or phenomena concerned. At the level, analysis begins to take on many of the features of synthesis.</p>	<p>to analyse to identify to separate to break down to discriminate to distinguish to detect to categorise</p>
<p>5) <i>Synthesis:</i> Synthesis is the opposite of analysis. It involves combining together a number of elements in order to form a coherent whole. The process involves logical deduction, and in the sense the category is intimately concerned with thinking and</p>	<p>to combine to restate to summarize to specify</p>

<p>creativity. Synthesizing or combining elements involves doing something in a unique or original way. The discovery of pattern or structure is an important part of the activity. The sub – categories of synthesis are production of a unique combination, production of a plan or proposed set of operation and derivation of a set of operation and derivation of a set of abstract relations.</p>	<p>to generalize to conclude to derive to organize to design to deduce to classify to formulate to propose to compose</p>
<p>6) <i>Evaluation</i>: This represents the highest level in the taxonomy. It includes a combination of all the previous five categories. Evaluation is concerned with making judgements about value. In order to make such an assessment, some yardstick or criterion is necessary as a standard which things can be measured. The evaluation can be quantitative or qualitative, direct or indirect, subjective or objective usually judgment is made in terms of internal evidence. Making judgments in terms of external criteria is regarded as the highest level of evaluative activity.</p>	<p>to evaluate to judge to decode to choose to assess to contrast to criticize to select to defend to support to attack to avoid to seek out to compare to determine</p>

### 10.3.2 Affective Domain

This classification was explained by Krathwohl (1964). This domain includes those objectives which are concerned with change in interest, attitudes, and values and development of appreciation and adjustment.

It is divided into five major classes arranged in a hierarchical order on the basis of involvement. These classes were: 1. Receiving (attending), 2. (Responding), 3. Valuing, 4. Organization and 5. Characterisation by value system.

Major categories	Action verbs
<p>1) Receiving (Attending): Receiving or attending is the lowest level in the taxonomy. It implies only that the communication will be intended to or heeded, that the person involved is aware of message stimulus. The subcategories are awareness (conscious of what is happening). Willingness to receive (will tolerate what is happening and will not seek to avoid it), and controlled or selected attention (will attend carefully to what is going on).</p>	<p>to listen to attend to receive to control to select to accumulate to be aware to perceive to favour to accept</p>
<p>2) Responding: responding implies that something more than merely attending is involved. Some sort of reply or answer occurs, and this suggests that a level of interest and motivation have been tapped as a resource. The level of commitment is low but a degree of curiosity, or arousal has occurred. The subcategories of this level are acquiescence in responding (learner reads), willingness to respond and satisfaction in response (sense of pleasure is evoked). Whatever the subcategory involved however, the important things to remember is the sense of willingness and pleasure involved in responding.</p>	<p>to stage to answer to complete to select to list to record to develop to comply to follow to acclaim to applaud</p>
<p>3) Valuing: valuing implies that the attitude is regarded as having merit or intrinsic worth to the person concerned. It is worthwhile, useful; desirable it is esteemed, appreciated, and important. At this level, the things that is valued has taken on the characteristics of a belief, and as such as great motivating force concerned. Enthusiasm and interest are all involved. Three subcategories are identified acceptance of value (is seen to have worth), preference for a value (there is a sense of commitment, and commitment itself (this involves quite a high degree of certainty about the value). Initiation into a set of personally developed values is the very essence of what education is all about?</p>	<p>to accept to recognize to participate to increase to develop to attain to indicate to decide to influence to support to debate to argue to appreciate</p>

<p>4) Organization: organization is involved when situation are encountered which involve more than one value or attitude. Under these circumstances some sort of organization or patterning is called for, otherwise behavior because of consistent and unpredictable. Organization, however, implies only the beginning of a value system that is carried to its most developed form in characterization. In both cases. Something more than an ability to put the value into words is called for, and some kind of ability to defend one's values is implied. Two sub-categories are included: Conceptualization of a value (the value is abstract or symbolic), and organization of a value system (an ordered set of relationship is beginning to occur).</p>	<p>to discuss to organize to judge to relate to correlate to determine to associate to form to select to balance to define to formulate to weigh</p>
<p>5) Characterization by a value complex: This represents the highest level in the taxonomy. Characterization, as the name implies, is concerned with a person's character; with is or her uniqueness as an individual. At this high level, values have been placed within a coherent framework, which lends consistency to what a person does or believes this characterization is seen in the philosophy of life of person, in their fundamental rules of conduct. Belief, ideas and attitudes are all fused together into an overall view of life. The sub-categories are generalized set (this gives internal consistency to a system of values), and characterization ( which is the peak of internationalization)</p>	<p>to revise to change to face to accept to judge to develop to require to resolve to resist to reject to identify with to believe</p>

### 10.3.3 Psychomotor Domain

These categories were explained by Harrow Anitha. J. in the year (1972) 'Psychomotor' covers any human voluntary observable movement that belongs to the domain of learning. Behaviour that belongs to this domain requires muscular action and neuro-muscular co-ordination.

The major clauses in domain are: 1. Reflex movements 2. Basic fundamental movements 3. Perceptual abilities 4. Physical abilities 5. Skilled movements 6. Non-Discursive Communication.

Major Categories	Action Verbs
<p>1) <i>Reflex movement</i>: Reflex movements are defined as involuntary motor responses to stimuli. They form the basis for all behaviour involving movements are functional at birth, and develop throughout life. They involve one or more spinal segment, and sometime the participation of the brain center. Reflex movements represent the lowest level in the psychomotor domain, but without them</p>	<p>to flex to stretch to straighten to extend to inhibit to lengthen to shorten to tense to stiffen</p>
<p>2) <i>Basic fundamental movements</i>: Basic fundamental movements are defined as those inherent body movement patterns, which build upon the foundation laid by reflex movements. They usually occur during the first year of life, and unfold rather than are taught or consciously acquired. These movements involve movement patterns which change a child from a stationary to an ambulatory learner. They also involve non – loco motor movements of the extremities. The movements involved in this category are fundamental to all, everyday human activity, and any deficiency</p>	<p>to crawl to creep to slide to walk to run to jump to grasp to reach to righten to support</p>
<p>3) <i>Perceptual Abilities</i>: Perceptual abilities are really inseparable from motor movements. They help learners to interpret stimuli so that they can adjust to their environment. Superior motor activities depend upon the development of perception. They involve kinesthetic discrimination, visual discrimination, auditory discrimination and coordinated abilities of eye, hand and foot. The skill of discrimination underlies all these abilities, Whether they are gross in character or fine in quality.</p>	<p>to catch to bounce to eat to write to balance to bend to bounce to draw from memory to distinguish by touching</p>

<p>4) <i>Physical Abilities</i>; Physical abilities are essential to efficient motor activity. They are concerned with the vigour of the person, and allow the individual to meet the demands placed upon him or her in and by the environment. Physical abilities are an essential foundation for the development of skilled movements. Prominent amongst physical abilities are spend endurance exertion and flexibility</p>	<p>to endure strength activity to endure for long periods of time to improve to increase to stop and start to more precisely to touch toes</p>
<p>5) <i>Skilled movements</i>: Skilled movements are defined as any efficiently performed complex movement. They require learning, and should be based upon some adaptation of the inherent patterns of movement described in level number two below. Skilled movements involve simple adaptive skills, compound adaptive skills incorporating the management of a tool or implement, and complex adaptive skills requiring a greater a mastery of body mechanics. The important thing about skilled movements is that they are performed with ease and grace, almost as if no effort or thought were involved. In every case, however, they been consciously acquired and practiced over a period of time until the present level of skill was acquired.</p>	<p>to waltz to saw to type to play the piano to plane to file to skate to somersault to juggle to punt to twist-dive to fence to change</p>
<p>6. <i>Non-Discursive Communication</i>: Non-Discursive Communication can be defined as comprising those behaviours which are involved in movement communication. They range from facial expression to highly sophisticated dance choreographies as in classical ballet. Generally speaking such non-discursive communication involves expressive communication forms like gestures and posture, as well as interpretative movements which can be either aesthetic or creative in from. The essential in such psychomotor movements is that the response comes more from intuition and the tacit dimension than from reason or explicitness. This is way the term ‘non-discursive’ is employed.</p>	<p>to gesture to carry oneself to stand to sit to express facially to dance skillfully to paint skillfully to play skillfully to smile knowingly</p>

**‘Check Your Progress’- 1**

1. The categories in cognitive domain are classified into  
a. 6 categories    b. 7 categories    c. 5 categories    d. 8 categories
2. Affective Domain is concerned with  
a. Thinking    b. Understanding    c. Feeling    d. Movements
3. Psychomotor domain objectives is explained by  
a. Bloom    b. Guilford    c. Krathwohl    d. Harrow, A.J.

## 10.4 Let us sum up

The behaviours of human being are classified into three main domain cognitive, affective, psychomotor. The objectives were also, associated with these domain which brings desirable change in these domains. This was systematically classified by educationists.

Bloom was explained the Taxonomy of cognitive domain objective which includes the intellectual abilities either thinking, knowing and understand in, they six classes in cognitive Domain.

Classes	Subclasses	Verbs
1. Knowledge	Which includes 1. Specific facts, terminology 2. Ways and means of dealing with specifics conventions trends, sequences, classification categories, criteria and methodology 3. Universal and Abstractions in the field principles, Generalization Theories	to describe to recall to define to state to identify to recognize to name to list to underline to reproduce to measure to label to write to acquire
2. Understanding	1. Translation 2. Interpretation 3. Extrapolation	to comprehend to understand to have insight into to predict to interpolate to extrapolate to interpret to translate to illustrate to draw

3. Application	Which includes application to unfamiliar situations	to apply to show to demonstrate to use to perform to relate to develop to transfer to construct to explain to inter
4. Analysis	<ol style="list-style-type: none"> <li>1. Analysis of element</li> <li>2. Analysis of relationships</li> <li>3. Analysis organizational principles</li> </ol>	to analyse to identify to separate to break down to discriminate to distinguish to detect to categories
5. Synthesis	<ol style="list-style-type: none"> <li>1. Production of unique communication</li> <li>2. Production of a plan or proposed out of operations</li> <li>3. Derivation of a set of abstract relations</li> </ol>	to combine to restate to summarize to précis to generalize to conclude to derive to organize to design to deduce to classify to formulate to propose to compose

6. Evaluation	1. Judgement in terms internal evidence 2. Judgement in terms of external evidence.	to evaluate to judge to decode to choose to assess to contrast to criticize to select to defend to support to attack to avoid to seek out to compare to determine
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Affective Domain is associated with name Krathwohl (1964) and explained the this domain is concerned with feeling attitude, interests and adjustment and is classified into five classes.

Classes	Subclasses	Verbs
1. Receiving (Attending)	1. Awareness 2. Willingness to receive 3. Controlled or selected attention	to listen to attend to receive to control to select to accumulate to be aware to perceive to favour to accept
2. Responding	1. Acquiescence in responding 2. Willingness to respond 3. Satisfaction in response	to stage to answer to complete to select to list to record to develop to comply

		<p>to follow to acclaim to applaud</p>
3. Valuing	<p>1. Acceptance of a value 2. Preference for a value 3. Commitment to accept</p>	<p>to recognize to participate to increase to develop to attain to indicate to decide to influence to support to debate to argue to appreciate</p>
4. Organization	<p>1. Conceptualization of value 2. Organization of value</p>	<p>to discuss to organize to judge to relate to correlate to determine to associate to form to select to balance to define to formulate to weigh</p>
5. Characterisation by value system	<p>1. Generalized set 2. Characterization</p>	<p>to revise to change to face to accept to judge to develop to require to resolve to resist to reject to identify with to believe</p>

Psychomotor domain is concerned with human voluntary observable movement that belongs to domain of learning. Behaviour which include muscular action and require neuro muscular co-ordination.

The major classes in this domain 6

Classes	Subclasses	Verbs
1. Reflex movements	Movement response to stimulus	to flex to stretch to straighten to extend to inhibit to lengthen to shorten to tense to stiffen to relax
2. Basic fundamental movements	Interest movement developed early in life	to crawl to creep to slide to walk to run to jump to grasp to reach to righten to support to handle
3. Perceptual abilities	Interpretation of stimuli to catch	to bounce to eat to write to balance to bend to bounce to draw from memory to distinguish by touching to explore

4. Physical abilities	Emotional vigour	<p>to endure strength activity</p> <p>to endure for long periods of time</p> <p>to improve</p> <p>to increase</p> <p>to stop and start</p> <p>to more precisely</p> <p>to touch toes</p>
5. Skilled movement	Efficient and complex movement	<p>to waltz</p> <p>to saw</p> <p>to type</p> <p>to play the piano</p> <p>to plane</p> <p>to file</p> <p>to skate</p> <p>to somersault</p> <p>to juggle</p> <p>to punt</p> <p>to twist-dive</p> <p>to fence</p> <p>to change</p>
6. Non-discursive movements	Bodily movement neuro-muscular communications.	<p>to gesture</p> <p>to carry oneself</p> <p>to stand</p> <p>to sit</p> <p>to express facially</p> <p>to dance skillfully</p> <p>to perform skillfully</p> <p>to paint skillfully</p> <p>to play skillfully</p> <p>to smile knowingly</p>

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## 10.5 Answers to ‘Check Your Progress’

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### **‘Check Your Progress’- 1**

1. (a) 6 categories
2. (c) Feeling
3. (d) Harrow, A.J.

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## 10.6 Unit-End Exercises

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1. Explain Bloom’s Taxonomy of Educational Objective and write action verbs for each objective.
2. Explain Taxonomy of Affective Domain objectives and write action verbs.
3. Explain the Taxonomy of Psychomotor Objectives and write action verbs.

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## 10.7 References

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- Krathwohl, D.R., Bloom, B.S. and Masia B.B. (1964) *Taxonomy of Educational Objectives*. Hand Book II Affective Domain, New York, Mckay.
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# UNIT-11 □ WRITING INSTRUCTIONAL OBJECTIVES

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## Structure

- 11.1 Introduction
- 11.2 Objectives
- 11.3 Criteria of a well stated Instructional Objectives
- 11.4 Guidelines for Writing Instructional Objectives, (Knowledge, Understanding, Application, Skills etc.)
- 11.5 Instructional Objectives for a Unit
- 11.6 Instructional Objectives For a Lesson (of One Class Period)
- 11.7 Let Us Sum Up.
- 11.8 Answers to ‘Check Your Progress’
- 11.9 Unit-End Exercises
- 11.10 References

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## 11.1 Introduction

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As you have learnt about the meaning of instructional goals objectives, taxonomy of educational objectives gives broad view of the objectives and their classification. Interesting questions which arise like - How to state instructional objectives? What is the criterion for well stated instructional objectives? The following unit throws highest on these aspects. So that it is easy for the teacher to state the instructional objectives for unit and lesson.

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## 11.2 Objectives

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After studying this unit, you will be able to:

- State the criteria of a well stated instructional objective
- State the guidelines for writing instructional of knowledge, comprehension, application, skills etc.,

- State the guidelines for writing instructional objectives for unit.
- Write instructional objectives for lesson.

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### **11.3 Criteria for a well stated instructional objectives**

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As you know, the objectives should be stated properly in well-defined terms and clear language.

1. The criteria for a well-stated instructional objective.

#### **Aspects**

- a. Object: Specification of the content, concepts skills attitude or other instructional objectives which is the focus of the objective and instruction what is being studied? What is the focus of instructional objective?
- b. Specification of Learner: the objective must specifically indicate the learner to whom, the objectives were written for i.e. who is going to demonstrate change in behaviour on end product of the instruction.
- c. Specification of learner performances in observable behavioural terms (using verbs in writing objectives that indicate behaviour that are observed directly).
- d. Specification of the conditions in which the learner performance occurs (learning experiences, provided for the-students rural tools/materials are needed to demonstrate understanding.
- e. Specification of minimum expected level of performance of the learner: Specification of how well students must perform the behaviour with a set of conditions. What is the criterion of acceptable performance (i.e. 85%, 90%, 100%). What level of accuracy, proficiency, or speed must the student attain to meet the objective?
- f. Time: Designation of time by which students will be expected to meet the objectives when should the objective be attained? By the end of unit? By end of term? By the end of Lesson? By end of week?
- g. Covering objectives of all the three domains cognitive, affective and psychomotor.
- h. Covering objectives of different levels of learning out-come

- i. Formulating objectives of instruction in direct relation with the particular content of the lesson.
- j. Correlating objectives with evaluation procedure

**Example-1:** At the end of the unit, the students will be able to write in tabulated form a essay on the role of different enzymes in the digestion of food giving the source, food rested upon, organs associated and resulting end products.

- a. Object: Role of different enzymes in digestion and
- b. Learner: All students
- c. Observable behaviour term : will be able to write
- d. Conditions: In a tabulated form
- e. Minimum expected level of performance: In the digestion of food giving the source, food reacted upon, organs associated and resulting end products.
- f. Time: By the end of the unit.

**Example 2:** By the end of period given out line map of India, with points representing major cities marked and list of ten major cities the IX Standard students will be able to Label nine out of ten cities correctly.

- a. Object: Major cities in India
- b. Learner: IX Standard students
- c. Behavioural term: will be able to label
- d. Conditions: Give an outline map with points of major cities
- e. Minimum expected level of performance: 9 out 10 major cities correctly
- f. Time: by the end of a period

**‘Check Your Progress’- I**

Here are a couple of examples to test your knowledge of the criteria in writing well stated objectives. Write appropriate criteria in the blank.

1. At the end of lesson, (.....a..... ), students in group B (..... b.....) will dictate (... . c.....) a summary sentence for each event (.....d .....) that occurred in the story (.....e .....). Stating them in sequential order (... . f.....).

2. At the end of the unit (... a .....), 90% of students (..... b.....) will point to and name (.....c..... at least three (.....d .....) major river systems and mountain ranges (... .....e.....) as shown on relief map of India (.....f.....).

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#### **11.4 Guidelines for Writing Instructional Objectives (Knowledge, Understanding, Application, Skills etc.)**

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1. Keep in mind the entry behaviour of learner.
2. Give thought to the element of content, topic or the learning experience to be provided to the learner.
3. Keep in mind the teaching-learning objective.
4. Select appropriate mental processor abilities for writing objectives.

For writing objectives as knowledge, understanding, application, skill mental process and abilities involved should be used.

##### **For example.**

1. Knowledge
  - i. The students will be able to recognize
  - ii. The students will be able to recall
2. Understanding

The student will be able to- (a) to see relationship, between and, (b) to discriminate between and (c) to classify, (d) to interpret, (f) to generalize, (g) to cite example.
3. Application

The student will be able to - (a) reason, (b) formulate, (c) establish, (d) infer, (e) predict.
4. Skills

The student will be able to - (a) drawing skill, (b) manipulative skills

Table E.2

<b>EXAMPLE OF GENERAL INSTRUCTIONAL OBJECTIVES AND BEHAVIORAL TERMS FOR THE COGNITIVE DOMAIN OF THE TAXONOMY</b>	
Illustrative General Instructional Objectives	Illustrative Behavioral Terms for Stating Specific Learning Outcomes
Knows Common terms Knows specific facts Knows methods and procedures Knows basic concept Knows principles	Define, describes, identifies, labels, lists, matches, names, outlines, reproduces, selects, states
Understands facts and principles Interprets verbal material Interprets charts and graphs Translates verbal material to mathematical formulas Estimates future consequences implied in data Justifies methods and procedures	Converts, defends, distinguish, estimates, explain, extends, generalizes, gives examples, infers, paraphrases, predicts, rewrites, summarizes
Applies concepts and principles to new situations Applies laws and theories to practical situations Solves mathematical and graphs Demonstrates correct usage of a method or procedure	Changes, computes, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses
Recognizes unstated assumptions Recognizes logical fallacies in reasoning Distinguishes between facts and inferences Evaluates the relevancy of data Analyzes the organizational structure of a work (art, music, writing)	Breaks down, diagrams, differentiates, discriminates, distinguishes, identifies, illustrate, infers, outlines, points out, relates, selects, separates, subdivides
Writes a well organized theme Gives a well organized speech Writes a creative short story (or poem, or music) Propose a plan for an experiment Intergrates learning from different areas into a plan for solving a problem Formulates a new scheme for classifying objects (or events, or ideas)	Categories, combines, compiles, composes, creates, devises, design, exemplains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes

Judges the logical consistency of written material	Appraises, compares, concludes, contrasts, criticizes, describes, discriminates, explains, justifies, interprets, relates, summarizes, supports
Judges the adequacy with which conclusions are supported by data	
Judges the value of a work (art, music, writing) by use of internal criteria	
Judges the value of a work (art, music, writing) by use of external standards of excellence	

**Table E.4**

**EXAMPLES OF GENERAL INSTRUCTIONAL OBJECTIVES AND BEHAVIORAL TERMS FOR THE COGNITIVE DOMAIN OF THE TAXONOMY**

Illustrative General Instructional Objectives	Illustrative Behavioral Terms for Stating Specific Learning Outcomes
<p>Listens attentively</p> <p>Shows awareness of the important of learning</p> <p>Shows sensitivity to human needs and social problems</p> <p>Accepts differences of race and culture</p> <p>Attends closely t the classroom activities</p>	<p>Asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, select, sits erect, replies, uses</p>
<p>Completes assigned homework</p> <p>Obeys school rules</p> <p>Participates in class discussion</p> <p>Completes laboratory work</p> <p>Volunteers for special tasks</p> <p>Shows interest in subject</p> <p>Enjoys helping others</p>	<p>Answers, assists, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes</p>
<p>Demonstrates belief in the democratic process</p> <p>Appreciates good literature (art or music)</p> <p>Appreciates the role of science (or other subjects) in everyday life</p> <p>Shows concern fot the welfare of others</p> <p>Demonstrates problem - solving attitude</p> <p>Demonstrates commitment to social improvement</p>	<p>Completes, describes, differentiates, explains, follows, forms, initiates invites, joins, justifies, purposes, reads, reports, selects, shares, studies,</p>

Recognizes the need for balance between freedom responsibility in a democracy	Adheres, alters, arranges, combines, and compares, completes, defends, explains, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes
Recognize the role of systematic planning in solving problems	
Accepts responsibility for his own behavior	
Understands and accepts his own strengths and limitations	
Formulates a life plan in harmony with his abilities, interests, and beliefs	
<hr/>	
Displays safety consciousness	Acts, discriminates, displays, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, uses, verifies
Demonstrates self-reliance in working independently	
Practices cooperation in group activities	
Uses objective approach in problem solving	
Demonstrates industry, punctuality and self discipline	
Maintains good health habits	

**Table E. 5**

**EXAMPLE OF GENERAL INSTRUCTIONAL OBJECTIVES AND BEHAVIORAL TERMS FOR THE PSYCHOMOTOR DOMAIN OF THE TAXONOMY**

Taxonomy Categories	Illustrative General Instructional Objectives	Illustrative Behavioral Terms for Stating Specific Learning Outcomes
See Pages 32,33 34 of this Block 10.3.3 Psycho-Motor Domain.	Writes smoothly and legibly Draws accurate reproduction of a picture (or map, biology specimen etc.) Sets up laboratory equipment quickly and correctly Types with speed and accuracy Operates a power saw safely and skillfully Performs skillfully on the violin Performs a dance step correctly Demonstrates correct form in swimming Demonstrates skill in driving an automobile Repairs an electric motor quickly and effectively Creates new ways of performing (creative dance, etc.)	Assembles, builds, calibrates, changes, cleans, composes, connects, constructs corrects, creates, designs, dismanles, drills, fastens, fixes, follows, grinds, grips, hammers, heats, hooks, identifies, locates, makes, manipulates, mends, mixes nails, paints, sands, saws, sharpens, sets, sews, sketches, starts, stirs, uses, weighs, wraps

\* Tables E. 1-E.5 are from N.E. Gronlund, Stating Behavioral Objectives for Classroom Instruction (New York; Macmillan, 1970).

### **‘Check Your Progress’- 2**

1. Write two guidelines of writing objectives

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### **11.5 Instructional Objectives for a Unit**

1. Unit - Nature of Matter- Class IX Standard Instructional objectives
2. By the end of unit, all students of 9<sup>th</sup> B class will be able to recall the meaning and nature of matter correctly (knowledge)
3. The students will be able to recognize the different states of matter solid liquid, Gases, correctly (Knowledge)
4. The students will be able to discriminate the different states of matter solid liquid and gases. (Understanding)
5. The students will be able to compare the different states matter solid liquid and gases (Understanding)
6. The students will be able to apply the knowledge of different states of matter in day to day examples. (Application)
7. The students will able to list different examples of solid state, liquid state, Gases state (Application)
8. The students will classify the examples of different states matter into solid liquid Gases, According to their nature correctly (Application)
9. The students will be able to draw the Arrangement of Atoms in different states of matter, solid liquid and gases (skill)

### **11.6 Instructional Objectives for a Lesson (of one class period)**

Lesson - Fractions and types of fraction

Class - VIII std.

Duration - 45 minutes

### **Instructional objectives**

1. By the end of the lesson, the students will be able write the meaning of Fraction correctly with example (knowledge)
2. By the end of the lesson, the students will be able to cite examples of fractions (understanding)
3. By the end of the lesson all the students will be able to identify the types of fraction - as proper, improper, and mixed fractions (knowledge)
4. By the end of the lesson, students will discriminate the types of fraction (understanding)
5. By end of the lesson, students will be able to classify the types of fraction in given set of fractions (understanding)
6. By the end of the lesson, students will be able to list proper fractions according to their nature (Application)

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### **11.7 Let Us Sum Up**

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In order to state instructional objectives the following points are to be kept in mind.

1. Object - specification of the content
2. specification of the learner
3. Specification of learner performances in behaviour terms (terminal behaviour)
4. The conditions in which learner performance occurs.
5. Specification of minimum expected level of performance of the learner.
6. Time.

#### **'Check Your Progress' -3**

1. 'Write two objectives for a lesson on fractions in Mathe matrices.

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## 11.8 Answers To ‘Check Your Progress’

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### ‘Check Your Progress’ - 1

1. a) Time, b) learner, c) terminal behaviour, d) object, e) condition, f) performance level,
2. a) Tie, b) learner, c) terminal behaviour, d) performance level, e) object, f) condition

### ‘Check Your Progress’ - 2

1. Guide lines for writing instructional objectives.
  - a. Keep in mind the entry behaviour of learner.
  - b. The learning experience given to students.

### ‘Check Your Progress’ - 3

1. a. By the end of unit students will be able to recognize the types of fractions.
- b. By the end of unit the students will be able to recall the meaning of fraction with examples

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## 11.9 Unit-End Exercises

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1. Explain the criteria for writing instructional objectives with one example
2. Write guide lines for writing instructional objectives
3. Take unit of your choice and write instructional objectives (knowledge, understanding skill applications)
4. Take a lesson of your choice and write instructional objectives (knowledge, comprehension skills, application).

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## 11.10 References

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- Aggarwal, J.C. (1995), *Essentials of Educational Technology : Teaching Technology*. New Delhi, Vikas Publishing House Pvt. Ltd.

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## **UNIT - 12 □ ANALYSIS AND CLASSIFICATION OF WELL STATED INSTRUCTIONAL OBJECTIVES**

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### **Structure**

- 12.1 Introduction**
- 12.2 Objectives**
- 12.3 Analysing the well-stated Objectives with respect to Knowledge, Understanding, Application, Skill etc.**
- 12.4 Let Us Sum Up**
- 12.5 Answers to ‘Check Your Progress’**
- 12.6 Unit-End Exercises**
- 12.7 References**

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### **12.1 Introduction**

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In the previous units you have studied the aims and instructional objectives. Aims are called large range objectives which are stated in a general terms. But instructional objectives are specifics which defined in terms of students behavioural changes that occur in different domains like cognitive, affective, and psychomotor. This was explained in Taxonomy of Educational objectives by bloom. But, this classification gives the overall classification of educational objectives. But, in case teacher want to state well-stated objectives. He has to classify the objective in knowledge understanding skill, application, etc. In the present chapter we shall understand the classification of objectives.

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### **12.2 Objectives**

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After studying this unit, students will be able to:

- Analyse the objectives with respect to knowledge understanding, application, skills etc.
- Able to list the objectives with respect to knowledge objectives, understanding application and skill

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### **12.3 Analysing the well-stated Objectives with respect to Knowledge, Understanding, Application, Skill etc.**

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Objectives may be classified in variety of ways. The classification of objectives in a particular group emphasizes the dominance of objectives in that group. When stating specific instructional objectives the teachers must focus on the terminal behaviour of students. This terminal behaviour gives the idea to the teacher whether the stated objective was grouped under knowledge, understanding, skill and application.

The terminal behaviours are those which are also called the action verbs used under each objective, knowledge, understanding, skill and application.

The action verbs under “knowledge objective” are.

1. Recall and recognize
2. Define, list label measure, name
3. Reproduce, select state, write underline, etc.

While writing instructional objective with respect to knowledge these action verbs are used.

**For example I :** The pupils are able to reproduce the formula for calculation of the area of a circle. Here the terminal behaviour is “reproduce” so this objective is classified under knowledge objective.

**Example II :** The pupils once able to state the laws of floating bodies.

Here also “state” is the action verb which is grouped under knowledge objective. It Action verbs used under “understanding” objective

1. Change, classify, distinguish, explain, formulate, Illustrate, Indicate, Interpret, Justify, Judge, represent, select, translate, contrast, cite example, see relationship, verify, generalize.

**For example.**

- 1) The pupils are able to explain the formula for finding out the area of a circle. Here the “action verb” or terminal behaviour used is explain so, this objective is grouped under understanding objective.

2) The pupils one able “cite examples” for improper fraction “cites examples” is also grouped under understanding objective.

- Action verbs under for stating Application “objectives are:

1. Predict 2. Select 3. Assess 4. Choose 5. Find 6. Show 7. Demonstrate 8. Construct 9. Compute 10. Use 11. Perform.

For example, by end of the lesson the pupil will be able use simple interest formula for calculating simple interest. “Use” is action verb used for stating application objectives.

Likewise the well -stated objectives were classified on the basis of the action verbs used for the particular (objectives (knowledge, understanding, application and skills). So action verbs and terminal behaviour will indicate the particular objective belongs to particular objective; such as knowledge, understanding, application skill etc.

### **‘Check Your Progress’-1**

Classify the following objective with respect to knowledge, understanding, application, skill etc.

1. By the end of the lesson students will be able to formulate the formula for solving simple interest problem.
2. By the end of the lesson students will be able reproduce the definition of Archimedes principle.
3. By the end of the lesson students will be able to explain the properties of solid state.
4. By the end of the lesson students will be able to draw a circle using compass box.

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## **12.4 Let Us Sum Up**

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Objectives were classified with respect to the knowledge, understanding application and skill. These objectives were classified according to the terminal behaviour which is learning ‘outcome’ defined in terms of action verbs, used in the particular objective. For example: Action verbs for knowledge is define, state list, name, write, recall recognize etc.

Action verbs for understanding objectives are:

Justify, select, indicate, illustrate explain judge contrast, classify etc.

Action verbs for application objectives are predict, select, assess, chase find etc.

Action verbs for skill objective are draw, sketch, construct, manipulate,

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## 12.5 Answers to ‘Check Your Progress’

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### ‘Check Your Progress’-1

1. Application (because formulate is action verb for application objective)
2. Knowledge (because reproduce is action verb for knowledge objective)
3. Understanding (because explain is action verb for comprehension objective)
4. Skill (because draw is action verb for skill objective).

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## 12.6 Unit-End Exercises

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1. How do you classify objectives with respect to knowledge, comprehension, skill and application?
2. State knowledge objectives.
3. List the action verbs used for comprehension?
4. Mention the action verbs of application objective.

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## 12.7 References

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1. Aggarwal J. C. (2002) *Essentials of Educational Technology, Teaching and Learning* New Delhi, Vikas Publishing House Pvt. Ltd.
2. Gronlund N. E. (1970) *Stating Behavioural Objectives for Classroom Instruction*. The Macmillan Company Cavalier-Macmillan, London.
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**COMPULSORY COURSE 04 (CC-04)**  
**TECHNOLOGY OF TEACHING**

**BLOCK 03**  
**PLANNING FOR TEACHING**

## **B.Ed. CC-04 : TECHNOLOGY OF TEACHING**

# **Block**

# **3**

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### **Unit - 18**

PLANNING FOR TEACHING IN THE INDIAN CONTEXT	170
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## **BLOCK - 03 : PLANNING FOR TEACHING**

### **INTRODUCTION**

Teaching a class and managing an educational institution are goal directed and systematic activities. A teacher and a head of an institution should have a full knowledge of all aspects of his / her work. He / she should consider several factors in carrying out his / her task. Hence prior planning is very much essential. A teacher or a headmaster should prepare a well thought plan to discharge his / her duties effectively in order to achieve the set goals. In this Block you will be acquainted with various aspects of planning teaching and managing an educational institution.

In **Unit -13**, you will study about the need for planning in teaching. In **Unit -14** explains about planning a programme / work during an academic year. This planning is known as Year / Annual Plan. In **Unit -15** you will learn about planning to teach a Unit which is known as Unit Plan. **Unit -16** explains the procedure of planning to teach a lesson. A teacher has to collect information / teaching aids and other materials from various sources, required for planning to teach. These materials have to be put in an organized manner to use them effectively in the class room. When required, teaching material relating to a unit of content has to be systematically organized. This is called as a Resource Unit. How to prepare such a Resource Unit is explained in **Unit - 17**.

Planning for teaching has to be done keeping in mind the context of teaching. There may be many problems in planning for teaching and executing the plan. A teacher should take into consideration such problems or constraints while preparing a plan to teach. In **Unit - 18** you will study about such problems typically encountered while planning to teach in the Indian context.

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## **UNIT - 13 □ PLANNING FOR TEACHING**

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### **Structure**

- 13.1 Introduction**
- 13.2 Objectives**
- 13.3 Planning for Teaching - Meaning, Importance**
- 13.4 Planning for Teaching-Types**
- 13.5 Planning for Teaching - General Principles**
- 13.6 Characteristics of a Good Plan**
- 13.7 Let Us Sum-Up**
- 13.8 Answers to ‘Check Your Progress’**
- 13.9 Unit-End Exercises**
- 13.10 References**

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### **13.1 Introduction**

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The present era is known as the planning era. Planning is required in every activity, be it finance, education, defense, population, or industry etc. Without planning it is not possible to achieve our objectives in life, or any activity. Planning is the back bone of every human activity. Likewise school administration these are broader terms but we shall restrict our selves the meaning to teaching - learning process. In this chapter we shall study about planning from teaching point of view.

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### **13.2 Objectives**

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After studying this unit, you will be able to:

- Explain the meaning of planning
- Identify the types of planning
- State the general principles of planning
- Enumerate the characteristics of a good plan
- Differentiate between types of planning

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### **13.3 Planning For Teaching – Meaning and Importance**

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Education does not consist merely giving out information to young minds; nor does it enable the pupils to acquire particular skill. But, it means much more. It should touch feeling and doing each lesson delivered must contribute something to the total personality of the students.

Good teaching does not just happen. It requires adequate and extensive planning. The teacher should know before hand what to teach and how to teach. To be effective teacher every teacher plans out his work like an engineer who prepares blueprint before constructing the building and doctor who makes preparation of instruments before puts the patient on the operation table. Hence, every teacher has to plan and prepare his work. Then only he will get the idea of objectives, specifications, methodologies, aids and evaluation effectively. Bagley rightly put it thus, “However, able and experienced the teacher he could do never without preliminary preparation”.

Planning means teaching outline of the important aspects of teaching that are arranged in the order in which they are to be presented. It may include, objectives, points to be made, questions to be asked reference to materials, assignments etc.

#### **Importance of Planning**

Planning helps the teacher in many ways.

- i. Planning helps in defining the objectives of teaching.
- ii. Knowing how to achieve the objectives of the teaching before doing his work.
- iii. Preventing the teacher form wandering away from the subject and wastage of time and energy.
- iv. Helping the teacher to mobilize the materials and teaching aids enabling the teacher to organise learning experiences systematically. Thus the continuity of the educative process is ensured.
- v. Planning gives confidence to face the class.
- vi. Planning helps the teacher to make his teaching interesting and motivating.
- vii. Helps the teacher to link the new knowledge with previous knowledge acquired by students.
- viii. Helps the teacher to provide for individual differences in pupils.
- ix. Helps the teacher to provide suitable teaching summaries.
- x. Provide the adequate checking of the learning outcomes of instruction.

**‘Check Your Progress’ -1**

1. Planning is the back bone of  
a) good teaching b) bad teaching c) normal teaching d) none of the above
2. Name two important points of planning for teaching.

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**13.4 Planning For Teaching—Types**

There are four types of planning:

- i. Planning of the work of the year unit-wise in definite manner which is called Year Plan.
- ii. Planning of each unit - Unit Planning. A unit is considered to be a block of subject matter where in a principle or a topic or a property is central to the well organised matter.
- iii. Lesson Planning - It is plan of action which involves the working philosophy of the teacher, his information and understanding of his pupils. It also involves the comprehension of the objectives of education, his knowledge of the material to be taught and his ability to use effective methods of education.
- iv. Resource Unit Plan - It is an encyclopedia for the topic that teacher want to discuss and which helps to make the classroom teaching more effective. Resource unit is a reservoir containing collection of materials, resources problems projects, activities, references etc., related to an area of topic, which a teacher used in planning, developing and evaluating learning unit.

**‘Check Your Progress’ - 2**

1. The number of types in planning teaching  
a) 4 b) 5 c) 6 d) 8
2. Planning for daily teaching is called as.....  
a) unit plan b) lesson plan c) year plan d) resource plan

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## 13.5 Planning for teaching—General Principles

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General principles of planning teaching are :—

- i. principle of definite goals or objectives
- ii. Principle of child centeredness
- iii. Principle of individual differences
- iv Principle of linking with life
- v. Principle of correlation
- vi, consult courses of the study and grade requirement
- vii. Select the best procedures for teaching
- viii. Tie the present teaching with previous learning
- x i Include appropriate assignment and supplementary materials for assignment
- x. Emphasize the main points of interest
- xi. Arrange learning experiences in a logical order that would lead to realization of goals, objectives
- xii. Provide adequate summaries
- xiii. It should be made flexible
- xiv Budgeting time for every teaching experience
- xv Provide means for evaluating the results of the teaching

### **‘Check Your Progress’ - 3**

1. State any two general principles of planning for teaching

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## 13.6 Characteristic of a good plan

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Generally speaking good planning

- a. It should be written - It helps in clarifying thoughts and concentration.

- b. It should have clear aims and objectives.
- c. It should divide into number of units.
- d. It should be flexible.
- e. It should be based on the philosophy of education, community etc.
- f. It should have activity - because students should not become passive listeners.
- g. It should contain relevant content or subject matter.
- h. It should show techniques of teaching used by the teacher.
- i. It must have assignments given to students.
- j. It must provide for self-evaluation.
- k. It should refer to reference material.

**‘Check Your Progress’ – 4**

1. State two characteristic of a good plan

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**13.7 Let Us Sum Up**

Planning for teaching is very important aspect in teaching-learning process. Without planning teaching will not be effective, and interesting. It is necessary on the part of teacher to prepare plan before entering into the classroom. Planning is nothing but ‘teaching out line’ of important aspects of teaching which are arranged in the proper order. It includes, objectives, points to be asked, references, materials, and assignments etc.

Planning helps the teacher to have definite ideas of the teaching it gives answer to the questions what to teach? How to teach? There four types in planning teaching year plan, unit plan, lesson plan and resource plan.

General principles of planning for teaching:

- a) principle of definite goals or objectives
- b) principle of child centeredness
- c) principle of individual differences

- d) principle of linking with life
- d) principle of correlation
- e) consult courses of the study and grade requirement
- f) select the best procedures for teaching
- g) tie the present teaching with previous learning
- h) include appropriate assignment and supplementary materials for assignment
- i) emphasize the main points of interest
- j) arrange learning experiences in a logical order for realization of goals
- k) provide adequate summaries
- l) it should be made flexible
- m) budgeting time for every teaching experience
- n) provide means for evaluating the results of the teaching.

**Characteristics of good plan involves:**

- a) It should be written - It helps in clarifying thoughts and concentration
- b) It should have clear aims and objectives
- c) It should be divided into number of units
- d) It should be flexible
- e) It should be based on the philosophy of education, community etc.
- f) It should have activity - because students should not become passive listeners
- g) It should contain relevant content or subject matter
- h) It should show techniques of teaching used by the teacher
- i) It must have assignments given to students
- j) It must provide for self-evaluation
- k) It should refer to reference material.

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## **13.8 Answers to ‘Check Your Progress’**

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**‘Check Your Progress’ - 1**

1. (a) good teaching
2. i) Planning give out of line of teaching points of teaching and definite goals and adjective teaching.  
ii) Planning gives confidence to teacher to face the class.

### **'Check Your Progress' - 2**

1. (a) 4
2. (b) lesson plan

### **'Check Your Progress' - 3**

- I. Two general principles of planning for teaching are -
  1. Principle of child centeredness.
  2. Principle of definite goals and objectives

### **'Check Your Progress' - 4**

- I. Characteristics of good plan are:
  - a. It should be well written
  - b. It should have activity to make students to take active participation.

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## **13.9 Unit-End Exercises**

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1. What is planning? Define and explain its importance.
2. How many types of plan a teacher can plan? Explain.
3. What is difference between unit plan and lesson plan?
4. List the characteristics of good planning in teaching.

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## **13.10 References**

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1. Aggarwal, J. C. (1995) *Educational Technology Teaching Learning*. Vikas Publishing House, Pvt. Ltd, New Delhi.
2. Das, R. C. (1985) *Science Teaching in Schools*. Sterling Publishers Pvt. Ltd., New Delhi.
3. Patel, R. N. (1978) *Educational Evaluation*. Bombay, Himalaya Publishing House.
4. Sharma, R. C. (1982) *Modern Science Teaching*. Dhanpal Rai and Sons, Delhi.

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## **UNIT - 14 □ PROGRAMME WORK / YEAR PLAN**

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### **Structure**

- 14.1 Introduction**
- 14.2 Objectives**
- 14.3 Programme of Work / Year Plan**
  - 14.3.1 Meaning and Concept**
  - 14.3.2 Need and Importance**
  - 14.3.3 Guidelines for Preparing year plan**
  - 14.3.4 Format**
- 14.4 Let Us Sum-Up**
- 14.5 Answers to ‘Check Your Progress’**
- 14.6 Unit-End Exercises**
- 14.7 References**

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### **14.1 Introduction**

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You are aware of planning and its importance from the teaching point of view. Effective planning for the teacher makes his teaching more effective and also we have discussed about types of planning teacher can plan his work for the whole year. The meaning of year plan and its need and importance of the study are furnished in this unit along with the format used for the year plan. In the present chapter, we shall discuss about the “year plan” or the ‘long range plan’ for the teacher.

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### **14.2 Objectives**

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After you go through this unit, you will be able to:

- Explain meaning of year plan
- Justify the need and importance of planning for the teacher
- Prepare year plan using guidelines for preparing the year plan
- Describe the format of the year plan

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## 14.3 Programme of Work - Year Plan

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### 14.3.1 Meaning and Concept

Teacher has to plan his teaching in many ways. A well accepted scheme of planning at different levels is as follows.

1. Long Range Planning: A rough long out for the whole year. The teacher has to decide before hand how much time he would devote to various topics or units in the curriculum.
2. Topic or Unit Planning: Detailed planning of the separate units of work or topics which may cover one day, several days or weeks. The teacher has to decide the number of lessons to be delivered on a particular topic and aspects to be covered in each lesson.
3. Lesson Planning: Detailed planning of one lesson. This is basic unit of planning for teaching on which the success of teaching depends.

Also, we shall discuss about the long range planning that is also called as year plan.

### *The Year Plan*

When the teacher is entrusted with the teaching of a subject in the beginning of the year, his first task is to plan the year's work. This programme of work for the whole year is called year plan.

### 14.3.2 Need and Importance

Year Plan enables the teacher to:

- a. Develop an idea about overall available time for teaching
- b. Identify the units to be taught in the stipulated time
- c. Specifies the objectives to be achieved for the whole year
- d. Understand the basis for unit planning as well lesson planning
- e. Function systematically throughout the year
- f. Act according to the programme for the whole year
- g. Test students and modify in their behaviour by making some alterations in the plan
- h. Designs the programme of work at his hand and achieve success in teaching career.

### 14.3.3 Guidelines for Preparing Year Plan

Before planning programme work/year plan, a teacher has to keep in mind the following factors which are essential for systematic planning. They are also called guidelines for preparing year plan.

- a. The unit to be taught in the subject
- b. The objectives to be realized through various units
- c. The number of periods available during the year
- d. The number of periods to be assigned for testing

### 14.3.4 Format

#### A) *Formation of Unit*

The teacher is expected to reorganize the content of the textbook on the subject into suitable units. This is necessary only when the matter is not systematically presented in the textbook. A unit may be defined as a large sub division of the subject matter where in principle or topic or a property is central to the well-organized matter.

A unit should satisfy the following criteria:

- a. It should bring wholeness in the learning activities related to problem on project
- b. It should emphasize the psychological principle of 'learning by whole'
- c. It should give importance to integrated learning outcome
- d. It should not be subject oriented but it should be learner oriented
- e. It should facilitate the organisation of subject matter into units of experience
- f. It should be organized in such a way that it achieves a certain set of specifications and objectives.

#### B) *Objectives to Be Realized*

The second dimension of the year plan is that it should realize the objectives of the unit. In every unit, the common objective is knowledge but in some other units understanding and skill objectives should be realized in a year. It should be realized through the units prescribed in the year plan. However, in all the units' interest, attitude, and appreciation can be more or less developed. This is possible in language units.

If the teacher is very competent, he will prepare the year plan in such a way that various objectives of units should be achieved through teaching of units of a subject matter. This can be done by giving weightage in terms of grades that the teachers want to give various objectives.

In the year plan, period wise distribution of objectives for each unit should be mentioned in order to make grading systems more meaningful.

### ***C) Time Available (For Teaching)***

While planning a teacher should necessarily consider the time factor. The number of periods allotted per week will enable the teacher to calculate how many periods would be available during the academic year for teaching a subject. He will have to be very careful here. He has to consider the non availability of the periods during examination weeks, sports and games week, non-teaching days, and preparatory days for examination or school social gathering day etc. When the available number of periods are properly assigned to the units of a subject, in accordance with its requirements the arrangement is known as year planning.

Here the teacher has to bear in his mind that he/she cannot increase or decrease the total number of periods available for a subject. The number of periods per week for a subject is fixed by the education department and course (content for a subject is also laid down). The teacher will have to use his discretion and his past experience before assigning a particular number of periods to the different units of a subject.

### ***D) Time Required (For Testing)***

While calculating the total number of periods available for teaching a subject, the teacher will have to take into account the number of periods required for units testing. When unit is taught, a test known as unit test is to be held. For this testing, periods are required. In the year plan the number of periods required for testing per unit should also be mentioned. All these are main guidelines for the year plan and above such general information as the subject; the standard etc. should be mentioned.

#### **Formation of the Year Plan**

Units	Lesson No.	Objectives					Periods Required		
		K	U	S	A	IAA	For teaching	For testing	Total
1. Essay	4, 5, 6, 7, 11, 13, 15, 16 .	A	A	A	A	A	20	3	23
2. Stories	1,2,8,12	A	A	A	A	A	9	2	11
3. Great men's life sketch	3, 17	A	B	C	A	A	4	1	5
4. Plays	10,14	B	A	A	A	A	4	1	5
5. Humerous Pices	9, 10	B	A	B	A	A	3	1	4
							<b>40</b>	<b>8</b>	<b>48</b>

Note : K – Knowledge, U – Understanding, S – Skill, A – Application, IAA – Interest Attitude Appreciation

**The Year Plan**

**Subject : Geography**

**Total Period Available : 60**

Units	Objectives					Periods Required		Total
	K	U	S	A	IAA	For teaching	For testing	
1) Astronomy a) The Stars and Solar Systems b) The Earth as a Planet	B	A	A	B	A	8	2	10
2) Motion of Earth a) Rotation and Revolution b) Latitudes and Longitudes c) Day and Night d) Seasons	B	A	A	A	A	9	2	11
3) The Atmosphere a) Composition and Layers b) Temperature and Pressure c) Rain fall	B	A	A	A	A	8	2	10
4) Major Natural Regions of World a) Equatorial b) Tropical c) Monsoon d) Mediterranean e) Temperate f) Coniferous g) Tundra	B	A	A	B	A	21	5	26
						46	12	58

**'Check Your Progress' – 1**

1. Define a year plan.

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2. Write two importance of year plan.

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## 14.4 Let Us Sum Up

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The teacher works out a plan to teach a particular subject in the beginning of the year. Year plan is nothing but 'available number of period in a year are properly assigned to the units of a subject in accordance with the requirements this arrangement is called as year plan.

The guide lines to prepare year plan are:

1. The units to be taught in the subject
2. The objectives to be realized through various units.
3. The number of periods available during the year
4. The number of periods to be assigned for testing.

### **Need and Importance Year Plan**

Year Plan gives the idea to the teacher to make proper arrangements for the number of available periods for particular subject in a whole year. It gives broader outlook for the conduction of teaching work for guiding necessary information about the objectives to be achieved in a whole year.

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## 14.5 Answers to 'Check Your Progress'

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### **'Check Your Progress'- 1**

1. The programme of work for the whole year is called year plan.
2. The two important points of year plan are
  - a. year plan gives the idea of available time for teaching for the whole academic year.
  - b. year plan specifies the objective to be achieved in an academic year.

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## 14.6 Unit-End Exercise

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1. What is year plan?
2. Describe the utility of a year plan
3. Prepare a year plan for each of the following subject
  - a) English (Std. VIII)
  - b) History (Std. IX)
  - c) Mathematics (Std. X)
  - d) Science (Std. VIII)

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## 14.7 References

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1. Aggarwal, J. C. (1995) *Educational Technology Teaching Learning*. Vikas Publishing House, Pvt. Ltd, New Delhi.
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## **UNIT - 15 □ UNIT PLAN**

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### **Structure**

- 15.1 Introduction**
- 15.2 Objectives**
- 15.3 Meaning of Unit**
- 15.4 Unit Plan**
  - 15.4.1 Meaning of Unit Plan**
  - 15.4.2 Need and Importance**
  - 15.4.3 Guidelines for Preparing Unit Plan**
  - 15.4.4 Merits and Demerits of Unit Plan**
  - 15.4.5 Format of Unit Planning**
- 15.5 Let Us Sum-Up**
- 15.6 Answers to ‘Check Your Progress’**
- 15.7 Unit-End Exercises**
- 15.8 References**

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### **15.1 Introduction**

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In the last unit, we have discussed about planning of teaching and the need and importance of year plan. As you know, year plan helps the teacher to plan for the whole academic year. It is long range planning, but unit planning is integrated and meaningful learning experience for students. The unit planning is essential part of the year plan. The unit emphasizes the learning by wholes and facilitates continuity of learning. The unit planning helps the teacher to achieve specific educational objectives.

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### **15.2 Objectives**

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After studying this unit, you will be able to:

- Explain the meaning of unit planning
- Understand the need and importance of unit planning

- Identify the guidelines for preparing unit planning
- Comprehend the merits and demerits
- Develop the format of unit planning

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### 15.3 Meaning of Unit

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Good teaching does not just happen. It requires adequate and extensive planning so that the objectives, the specifications, teaching methods and evaluation procedure could be planned systematically.

There are a number of types of planning. The unit plan also requires systematic approaches. The unit planning is likely to ensure more integrated, meaningful learning experience to the students. Unit planning incorporates a variety of learning activities for the students.

In order to make a systematic unit planning, we must understand the meaning of unit. The unit means when the matter in the textbook is not adequately grouped and prescribed the teacher has to reorganize and regroup the given sub matter into units. “A unit may be defined as large sub division of the subject matter where in a principle or a topic or a property is central to the well organized matter”.

According to Priston “A unit is as large as block of related subject-matter that can be overviewed by the learner”. Samford defines: “Unit is an outline of carefully selected subject matter which has been isolated because of its relationship to pupils’ needs and interest”.

#### **The unit should satisfy the following criteria:**

- a. It should satisfy the unity or wholeness of learning activities related to some problem or project.
- b. It should emphasize the psychological principle of ‘learning by whole’.
- c. It should give importance to integrated learning outcomes.
- d. It should emphasise the organisation of the subject matter into units of experience.
- e. It should not represent only the subject matter but learning experience as well.
- f. It should facilitate the organisation of similar type of contents methodically.
- g. It should enable the teachers to achieve a certain set of specific instructional objectives

### **‘Check Your Progress’ -1**

1. Define an unit.

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2. Give two criteria of good unit

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## **15.4 Unit Plan**

### **15.4.1 Meaning of Unit Plan**

For teaching a unit, the teacher has to prepare a unit plan. While planning a unit due care should be taken with regard to the nature of subject matter, the conditions under which it is to be taught, the needs of pupil etc. The teacher who is competent enough in the subject matter should prepare unit plan.

The unit plan is simply defined as a means of organising instructional activities and materials into larger, related, unified patterns of learning in order to achieve significant educational objectives. The dictionary of education describes, unit plan as “An organisation of various activities experiences, and types of learning around a central problem or purpose, developed co-operatively by a group of pupils under teacher leadership”.

According to Burton, “The important thing is to provide a combination of subject matter and process which will have real meaning for the learner which will aid him in continuously integrating learning”. According to Bossing, “Unit planning consists of a comprehensive series of related and meaningful activities, so as to achieve pupils purpose, and provide significant educational experiences and it results in appropriate behavioural changes.

On the basis of this the characteristics of a unit planning are:

1. The unit is organised around the purposes of the learner.
2. The unit plan should be unified.

3. The unit plan is a place of beginning and ending.
4. The learning activities should be educationally significant.
5. The unit plan is comprehensive which involve two or more lessons.
6. The unit plan is practicable in the given setting.
7. The unit plan should have variety of activities or learning experience.
8. The unit plan should have unit test.
9. The unit plan prepared with full co-operation of student and teacher.
10. The good unit plan provides further action - It must stimulate students for further study.

#### **15.4.2 Need and Importance**

In every activity, systematic planning is absolutely essential the present educational scenario is based on scientific planning. Without planning, education will not move a step forward. For every activity of human beings planning is a prerequisite.

1. The unit planning is likely to ensure more integrated and meaningful learning experience for the students.
2. Unit planning incorporates a great variety of learning activities, such as reading, writing speaking, listening dramatizing, experimenting, co-operative planning researching and reporting.
3. Unit planning makes use of many kinds learning aids and teaching aids, such as audio-visual aids, lab-equipments, and community resources.
4. Unit planning meets the individual difference in the school, because it was rich, varied aids and activities.
5. Unit planning gives wide opportunity for the students to choice, greater appeal to diversified interests and better use of talents assured.
6. Unit planning gives integrated knowledge to the subject matter so that continuity in learning is possible.
7. It is based on the psychological principle of learning by whole.
8. Student involvement is more, so the motivation of students may be sustained though out the year

### **15.4.3 Guidelines for Preparing Unit Plan**

While planning a unit the following factors should be born in mind as a guide lines.

1. Objectives with specifications
2. Content analysis
3. Learning activities
4. Testing procedures

**Content analysis** - Unit planning emphasises is placed on the organisation of its contents into concepts, situations, processes generalizations, conclusions, principles, laws, relationships, etc.

In language units, it should be organised into new words, new phrases, idioms, facts, figures of speech, central idea, concepts, proverbs, word building etc. This helps the teacher to have thorough knowledge of the subject matter including its scope and significance. The teacher enters the class with full confidence since he will have mastery over the subject matter. Content analysis gives the ideas to the teacher and that he will not miss any point of subject matter.

**Objectives** - General and specific objectives should be well stated so that they will be realized through unit teaching.

**Learning activities** - In order to realize the objectives he will have to organise learning activities, in most beneficial manner; keeping individual differences and psychology of students he must make use of learning aids and teaching aids while organising learning activities. Three types of learning activities are organized:

1. Introductory activities which are carried out before starting unit.
2. Developmental activities which will be used at the development of the unit.
3. Follow up activities for the future use.

**Testing procedures** -This is last step in the unit plan. Here unit test and types of evaluation tools should be mentioned. Thus the teacher would get the evidence of the realization of objectives.

### **15.4.4 Merits and Demerits of Unit Plan**

#### **1. Merits of units plan**

- a. It will accommodate the needs, capabilities and interest of pupils.
- b. It will provide variety of learning experiences.

- c. It will be based on psychological principle of learning by whole method which is useful.
- d. The units are interrelated in order to give continuity for learning and facilitate holistic idea of subject matter among the students.
- e. Pupil-teacher relations are good because it is planned with teacher-pupil co-operation with that democratic atmosphere in the classroom.
- f. It will provide individual differences in schools.
- g. The material of the unit should consist of familiar and related topics.
- h. It is flexible for above average students, may go beyond the limits of the unit.
- i. It is related to social and physical environment of the students.
- j. It uses learning aids, so that learning becomes more interesting for the students who will be motivated.
- k. It incorporates certain follows up activities which satisfy the tutor needs of pupils.

**2 *Demerits of unit plan***

- a. It is not economic - needs competent teacher to plan various activities.
- b. It is not that easy to get related concepts in one year syllabus.
- c. Syllabus is not flexible.
- d. Some units once not systematically arranged and they confuse and discourage students.
- e. Evaluation is not possible at lower stage.

**‘Check Your Progress’-2**

- 1. Define unit planning

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2. State two merits of unit planning.

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#### 15.4.5 Format of Unit Planning

1. Title of the unit
2. a. Class, b. No. of sub units, c. No. of class period required.
3. Significance and scope
4. General objectives
5. Instructional objectives
6. Introductory activities
7. Development

Sub unit No.	Content (in terms of major concepts/ principles)	Outline of teaching approach/ leaning experience	Learning aids
Sub Unit 1			
Sub Unit 2			

8. Review Techniques
9. Evaluation-unit test
10. Suggested follow up activities
11. Reference Materials
  - c. For Students
  - d. For Teachers

Example of unit plan

- I. 1. Title of the unit - properties of liquids

- II. 2. i) Class - IX Standard
- ii) Submits -
- a. liquids show the properties of fluidity
  - b. Liquid transmit pressure in all directions
  - c. Application of Pascal's law
  - d. Pressure on the bottom and wall of the vessels and inside the liquid
  - e. Liquids tend to keep their level.
  - f. Liquids exert up word thrust or force of buoyancy
  - g: Floatation of a body depends upon the specific gravity of the body as well as that of the liquid.
- iii) 7th Class (45 minutes period)
- III. Scope of significance-liquid is one of the essential states of matter, liquid properties will give the important laws like Pascal's law Archimedes law, which are the basis for floating bodies.
- IV. General Objectives:
1. The pupils will get the knowledge about properties of liquid.
  2. The pupils understand the properties of liquids.
- V. Specific objectives:
1. Students will recall the properties of liquids
  2. Students will recognize the different properties of liquids.
  3. Students will be able to explain the Pascal's law of liquids.
  4. Students will be able to analyse the properties of different liquids.
  5. Students will be able to solve mathematical problems.
  6. Students will be able to get the manipulative skills - constructive skills.
- VI. Introductory activities.
1. Teacher explains three states of matter.
  2. Teacher explains with example the arrangement of atoms in liquid.
  3. Teacher gives back ground with showing liquids available.
  4. Teacher use the liquids like water and explain the general properties.

## VII Development

Sub unit	Major content concepts/principals	Art line of teaching approach/teaching experience	Teaching aids
1. Liquids shows the property of fluidity	Concept of fluidity; ripple formation fluidity in different liquids	Inductive with experiments approach	Patridishes says different liquids apparatus to show ripple formation
2. Liquids transmit pressure in all direction	Pascal's law	Demonstration with Pascal's ball, relationship between pressure transmitted and direction of transmission pressure exerted in all directions	Pascal's ball, apparatus to show pressure of liquids at the bottom and sides of up cylinder
3. Application of Pascal's law	Construction of working of Hydraulic machine	Construction and working of Hydraulic machine mathematical problem based upon it.	Working modes of hydraulic machine chart sharing its structure, function cotton.
4. Pressure on the bottom and walls of vessels and inside liquid	Pressure on the bottom and wall of vessels inside the liquid	Experimental approach calculating mathematical problems	Vessels of different feror shapes different liquids.
5. Liquid tend to keep their level	Law of inter connected vessels; River holes system; application of this proper	Demonstration method application to this proper	Apparatus of inter connected vessels – modes or chart-showing river lock system city water supply system fountain.

6. liquids exerts up word thrust or force of buoyancy	Archimedes principle –relationship between buoyancy and specific gravity of liquid	Experimental approach	Beakers, Spring balance weight box, wood, water, and metal, apparatus for Archimedes different liquids.
7. Floatation depend on specific gravity of the body as well as that of liquid	Floatation of different solids in different liquids their relationship construction and working of hydro meter	Experimental/ approach	Beakers, cork, alpines, kerosene mercury, paraffin iron piece, cylinder sponge hydro meter.

8. Review techniques
9. Unit-test
10. Suggested follow up activities
11. Reference materials
  - a. For students
  - b. For teachers

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## 15.5 Let Us Sum Up

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- Unit planning is one of the types of planning for teaching.
- Unit means a large sub division of the subject matter where in a principle or a topic or a property is central to the well organised matter.
- Unit satisfies the wholeness of learning activities.
- It must give importance to integrated learning out comes.
- It should organise similar type of content
- It should be organised in such way that pupils get benefits of proper exposure.

- It must fulfill same objectives.
- For teaching any unit, a teacher's foremost duty is to prepare unit plan.
- Unit plan is organised instructional activity and presents the materials into larger, related unified patterns of learning in order to achieve significant educational objectives.

Guide lines for preparing unit plan.

1. Content analysis
2. Objectives with specifications
3. Learning activities
4. Testing procedure

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## **15.6 Answers to 'Check Your Progress'**

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### **'Check Your Progress' - 1**

1. Unit is a large sub division of the subject matter where in principle or a topic or property is central to the well organised matter.
2. a. Unit emphasizes wholeness of subject matter  
b. It should be organised in such a way that it achieves a certain set of specific instructional objectives.

### **'Check Your Progress' - 2**

1. Unit planning consists of a comprehensive series of related and meaningful activities, so, as to achieve pupils purpose, and provide significant educational experiences and it results in appropriate behavioral changes.
2. Two merits of unit planning
  - i) Units are interrelated, so it will give continuity of learning so that students will get holistic idea of subject matter
  - ii) It is planned with teacher pupil co-operation.

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## **15.7 Unit-End Exercises**

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1. Define unit.
2. Describe the criteria of a good unit.

3. Define unit planning.
4. Explain the guidelines for preparing unit plan.
5. What are merits and demerits of unit plan?
6. Prepare unit plan format.
7. Prepare unit plan of subject of your choice.

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## 15.8 References

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## **UNIT - 16 □ LESSON PLAN**

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### **Structure**

#### **16.1 Introduction**

#### **16.2 Objectives**

#### **16.3 Lesson Plan**

##### **16.3.1 Meaning and Concept**

##### **16.3.2 Need and Importance**

##### **16.3.3 Guidelines for Preparing Lesson Plan**

##### **16.3.4 Format of the Lesson Plan**

#### **16.4 Let Us Sum Up**

#### **16.5 Answers to ‘Check Your Progress’**

#### **16.6 Unit-End Exercises**

#### **16.7 References**

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### **16.1 Introduction**

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In the last unit you have learnt about year plan, and unit planning. These two planning for teaching will not meet the immediate needs of pupils as well as class teachers if they are not planned properly. So teachers have to plan daily teaching plans, they are also called “Plan of Action”. This type of planning teachers will get the necessary guidelines for the day’s work. Good lesson planning is essential to a good teaching which is the basis for the most effective teacher pupil planning within the classroom activities.

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### **16.2 Objectives**

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After studying this Unit you will be able to:

- Explain the meaning of lesson plan
- Comprehend the need and importance of lesson plan

- Understand the guidelines for preparing lesson plan
- Formulate the format of the lesson plan.

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## 16.3 Lesson Plan

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### 16.3.1 Meaning and Concept

Detailed planning of one lesson is called lesson planning which is the basic unit of planning for teaching, on which the success of teaching depends. A good lesson plan is a guide to the teacher. It is the outline in detail the various steps the teacher purposes to take in his class. In general a lesson plan indicates the aims to be realized by teaching a lesson, the methods to be employed and activities to be undertaken in the class so that it is kept engaged the realization the aims and objectives. So, it is called as “plan of action”.

Following definitions indicate the broad meaning of lesson plan. Bining and Bining define: “Daily lesson planning involves defining objectives, selecting and arranging the subject matter and determining the method and procedure.”

According to Carter V. Good, “A lesson plan as ‘a teaching outline of the important points of lesson arranged in order in which they are to be presented. It may include objectives, points to be asked, references to materials, assignments.”

Bossing N. L. states: “A Lesson plan is an organized statement of general and specific goals together with specific means by which these goals are to be attained by the learner under the guidance of teacher on a given day.”

A lesson plan is actually a plan of action of what the teacher has to perform in the classroom. Lesson plan is teacher’s mental and emotional visualization of classroom activities. Lesson plan is window through which all the academic activities of the teacher can be seen.

Lester B. Stands has given a very comprehensive definition of lesson plan. It reads: “Lesson plan is a plan of action therefore it includes the working philosophy of the teacher, his knowledge of philosophy, his information about and understanding of his pupils his comprehension of the objective of education, his knowledge of material to be taught and his ability to utilize effective methods.”

From all these definitions it is concluded that lesson plan:

- i. is plan of action
- ii. is a blue print
- iii. teaching outline

- iv. is a creative piece of work
- v. is an elastic but systematic approach for teaching concepts, skills and understanding etc.
- vi. mental and emotional visualization to words class work.

### **16.3.2 Need and Importance**

Planning is essential for teaching. To be effective, teacher has to plan lesson plan. Bagley has put it thus, “However able and experienced the teacher, he could do never without his preliminary preparation.”

#### **Importance of Lesson Plan.**

1. It ensures definite aim for each day’s work.
2. It makes the teacher to be systematic and orderly in the treatment of the subject matter.
3. It gives confidence to the teacher as he has beforehand dealt with problems and the ways to handle them.
4. Planning helps the teacher to avoid needless repetition.
5. It saves time and energy of the teacher because he has prepared systematic way, so he does not go haphazard.
6. It ensures suitable use of learning aids at the proper time.
7. It ensures proper assignments according to the mental level of students.
8. It stimulates the teacher to introduce necessary questions and illustrations.
9. Lesson planning helps the teacher to make use of principles of correlation and integration by seeking, the following types of links.
  - i) Linking new knowledge of subject with prevailing knowledge of students.
  - ii) Linking the lesson with the knowledge of other related subjects or socio-physical environment of the students.
  - iii) Linking the theory with practical application
10. Lesson planning provides sufficient help to both teachers as well as students in respect of evaluating the process of teaching and learning process.
11. Lesson planning helps the teacher to base adequate mastery over the contents or the subject matter to be presented in lesson plan.

### **16.3.3 Guidelines for Preparing Lesson Plan**

For preparing lesson plans Herbatian approach or steps were used to a great extent. They are.

1. Preparation
2. Presentation
3. Association and Comparison
4. Generalisation
5. Application

#### ***I. Preparation***

This step is concerned with the preparation of teacher who has to prepare students to revive new knowledge. This is very essential for both teacher as well as the pupils. It is the step where teacher will have to understand where the pupils are and where they should try to be? Are the two essentials of good teaching, this is also known as introduction?

In the preparation the 'will to learn' is aroused to some extent. Whereas, in motivation, it is reinforced to a higher extent.

Main features of preparation.

1. It should contain no new knowledge
- 2 It should stimulate curiosity
- 3 It should be as brief as possible

#### ***II. Presentation***

It is here that the actual lesson is commenced. This step should involve a good deal of activity on the part of the students. The teacher will make use of various devices, e.g. question, illustrations, explanation, exposition demonstration, and audio-visual aids.

The teacher should have following principles in the presentation stage.

1. Principles of Selection and Division - The material should be wisely selected. It should be divided into different sections. The teacher must also divide how much information to be given to students.

2. Principle of Successive Sequence -The different sections should be well connected and maintain proper sequence.
3. Principle of Integration - At the end of lesson whole learning experiences should be integrated to facilitate better understanding of the whole subject matter.

**Association and Comparison:** This step is related to the task of acquisition of new material and knowledge which should be associated with previous knowledge. The new facts should be compared with old facts or another set of facts so that learning subject matter will be easy for students.

**Generalization:** In this step the teacher has to systematize the knowledge learnt by the pupils. In inductive type lessons, the students will have to generalize some formulas, rules. The teacher should see that students should draw out conclusion or make a generalization. It is product part of the students thinking by the lesson. In the word of Ryburn, "It is bad teaching which gives readymade general conclusions. So the child with teacher's help and guidance must be led to make the generalizations for himself.

**Application:** Knowledge will be useful only when it is practically applicable. The fundamental laws of learning reveals that the consolidation of knowledge takes place only when the knowledge learnt is applied to similar situations. Application also serves the purpose of recapitulation.

The following steps should also be considered.

1. Lesson plan should be written in such a way planner should have clear idea of subject matter.
2. It should have clearly stated aims and objectives.
3. While formulating lesson plan, physical conditions of the class room should be kept in mind.
4. It should have techniques of teaching and illustrating aids.
5. It should facilitate lineage between previous knowledge of subject matter and present new knowledge.
6. It should provide ample of activities for the students.
7. Black board work should be clearly shown.
8. Questions should be well planned.

9. There should be provision for individual attention.
10. Use of teaching aids at proper time should be given.
11. It should be flexible.
12. It should include assignments for students.
13. It should provide scope for self-evaluation.

#### 16.3.4 Format of the Lesson Plan

Name : Class :  
 Subject : Topic :  
 Date : Period :  
 Lesson No :

Major Concepts / Principles

#### Instructional Objectives:

The pupil will be able to -

Learning Aids.1.

2.

3.

4.

5.

#### Introduction

Expected Previous Knowledge	Introductory activities

**Statement of Aim :**

**Development :**

Specifications	Content Analysis	Teaching Approaches/Learning Experience	Education
Review			
Re-capitulatory Questions		Black Board Summary	

**Home Assignment :**

**'Check Your Progress' - 1**

1. Lesson plan is...
  - a. year plan
  - b. daily teaching plan
  - c. week plan
  - d. monthly plan
2. 'Plan of action' is called as.....
  - a. year plan
  - b. unit plan
  - c. long rough plan
  - d. lesson plan

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**16.4 Let Us Sum Up**

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Lesson plan is a plan of action which gives definite aim for the daily lessons of the class teacher. The steps involved in the lesson are:

1. Preparation
2. Presentation
3. Comparison and association
4. Generalisation
5. Application
6. Recapitulation

### **Importance of the lesson Plan**

1. It ensures definite aim for each day's teaching programme
2. It enables the teacher to be systematic and orderly in the treatment of the subject matter.
  3. It gives confidence to the teacher as he has beforehand dealt with problems and the ways to handle them.
  4. Planning helps to avoid needless repetition.
  5. It saves time and energy of the teacher who has prepared systematically.
  6. It ensures suitable use of materials and contents at the proper time.
  7. It ensures proper assignments according to the learning capacity of students.
  8. It stimulates the teacher to introduce necessary questions and illustrations.
  9. Lesson planning helps the teacher to make use of principles of correlation and integration by seeking, the following types of links.
    - a. Linking new knowledge of subject with prevailing knowledge of students.
    - b. Linking the lesson with the knowledge of other related subjects or socio-physical environment of the students.
    - c. Linking the theory with practical application
  10. Lesson planning provides sufficient help to both teachers as well as students in respect of evaluating the process of teaching and learning process.
  11. Lesson planning helps the teacher to base adequate mastery over the contents or the subject matter to be presented in lesson plan.

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## **16.5 Answers to 'Check Your Progress'**

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### **'Check Your Progress' - 1**

1. (b) daily teaching plan
2. (d) lesson plan

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## **16.6 Usnit-End Exercises**

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1. Define "Lesson Planning"
2. What is the need and importance of the lesson plan?

3. What are the suitable guidelines for preparing lesson plan?
4. Prepare a lesson plan of subject of your choice by using format given.

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## **16.7 References**

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## **UNIT - 17 □ RESOURCE UNIT**

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### **Structure**

#### **17.1 Introduction**

#### **17.2 Objectives**

#### **17.3 Resource Unit**

##### **17.3.1 Meaning and Concept of Resource Unit**

##### **17.3.2 Need and Importance**

##### **17.3.3 Guidelines for Preparation**

##### **17.3.4 Format**

#### **17.4 Let Us Sum Up**

#### **17.5 Answers to ‘Check Your Progress’**

#### **17.6 Unit-End Exercises**

#### **17.7 References**

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### **17.1 Introduction**

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Already, we have discussed about unit planning, lesson planning and year planning exercises. The unit planning approaches for class room teaching is the most promising approach because they consist of (i) broad comprehensive units or related problems or projects (ii) a series of related activities to provide common learning for a group as a whole and individual learning in terms of specific, needs, and interests and problems of students. (iii) evaluation materials for determining the outcomes of work in terms of behaviour changes in students these were discussed in the last units.

The school teachers have by and large failed to work democratically and creatively with a group of students. They only use conventional materials such as prescribed textbooks which are not adequate for creative teaching. They also provide ready-made plan for teachers, Daily assignments are also taken from those text books only. Hence, always preplanning is based on textbook assignments.

This situation becomes entirely different once the teacher breaks away from the ground-to-be-covered-textbook-assignment-recitation procedure, and seeks to develop a new concept of scope and sequence and new classroom procedure, based on the

thesis. These measures are needed for a teacher to work democratically. The “Resource unit” or guide is designed to bridge the gap between traditional planning and modern teaching. The present unit relates to modern teaching which is based on ‘Resource Unit’.

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## **17.2 Objectives**

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After studying this unit, students will be able to:

- Explain the meaning and Resource Unit.
- Bring out the need and importance of Resource Unit.
- State the guidelines for the preparation of Resource Unit
- Formulate the format for Resource Unit.

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## **17.3 Resource Unit**

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### **17.3.1 Meaning and Concept of Resource Unit**

The resource unit is a reservoir out of which the teacher works co-operatively with the students from whom he may draw helpful suggestions for developing a learning unit in a classroom. Thus it is developed in advance of the day-to-day works of the classroom.

The following definition will indicate the nature of such pre planning: A resource unit is a systematic and comprehensive survey, analysis and organisation of the possible resources (e.g., personnel problems, issues, activities bibliographies) and suggestions as to their use, which the teacher might utilize in planning, developing and evaluating proposed learning unit in the class room.

Since 1938 there have been noteworthy attempts to develop resource units in various fields, principally in social studies.

Lavone Hanna describes: “A resource unit as a reservoir from which teachers can draw suggestions and materials for making teaching unit or for preparing for student-teacher planning.”

A Commission on the secondary school curriculum of progressive education association has defined resource unit as a preliminary exploration of a broad problem or topic to discover its teaching possibilities.

National Council of Social Studies defines: “ A resource unit consists of rich resources from which individual teacher can extract procedures which will help him to teach most effectives learning.”

Accordingly, essentially resource unit is a comprehensive analysis and organisation of objectives, problems, activities, materials which form a unit in sequence of plans for achieving the purpose of education. It is made by teachers and is a form of pre planning designed to guide them in their selection of instructional problems and materials out of resource unit actual teaching unit may be built. A resource unit may be made by one teacher or by a group of teachers specialized and experienced in the same subject.

### **17.3.2 Need and Importance**

- a. Resource unit is an encyclopedia for the topic that teacher want to discuss and which helps to make the classroom teaching more effective.
- b. Resource unit furnishes suggestions for materials, methods activities, teaching aids, and evaluative procedures for building a learning unit.
- c. Resource unit provides means of helping the teacher to organize materials so that he can depart from the traditional use of the text book as a guide in curriculum development.
- d. Resource unit provides suggestions for teachers for translating an educational philosophy into practice.
- e. Resource unit serves as a guide in helping the teacher to include in the learning unit certain important values basic to education.
- f. Resource unit sensitizes the teacher to all the significant problems and issues that have a bearing on an area of living.
- g. Resource unit utilizes the personnel resource of the school appropriate to the co-operative pre-planning of a Unit
- h. Resource unit conserves the time of the teacher.
- i. Resource unit makes to possible to have teaching materials available when need.
- j. Resource unit provides the ways and means of evaluating learning outcomes of the unit are usually suggested.
- k. Resource unit gives suggestions for related materials to be used with students with special interest and special abilities

### **17.3.3 Guidelines for Preparation**

1. Resource units are of value on all learning situations involving flexibility and teaching - learning procedures.

Resource units are most widely used in core program development since such programs call for organization of material which draws freely from many subject fields. So text book because inadequate and needs more flexible approach which calls for wide variety of resources. In the development of resource units, the teacher breaks the bonds of tradition and needs help in discovering and utilizing wide variety of resources.

2. Resource units are best developed by a group of teacher rather than by one teacher. When the resource unit is prepared for as subject field, teachers representing different fields of specialization can offer suggestions for enrichment.
3. Resource units are likely to be most effective when they are used by the group that proposes them.
4. The resource unit should be organized and indexed for effective use and published in a form that facilitate frequent and easy revision.

If the resource units are to be valuable they must be kept up to date and modified in the light of the experience of teachers using them. For this reason, it desirable to publish them in loose leaf form or to leave blank pages at the end of each section for suggested revision.

5. A program of resource unit development requires that ample provisions be made for physical facilities, released time for participants, secretarial and constant service and the like.

Preparing resource units requires a great deal of time and energy. It should not be relegated to after school hours. It should be regarded as a necessary and valuable port of the teaching load. The workshops should be conducted during periods in which teachers are paid. There should be encouragement and sufficient budget provided for various types of services. So, a high quality of leadership is required and should be ensured.

Keeping above criteria in mind, some of guidelines to organize / prepare resource units are as follows.

- i. Philosophy and purposes: The purpose of the resource unit should be clearly stated.

Purpose stated in a resource unit should represent the highest level of agreement among the members of group preparing it.

- ii. The scope: The resource unit should contain a statement of the scope i.e., limits of the subject area included and the basic content in the form of concepts, issues, or problems.
- iii. The purpose is to brief the teacher on the possibilities and appropriateness of the area for the development of teaching learning unit for a particular class. Title of the unit and its significance at this stage, the teacher would indicate the importance of the unit.
- iv. Grade placement and time allotment. Here the teacher would indicate the level for which the resource unit has been prepared and time allotted for the unit which suggests how long the learning unit would progress.
- v. Concepts and Generalization: Major concepts and generalizations to be developed and drawn of unit area to be clearly spelt out keeping in view the maturity level of the pupil concerned. There should be adequate provision to draw generalizations from the isolated bit of knowledge.
- vi. Anticipated outcomes:
  - a. Instructional objectives are to be formulated keeping in view the objectives of the unit in particular and those of education in general.
  - b. Objectives which include behavioural changes that we intended to bring about in major areas like knowledge, understanding, skill and attitude.
- vii. Content analysis of the unit: Its purpose is to establish the content in a particular unit. It permits the teacher to visualize the broad scope of the area to be taken into account and all significant points in the classroom.
- viii. Suggested activities: This is often referred to as heart of the resource unit. These are classified in to three types.
  - a. Introductory activities: These activities are generally needed for introducing the new concept they related to common experience of every individual. They are easily under stable and directly lead to the topic to be taught.
  - b. Developmental Activities: These activities when the introduction ends. These will be carried out while teaching unit and therefore to drill the concept into the minds of students concrete examples were taken.
  - c. At the end of the each unit there will be follow up activities.

- ix. Evaluation: Evaluation procedures and instruments selected in terms of the stated objectives should be included as an integral part of the resource units.
  - a. Discussion and observation by teacher is desirable
  - b. Self evaluation on the part of the teacher is highly desirable.
- x. Follow up Activities: The value of all learning is to provide such rich experience to the learners so that he is able to face real problems in life and get through them successfully. That is real proof for effective teaching. In this respect a few follow-up activities which the pupils are able to carry out to their own are to be listed at the end of the resource unit.
- xi. Resource Materials / Reference Books: At this step of resource unit, all the reading material, for students, for teachers, audio visual aids used, community resources, pamphlets periodicals, free and in expensive materials, films, film strips, recordings, models, pictures maps etc. which might be written which is helpful to a class in developing a learning unit to be collected.

#### **17.3.4 Format**

1. Title of the unit and its significance
2. Grade placement and time allotment
3. Concepts and generalizations
4. Anticipated outcomes
5. Analysis of the unit in terms of content
6. Suggested activities:
  - a. Introductory activities
  - b. Developmental Activities
7. Evaluation
8. Follow-up activities
9. Resource materials and References

**‘Check Your Progress’ -1**

1. Define Resource Unit

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2. State two criteria of organisation of Resource unit

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**17.4 Let Us Sum Up**

The preparation of resource unit plan is a valuable procedure for planning teaching programmes. It provides means of introducing flexibility in teaching practices and promotes interaction among the staff members representing different interests. This cooperative relationship among the staff members server to enrich learning activities in the class room

**Criteria for Organizing Resource Unit Plans**

1. It is developed by group of teachers
2. Resource unit plan is most effective when it is used by a group of subject specialists.
3. It should be revised and updated.
4. Resource unit plan need, physical facilities, time for participants, consultant service, secretarial service.

The resource unit plan is organized keeping in mind following elements.

1. Title and significance
2. Grade and placement time
3. Concepts and generalizations
4. Anticipated out comes
  - i. General objectives
  - ii. Specific objectives

5. Content analysis
6. Suggested activities
  - i. Introductory activities
  - ii. Developmental activities
7. Evaluation
8. Follow up activities
9. Reference material, resource materials.

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## **17.5 Answers to ‘Check Your Progress’**

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### **‘Check Your Progress’ -1**

1. Resource unit is an encyclopedia for the topic that teacher wants to discuss and helps to make the classroom teaching more effective.
2. a. It should be prepared by group of teachers  
b. It should be updated every year

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## **17.6 Unit-End Exercises**

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1. Define Resource unit plan and explain its need for the class room teachers.
2. Explain the criteria for organising resource unit plan
3. Prepare Resource unit plan using format given in the present chapter choosing subject matter of your choice.

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## **17.7 References**

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## **UNIT - 18 □ PLANNING FOR TEACHING IN THE INDIAN CONTEXT**

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### **Structure**

- 18.1 Introduction**
- 18.2 Objectives**
- 18.3 Planning for Teaching in the Indian Context**
  - 18.3.1 Problems and Constraints of Planning For Teaching**
  - 18.3.2 Possible Solutions**
- 18.4 Let Us Sum Up**
- 18.5 Answers to ‘Check Your Progress’**
- 18.6 Unit-End Exercises**
- 18.7 References**

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### **18.1 Introduction**

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Teaching itself is a complex activity. It does not only pour information into the heads of pupils, but it is much more than mere giving information when teacher enters into the teaching profession. Planning for a diverse group of students is not only a desirable skill for a new teacher but essential one because; there is diversity among the students. Naturally there are many other problems and constraints of teaching. In the proceeding chapter you will know more about all these problems and find possible solutions for them.

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### **18.2 Objectives**

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After studying this unit, you will be able to:

- Identify the problems of planning teaching
- Understand the constraints of planning teaching
- Find out possible solutions for problems of planning for teaching.

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## **18.3 Planning For Teaching in the Indian Context**

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### **18.3.1 Problems and Constraints of Planning For Teaching**

It is recognized that the student population in schools today is becoming increasingly diverse. Teachers must address the needs of students with diverse linguistic and cultural backgrounds. They are additionally being asked to teach students with disabilities.

There are three major groups of students who contribute significantly to the diversity within the classroom.

1. Students with varied cultural and linguistic backgrounds.
2. Students considered “at risk”
3. Students with disabilities.

First, students’ diverse cultural and linguistic background amalgamated to a single group has enriched the classroom today. Their presence has created opportunities to learn about custom, beliefs, and traditions that may be outside the personal experiences of the teachers and other students. Many of those students however experience “cultural shock” in class rooms where their personal preferences for learning and performing don’t match to the expectations of school setting.

In a class where students’ primary languages are different, it is quite challenging for those who do not speak English which can facilitate a smooth transition to a new school environment.

So, teachers must learn about the individual student preferences and must find ways to accommodate them. They may also need to help their students to learn English. So the teacher finds its challenges to help them and their cultural variations.

A second group of students coming to school is “at risk” can be found both within our society at large and within our schools. The increase in drug and alcohol use/abuse, poverty, teenage pregnancy, physical and emotional abuse, homelessness, and lack of supervision are some societal problems. That can cause students to come to school unprepared to learn.

The third group of students that has contributed significantly to the diversity of the general education classroom is students with disabilities when the Education for all Handicapped Children Act was passed in 1975. It revolutionized service delivery to these students.

The least restrictive environment (LRE) mandate was the first time in the history of special education that integration of students with disabilities was made a priority within all school districts. Placement in the LRE for students with disabilities often means spending time in the general education classroom.

Today, the majority of these students remain in the general educational classroom for a significant portion of their school day.

Therefore it is unusual for general education teacher to provide some individualized service. With all these diversity there are many problems for the teacher.

### **Problem of Readjustment from Learning to Teaching.**

Before entering into the teaching profession, a teacher is concerned with only acquisition of knowledge and skills. But, after teaching profession his transition takes place from hearing to teaching. He must deal with living mind before him. So he faces many problems of readjustment.

- a. The problem of disinterested and in-attentive pupils is of most embarrassing problem in contemporary education or any teaching.
- b. Problems due to large classes: Present day classes are overcrowded. There are numerous problems for the teacher, and he cannot provide individual attention to all the students. Control over the class becomes very difficult.
- c. Problem of rigid time-table and syllabus: Teacher in the present day classrooms work under restrictions of rigid syllabus and time-table. Also pressing demands of examination too contribute to the problems. Hence a teacher cannot demonstrate originality and modify the subject-matter according to the needs of the pupil.
- d. Problem of evaluating the written work: Another problem for class teaching correction of written work may become heavy burden on the part of the teacher because of large classes.
- e. Problem of lack of preparation by teachers: If teacher has not prepared the lesson well, he/she will not feel confident enough to conduct the classes effectively.
- f. Problems of personality of the teacher: If a teacher is not agreeable and co-operative in nature and he has not understood the psychology of the students, it is difficult for the students to co-operate with him.

These are some of the problems and constraints for planning effective teaching.

### 18.3.2 Possible Solutions

- The teacher should cultivate better teaching skills and capability in order to be successful in working with diversity of student population with feeling of responsibility to do so.
- The diversity of students requires a special kind of a teacher. Regardless of the age and experience level of the teacher, this educator always views teaching as an important and exciting profession. This type of teacher shoulders a responsibility to teach all students and see diversity as a challenge.
- Planning should be done with the needs of all students in mind and using many strategies of teaching which are essential for the success of students “at risk” or students with disabilities.
- Cultural diversity needs to be considered when planning lessons and activities. It is important to be educated about culture and cultural perspectives. It is also important to be aware of your own cultural back ground and how this affects beliefs, values, expectations and in turn, the choice of subject matter, models, methods, management procedures etc.
- When planning the teachers must consider two general areas in which to provide for cultural diversity content and instructional management. While planning content, incorporate subject matter, materials, and examples which reflect the contributions and perspectives of a variety of cultures and the personal experiences and interests of students.
- The purpose is to help all the students feel valued, represented and motivated and to help the students become knowledgeable and tolerant of diversity.
- While planning the teachers must avoid stereo typing or over generalizing for e.g. don't think culturally diverse students will best learn through co-operative learning to avoid this make a best guess as to which methods will work most successfully for particular students and then monitor their progress carefully while planning multicultural topics may also be included.

While teaching the students from different cultural backgrounds the following are the other possible solutions of planning for effective teaching.

1. Use of right methods of teaching
  - The right method is one which aims at not only internal development but social moral and psychological development.

- Right methods should evaluate desirable values proper attitudes and habits of work in the students.
  - Verbalism should be removed and purposeful realistic situations were created for this purpose. Activity methods, project methods should be assimilated while planning for teaching.
2. Some modern trends in planning teaching
- Decreasing importance of class-teaching
  - Individualization of instruction
  - Provision of group work.
  - Advent of new psychology of education
  - New concept of teaching and learning
  - Reflective thinking and self activity
  - Changed role of the teacher.

Some modern methods have changed the scenario of teaching they should be included while planning for teaching they are.

1. Activity and play way methods: These methods are direct outcome of the shift of emphasis from the quantum of knowledge to the significance of pupil activities - intellectual physical, sensory and emotional.
2. The psychological methods: Understanding based on the psychological principle that there are individual differences and that no children are alike.
3. Use of Montessori methods: They involve spirit of liberty or freedom and are based on the principle of individuality art of education and sensory education.
4. The Dalton plan based on scientific approach to all that is to be learnt and lays emphasis in the altitude of the pupil to be like that of a scientist discovering truth by his own effort.
5. Winnetka plan of Dr. Carleton Wash Borne and his colleagues.
6. Gandhiji's Basic scheme of education is major Indian contribution to teaching and is direct outcome of his educational philosophy which means an all-round drawing out of the best in the child and man's- body, mind and spirit.
7. Socialized techniques of teaching may be included.

8. Lastly, new methods like programmed instruction, models of teaching were used while planning teaching. With all these methods syllabus and time-table should be made more flexible. So that rigidity of the syllabus can be removed.

The teacher is a first and foremost component of planning for teaching. He/she should play a role competent and most efficient person in planning teaching with him all other components like material money could be well utilized. Otherwise teaching-learning process will not be that effective for “educating children.

### **‘Check Your Progress’ - 1**

1. State two problems of planning for teaching

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2. State two possible solutions for the problem of planning for teaching.

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## **18.4 Let Us Sum Up**

Planning is an essential component of better teaching in the modern competitive environment. In the Indian context, it very difficult to make planning because:

1. Classes are over crowded.
2. Diversity among the students
3. Physical conditions are not up to the mark.
4. Use of ineffective teaching evaluating methods

In order to cope up with these problems, a teacher needs to find answers in proper planning for teaching. While planning for teaching:

1. Teacher must plan the needs and interests of pupil
2. Teacher should see take into account the differences in language, culture and needs, interests, background etc.

3. Teacher should use effective methods, materials, and modern techniques of teaching.
4. Teacher should remove the rigidity of the time-table and syllabus by adjusting methods of teaching.
5. Teacher must develop competency in planning, and to make effective teaching in the classroom.

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## **18.5 Answers to ‘Check Your Progress’**

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### **‘Check Your Progress’ - 1**

1. The two problems of Planning are:
  - a. Overcrowded classrooms
  - b. Diversity among pupils due to difference in culture and language
2. Possible solutions are:
  - a. Teacher should use effective methods like activity and project methods
  - b. Teacher should plan according to the needs and interests of the pupil.

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## **18.6 Unit-End Exercises**

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1. What are the problems of planning for teaching in Indian Context?
2. Suggest some of the possible solutions to improve the standard of teaching in India.

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## **18.7 References**

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**COMPULSORY COURSE 04 (CC-04)**  
**DESIGNING TEACHING STRATEGY**

**BLOCK 04**  
**DESIGNING TEACHING STRATEGY**

## **B.Ed. CC-04 : TECHNOLOGY OF TEACHING**

# **Block**

# **4**

## **DESIGNING TEACHING STRATEGY**

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## **BLOCK 04 : DESIGNING TEACHING STRATEGY**

### **INTRODUCTION**

A teacher wisely uses quite a good number of tactics, and skills to bring about the expected learning outcomes among the students. Apart from different methods of teaching, he or she may make use of teaching strategies also. This Block exclusively deals with different varieties of teaching strategies. **Unit 19** in this Block deals with the concepts like, teaching strategies, approaches and methods of teaching.

**Unit 20** deals with different approaches like, conceptual approach, and investigatory approach. **Unit 21** discusses about inductive approach and deductive approach. In **Unit 22**, you learn methods of approach, namely, lecture method and demonstration method. **Unit 23** deals with a special concept, known as 'Assignments' and **Unit 24** again gives the details designing a teaching strategy.

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## **UNIT - 19 □ TEACHING STRATEGY - AN INTRODUCTION**

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### **Structure**

- 19.1 Introduction**
- 19.2 Objectives**
- 19.3 Teaching Strategy - Concept, Importance**
- 19.4 Approaches and Methods - Differentiation**
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- 19.7 Let Us Sum Up**
- 19.8 Answers to ‘Check Your Progress’**
- 19.9 Unit-End Exercises**
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### **19.1 Introduction**

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Teaching is a noble profession, and here we deal with students. You know that, child’s mind is not like clay or wax, where you can mould it in to any type of sculpture or doll or idols that you want. In each and every moment, knowingly or unknowingly, the child will be interacting with the environment. This definitely will result in behavioural change. But you also know that, a teacher wants the desirable changes in the child. For this he utilizes a number of ways and means of teaching. You may feel interested to know a little more about such ways and means of teaching, like, what are these ways and means of teaching? How many types are there? Will it suit each and every child? Isn’t it?

The more you think in these lines, the more clarity you get by means of learning about teaching. Because teaching and learning are inseparable processes. According to philosophers, educationists and educational psychologists, the ways and means used by teachers while teaching is generally called approaches and methods of teaching.

Now a day you know that modernization in the name of globalization has made science and technology to penetrate in to the teaching and learning process of an educational system also. This in turn has resulted into an introduction of a new term what is known as *technology of teaching*. Teaching technology means “*a systematic measure to execute the complex process of teaching with a strong support of theory and practice of educational technology in which the main purpose will be bringing improvement in the task of teaching*”.

As it is told earlier, teaching is a highly skill-oriented job. So far you have performed your role as a *learner*. But now, you are learning to become a teacher. This requires an adequate training and preparation. Teaching technology definitely will help you to perform your role as a teacher more effectively and efficiently in the process of teaching - learning. Sometimes a teacher has to play the role very tactfully to treat the process of teaching as both a science and an art. For this teaching technology stretches its helping hands to a teacher. It makes a teacher more efficient and effective. Here the effectiveness is explained as the quality learning outcome and efficiency in terms of time taken for that output as less as possible. That is to say, a quality work is achieved in as short period of time as for possible. In other words, it is getting more and better output with the least input in terms of time and effort. Technology in teaching, if it is acquired by a teacher, then he will show an outstanding performance with reference to the following aspects:

- Communication
- Interaction with pupils
- Motivating/inspiring students to learn and also for self-learning skill

To evaluate, diagnose and reinforce the pupils’ learning behaviour

Now you may ask a question as how the above said qualities have been derived and assigned to teaching technology? Isn’t it? If you go through the fundamental principles and characteristic features of teaching technology it becomes very clear to you.

According to Vedanayagam E. G. (1988), teaching technology is distinguished by the following fundamental principles:

- Teaching is a scientific process involving content, communication and feedback as major components
- Teaching and learning are inter related
- Teaching - learning activities can be generated and could be modified / improved
- Learning outcome can be achieved by creating an appropriate learning environment
- Teaching technology involves strategies, approaches and methods of teaching.

Likewise, in this unit you will be introduced to the meaning, nature and importance of teaching strategies, approaches and methods of teaching in general; their inter relationship as well as the respective differences. It also describes you about how learning experiences are influenced and enhanced by teaching strategies.

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## 19.2 Objectives

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After studying this Unit you will be able to:

- Explain the term technology of teaching
- List out the characteristic features of teaching technology
- Define teaching strategy
- Explain the nature and importance of teaching strategy
- Differentiate between approaches and methods of teaching
- Correlate strategy, approaches and methods of teaching
- Differentiate learning experience from teaching strategy

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## 19.3 Teaching Strategy - Concept, Importance

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In order to bring about desirable changes in the learner, the teacher has to employ a number of devices. Having the same purpose, teachers in the long ago i.e., in the past history also have utilized a number of tactics and strategies. For example, our “*Panchatantra stories*”. Each and every story had one need or moral. Here the teacher was narrating the story in such a way that the child automatically was absorbing and inculcating the moral or the hidden need it in to his personality. So, here the story telling was just one among the many teaching strategies.

Let us take another example: A cheetah/leopard wrongly entered to a village, may be captured by using a scapegoat/dog or any domesticated animal. Here the use of a goat is an example for one more type of strategy. Instead of fighting directly with the leopard, villagers have utilized this *planned situation*.

In the story of Kisa Gowthami, Lord Buddha asks her to bring mustard seeds from a house where no death has occurred. Here Buddha did not preach anything directly to her instead, made her to undergo the learning situation so practically, in such a way that at the end she clearly understood how mortal everybody’s life is. Later she wholeheartedly started learning more about metaphysical questions like what is life? Is there after death?, etc., and she became one of best disciples of Lord Buddha.

My dear student, all the above given examples are suggesting you that there are plenty of strategies to teach the concepts of any type at any level of learning. So a strategy means, “It is a purposefully conceived and determined plan of action orienting towards the goal achievement.”

To tell you the truth, the term ‘strategy’ is popularly used in the battlefield, like different strategies are going to be employed to defeat the enemies. But here in the field of education who is the real enemy? It can’t be other than the Ignorance. Isn’t it? Therefore the teacher as a soldier has to fight with this enemy using several teaching strategies; so that the learner’s ignorance/ disabilities to learn will be defeated, and thereby desirable behavioural changes or the learning outcome is assured and there lies the teacher’s victory.

Strategies are the means to achieve learning objectives. In spite of the mastery over the content on the part of the teacher, he/she should be appropriately oriented with regard to the importance and various types of instructional strategies. It is because strategies form the essential and integral part in curricular transaction. Now let us look at some of the definitions of teaching strategies:

Smith et al (1970) identified teaching strategies basically “as being skillful plans that control the subject matter of instruction and direct student behaviour towards selected outcomes”.

E. Stones and S. Moris have defined the term teaching strategy in a very comprehensive way. They say that “teaching strategy is a generalized plan, for a lesson which includes structure, desired learner behaviour in terms of goals of instruction and an outline of planned tactics necessary to implement the strategy. The lesson strategy is a part of a larger development scheme of the curriculum.”

Now a question may arise in your mind that why one has to use these strategies at all? It is because the use of strategies gives a scientific touch to teaching. It gives the scope for empirical evidences with respect to goal achievement. Strategy tries to visualize the complete personality of the learner and creates a learning situation and also gives a chance to check the desired behavioural changes have achieved or not in cognitive, affective and psychomotor domain of the learner. Hence teaching strategies are said to be more scientific.

Different teaching strategies have different effectiveness in achieving different kinds of learning objectives. However, teaching strategies in general can be classified broadly in to two types, namely,

- Autocratic Teaching Strategy and
- Democratic Teaching Strategy.

***Autocratic Teaching Strategy:*** Here, the teaching strategies will be highly teacher centered and also content or the subject centered in their nature. Lecture strategy, demonstration strategy, tutorial strategy, narration strategy, description strategy, explanation strategy, illustration strategy, role playing strategy etc., can be cited as examples for autocratic teaching strategy.

***Democratic Teaching Strategy:*** Here, the teaching strategies will be highly pupil centered and also give more chance for the interactions between the teacher and the taught and also can have a many number of activities for the purpose of learning. Problem solving strategy, project strategy, group discussion strategy, questioning strategy, independent discovery strategy, guided discovery strategy, assignment strategy, field study strategy, brain storming strategy, computer assisted learning/ programmed instruction strategy, self - study strategy etc., can be cited as examples for democratic teaching strategy.

***Importance of Teaching Strategy:*** By understanding the meaning and nature of teaching strategies, now you may be in a good position to speak a few points regarding how important are these strategies for a teacher. The importance of teaching strategies are:

- More scientific and thereby they assure learning outcome.
- Visualize the child's personality completely
- Enhance the teachers' efficiency and effectiveness
- Give a scope for the critical analysis of a learner's behaviour with respect to learning outcome.
- It smoothens and quickens learning.

### **'Check Your Progress' - 1**

1. The quality of an education system depends upon the teacher's competency in terms of his :
  - a. qualification
  - b. experience
  - c. efficiency and effectiveness
  - d. mastery over the subject
2. Teaching strategies take the following point in to consideration as utmost important:
  - a. infrastructure
  - b. curriculum
  - c. syllabus covering
  - d. learner and his learning outcome

3. What are the major types of teaching strategies? Give two examples each.

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## 19.4 Approaches and Methods - Differentiation

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Wherever you come across interactions, whether it is between individuals, individuals and environment or whatever it may be, it gives a chance to think in terms of a different angle or vision i.e., approach. Suppose, a person is asking a favour from somebody, here the interaction shows that, the person who is asking a favour, will be polite enough in his approach. Isn't it? If, he is not polite in his approach means, the thing which he had in his mind (i.e., receiving a favour) may not occur at all. Here what I want to say you is, approach depends upon the nature of the task which has to be carried out. Now let us take-up the teaching profession. Here also, you come across interactions. Interaction between the teacher and the taught, pupil and pupil and also, between the subject to be learnt and the learner.

Such interactions also can be analyzed in terms of approaches, namely, teacher centered approach, learner centered approach/child centered approach, activity centered approach and subject centered approaches. Let us take up these approaches one by one to understand clearly.

**I. Teacher Centered Approach:** This is also called an expository approach. Here the interaction is dominated by telling, memorization and recalling of information. That is, usually teachers' role is dominated and students are passive recipients of knowledge. It appears almost like one way traffic. Sometimes, it results in very meaningful learning also. Lecturing, seminar activities, lecture-cum- demonstrations, special talks are the few examples coming under this category. In such a situation teaching environment will be very much formalized and teacher occupies the central position in the classroom.

**II. Subject Centered Approach:** In this type, the subject matter occupies the pivotal place, and all the curricular activities will be designed based on the subject matter. This is also considered as traditional type of approach.

**III. Learner Centered / Pupil Centered Approach:** You know that, teaching is a process of transaction. The information is transacted in a socio-emotional set up. The learner centered approach is characterized by the pupil dominated socio-emotional set up. Here

the teaching is considered as a bipolar activity; where teacher and the taught occupy the two poles. Whatever the teacher teaches will be determined by the child's need, interest, attitude, aptitude, and his background as well as his requirements. That is to say, the whole teaching - learning process is geared to the needs, requirements capabilities and interests of the pupils. The interaction here will be dominated by the students' role and activities under a very special type of learning situation where it is psychologically quite open. The teachers role here confines to creating a learning situation, from which a problem may be developed so that by exploring the resources available, students may identify issues, construct hypotheses, clarify and test hypotheses and draw some conclusions. Heuristic, project, discussions, and debates, problem solving etc., are the different approaches, which could be cited as examples under this category. The outstanding feature of this type of approach will be the active participation by the learner.

**IV. Activity Centered Approach:** Sometimes teachers will take up several activities in order to teach certain concepts/principles/generalizations/facts.

Here the activities have to be planned well in advance. The main philosophy behind this approach is that it considers child as a “**Constructor of Knowledge**”. It may demand the rehearsing of such learning activities also. Here one may come across of two types of activities, namely, (I) Short Term Activities and (II) Long Term Activities.

Usually science lessons will give much scope for activity centered approach for teaching in a class room situation. The subjects under social science category may need out of school activities much. Anyhow it depends upon the nature of the subject matter or the information which is to be taught rather than on whether it is science or arts. Teaching of science subjects in general demands experiments where science process skills, namely, identification, classification, experimentation, observation and hypotheation shall be inculcated in to the child's personality. In this type of approach the teacher and taught are equally involved irrespective of short term or long term type of learning activities. Let us go through the, following examples to understand this concept still clearly:

- 1) In order to determine the pH value of water the students may be asked to collect and bring water samples from different sources. Later 'use of the pH indication paper activity' could be done in the class. Based on this students will decide and say their findings as which sample of water is acidic/basic/neutral. This could take comparatively shorter/ longer time for learning.
- 2) Students are encouraged to study the effectiveness of the wormy cultured manure by a comparative method. Here two potted plants of the same variety will be selected. One will be growing with the help of traditional or chemical

fertilizer and other will be growing with the help of wormy cultured manure. The collection of data will be with respect to the rate of growth, flowers and their size, colour, shape etc., fruits and its qualities, seeds etc., and also the same type of data will be collected from the next filial generations (if possible). Based on the information collected children are asked to infer which method is the best for the plant growth. This activity may take up comparatively a longer time, depending upon the species selected for the experiment. If pea plant is selected one can complete the whole activity within one and a half month.

Now a days any subject is taught with scientific temperament. So, a teacher can plan number of activities with appropriate approach to teach the subject. For example, inquiry / investigatory can also be used even to teach the subjects like, history, civics, geography or languages also. Only thing is a teacher must be very resourceful and enthusiastic to create activities as a learning medium that's all.

In activity centered approach the pupil will be like a mini scientist or an investigator. His learning will be more professional. And there will be an ample scope for first hand learning.

So far you have come across the terms like teaching strategy, approaches to teaching. Now let us move towards another term 'Methods', which is again one of the most important integral aspects of teaching learning processes.

### ***What Is Meant By Method?***

You know that if at all you want to do a thing / work very systematically, it has to follow a method. That is to say, a method corresponds to a certain systematic procedural execution. In teaching, the teachers' prime aim will be bringing desirable behavioural changes in learner. This depends upon effective teaching. This in turn will depend upon the method the teacher adopts. You see, there is a great world outside and the mind within is small (for a child) it is the duty of the teacher to bring the two together. Systematically, the teacher interprets the world interims of knowledge and infuses this in to the child's mind. Such a process is said to be 'Method of Teaching'. It is just a way of teaching.

People say that teaching is an art and there are some born teachers. For the ever increasing population, and similarly ever increasing number of learning aspirants, the available number of born and gifted teachers is meager. Hence the need of training of the available persons for teaching profession has arisen. Whoever wishes to come to this profession can improve their teaching skill by following various methods of teaching.

A teacher should feel free to use a variety of methods based on/ according to his / her own abilities/interests and experiences and also the students learning under particular situation / circumstances. Because, method is not an end itself; but it is the means to achieve the pre-determined objectives of teaching.

According to M. Verma, teaching method is a style of the presentation of content in the class room. But Broody says “Method refers to the formal structure of the sequence of acts commonly denoted by instruction. The term method covers both strategies and tactics of teaching and involves the choice of what is to be taught, and in which order it is to be presented”.

Method is based on classical theory of organization and it is task centered. Here the content and mode of presentation are the main elements. Method is determined by the subject or the content. For example, the subject / content is “liberation of oxygen during photosynthesis” that demands / determines an experimental or laboratory method. Similarly, if the content is “evolution of man” or “Parliamentary activities” in the subject civics, that demands / determines a lecture method or an expository method. Anyway, a method employs a macro approach to teaching. The teaching methods are evaluated in terms of mastery over subject matter by using achievement tests. In general teaching method aims at the effective presentation of the subject matter to result in the mastery learning by the learner as a learning outcome. Lecture method, lecture cum demonstration method, heuristic method etc., are the examples for various teaching methods. Sometimes teaching method and strategies are used interchangeably. Like, lecture strategy, and lecture method but you should not get confused here. It must be very clear to you now, that, a strategy is more scientific-and each and every step under strategy will be very clear with a definite purpose. Where as a method will be in general terms and bothers simply for the overall presentation of the subject matter.

While selecting an appropriate teaching strategy, task analysis, learning conditions and learning objectives are crucial factors, but method is determined by the nature of the subject matter. Method is a wider term, in which different strategies can be adopted. Both methods and teaching strategies have the same purpose or the objective i.e., bringing a desirable behavioural change or learning in simple terms. One can enhance their teaching styles effectively and become efficient teachers by practicing different methods of teaching.

Now after understanding what an approach is and what a method lets us try to differentiate the two aspects.

Approaches	Methods
1. Have been identified in to four main types, namely, <ul style="list-style-type: none"> <li>● Teacher centered approach</li> <li>● Subject centered approach</li> <li>● Learner centered approach</li> <li>● Activity centered approach</li> </ul>	1. Methods are of several types, which can be decided, based on the nature of the subject to be taught.
2. It is explained in context with the interactions between the teacher and the taught or among the students or between the subject and the student	2. Methods are said to be the general way of presentation of the subject matter. They are said to be the means to achieve the pre-determined objectives.
3. Teaching approaches are planned by the teacher in order to bring a desirable change in the behaviour of the student.	3. A method is decided by the nature of the content to be presented in the classroom teaching learning situation.
4. Teaching approach seeks to perceive the complete personality of the child, and enhances the development in cognitive, affective and psychomotor domain and hence facilitates the process of evaluation through criterion referenced tests.	4. Methods of teaching enhance the cognitive development of the child's personality and hence facilitate the process of evaluation through achievement tests.
5. Approach helps in generating a number of strategies so that they could be incorporated effectively in different methods.	5. A method can utilize any number of strategies by allowing them freely in any sequence in a teaching and learning set up. A method also allows a change of strategies in the midst of the process.

**'Check Your Progress' - 2**

1. What are the types of teaching approaches? Give one example each.

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2. Define teaching method.

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3. List out any three differences between approaches and methods of teaching.

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## **19.5 Relationship among Strategy, Approach and Method**

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By this time it must be very clear to you, that, strategies are very systematic steps or actions carried out by the teacher with clear purpose or objective to achieve. Here the objectives in most of the time will be instructional objectives. Hence they are prescribed in behavioural terms. For example, pupil will be able to define, explain, compare, draw conclusions etc., with reference to a selected content or the subject matter. So, a strategy will have a highly structured, deliberately planned actions orienting towards the goal achievement or to achieve the instructional objectives. You also know that methods make use of any number of strategies while presenting the subject matter. Where as an approach speaks about the interactions, it could be between the teacher and the taught, between pupil and pupil or between the subject and the learner. You have to notice here that all the three, that is, approach, strategy and the method intend to bring about the desirable changes in the student's personality in several ways. But they never contradict each other rather may become complementary to each other or even reciprocal to each other. That is why it is very difficult to differentiate them with crystal clearance. It is also because of their integrated nature. They are interwoven in such a way that, their separation, just for the sake of understanding also is difficult. They do not possess any watertight compartments among themselves. It is like, method subsumes strategies, and strategies are generated by means of approaches. So, it becomes first and the foremost duty of a teacher to understand these concepts properly and utilize them in teaching and learning situation appropriately.

Take for example, the process of questioning. Questions can be generated during interactions. That is, here the questioning process can take the form of an approach.

The same questioning can be the strategy, like, how a lawyer makes use of this strategy in eliciting the truth during interrogation in a court scene. A teacher also can use the same as a strategy during teaching. As Swami Vivekananda says everything will be hidden in the personality of the child. Only thing is that it has to be manifested. Through the questioning strategy a teacher can develop the content in a class room situation. Questioning strategy is the main device for teaching - says the great Greek philosopher Socrates. And hence, this is said to be the Socratic Method of Teaching.

In a classroom situation a teacher might be conducting an experiment. While doing this he may ask questions like, ‘What are you observing?’ ‘What is the reason for this?’ etc., and the very next moment, he may write the chemical equation on the board (use of black board an yet another strategy). Later he may ask one or two students to balance the chemical equation on the board (one more strategy).

In the above example, you have seen, lecturing, demonstration, narration, use of black board, experimenting and questioning and also asking the students to balance the chemical equation etc., all these are deliberately planned actions executed by the teacher in teaching process. Here the teacher has chosen the experimental / laboratory method to teach the content. (This is decided by the nature of the content). This could be a strategy’ also. And you know very well now that these strategies are originated because of the approaches and the approach will be the resultant of the interactions. Here interaction may have a dominating role by the teacher; then we call it as teacher centered approach or it may have learner dominated situation (the pupil actively conducting an experiment); then we call it as pupil / learner centered approach or even it can turn to be activity centered approach also or for your greater surprise, it may be a mixture of all these approaches also.

To conclude it could be said that you have to visualize the inter relationship between the strategy, methods and approaches in teaching. One thing is true; whether it is an approach, strategy or a method, it will lie in the hands of the teacher. Hence you are going to get trained in making use of these three essential factors in your ‘teaching practice session’.

### **‘Check Your Progress’ - 3**

1. Is questioning a strategy or an approach? Explain with an example.

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2. What is the relationship between an approach, method and strategy of teaching? Explain briefly.

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## **19.6 Teaching Strategy and Learning Experience -Differentiation**

Well, all of us accept that, teaching and learning are the two faces of the same coin. Sometimes learning takes place as a direct resultant of teaching and sometimes it happens indirectly also. Teachers' influence on the students' learning is un-questionable. Many a times students may learn several good qualities by the teacher, though the teacher himself/herself may not know it or intentionally might not have planned and taught it. These are said to be nurturing effects. However, for leading properly the students in the path of learning a teacher has to be very careful in the selection and use of the proper approaches, methods and strategies of teaching.

Coming to teaching strategies you know that broadly they have been classified into two groups, namely, (1) Autocratic Teaching Strategies and (2) the Democratic Teaching Strategies. And each group is having several examples / strategies under it. But it is also true that no one strategy is completely perfect. A teacher has to arrive at the proper conclusion with regard to the use of these strategies by taking the following points in to considerations:

- Previous knowledge / competencies / capabilities of the learner
- Learning outcome with reference to instructional objectives in behavioural terms
- Construction or designing of learning situation to fulfill the objectives
- Taking an account of available learning resources
- Other allied limitations or delimitation while executing the strategy

Now having this much of background regarding teaching strategy, let us try to critically analyse how learning experiences are correlated with that of the teaching strategies.

First of all we know that, strategies are scientific in their nature, so that we can trace out a cause and effect relationship in teaching learning process. By telling this it is implied that, one can find out evidently that, this much of learning has occurred because of a particular teaching strategy. Because, strategies give a chance to administer criterion referenced tests, where the learner competencies belonging to cognitive,

affective and psychomotor domain could be assessed or evaluated. Under teaching strategies, students may be given certain responsibilities as an opportunity for learning. For example, organization and utilization of library services, laboratory work, museum and exhibition organization, conducting excursion etc., It will extract an active participation from the students both in scholastic and non-scholastic fields, thereby helping approximation of all round development of the learner's personality.

Now let us again critically analyze what is learning? And what are learning experiences? A desirable behavioural change in an individual is said to be learning. The experiences that are responsible for bringing about such a change are said to be learning experiences. These can be of two types, namely, (I) Direct learning experiences and (II) Indirect learning experiences.

***Direct Learning Experiences:*** These are first hand experiences. It may be due to experience of seeing, hearing, smelling, tasting, touching, feeling, handling and manipulating objects in various ways. It may be because of:

- Observing samples / specimens
- Experimentation
- Setting up of apparatus for an experiment
- Constructing models, charts, plans and diagrams
- Drawing figures/ paintings
- Collecting, analyzing and interpreting the data
- Listening to important facts, points
- Presenting ideas orally or in written format

***Indirect learning experiences:*** These are not firsthand experiences. Hence are called indirect learning experiences. You know that, each and every learning cannot be because of firsthand experience only. Therefore indirect learning experiences also have a place in the process of learning. Any beautiful explanation / narration will help the listeners equally to enjoy the event as it could be with that of a direct experience. Isn't it? For example: by reading about the beauty of Himalayas / any waterfall / stories in journal / a historical event explained in a novel etc., a person can acquire the respective knowledge.

And another example could be observing pictures / portraits / maps (one can compare the area possessed by old India and the present India and exclaim that how big was our old India!). It may be pointed out here that, to differentiate direct and indirect learning experience with crystal clearance is very difficult; rather it is a hair splitting job. It may not be even desirable also. Many a times, it will be a collective situation where direct and indirect learning takes place at a time.

So, how to differentiate Teaching Strategies with that of Learning Experiences? Let us see:

<b>Teaching Strategies</b>	<b>Teaching Strategies</b>
1. Identified, planned and designed by the teacher.	1. Learner's capabilities, previous knowledge and previous learning experiences are taken in to consideration for designing a teaching strategy.
2. Teachers role may be direct or in direct.	2. Learning can occur as a result of attaching strategies directly or indirectly. And a learner need not know what strategy was adopted by the teacher.
3 Give a scope to perceive the complete personality of the learner.	3. Learning can take place in cognitive, affective as well as in the psychomotor domain of learner's personality.
4 Give a scope to administer the criterion referenced test and provide the feedback.	4. Based on the strategies applied a learner can get his knowledge of result and can even undergo there medial measures if necessary.
5 By adopting teaching strategies a teacher becomes more scientific, systematic, professional, efficient and effective in his teaching task.	5. Learner becomes more sincere, punctual, so that it leads to true learning, learning to learn and acquire the skill of self-learning.

**'Check Your Progress'-4**

1. What is learning?

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2. State any three co-relating factors between teaching strategy and learning.

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3. State any two differences between learning and teaching strategy.

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## 19.7 Let Us Sum Up

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Teaching is a complex process resulting in learning. In order to ensure learning teaching utilizes different strategies, approaches and methods. Here it tries to keep pace with modernization and allows intervention of technology into teaching.

- Teaching technology leads to effectiveness and efficiency of teaching learning process
- Teaching approaches could be of four types, namely, teacher centered approach, learner / pupil centered approach and activity centered approach and subject centered approach.
- Teaching strategy is a purposefully conceived and determined plan of action, orienting towards the goal achievement.
- Teaching strategy could be of two types, namely, autocratic teaching strategy and democratic teaching strategy. Lecturing, demonstration, tutorial, narration, description, explanation, illustration etc., are the examples of autocratic teaching strategy and group discussion, question- answers, heuristic strategy, problem solving strategy, projects, excursions, etc., are the examples for democratic teaching strategy.
- Teaching strategies are scientific, assure the learning outcome and also enable teacher to become more effective and efficient.
- They give a chance for critical analysis of a learner's achievement and • competencies. Teaching strategies enhances the rate of learning

- Teaching method is a style of presentation of content in the classroom. A method is determined by the nature of the content, where as a strategy is determined by the behavioural objective of the learner.
- Though the approaches and methods of teaching aim at desirable behavioural changes in the learner there are few subtle differences among them. But teaching approaches, strategies and methods are inter related and they never contradict to each other rather compliment as far as the goal achievement is concerned.
- Teaching and learning are considered as the two faces of same coin. Here learning experiences can be direct or indirect. In a nutshell one can say that teaching strategies and learning experiences of a learner approximately express the cause and effect relationship among themselves.

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## **19.8 Answers to ‘Check Your Progress’**

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### **‘Check Your Progress’ - 1**

1. (c) Efficiency and effectiveness
2. (d) Learner and his learning outcome
3. The two major types of teaching strategies are autocratic teaching strategies and democratic teaching strategies. Lecturing and lecture cum demonstration are the examples of autocratic teaching strategy. Problem solving and inquiry learning are the examples for democratic teaching strategies.

### **‘Check Your Progress’ - 2**

1. Teaching approaches can be of four types, namely, teacher centered approach, learner / pupil centered approach, activity centered approach and subject centered approach. Lecturing is an example for teaching approach, problem solving is an example for learner / pupil centered approach and long term or short-term experiments are the examples for activity centered approach.
2. Broudy defines teaching method as “method refers to the formal structure of the sequence of acts commonly denoted by instruction”. The term method covers both strategies and tactics off teaching and involves the choice of what is to be taught, and which order it is to be presented.

3. Approaches of Teaching	Methods of Teaching
1 Teaching approaches are generated in context with the interactions, like, the teacher and the taught, the pupil and pupil and between the subject and the learner.	1 Methods are determined by the nature of the subject matter.
2 Approaches can be of four types, namely, teacher centered, pupil centered, activity centered and subject centered.	2 Methods can be of several types, like, lecture method, heuristic method, project method, problem solving method etc.
3 Teaching approaches facilitate the development of all the three dimensions of the personality, namely, cognitive, affective and psychomotor domain.	3 Most of the times, while teaching a method facilitate the cognitive development among the students.

**‘Check Your Progress’ - 3.**

1. Questioning can be considered both as a strategy and as an approach. During teaching if a teacher uses this skill with all deliberate planning in order to achieve the learning objective in behavioural terms, then-questioning has to be considered here as a strategy. Similarly, if the teacher starts the lesson transaction through some interactions with the students where questioning is used as a device, then it is said to be the approach.
2. Teaching approaches, methods of teaching and teaching strategies are interrelated in the context of a teaching and learning situation. Teaching being a complex process involves interactions essentially. Based on this interaction, approaches are generated. It could be teacher dominated interaction, where we call it as teacher centered approach, and if not it could be either learner centered or activity centered approach. A method is the general way of presentation of the subject matter. And strategy is a well-planned and determined activity that gives the guarantee of learning

outcome. Thus all these three are orienting towards the bringing of a desirable behavioural changes in the learner.

#### **‘Check Your Progress’- 4**

1. The desirable behavioural change in the learner is said to be learning.
2. Teaching strategy and learning are interrelated factors in a learning environment.
  - (a) If the strategy is well planned and deliberately executed then definitely it finds a high correlation with good learning.
  - (b) The strategy with the sound background of psychological principles of learning caters to individual difference and assures learning.
  - (c) A strategy used properly by the teacher makes his teaching more effective and efficient there by implying quality learning among the learners.
3.
  - a. Though the teaching strategies guide a teaching situation, they are not the ends by themselves; rather it has to be sensed in terms of learning outcome by the learner.
  - b. Teaching strategies will explain the teacher’s role in the curriculum transaction where as learning experiences will stand as a landmark of the whole curricular activities, in which teaching strategy will be one of the influencing factors of learning outcome.

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### **19.9 Unit-End Exercises**

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1. Explain the influence of technology on teaching process.
2. What does teaching strategy mean? Illustrate your answer.
3. How do you differentiate a method from that of an approach?
4. What is the effect of teaching strategies on learning outcome of a learner? Explain.
5. Distinguish between method and teaching strategies.

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### **19.10 References**

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## **UNIT - 20 □ APPROACHES TO TEACHING - 1**

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### **Structure**

- 20.1 Introduction**
- 20.2 Objectives**
- 20.3 Conceptual Approach**
  - 20.3.1 Conceptual Approach–Meaning**
  - 20.3.2 Salient Features of Conceptual Approach**
  - 20.3.3 Merits and De-merits**
- 20.4 Investigator Approach**
  - 20.4.1 Meaning of the Investigatory Approaches**
  - 20.4.2 Salient Features of Investigatory Approaches**
  - 20.4.3 Merits and De-Merits of Investigatory Approaches**
- 20.5 Conceptual Approach, Investigatory Approach - Relative Importance**
- 20.6 Let Us Sum Up**
- 20.7 Answers to ‘Check Your Progress’**
- 20.8 Unit-End Exercises**
- 20.9 References**

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### **20.1 Introduction**

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In the previous Unit you have been introduced to a set of terminologies, (new terms) namely, teaching strategies approaches to teaching and methods of teaching. There we classified the teaching approaches into four categories, like, Teacher Centered, Learner Centered, Activity centered and Subject Approach; and here the classification was based on the interaction between either teacher and the classification was based on the interaction between either learners. This is a very broader type of classification. There is one more type of classification, which specifically takes the content transaction into consideration. You know that, any subject will be made up of facts, concepts,

generalizations or principles. Usually before teaching, a teacher will do the content analysis well in advance. And also a good teacher prepares a plan for resources and learning aids. During teaching which an execution of the deliberate plan is content transaction, he / she may make use of these approaches namely:

- Conceptual approach
- Investigatory approach
- Inductive approach
- Deductive approach
- Self - learning approach

Here the approaches are identified in context with content or information or subject matter transaction. It is also nothing but, providing a learning opportunity for students. That is to say, the teacher with a master mindedness can plan and provide the learning situation in order to make the pupil to learn in palatable doses. It is just like the different paths chosen to reach a particular destiny. It will be very clear if you follow the example given below:

Sriram wants to go the Delhi. For this he has several options or ways / means like,

- Going by bus;
- Going by train;
- Going by Aeroplane

Here the goal being the same could be achieved through the bus or train or plane. Likewise, a teacher keeping the goal as the achievement of a desirable behavioral change in the learner can make it occur by adopting any of the following approaches:

Note that, here the term approach has been used in context with content analysis and its transaction.

A teacher may impart the subject matter in terms of concepts with proper learning environment or he can put the learner in the role of an investigator, to explore the subject matter and while doing investigation, the learner will get acquired with the content or the subject matter. A teacher can teach by adopting / illustrating several examples and making the learner to come out with the generalization etc; See, all this will lie in the teachers' hand. The same subject matter could be taught by adopting different approaches to different group of individuals or pupils at different time. Hence,

this type of classification of teaching approaches seems to be more interesting, because of its functional value. In this particular unit you will come to know about, conceptual approach and investigatory approach with their respective merits and demerits. And also at the end you are supposed to compare the two in context with their relative importance.

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## 20.2 Objectives

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After studying this Unit you will be able to:

1. Explain the meaning of conceptual approach.
2. List out the salient features of conceptual approach.
3. Mention the merits and demerits of conceptual approach.
4. Illustrate the conceptual approach with suitable examples.
5. Describe the meaning of investigatory approach.
6. List out the salient features of investigatory approach.
7. Mention-the merits and demerits of investigatory approach.
8. Give examples for investigatory approach.
9. Explain the relative importance of Conceptual Approach and Investigatory Approach.

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## 20.3 Conceptual Approach

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Many times you might have come across the term 'concept'. That too, as far as the subject science in concerned, it is full of facts, concepts and principles. While studying educational psychology, you will see that, many eminent psychologists, have used the term 'concept' when they deal with human learning. For example: Gagne's hierarchy of learning gives a very conspicuous position for concept learning. Jean Piaget also mentions the 'concept learning' stage while explaining the process of cognitive development of man. Jerome. S. Bruner, is famous for his concept attainment model of teaching.

Now you may ask me a question, that what is a concept? And what is the importance of knowing it?

As a would be teacher, it becomes your part of learning to know about the term. And also to know, what are the different approaches to teach such concepts to the learners. Because, concepts are learnt by means of experiences. No one can give the learner his concepts; but he can be given the experiences form which he can derive them.

### **20.3.1 Conceptual Approach - Meaning**

To put in simple terms, a concept is an abstraction used to classify words, ideas, objects, feelings, skills, etc; which have certain qualities in common. It is the resultant of one's own cumulative experiences. Concepts are not arrived at directly. Frequently much thought is involved in their development. You may feel like appreciating, after going through the details of how much children think about their experiences and work for learning a concept. It is because concepts develop gradually out of a series of experiences. During such development, concepts move along various 'dimensions'. That is, may be from concrete to abstract, from vague to clear; from simple to complex etc; They may move along with other dimensions, like affective domain or psychomotor domain also. Let us take one example for clear understanding.

#### **Example:**

1. If an animal has four legs, one tail and barking ability we call it a dog.
2. Similarly, 4 legs, a flattened wooden plank supported by these 4 legs, make a table.
3. All ideal behaviours seen in a man means, he is equated with Lord Rama (*Adarsha Purusha*).

For teaching a concept, a teacher must identify its properties / attributes which differentiates it from others. It is nothing but just helping a learner to acquire the knowledge of dog as a dog and not dog as a cat! For a child, the concept of 'dog' would be at first just his own dog. Later it is differentiated from Fox, Wolf, Jackal etc., and also from Rabbit, Cat, and Lamb. At this stage 'concept' of Dog developing by moving along the dimension what is called simple to complex, or vague to clarity etc.

Now, it is confirmed to the child by his own experience that 'dog' has certain characteristics which are peculiar to it and separate it from other "Animals with four legs". As the concept gains in clarity, abstractness, precision and its meaning is increased. Therefore, the learner now understands the expressions like "dog tired", "dog-in-the manger" or "doggedness" where "dog" carries with it other implications and relationships involving this affective domain / psychomotor domain also. Hence at the end we can

say that, cognitive, affective and psychomotor components may be part of a concept.

Thus, the learner discovers qualities of the concept gradually and extends the use of the concept into new relationships even to the extent of abstractness. This of course involves the process of differentiation and integration during concept learning. For example: If the learner has learnt the concepts “flowering plant”, “adaptation” and “evolutionary change”-he could understand and generalize like: “The structures of the flowering plant are the result of adaptations through long periods of evolutionary change”.

Concept learning can be enhanced by providing a stimulating environment. Now let us take a note on how J. S. Bruner has treated this ‘concept learning’ in context with teaching - learning process.

J.S. Bruner states that each concept will have its own property or characteristics that differentiate it from others. It may be the colour, texture, form, size, number of parts, etc., and we categorize such concepts or objects based on their common characteristics into one group. For teaching a concept, the teacher must identify such attributes of that concept which differentiate it from others. For eg: Dog and cat have legs (4) and a tail but cat has a different voice from that of a dog.

Further he says, such a categorizing activity has two components, namely, the act of *concept formation* and the act of *concept attainment*. Concept formation is the first phase and it leads to concept attainment, indicating acquiring mastery over the concept. Suppose you would like to teach the concept, “*a few morphological features of insects*”. This may have two phases in your teaching.

**Phase - I:** Give a general introduction either through lecturing / or questioning strategy and provide several live / or preserved insects to the students. And ask them to list out the commonality that they observe.

**Phase - II:** Now you provide the other invertebrate animals, like, earthworm, snail, etc; and then, ask the students “do they belong to the same category? Can they be called insects?”

In the above example, the phase I refers to the concept formation stage and phase II to the concept attainment. Note that under concept formation stage, you are supposed to give all positive examples whereas under phase-II, all negative examples. So, at the end of this teaching-learning session a learner will reject the ‘snail’ by telling that ‘it is not an insect’ and accept ‘cricket’ as an insect.

**‘Check Your Progress’ - 1**

1. What is a concept?

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2. How a ‘concept’ extends its meaning with different dimensions? Illustrate your answer.

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**20.3.2 Salient Features of Conceptual Approach**

After understanding the meaning of concept and conceptual approach, it must be easy for you to list out the salient features of the conceptual approach. Yes, they are,

1. A concept is identified by its meaning, properties or attributes.
2. A concept gradually development in different dimensions.
3. Conceptual approach is characterized by its development similar to the teaching dimensions like from easy to complex, from concrete to abstract etc.,
4. It is recognized by two essential consecutive phases, namely concept formation and concept attainment.
5. Concept learning involves differentiation and integration. The learner discovers the dualities of the concept which may not be there in the beginning and he extends the use of concept into new relationships gradually in the due course.

Concepts are continuously developing with experience, which implies that each individual will has his own experience and hence his own level of understanding.

**‘Check Your Progress’ - 2**

1. Mention any two characteristic features of conceptual approach.
2. Name any two eminent persons from the field of educational psychology who have contributed for concept learning.

### 20.3.3 Merits and Demerits

The conceptual approach is one of the good approaches because of the following points.

- Learner's intellectual development is enhanced so that, he recognizes what is an example of a particular concept and what is not.
- A learner can bring about generalizations by interrelating and extending as well as integrating the different concepts.
- Enables a student to apply the concept in new situation and assures transfer of learning.
- Enables a student to be fit enough for problem solving situation.  
Example: If the student understands the concept of atomic structure, then he can correct write formulae for molecules and express chemical reactions in terms of chemical equations.
- Conceptual approach enhances the power of reasoning and imagination among the students.
- Students will acquire a systematic analyzing ability.
- It develops and reinforces the skill of observation among the students.

By going through the above positive points, you may feel that it is absolutely the best approach of teaching. Isn't it? But each teaching approach will have its own limitations or demerits also. Then, what are the demerits of conceptual approach?

Let us make a list:

1. It poses a high mental taxing on both the teacher and the taught.
2. Many a times, the teacher dominates the teaching-learning session.
3. Does not favour for the inquisitiveness, enquiries, investigations and exploration by the students.
4. It cannot give the guarantee of 'learning levels; or 'level of understanding' because, each individual's experience leads for concept attainment with high specificity or subjectivity.
5. It enhances the cognitive development but affective and psychomotor development is not enhanced to that extent.
6. Conceptual approach may not be suitable for the subject or the content which demands an experimental approach.

### **‘Check Your Progress’ - 3**

1. Mention any two merits of conceptual

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2. List out the demerits of conceptual approach.

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### **20.4 Investigatory Approach**

Your main aim of pursuing this B.Ed. Programme is to become a good, efficient and effective school teacher. Isn't it? For that you need to know, how will be the mentality of school children. They will be particularly at their adolescent stage. Especially at this stage all children will be overwhelmed by enthusiasm, curiosity and are intrigued with puzzles and riddles. This is from the students' point of view. How a teacher as well as the society wants to treat this target group? For a teacher, he wants his students should behave like a little scientist or like a professional learner. For this to happen, a teacher has to perform a high challenging role.

You might have seen in the majority of the schools that the teacher is the main performer, the dispenser of information and the students as passive recipients. But, actually what is needed is a teacher has to become a guide in helping students uncover the information for themselves. For this a traditional teacher has to surrender his stellar role and the learner should transform himself into a self-teacher role. Again for this paradigm shift, a teacher should transform himself first into a stimulator and then a consultant. If these things happen in reality, then definitely it will result in a very special type of teaching approach what is known as investigatory approach of teaching. Investigatory approach is advocated unanimously and universally to cater to the genuine curiosity, bubbling energy that is stored in an adolescent mind. It has to get channelised properly so that, it will result in true learning and also the all round development of the learner.

Let us go through the following discussion to understand, the meaning, nature, importance, and merits and demerits of investigatory approach of teaching.

#### **20.4.1 Meaning of The Investigatory Approaches**

Investigatory approach anticipates a personal involvement in learning, most of the time through experiments in the similar lines as a scientist works and thinks. The experiment is the vehicle for investigations. An experiment usually serves two functions, namely.

1. To generate evidence to strengthen or illustrate some already known by fact, concept or generalization - illustrative functions.
2. To arrive at new information or an answer or a solution to a problem this was not known by the experimenter before the experiment-Investigatory function.

The second function of the above said; help us to understand term 'Investigation' properly. Investigative experiments require the student to apply the principles of inquiry.

But we cannot say that, simply by sending the students into the laboratory they start doing investigation or just memorizing the list of inquiry skills does not mean investigation. The spirit of inquiry is learnt only by participating in it.

So, it is obvious that investigatory approach involves inquiry skills as an integral part. Inquiry skills are the part and parcel of investigation. Hence you must know, first, what are these inquiry skills that essentially constitute an investigation. They are,

- a) Deriving and stating a problem.
- b) Formulating the hypotheses.
- c) Predicting from the hypotheses.
- d) Proposing and selecting experimental procedures.
- e) Obtaining and recording relevant data.
- f) Interpreting data.

Each inquiry skills listed above will have its own explanation in detail. So, let us take one example to understand the above said inquiry skills correctly. Investigatory approach can be understood only when, you are thorough with these inquiry skills.

#### **Example:**

1. A teacher displays two jars of tadpoles and asks:
  - a. "Why do the tadpoles in jar A have longer legs and shorter tails than those in jar B?"

Or

2. A teacher asks the following question to the class  
“How does a change in the density of air effect a barometer?”

Or

3. How does the addition of solutes affect the freezing point of water ?

Or

4. What kind of weather are people experiencing in Australia?

Or

5. Is the climate of the earth changing?

Or

6. How do some parts of the earth become warmer than others?  
7. How does a croton plant which is red in colour prepare it food?

In the above examples, some activities or experiments facilitate investigatory approach and some can fulfill the illustrative function. Let us take the example (I) for further analysis.

***a. Deriving and stating the problem:***

This is noted by rise of a problem in the learner’s mind. His curiosity is aroused by some discrepancy based on his observation of the two jars, A and B. For any learner to derive and state the problem two factors are very important, they are,

- i) Curiosity and (ii) Experience.

Challenging the student to identify the discrepant event is in itself a stimulus to his curiosity. And also, the challenge for the teacher is to present the situation so that the student really wants to find out. A clearly defined problem statement simplifies the formulation of a hypothesis and experimental procedures. For this a problem statement should be specified with only one aspect, without any ambiguity.

***b. Formulating the hypothesis:***

Hypothesis is a tentative guess, which helps further execution of the inquiry. That is hypotheses help in finding solution for the selected problem. For example,

“Why do the tadpoles in this jar have longer legs and shorter tails than the tadpoles in that jar even though they are all of the same age?”

### ***Hypothesis***

1. They may belong to different species of frog
2. Something in the water is different in the two jars.
3. Tadpoles have been given different food.
4. Tadpoles in one jar have received injections of hormones.

### ***C. Predicting from the Hypothesis:***

Predictions are made from hypotheses, and by testing the prediction through experimentation evidence is obtained, which either supports the hypothesis or does not.

### ***D. Proposing and Selecting Experimental Procedures:***

Learning experiences in proposing or selecting experimental procedures can be provided in a number of ways. Here a teacher even can assume that the problem, hypothesis and predictions have been developed or given, and further execution of the experiments for testing hypothesis may be continued.

### ***E. Obtaining and Recording Relevant Data:***

The laboratory (or field) is the only situation where the student can have experience in obtaining data. This may be in the form of measuring, graphing, using equipment and apparatus, making assumptions, etc.,

### ***F. Interpreting Data:***

A scientist usually opines that “Data are the gold extracted from the ore. They represent the facts about particulars that the scientist selects from all available facts, because he thinks they will best serve the aim of science - lead him to the most revealing truths about the particulars he is studying”.

While interpreting data, one must have open-mindedness, cautiousness, skepticism and integrity as well as an ability to see relationships in and extract meanings from the data. Students need practice it interpreting data. To train the learner in this direction, you can use transparencies of tables and graphs, and project them during discussion.

Xeroxed copies of such data can be made and interpretation part can be given as homework or assignment. Students can be asked to distinguish between valid and false interpretations.

In order to have investigation as a teaching approach, we may plan the whole activity into three phased activity like

**Phase - I: Pre - Experimentation:** This involves

- i) Deriving and stating the problem
- ii) Formulating the hypothesis
- iii) Predicting from the hypothesis
- iv) Proposing experimental procedure

**Phase - II Experimentation:** This involves activities like, obtaining and recording data.

**Phase - III Post - Experimentation:** This involves interpreting the data.

While adopting this investigatory approach, you should have all the above said phases well determined. Practice in the skills that come under pre-experimentation phase, can be developed through discussion in the classroom situation. Here learner will be facilitated to identify and state the problem, formulate the hypothesis and make testable predications.

And Phase II can be like, an individual or a group discover with or without moderate guidance by the teacher. And phase -III can be conducted under the supervision of the teacher.

**‘Check Your Progress’-4**

1 What are the two essential factors for deriving and stating a problem for investigation?

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2 Mention the three phases of investigation with their components.

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**20.4.2 Salient Features of Investigatory Approach**

In order to lay down the salient features of investigatory approach you must visualize a

learner as a scientist in teaching learning situation. It itself reveals you so many points, like,

- It is empirical and hence inevitably involves experiment
- Experiments in investigatory approach can serve two functions, namely, illustrating and discovering or problem solving.
- Investigatory approach in turn is made up of inquiry skills.
- Being a major component of an investigation inquiry skills involve the functional activities, like, deriving and stating the problem, hypothesizing proposing and selecting a hypothesis for testing executing the experiment, accepting / rejecting the hypotheses and analysis, and interpretation of the data etc;
- Curiosity and experience are the sound basis for the establishment of an investigation.
- Investigation as, a teaching approach will have three essential phases, namely, Phase-I involving deriving and stating the problem, hypothesizing, predicting from the hypothesis and proposing experiments - procedure.

Phase-II involves experimentation and phase-III involves post-experimentation activity involving interpretation of the data.

- Investigatory approach will be free from subjectivity and enhances open-mindedness, intellectual honesty and generates a working zeal among the students.
- Investigatory approach is suitable for most of the concepts in the subject science.
- It is quite different from conventional type of teaching approaches.

### **‘Check Your Progress’ - 5**

1. Investigatory approach in turn made up of
  - a) Observation
  - b) Hypothesizing
  - c) Inquiry skills
  - d) Experiments
2. The very important aspect in any investigation is:
  - a. Deriving and stating the problem
  - b. Data analysis and interpretation
  - c. Experimentation
  - d. Formulating hypotheses.

3. List out three salient features of investigatory approach of teaching.

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### **20.4.3 Merits and Demerits of Investigatory Approach**

Investigatory approach gives you an option to put the learner in the position of a scientist. Hence it has got several positive points to be considered as its merits. They are,

#### ***Merits***

- It is child centered to the maximum extent
- It gives a firsthand experience for learning during exploration or investigation
- It provides strong psychological and scientific foundations for learning.
- It makes the learner to become more independent and facilitates self learning.
- It is empirical and enhances, open mindedness, intellectual honesty, skill of systematic analysis and help the learner to be free from prejudices.
- Learner's innate curiosity, enthusiasm, ever energetic personality gets channelised properly and ensures all round development.
- It enables the learner to acquire the skill of observation, experimentation, hypotheation, data analysis etc, which are very essential for science learning.

As you know that no one approach is completely perfect and each will have its own merits and de-merits or limitations. Investigatory approach is having the following limitations.

#### ***Demerits:***

1. Does not suit for all types of subject matter.
2. Time consuming and un-economic, and doesn't suit for a developing country like India
3. It exerts too much of burden on the teacher.
4. It demands a set of material resources, laboratory equipments, time allotment, which possess a higher level of practical problems.
5. Each class in the school system usually will have a minimum of 60 students - which affects the quality in implementing the investigator approach.

**‘Check Your Progress’ - 6**

1 Mention any two merits of Investigatory approach of teaching.

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2 List out the demerits of Investigatory approach of teaching.

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**20.5 Conceptual Approach, Investigatory Approach -Relative Importance**

A teacher can adopt any type of approach depending upon the nature of the subject, learners’ ability, available resources, etc. Any one approach by itself is not complete and perfect. Each approach has its own merits and demerits. Take for example conceptual approach. This enhances cognitive development and meaningful learning of the concepts. Conceptual approach makes learning easier by attaching meaning to new words. To illustrate this, just observe the three columns with set of words given below.

<b>Ese</b>	<b>See</b>	<b>Can</b>
Nac	Can	You
Tac	Cat	See
Het	The	The
Ouy	You	Cat

Now compare the time you have taken to learn the above lists of words, which are equal in everything except meaning!. Here the learner learns based on his own experience, and level of understanding. Hence it is said that, a concept cannot be given to a student, only thing a situation can be provided through which he develops his own concept. Conceptual approach is best suited for language teaching, teaching of mathematics,

and also for several concepts in the subject science. Here a teacher's role will be in identifying the properties of a concept which makes it to be different from other (differentiate) and then gradually increasing the meaning in the direction of abstractness. All will be under the teacher's hand, and the master plan will be designed and execution by the teacher.

Investigatory approach as it is already explained, develop itself on experiments. So, if the content or the subject matter demands an experiment for a clear understanding, Investigatory approach suits as the best. Hence to decide which approach has the best is not an easy job, because there is no single answer for it. The importance of either of the approach varies with the nature of the subject matter. Hence it is decided in, context with the subject matter to be taught. Therefore the sub heading is given as the 'Relative importance'.

If the subject matter demands an experiment as a learning experience then you should better to choose Investigatory approach or if the subject matter is having certain concepts that are extended to its abstract level, which does not come under the purview of an experimentation, then you can select conceptual approach.

**For Example:**

'Plants showing phototropism' - if this is the information, to be thought an experiment can be used here. So, that it goes along with the Investigatory line, where students learn by setting up an experiment using 2 potted young seedlings, one is kept in the normal day light condition and the other will be kept inside a box, having one lateral hole. The plants which are kept inside the box show a different type of growth, where as the seedling will be bending their slender stems collectively towards the lateral hole. This is just to get the sunlight that is vital for all metabolic activities of the seedling. Here the students observe, hypothecate, collect the necessary data with respect to the two potted plants, and test their hypotheses, and conclude that, the bending nature of plants which were kept inside the box was due to the stimulus light, and justify the term 'Phototropism' for such a behaviour by the plants.

The same concept can be taught through the conceptual approach also. This could be in the following lines.

'*Phototropism*' if at all to be considered as a concept, must possess certain properties, isn't it? Let us list those properties, which make it very distinct and separate from others.

- It is shown by green plants

- It is a response towards the stimulus, sunlight

Teacher by explaining, about the different motions shown by plants, can draw the attention of the students towards Phototropism specifically. Number of pictures, specimen examples also can be used here. Remember all these activities are going to help the students for concept formation which is the I phase of conceptual approach. Hence you have to make use of all positive examples only. Later teacher shows the ‘touch me not’ plants and demonstrate the movement of leaves before the students where ‘touch’ is the stimulus and folding of leaflets is the response. Now he asks the students, ‘can you call it as phototropism?’

Definitely students say ‘No’. And this will be the indication of concept attainment state, which is the II and last phase of conceptual approach where students have learnt the concept ‘phototropism’ meaningfully.

By observing the above examples, now you can say that, both the approaches are important, but if the subject matter demands an experiment then Investigatory approach becomes more important, and if there is no scope for any experimentation, the conceptual approach dominates. However, whether it is Investigatory or conceptual approach both will be facilitating the students’ learning.

### **‘Check Your Progress’ - 7**

1. Conceptual approach involves

a) Experiments b) Illustrations c) Examples and non-examples d) None of the above

2. Investigatory approach best suits for:

a) Science subjects b) Languages c) Both social and science subjects d) None of the above

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## **20.6 Let Us Sum Up**

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There are several approaches to teach the subject matter. Teaching approaches can also be classified based on the mode of content transaction. It is like a person can reach his destiny by taking any of the routes. That is to say the same concept or information can be taught by utilising different approaches.

A teacher can decide and select the appropriate teaching approach. To name a few, conceptual approach, Investigatory approach, inductive approach, deductive approach and self-learning approach.

Conceptual approach aims at meaningful receptive learning. The students will learn the concepts by attaching meaning to it with the help of their experience; because, a concept can be any of the following - an abstraction used to classify words, ideas, objects, feelings, skills, etc., that have certain qualities in common. These common qualities are also called as properties. For teaching a concept, a teacher must identify their properties or attributes. A concept can have cognitive, affective and psychomotor components in it. Gradually concepts get extended their meaning towards abstract. It is like, the concept of dog, developing up to 'doggedness' 'dog tired' etc.

Jerome. S. Bruner advocates that a concept can be taught effectively by adopting two successive phases, namely concept formation phase and concept attainment phase. During concept formation phase the teacher can explain a concept, by illustrating with all positive examples and during concept attainment phase students are allowed to cross where by their already learnt concept by checking it with negative examples. This approach enhances the cognitive development into the students to a greater extent.

Investigatory approach is one more type of teaching approaches, where it strongly depends upon, observation, and experimentation skills. Investigatory approach is best suited for the subject science.

Investigative experiments require the students to apply the principles of inquiry. Inquiry skills in turn involve, deriving, and stating a problem, formulating the hypothesis, predicting from hypothesis, proposing and selecting experimental procedures, obtaining and recording relevant data, and interpreting the data. Generally it is advised that, to have an investigatory approach of teaching, one should plan the whole activity into three phased, like,

***Phase I: Pre-Experimentation Involving***

- Deriving and stating the problem.
- Formulating the hypothesis.
- Predicting from the hypothesis.
- Proposing experimental procedures.

***Phase II Experimentation:*** This involves the activities, like obtaining and recording data

***Phase III Post - experimentation:***

This involves interpreting the data. Investigatory approach is empirical, providing student an opportunity to gain firsthand experience. Thereby it properly channelizes the pelt up

curiosity and enthusiasm of the students and ensures greatly towards all round development of the personality. Conceptual approach and investigatory approach appear to be important on their own context. But either of these approach is isolated or in combination can be used by the teacher who decides their relative importance in relation to the subject matter to be taught. Anyhow both the approaches envisages the cognitive development of the child to a greater extent.

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## **20.7 Answers to ‘Check Your Progress’**

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### **‘Check Your Progress’ - 1**

1. Concept is an abstraction used to classify words, ideas, objects, feelings, skills, etc; that have certain qualities in common. Each concept will have its own property that differentiates it from other.
2. Concepts get extended with their meaning along with the different dimensions based on the experience. For example, in the beginning ‘Snail’ an animal will be learnt by its external appearance, habitat, etc. This may be followed by its anatomical study also or the learner may use the term snail as snail speed to explain any lethargic activity.

### **‘Check Your Progress’ - 2**

1. i) Conceptual approach follows a systematic presentation of the concept where, the properties of that particular concept are identified first.  
ii) It utilizes both positive and negative examples.
2. Jean Piaget

### **‘Check Your Progress’ - 3**

1. i) Enhances the power of reasoning and imagination  
ii) Develops and reinforces the skill of observation
2. i) It demands a high level of mental abilities from both the teacher and the taught.  
ii) It gives a scope for teacher domination  
iii) Doesn’t favour for the investigation or experimentation

- iv) It cannot give the guarantee of 'learning levels' or 'level of understanding' because it leads towards concept attainment with a high subjectivity.

**'Check Your Progress' - 4**

1. a) Curiosity                      b) Experience
2. Phase I: Pre-Experimentation
  - Deriving and stating the problem
  - Hypothecation
  - Prediction
  - Experiment proposal

***Phase II Experimentation:***

- Data Collection and recording

***Phase III Post Experimentation***

- Data Analysis
- Interpretation

**'Check Your Progress' - 5**

1. (d) Experiments
2. (c) Experimentation
3. (a) It is empirical in its nature and involves experiments  
(b) It utilizes inquiry skills  
(c) Curiosity and experience are the basis an investigation

**'Check Your Progress' - 6**

1. a) It is child centered and provides an opportunity for first hand learning.  
b) It makes the learner to become more independent, and facilitate self - learning.
2. a) Doesn't suit all the type of subject matter  
b) It is time consuming and uneconomical and depends upon too many material as well as laboratory resources.

### **‘Check Your Progress’ - 7**

1. (e)
2. (a)

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## **20.8 Unit-End Exercises**

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- 1 Explain the meaning, nature and importance of conceptual approach.
- 2 What is meant by Investigatory approach? Illustrate your answer.

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## **20.9 Reference**

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## **UNIT - 21 □ APPROACHES TO TEACHING - 2**

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### **Structure**

#### **21.1 Introduction**

#### **21.2 Objectives**

#### **21.3 Inductive Approach**

##### **21.3.1 Meaning of Inductive Approach of Teaching**

##### **21.3.2 Salient Features of Inductive Approach**

##### **21.3.3 Merits and Demerits of Inductive Approach**

#### **21.4 Deductive Approach of Teaching**

##### **21.4.1 Meaning of Deductive Approach of Teaching**

##### **21.4.2 Salient Features**

##### **21.4.3 Merits and Demerits of Deductive Approach of Teaching**

#### **21.5 Inductive Approach, Deductive Approach – Relative Importance**

#### **21.6 Let Us Sum Up**

#### **21.7 Answers to ‘Check Your Progress’**

#### **21.8 Unit-End Exercises**

#### **21.9 References**

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### **21.1 Introduction**

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You know that the subject matter which a teacher wants to teach will be having some information. This information could be facts, concepts, generalizations / principles etc. In the previous units we have discussed with reference to approaches to teaching in general, and conceptual as well as investigatory approaches in particular. Now we shall move towards understanding a few more approaches. Here we shall try to concentrate on how the generalization or principles could be taught using suitable and appropriate approaches of teaching. Prior to this you should know, what are these generalizations and how do they originate isn't it?

Generalization means any statement of relationship which is of broad applicability. It includes theories, principles, laws, rules, inferences and even some times definitions if they express broad relationships. Generalizations are derived from unifying themes which in turn are made up of facts and concepts. Facts are the basic units. They are isolated pieces of information. Related facts collectively result in concepts. Hence facts and concepts are interrelated, and their combination will result in generalization.

Generalizations can be learnt through inductively or deductively or by both. In this unit you will learn about, the meaning, nature, importance, and merits and demerits of inductive' approach as well as deductive approach. The relative importance 'of the approaches will also be dealt with in detail.

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## 21.2 Objectives

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After studying this Unit you will be able to:

- Explain the meaning of inductive approach of teaching.
- List out the salient features of inductive approach.
- Give examples for inductive approach of teaching
- Bring out the merits and demerits of inductive approach of teaching.
- Explain the meaning of deductive approach of teaching.
- List out the salient features of deductive approach.
- Give examples for deductive approach.
- Bring out the merits and de-merits of deductive approach.
- Compare the inductive approach and deductive approach with reference to their relative importance in teaching.

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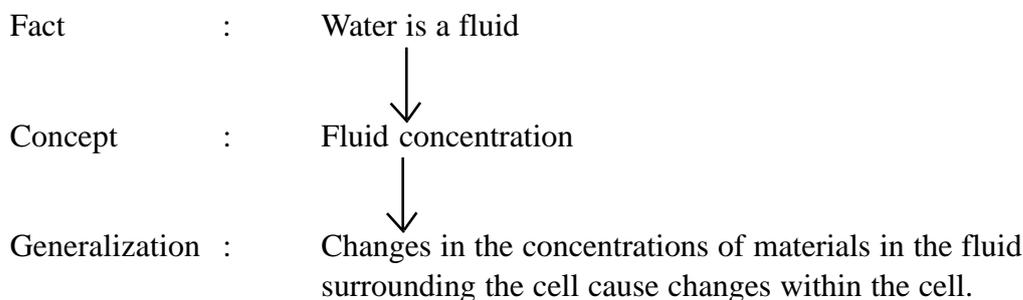
## 21.3 Inductive Approach

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The subjects that are prescribed for any studies in schools will be made up of facts, concepts and generalizations. Facts are forgotten quickly. But still they are useful in forming permanent concepts / generalizations. That is to say, facts are building blocks for concepts as well as for generalizations.

Learning of generalization is easier and long lasting and also will beat a higher level when compared with learning of facts. It is because; generalizations are landmarks or outstanding resultant of a formless huge mass of data. Hence, generalizations are said

to be coherent and comprehensive whole. Let us take an example for clear understanding:



To teach such generalizations, there is one very effective and smooth going approach that is nothing but **inductive approach**. It is a methodical way of content transaction. Now you will find the details of inductive approach and its salient features with illustrations that are given below in the successive captions.

### 21.3.1 Meaning of Inductive Approach of Teaching

Basically inductive approach is a type of reasoning. Several similar examples / incidents / events/ experiences leading to one conclusion will be the essence of generalization and this process is said to be an induction. Here the interaction between the learner and the subject matter proceeds from particular to general. Hence it is also known as discovery approach. In the subject science, the generalizations are observable, measurable and they are empirical in their nature. Hence a teacher can provide quite a good number of learning situations, associated with inductive approach.

One of the definitions of inductive approach as “A variety of directed learning experiences which includes applications of the generalizations can be presented, from which the generalization emerges is said to be inductive approach”. According to the above definitions inductive approach means, an approach of teaching which enables to draw a conclusion or generalizations by observing a series of examples.

If you critically analyse the above definitions, it becomes clear that, a teacher has to provide number of examples serially, so that the students draw the generalization at the end base on their learning experiences with the serial examples deliberately provided by the teacher.

#### **For Example:**

- I) a) Hydrochloric acid acting on the copper metal
- b) Hydrochloric acid acting on Magnesium liberates Hydrogen gas.

- c) Hydrochloric acid acting on Zinc liberates Hydrogen gas.
- d) Similarly Sulphuric acid, nitric acid and phosphoric acid also, when they react with copper, magnesium Zinc (any metal for that matter) respectively, liberates Hydrogen gas.

So, by doing the above experiments, students will generalize that all acids reacting on metals liberate the hydrogen gas.

- II. a) Leaves of Hibiscus plant show reticular venation.
- b) Leaves of Neem Plant show reticular venation.
- c) Leaves of Rose Plant show reticular venation.
- d) Similarly any number of dicot leaves, if checked.

So, based on the above observation, students will generalize that all dicot plants show leaves with reticular venation.

- III. The same type of learning experiences could be provided with monocot plants for the teaching of the concept leaves with Parallel venation
- IV. Provide number of insects to the students and ask them to note down the common features of such insects. They can generalize obviously that all insects have six legs, compound eyes and exoskeleton system.
- V. a) Ask the students to measure the angles in a right angle triangle and find out the total of all the three angles.
- b) Let the children do the same activities with obtuse angle triangle.
- c) Let them do the same activity with acute angle triangle.
- d) Similarly with any shape (acute / obtuse / right angle triangle) and any size of the triangle, if students are asked to measure all the angles and also calculate the total of the three angles in the respective triangles, then definitely they will come out with one generalization that in a triangle the total of all the three angles irrespective of the shape and size will be equal to  $180^\circ$  only.
- VI. By observing a series of deciduous forests where the leaves of the majority of the trees wither away during winter season one can generalize that, trees of deciduous forest shed their leaves during winter.

### **'Check Your Progress' - 1**

1. In inductive approach, the generalization is
  - a) Told in the beginning itself
  - b) Arrived at the end
  - c) Not at all present
  - d) None of the above.
2. In inductive approach the logical analysis will be from
  - a) Particular to general
  - b) General to particular
  - c) Lateral to central
  - d) Top to bottom
3. Fishes, amphibious, reptiles, mammals and birds have backbone. Hence the generalization is
  - a) Animals possess back bone
  - b) Not all animals possess back bone
  - c) All vertebrates possess back bone
  - d) All invertebrates possess back bone

### **21.3.2 Salient Features of Inductive Approach**

- It involves the learning situations made up of a number of similar sequential examples.
- Generalization is never told or expressed in the beginning.
- It is a discovery approach where a learner moves from each and every particular example towards a universal generalization.
- This is a logical analysis and many a time forms the first step in learning by exposure.

### **21.3.2 Merits and Demerits of Inductive Approach**

Traditional teaching has not emphasized inductive approach. But later on the view point is changed, and it is said that, learning should be exclusively inductive; since inductive is the method mostly used in science and provides an ample scope for discovery. So, definitely inductive approach has several positive points contributing for its merits.

***Merits:***

- It is psychologically sound enough and said to be a functional way of teaching.
- It motivates students for discovery and thereby demands active participation by the students.
- Generalizations are learnt more effectively.
- It provides a strong background for transfer of learning.
- It enhances the grasping ability of the students.
- It promotes reasoning power, as well as ability of analysis, synthesis and evaluation.
- It encourages students to become professional learners and supports self learning.

Whatever may be the merits of inductive approach, there are a few drawbacks in this approach. Before adopting this approach one has to take care of the following points also.

***Demerits:***

- It is highly time consuming, and if every generalization were to be learned by induction, then very few generalizations would be taught during a school year.
- Inductive approach isolated from deductive approach becomes incomplete. Because in real life we use both inductive and deductive thinking in solving many problems.
- It is seldom used in problem solving situations.
- The progress of students will be relatively slow compared to other dynamic approaches.
- Many a times it confines to acquisition of the knowledge only.

**‘Check Your Progress’ - 2**

1. Mention any four merits of inductive approach.
2. Mention any two demerits of inductive approach.
3. Give two examples for teaching of any concept through inductive approach.

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## **21.4 Deductive Approach of Teaching**

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Generalizations are taught by one more methodical way in classroom situation i.e what is known as deductive approach. The approach whether inductive or deductive

that could be used will be decided by the teacher himself. Of course, this again in context with subject matters, its level of difficulty and the learner's ability and other pre-requirements. Some concepts /generalizations will be in such a way that, a teacher's domination will be inevitable. But here also the students can learn effectively. This type of learning is known as meaningful receptive learning. In such situations teachers make use of deductive approach. The details of deductive approach, its salient features with illustrations are given below in the successive captions.

#### **21.4.1 Meaning of Deductive Approach of Teaching**

Deduction, contrary to induction is yet another branch of reasoning. But in function it never opposes induction. It is not opposite to inductive approach; rather, it is complementary and supplementary to it. It is also said to be logic of discovery. It begins with one or more generalizations which are assumed to be valid. Here generalizations are used to make inferences about specific situations. It proceeds from general to specific. Many a times it provides an option for the application of the knowledge acquired through induction.

“If a generalization is presented first, and then followed by illustrations or applications - then it is said to be deduction”. For example, if students are given the generalization, that, all insects have six legs, compound eyes and exoskeleton system and then presented with several different kinds of insects to examine for these characteristics, - this approach is said to be deductive approach.

Let us take few more examples for clear understanding.

##### **Example -1**

A teacher declares the generalization that, always an acid when it reacts with a base, gives out salt and water

Then it is illustrated by

- Hydrochloric acid reacting with Sodium Hydroxide, gives out Sodium Chloride (common salt used for cooking).
- Hydrochloric acid when reacts with potassium hydroxide, gives out potassium chloride and water
- Sulphuric acid reacting with Sodium Hydroxide gives out Sodium Sulphate and water
- Similarly Sulphuric acid reacting with Potassium Hydroxide gives out Potassium Sulphate and water.

- Likewise, all acids (Hydrochloric acid, Sulphuric acid, nitric acid, phosphoric acid while reacting with NaOH; KOH; Ca(OH) etc; give salt and water.

**Example 2:**

“In a right angled triangle the square of the hypotenuse is equal to the sum of square of the other two sides”- This will be announced by the teacher first. Later, it will be illustrated with, the following examples - like

- (i) In a right angled triangle, the hypotenuse is 5cms and the other two sides are 3cms and 4cms respectively. By substituting the values to the respective sides and squaring them, we get:

$$5^2=3^2+4^2$$

$$25 = 9+16$$

- ii) The values of the hypotenuse and other sides will be changed like, 10cms as hypotenuse and 6cm, 8cm are the other sides.

Similarly:  $10^2 = 6^2 +8^2$

$$100 = 36+64$$

$$100=100$$

**Example 3:**

All birds lay their eggs; hence birds are oviparous. Oviparous means a group of animals which propagate through laying eggs. This is learnt through the examples like sparrow, pigeon, parrot, hen/fowls etc; which lay their eggs during reproduction.

**Example 4:**

‘All insects possess jointed legs’ - is the generalization.

This could be studied with several insects like, mosquito, cricket, grasshopper, fruit fly etc;

**‘Check Your Progress’- 3**

1. In deductive approach generalization is

- a) told first
- b) told at the end
- c) told in the middle of the teaching
- d) Not at all told

2. Deductive approach is
  - a) Opposite to inductive approach
  - b) Parallel to inductive approach
  - c) Neutral to inductive approach
  - d) Supplementary to inductive approach.
3. In deductive approach
  - a) Examples are followed by generalization
  - b) Generalization is followed by examples
  - c) Examples are not at all used
  - d) None of the above.

#### **21.4.2 Salient Features**

- It involves a well organized, pre-planned and learning situation with a fixed parameters of content or the subject matter.
- The generalization or the principle / law will be told in the first step of teaching itself:
- It is a sort of 'in an advanced' mode of approach; because by declaring the generalization a teacher sets up the students mind for further learning transaction
- It also said to be discovery approach where a learner checks or verifies the generalization with specific examples.
- It is a cognitive / logical movement which moves from universal principles to specificity.

#### **21.4.3 Merits and Demerits of Deductive Approach of Teaching**

All traditional teaching practitioners have advocated deductive approach strongly. The reason was, the deductive approach takes so many factors under its good control, just take for example, declaring the generalization that is to be taught in a particular class itself. It confirms the students what they ought to learn, through the series of examples that are provided in a learning situation. So, let us now concentrate to list out the positive points that can be found in a deductive approach.

**Merits:**

- It is very systematic and gives a fixed frame work for teaching learning situation.
- It gives a very clear cut picture for students regarding what they are supposed to learn and thus facilitates meaningful receptive learning.
- It enhances a sharp mental ability among the learners for cross verification of the generalized rules / principles.
- It promotes inquiry skills and investigatory abilities among the students.
- It is highly economic with respect to time consumption, efforts and other relative resources.

Apart from the above said positive points, the deductive approach has some negative points also. So, one has to take care of such aspects before adapting it:

**Demerits:**

- It is not accepted by modern psychologists, because, they say it treats the students as passive learners.
- Students learning on their own are seldom here.
- It can become functional only when the generalization is picked up literally by inductive approach and not if it is only declared / told by the teacher.
- Deductive approach without the support of inductive approach will be a half success.

**‘Check Your Progress’- 4**

1. Mention any four merits of Deductive Approach.
2. Mention any three demerits of Deductive Approach.
3. Give an example for teaching of any concept through deductive approach.
4. Deductive approach moves from:
  - a) Universal to particular
  - b) Specific to general
  - c) Both a and b
  - d) None of the above

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## **21.5 Inductive Approach, Deductive Approach – Relative Importance**

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After going through the details with reference to inductive approach and deductive approach, now it is the time for us to discuss with their relative importance.

In real life we use both inductive and deductive thinking in solving many problems that we meet. Therefore the learner to be fit in the society needs experiences for developing both kinds of thinking. But in order to bring an effective teaching, both the approaches need to be planned properly in advance. In both the approaches, the acquisition or the attainment of the generalization will be more successful if the learning experience is initiated by a problem that is real one and could be perceived properly by the learner.

Inductive thinking is comparatively a simple approach; only the thing is, teacher has to put more effort to give the suitable learning environment. As it consumes more time, less number of generalizations will be acquired by the students. So, a teacher under the pressure of syllabus completion may quit this approach and switch over to the deductive approach. We cannot deny this point. But, for an efficient and effective teacher, quality learning by the students' counts a lot.

In some cases, it becomes so inevitable that, one has to adopt deductive approach only. This happens in the case of teaching of abstract concepts. Where live examples to illustrate may not be possible at all.

Usually providing a learning situation with inductive approach is preferred. It is because, this approach demands an active participation from the students; and their gain of knowledge will be like, their first hand information. It gives a concrete base for further learning. Later a teacher can go with deductive approach. For here, it could be like; the so obtained generalization is going to be checked with different particular illustrations or examples. Hence it becomes empirical. It smoothens the process of learning by the way of inducto-deductive approach.

If whatever generalization is drawn because of inductive approach is tested with quite a number of particular examples as deductive approaches - that makes a learning cycle complete; which is nothing but inductive approach. If induction doesn't end up with deduction, it is said to be fruitless and if deduction doesn't have the strong support of induction is said to be root less.

Both the inductive approach and deductive approach are complimentary to each other. If considered isolated both of them become incomplete. That is to say, what is

left out in inductive approach is fulfilled by deductive approach and vice versa. In scientific thinking there is a constant interplay between inductive and deductive reasoning. Some inquiry skills are essentially inductive; and some others are deductive.

**For Example:**

1. Observing a group of facts / events.
2. Formulating hypothesis, relating some of the observed facts / events. (inductive reasoning).
3. Predicting possible outcome based on hypothesis. (Deductive reasoning).
4. Testing hypothesis experimentally.
5. Repeating the experiments and testing for confirmation.
6. Interpreting the results and formulating generalizations.

So, a teacher should understand the relative importance of both the approaches and utilize them suitably in context with the subject matter to be taught and the maturity level of the students. Because, in both the approaches; the attainment of the generalization will be more successful, if the learning experience is initiated by a problem, real and understandable to the learner. Following are some of the tips that could be adopted, while you will be in a teaching situation.

1. Initiate the teaching - learning session by a problem that is real, and could be perceived properly by the learner.
2. Provide experiences where students must arrive at their own solution to problems using inquiry processes.
3. Make sure that there is adequate understanding of the concepts involved in the generalization. Given the requisite understanding the learner can develop his own methods of attacking the problem.

**‘Check Your Progress’ - 5**

1. Psychologically, it is advised to start teaching with ..... approach
  - a) Inductive approach
  - b) Deductive approach
  - c) Inducto-deductive approach
  - d) Deducto-inductive approach
2. If deduction doesn't have the support of induction then it is said to be: ...
3. If induction doesn't have any sort of application, then it is said to be ...

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## 21.6 Let Us Sum Up

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Generalization or principles could be taught effectively and efficiently by adopting inductive approach as well as deductive approach. Generalizations are derived from unifying themes which in turn are made up of facts and concepts. Facts and concepts are inter-related and their combination will result in generalization.

Inductive approach means, an approach of teaching which enables the learner to draw a conclusion or generalization by observing a series of examples. "A variety of directed learning experiences which include applications of the generalization can be presented, from which the generalization emerges is said to be inductive approach."

For example; all acids like hydrochloric acid, Sulphuric Acid, Nitric Acid, Phosphoric Acid etc; whenever reacted with any metal, like Zinc, Copper, Aluminum etc; will liberate the Hydrogen gas. This is taught by taking each acid and each metal one at a time. So, these series of experiments and the respective observations help the learner to draw one conclusion that, all acids whenever reacted with metals liberate the hydrogen gas.

The salient features of inductive approach are:

1. It involves a number of relevant similar examples presented in an order.
2. Generalization is never told in the beginning.
3. It adopts discovery approach.
4. It provides firsthand experience to the learners.

Because of its nature, inductive approach has certain inbuilt merits, they are,

1. It is psychologically considered as a sound and functional way of teaching.
2. It demands active participation by the students, propelling for discovery learning.
3. Provides strong basis for positive transfer of learning and enhances the grasping ability of the students. It encourages the reasoning, analyzing, synthesizing and evaluating competencies among students and thereby promoting them to become professional learners.

The Demerits, of this approach are:

- It is highly time consuming.
- It becomes a complete learning, only after getting a link: with deductive approach.

If a generalization is presented first and then followed by illustrations or applications - then it is said to be deductive approach. For example, to teach the characteristics of phylum Arthropods, the teacher can say that all the insects have six legs, compound eyes exoskeleton. And then substantiate this generalization with as many insects as possible.

The salient features of deductive approach are:

- It starts with well organized, pre-planned learning situation with a fixed, subject matter.
- The generalization is told in the beginning itself, and later it is supported by a number of particular examples.

This approach is also having some positive points, as merits.

- It provides a very systematic and fixed frame work for teaching-learning experiences.
- It gives a sort of “Mental readiness” to the students.
- It enhances the intellectual power of the students by providing an opportunity to check the generalized facts.
- It is highly economic with respect to time, effort and other relative resources.

If one speaks about the relative importance of inductive and deductive approach of teaching, they may say that, both are very important. It is because in real life we want both the approaches. Both of them are complementary to each other; and they are reciprocal to each other also. In no way they oppose each other. So, with this notion a teacher can select either of the approaches or a good combination of the both depending upon the nature of the subject/ information to be taught.

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## **21.7 Answers to ‘Check Your Progress’**

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### **‘Check Your Progress’ - 1**

1. (b) Arrived at the end
2. (a) Particular to general
3. (c) All vertebrates possess backbone.

### **‘Check Your Progress’ - 2**

1. i) It facilitate for learning of generalization more  
ii) It promotes cognitive abilities, like, reasoning, analysis, synthesis and evaluation.

- iii) It supports self -learning.
  - iv) It provides a strong background for transfer of learning.
2. i) Inductive approach does not suit much for problem
- ii) Most of the time it confines to acquisition of knowledge only.

**3. Example 1:**

Concept : “ All invertebrates cannot possess backbone”.

This could be taught by providing a series of examples, like, earthworm, snails, amoeba, sponges, starfish, etc;

**Example 2**

Concept: “The songs that can motivate the people to serve our nation are called patriotic songs, This could be taught, by helping the students to learn meaningful a few patriotic songs, sequentially one after the other.

**‘Check Your Progress’ - 3**

1. a) Told first

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2. d) Supplementary to inductive approach.

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3. a) Examples are followed by generalizations

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**‘Check Your Progress’-4**

1.
  - i) It enhances meaningful receptive learning.
  - ii) It provides an opportunity to verify the generalizations.
  - iii) It promotes inquiry skills and investigatory abilities among the students.
  - iv) It is highly economic as for as the time, effort and use of resources are concerned.
2.
  - i) It treats students as passive learners
  - ii) It takes the support of inductive approach otherwise
  - iii) ‘Students self-learning is not facilitated much.
3.
  - i) Telling the characteristic features of all unicellular organisms first, and then allowing the student to observe amoeba, euglena, paramecium.
4. a) Universal to particular.

**‘Check Your Progress’ - 5**

1. Inductive approach
2. Root less
3. Fruit less

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**21.8 Unit-End Exercises**

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1. What is meant by inductive approach? Explain its salient features.
2. Define deductive approach, and explain the characteristic features of deductive approach, with illustration.
3. Give examples for inductive and deductive approach of teaching.
4. Distinguish between the inductive and deductive approach of teaching.

5. List out the merits and demerits of inductive approach.
6. Mention the merits and demerits of deductive approach.

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## **21.9 References**

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1. Dores F. Falk, *Biology Teaching Method* (1971.)
2. Nathan S. Washon, *Teaching Science Creativity* (1967)
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4. Alfred T. Collette, *Secondary Schools* (1964)

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## **UNIT - 22 □ METHODS OF TEACHING**

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### **Structure**

#### **22.1 Introduction**

#### **22.2 Objectives**

#### **22.3 Lecture Method**

##### **22.3.1 Meaning, Need and Importance of Lecture Method**

##### **22.3.2 Salient Features of Lecture Method**

##### **22.3.3 Merits and De-merits of Lecture Method**

#### **22.4 Demonstration Method**

##### **22.4.1 Meaning Need and Importance of Demonstration Method**

##### **22.4.2 Salient features of Demonstration Method**

##### **22.4.3 Merits and De-merits of Demonstration Method**

#### **22.5 Project Method**

##### **22.5.1 Meaning, Need and Importance of project Method**

##### **22.5.2 Steps in project Method**

##### **22.5.3 Merits and Demerits**

#### **22.6 Let Us Sum Up**

#### **22.7 Answers to ‘Check Your Progress’**

#### **22.8 Unit-End Exercises**

#### **22.9 References**

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### **22.1 Introduction**

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In the unit No. 19.0, you have already been introduced to the concepts, like Technology of teaching, Teaching Strategy, Approaches and Methods of teaching. And in all these cases, Teaching - learning process was perceived in totality. And you also come to know about the term method as a formal structure of the sequence of acts commonly denoted by instruction, where, if the sequence of acts commonly denoted

by instruction, where, it covers both strategies and tactics of teaching and involves the choice of what is to be taught, and in which order it is to be presented. To tell it in a simple way, a method is nothing but a general way of presented. To tell it in simple way, a method is nothing but a general way of presentation of the subject matter, and it enhances the cognitive development among the students.

If at all anybody wants to become a very good teacher, then, knowing, understanding and practising of different methods of teachings becomes the first and the foremost necessary of any task. There are quite a good number of methods of teaching. Each will be advantageous and helpful to the teachers in its own way. So, particularly in this unit you will learn about, Lecture Method, Demonstration Method and Project Method. Each method will be dealt with its meaning, nature, importance, merits and demerits. You will come across certain illustrations also.

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## **22.2 Objectives**

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After studying this unit, you will be able to:

- List out the salient features of lecture method.
- Bring out the importance of lecture method.
- Mention the merits and de-merits of lecture method.
- Explain demonstration method.
- Bring out the importance of demonstration method.
- List out the salient features of demonstration method.
- Mention the merits and de-merits of demonstration method Explain the project method.
- Bring out importance of project method.
- List out the salient features of the project method.
- Point out the merits and de-merits of the project method.

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## **22.3 Lecture Method**

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Lecture method is one of the popular methods of teaching. It may be because of its simplicity and less responsibility compared to other methods. Any common understanding about lecturing will be that, it is an oral discourse by a teacher resulting in the learning by the students. But we also know that the main purpose of the lecture

is to teach and not just standing before a large group to speak- that is how Hyman (1974) opines about lecturing. In the same context, Eble (1978) cautions that mediocre discussion classes, poor student's reports, in effective panels or role playing are just as deadly as any lecture might be. If lecture is carefully prepared and executed then, it could be one of the best methods of teaching also. So, for this you should know what is meant by lecture method, and how it becomes significant competence for a teacher. An effective and efficient teacher usually will be well versed in lecture method. Therefore, let us, focus our discussion on the meaning, need and importance of lecture method.

### **22.3.1 Meaning, Need and Importance of Lecture Method**

Lecture method is also known as expository method. Generally the teacher dominates in a teaching learning session, if he adopts lecture method. And many a times it confines to oral presentation. Therefore it is considered as an easy way to teach. If you look at the past history to the modern period, irrespective of any country, you can see the ever existing "Lecture method" in the teaching profession. In all these periods, in most of the occasions, teaching was done by a few manuscripts and from the teacher's store of knowledge through lecturing, questioning and with the use of some other support systems. So, lecture method comes under teacher centered approach.

Because of the above said aspects many will criticize the lecture method. But In spite of the broadside of criticism which has been raised at it in recent years, it still persists as the most widely used method in secondary schools.

Now let us have a look at the definitions on lecture method, given by different experts.

- "A lecture is a carefully prepared oral presentation of a particular subject by a highly qualified individual". - (Bergevin, Morris and Smith - 1963).
- "Lecturing is informative speaking" - (Cooper 1985)
- Lecture method is teacher centered; provides an authoritarian social situation (W. J. Mckeachie in N.R. Gage - 1963).

Mckeachie is of the opinion that, lecture method is appropriate when the information to be transmitted is not readily available or is scattered among diverse sources and when an experts has current information immediately desired or needed by a large group of learners in a short period of time (1986). He continuingly says that, lecture method is best suited for the transfer of cognitive information and not for technical motor skills or attitudinal modifications.

- Lecture is a monologue by a lecturer. Here the topic discussed will be arranged in some logical structure and sequenced in an economical manner.

All the above said points with one or two definitions might have made it clear to you that what is meant by lecture method. Isn't it? Therefore now we shall focus our discussion on, "when the lecture method is needed?" and how far it is significant.

Usually lecture method is adopted for

1. Acquisition of information.
2. The promotion of thought.
3. Changing the attitudes.

But evidences have shown that, the lecture method is equally effective as other methods for transmitting information and not for the promotion of thought or for attitudinal changes. (Donald. A. B. 1972). The need and importance of the lecture method can be felt, if you go through the following points:

- To present the information in an organized way when the available time will be of a short duration.
- To give a frame work for learning activities and further studies for learners.
- To explain the analysis of a controversial issues (may be of social context).
- To stimulate or inspire the young learners for further inquiry or indepth studies.

Lecture method becomes more effective and fruitful only when the teacher possesses a content hold or subject hold and also proficient communication skills. In a developing country like India, where increased population growth is a burning problem, educating more students at shorter period of time with a minimum usage of resources becomes very important. For this lecture method is the most suitable one.

If you want to use the lecture method at its best level, you have to bear in mind the following points.

- i) A good lecture needs sufficient preparation and self-confidence (Weaver 1983)
- ii) You have to stay within the given time frame, for this pre-planning, preparation and organisation of the subject matter - are considered as the essential ingredients for an effective lecture method.
- iii) You have to correlate your speaking rate with that of the understanding rate of the students. May be, like, if the concepts or information is easier and familiar, then

faster speaking rate and if the concepts or information is difficult, then slower speaking rate with intentional pauses are advisable.

- iv) As far as possible avoid irrelevant utterances. Because, silence is always preferred to meaningless “Uhs”, “Ums”, and “Okays”!
- v) Any explanation should have relevant, meaningful examples to clarify and amplify the content. Because, you will be always having a heterogeneous students group. They will be differing in their knowledge, skill and experience. So, to suit everybody’s understanding you have to make use of several examples and illustrations taking their experiences as basement.
- vi) Open mindedness is needed for accepting and getting improved in your teaching style. For this, seek your colleague’s critique, feedback from your students, and audio / video / digital documents of sample lectures.
- vii) After getting the feedback as said above, look at your, annoying mannerisms, distracting gestures, unnecessary jargon, and over used pet words - And try to overcome this.
- viii) Try to present the subject matter in a “talking” way, because it is different than “reading”.
- xi) It is said that, voice command is as important as subject matter command. Hence try to use your voice ability with the proper intonation and modulation.
- x) Also try to supplement your presentation by using handouts, videotapes, flip chart, chalkboard, over head transparencies, slides, etc; suitably. (If all the above said are available!)
- xi) Be sensitive to certain environmental factors (like temperature, excess noise, illumination) and learner’s feedback, (nodding of head in agreement or facial expression body and position).
- xii) Relate the subject matter into the daily life experiences and needs of the learners. For example: “The purpose of this class is to provide you with some current information on low cost, high protein foods” - Here the topic to be taught is Mushroom Culturing.
- xiii) You have to crete a learning climate and speak clearly, loudly enough and at the speed which is appropriate for the learner group.
- xiv) Use a conversational tone, encourage the students for active participation. Because,

waiting until the end of the lecture to ask “Are there any questions?” - will rarely result in active participation by the students.

- xv) Last but not the least is, providing an obvious end for your lecture. It has to be through sum relation and highlighting the major points covered. Ending on time is very important because, learner’s attentiveness decreases as you take longer time for lecturing, i.e beyond the stipulated time. Therefore it is best to stop speaking before they stop listening.

### **‘Check Your Progress’ - 1**

1. Lecture Method is one among them:
  - a) Child centered Method
  - b) Subject centered Method
  - c) Activity centered Method
  - d) Teacher centered Method
2. Usually Lecture Method is adopted for:
  - a) Acquisition of information
  - b) The development of certain skills
  - c) The development of writing competence
  - d) The teaching of science subjects.
3. A good lecture needs:
  - a) Well equipped class rooms
  - b) Sufficient preparation and self-confidence
  - c) Minimum number of students
  - d) Teaching aids
4. A Lecture is a:
  - a) Dialogue
  - b) Set of sequential learning activities
  - c) Monologue
  - d) Discussion

5. Lecture Method is also known as:
  - a) Experimental method
  - b) Problem solving method
  - c) Discovery method
  - d) Expository method
6. In a lecture method, generally:
  - a) Students dominate
  - b) Teacher dominate
  - c) Both the teacher and the students dominate
  - d) No one will dominate

### **22.3.2 Salient Features of Lecture Method.**

If you have understood the meaning, nature and importance of the lecture method, then definitely you are in a position to list out the salient features of the lecture method. They are, as follows.

- It is one among the teacher centered approaches.
- Teacher dominates in the teaching learning situation, that too, in most of the time as an autocratic personality.
- It anticipates meaningful receptive learning by the students.
- It involves the presentation of information in an organised way.
- It is considered as a monologue, because, here the communication will be in mono direction or it is a one-way communication.
- The interaction between the teacher and the taught depends upon the teacher's decision.
- It is best suited for the transfer of information rather than in bringing about attitudinal development.
- In a teaching situation, the whole system will be under teacher's control It does not cater for individual differences.
- It is said to be expository in its approach as it exposes the fund of knowledge before the listeners or the pupils.

- As the number of variables involved in a teaching session is very less, (like, support systems, infra structures etc;) it is easily accessible by any teacher.
- This method can accommodate a maximum number of students in a teaching session compared to any other method of teaching,

**‘Check Your Progress’ - 2**

1. A lecture method most of the time is considered as,
  - a) An autocratic performance by the teacher
  - b) A democratic performance by the teacher
  - c) A laissez faire type performance by the teacher
  - d) None of the above
2. Lecture method anticipates
  - a) Passive participation by the students
  - b) Silent listeners
  - c) Meaningful receptive learners
  - d) both b and c
3. Lecture method can accommodate
  - a) Very less number of students
  - b) Any number of students
  - c) An optimum number of students
  - d) All the above
4. A teacher can use the lecture method for teaching
  - a) Even in the absence of support systems
  - b) To explain an abstract concept
  - c) Associated with an experiment
  - d) All the above.

### **22.3.3 Merits and Demerits of Lecture Method**

Lecture method appears to be the best method in most of the time. It is because of its several positive aspects or merits, rather, the advantages or merits of lecture method can be listed as follows:

#### **Merits:**

1. It allows a teacher to present the subject matter in a clear, precise and orderly format
2. It is quite economical in time and energy. Because, information can be shared with large groups of individuals in short period of time. Instead of having to repeat the information to several small groups.
3. It is a well known, popular and acceptable method - as most of the students folk is familiar with and feel comfortable with this method.
4. It gives a chance for face to face interaction. Lecturing well is an art; so, students comprehension will be enhanced by direct talking, gesturing and feelings expressed by the teacher.
5. It can intellectually stimulate, engage, arouse and excite a learner's mind for further study and inquiry.
6. One can use it effectively to start a new but difficult topic
7. It is very useful in explaining the difficult and theoretical points which cannot be demonstrated.
8. It awakens critical thinking skills in the students.
9. It may provide necessary information when satisfactory text books are lacking and can give a selective emphasis when there are too many books.

Thus, if a lecture is planned for an optimum time (say 30 to 40 minutes) with carefully constructed, sequentially arranged subject matter, associated with meaningful examples and illustrations, simple language, highlighted by frequent summaries and also with appropriate speed of delivery, intervened by student - teacher's interaction and an obvious end statement - then definitely it will result in effective lecture.

Lecture method is also open to so many demerits. Most of the disadvantages are generally related to its overuse and misuse. Therefore one has to get the knowledge of its limitations. So, that, needed precautions, worth modifications could be brought about during lecturing. Isn't it? Hence, let us have a look at the limitations of the lecture method.

**Demerits:**

1. Usually lecture method is adopted for transferring of information. So, it never caters to the development of the balanced personality of students.
2. It cannot be said economical if it not achieves the learning outcome, because what is important is, what the students learn, not how much the lecture covers.
3. It is assumed that, student also receives the information as it is presented.. But, in reality, the speed of speaking, the speed of listening and the speed of understanding (by the learners) will not be one and the same.
4. It is against to the principle “Learning by doing” and not child centered in its approach. Hence it appears to be non-conducive and un-psychological in its approach.
5. Teacher is the only active participant and students are passive listeners. Hence it becomes monotonous and sometimes students may feel bored.
6. Teachers may be tempted to finish off a particular topic in the periods at a stretch. Then the fate of the students will be miserable. Because soon after the 20 to 25 minutes, pupils will be completely switching off from listening. (common human nature!).
7. Students get a very little chance for questioning in an authoritative presentation i.e. in lecture method.
8. If never encourages for problem solving and students are not at all given an occasion for formulating their own generalisations.
9. This method does not give the teacher an opportunity to get feedback, either with refer once to his own presentation or to evaluate students’ progress during the period.
10. There is a danger of inaccurate or biased information by careless or irresponsible person laities.
11. In its purest form, the lecture provides no verbal interaction between the teacher and the taught.
12. Most of the time it gives a scope to judge on teachers, like, whether or not they entertain the learners rather than on worth wholeness of the content.

So, after discussing on merits and demerits of lecture method, we may come to one conclusion, that if at all one would like to use the lecture method, let it be by taking

a proper note on its positive as well as negative points, then plan it deliberately before execution. While planning, the following points can also help you.

- Say a lot about a little
- Use a lot of examples
- Keep moving (But don't overdo it!)
- Capitalize on variety.

(Because, change alone is a major factor in holding students' attention. Use audiovisuals, discussion strategy, questioning etc; change your rate of speaking, tone of voice, and body gestures). Remember you want variety in everything!

### **'Check Your Progress'-3**

1. Write any two merits of lecture method.
2. Write any two demerits of lecture method.

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## **22.4 Demonstration Method**

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Nowadays it has become so common to see electronic gadgets performing many tasks. That too, single machine performing two or three functions simultaneously at a time depend upon the need. For example Radio cum Tape Recorder cum, or a washing machine which washes as well as dries the clothes! So whenever a common man purchases such a novel devices, he will ask the shopkeeper, like "how does the machine work? Please show me." Then the shopkeeper demonstrates the working nature of that particular machine isn't? Then what this demonstration is? Definitely it is some sort of "showing". This involves, telling, and showing how the machine works, providing a chance for the buyer to try it himself. If this idea is little bit elaborated systematically and adopted in a teaching - learning situation, then it will take up a very meaningful construction, what could be called as Demonstration Method of Teaching. Generally demonstration method is more appreciated, and advocated than lecture method. It is just because of its effectiveness on pupils learning. Demonstration method gives more chances for learning by the students, compared to lecture method. Now you must be very eager to know some of the details regarding this demonstration method. Isn't it? Hence the following discussion, is dealing with respect to meaning, nature and importance of demonstration method in detail.

### 22.4.1 Meaning Need and Importance of Demonstration Method

Laird (1986) is of the opinion that, demonstration is merely an *illustrated Lecture or illustrated presentation*. This implies that demonstration is a teacher centered approach influencing the students' learning. It can be effective in providing information as well as developing skills step by step. For example, when a teacher shows his class how to mount a transverse section of a plant stem on a slide, and cover it with a cover slip and observe under a compound microscope - he is presenting a demonstration or when a teacher wants to show the process of oxidation by burning a Magnesium wire - he is presenting a demonstration.

By observing the above examples, you can conclude that, demonstration is concerned with acquiring some combination of knowledge and skill. Now let us go through some of the definitions that reveal the central idea of demonstrations:

- Demonstration can be defined as an accurate portrayal of a procedure, technique or operation” (Laird, 1986).
- A demonstration is a method of instruction in which the adult educator actually performs an operation. Therefore demonstration requires adult educators who are highly skilled in the material or the process to be demonstrated.
- Demonstration is any well chosen example of something the learner should be able to do.
- Demonstration and simulation are the methods based upon experiential learning, provide an port unity to observe actual practice and utilize their experience in real life situations” (Jaunted - 1980).

All the above definitions point out one thing that demonstrations involve adults showing how something works and the procedures followed in using it. It can support and supplement content and translate the descriptive materials into actual practice. Therefore, demonstration is a method that requires special skills and abilities in order to perform effectively.

If you take up the subject science as an example, there demonstration involves showing students the apparatus they are to use, illustrating a technique, performing an experiment which could be either too dangerous or too expensive for individual student use or establishing a discrepant event.

Broadly we can classify demonstrations into two types based on the purpose, namely,

1. Illustrative demonstration
2. Investigative demonstration

**Illustrative Demonstration:** In this type usually, the teacher teaches the topic first on some phenomena, later he performs an experiment before the class in order to illustrate what he had taught.

**For Example:** The teacher after teaching the concept “Respiration”, switches over to some demonstration. Like, first he will tell about respiration as a process which involves taking in of oxygen (Inhale) and giving out of carbon dioxide (Exhale). Then he exercises the inhale and exhale process as it occurs in respiration. (This is also an illustrative demonstration) Later, in order to illustrate, the concept, that the carbon dioxide is liberated during respiration, he conducts the following experiment before the students.

The teacher fills two test tubes with half of water and puts one drop of Phenol red indicator in each test tube. (This indicator gives red colour in alkaline solution and yellow in acidic solution). Now the teacher tells the class that, when carbon dioxide dissolves in water it produces carbonic acid. And he blows through some pipe, in one of the test tubes. Because of this the colour changes from red to yellow and in the other test tube it remains unchanged.

**Investigative Demonstrations:** Here the teacher uses the demonstration as a device to arouse the inquiry mood among the children. He may describe the action of the apparatus and the process involved in it in brief and proceeds immediately with demonstration.

Pupils are guided to understand and analyse the selected problem and are encouraged to hypothesize; and test their hypothesis. Usually pupils readily accept the purpose of demonstration that promises the possibility for minor explosions, odd sounds and other unusual events. It is said that they enjoy the feeling of suspense.

**For Example:** Teacher demonstrates the action of concentrated hydrochloric acid on the metal Zinc; in which Hydrogen gas is liberated.

The confirmative tests for hydrogen gas is introducing a burning stick near the mouth of the test tube, where the gas is liberated, immediately, very clearly a “Puff” sound is heard. For students this will be a thrilling experience!

After understanding what a demonstration means now, let us see where it suits well!

- Demonstrations can be employed in order to enable the students to infer generalizations from observations.
- It is also used to a greater extent today for purposes of developing inquiry skills.
- Generally, demonstrations fit aptly in science teaching, including proving, illustrating clarifying and amplifying a scientific concept or principle.

- It is also advocated to do demonstrations to emphasize an intuitive approach in which students are encouraged to guess, hypothesize and leading to problem solving.

**For Example:**

- i) To determine **pH** of a given solution in; detergents, fruit juices, tooth pastes, cosmetics and other household substances.
  - ii) Earthworm's behaviour for the nail polish eraser's stimulus and then identifying the ganglion in each segment of earthworm's body.
- Demonstration can be used to provide a model of a skill and also to support an explanation of an idea, theory, belief, concept etc;
  - Demonstrations can play a significant role in the following situations:
    - a) To set a problem
    - b) To illustrate a point
    - c) To help in solving a problem
    - d) As a review
    - e) To serve as climax

**'Check Your Progress' - 4**

1. 'Demonstration' is considered as"
  - a. A lecture
  - b. Experiments
  - c. An illustrated lecture
  - d. All the above
2. 'Demonstration' clarifies and amplifies the understanding of
  - a. Concrete concepts
  - b. Universal laws
  - c. All abstract concepts
  - d. Scientific concepts and principles

3. Generally the demonstrations enhances the skill of

- a. Inquiry
- b. Explanation
- C. Wilting
- d. None of the above

As it is already pointed out, demonstration method is more effective than lecture method; one may prefer to adopt this in their teaching. In this method also one should have the subject hold and must be good at communication skills. Demonstration method is not as simple as it appears to be.

It needs a thorough planning, rehearsals, and deliberate preparation well in advance. So, before stepping into adopting the demonstration method, you have to be trained in certain aspects and also should remember some of the important factors. Therefore let us now focus our discussion towards such aspects which are considered as the pre-requirements (pre requisites) for any demonstrations.

Usually any demonstration will have three integral and sequential phases; they are a) Preparation b) Presentation & c) Evaluation. And each of these phases are very meaningful and significant in any demonstration.

**A) Preparation:** Usually a demonstration is “produced” which is similar to that of a “drama produced”. Hence a teacher has to give attention towards many factors as a drama director gives. i.e., visibility, audibility, audience participation, contrasts and climaxes etc.,

A teacher has to decide the demonstration method based on the nature of the content. For example if the content is ‘detecting starch’, then performance by individual students will be for better then a demonstration by the teacher.

- The demonstration should be planned and rehearsed well in advance.
- A good planning and rehearsal of the experiment gives confidence for a teacher.
- The teacher must know the purpose or aim and the procedure of the demonstration very clearly. He should also have awareness about generalizations to be made and the attitudes to be developed while demonstrations.
- The equipments and apparatus needed for demonstration should be listed and arranged in order. It is usually better to keep the apparatus to be used on the left hand side and the used one on the right hand side.

- Demonstration table should be visible to all the students in the class. Therefore it has to be at a little higher level than the pupils seat arrangements.
- Proper care should be taken for adequate lighting, and clarity of the apparatus.
- Make use of other learning aids to help the clear understanding by the students.
- Insist the students to observe infer and write what they observe while the demonstration is going on.

#### **B) Presentation:**

- Make the students to become aware of the purpose of the demonstration. As far as possible, keep the purposes of the demonstration as simple, so that they may be given in short, direct statements.
- Write the aim or purpose of the demonstration on the blackboard and ask the students to take it down in their note book.
- Tell the students to commit themselves as to what they think the outcome of the demonstration will be.

#### **For Example:**

Concept: Acid turns blue litmus to red and base turns red litmus to blue.

After taking acid, base and water in three different test tubes, (a, b & c test tubes) the teacher asks the question as “How will you identify an acid and a base?” and then performs the demonstration to illustrate one of the properties of an acid a base as well as neutral liquids (though all these apparently may look similar).

- Never say the outcomes of the demonstration in advance. Because it is justified in some of the special occasions only.
- Take the help of the students in arranging or setting up of apparatus for demonstration. This helps the students to acquire the knowledge of apparatus and procedure of the experiment.
- If the demonstration involves several steps or several associated activities, you better stop occasionally and give summaries of results, you may tell it orally or it could be recorded in tabular form on the blackboard; the recording of results in the form of graphs is also helpful.
- You should keep in mind the audience and their active presence participation.

Facial expressions, obvious inattention, questions, laughter and exclamations - all these are helpful clues in judging the effectiveness of a demonstration (But you have to make use of them judiciously).

- In general, demonstrations must be short and fast moving.
- Suspense is a useful device for holding attention, like; an explosion or changing of colour without the prior knowledge can be very exciting.
- Get assured about the students' understanding. Because things are apt to happen so rapidly in demonstrations that a pupil may miss some important points. Therefore here and there ask a few students, like, what they have observed and refocus the same question with other students, so that all the students will be alert during demonstration.

### **C) Evaluation:**

This has to be done from three points of view, as:

- i) With reference to the aim or purpose of the demonstration. i.e., check whether the experiment has given the pre-determined results?
- ii) Has the demonstration resulted in the expected learning outcome from the students?
- iii) How far the teacher is effective in bringing about the desirable behavioral changes among the students?

### **'Check Your Progress' - 5**

1. The three essential phases in a demonstration are:
  - a. Preparation, presentation and evaluation.
  - b. Evaluation, presentation and preparation.
  - c. Presentation, evaluation and preparation.
  - d. None of the above.
2. Say whether the following statements are true or false:
  - a. Facial expressions, obvious inattention, questions, laughter and exclamations - all these are helpful clues in demonstrations.
  - b. Suspense is not a useful device for holding attention in a demonstration.
  - c. In general the demonstrations must be short and fast moving.
  - d. One should not say the outcomes of the demonstration in advance.

### 22.4.2 Salient Features of Demonstration Method

By looking at the meaning and nature of demonstration method, one can recognize its characteristic features. So, now let us try to list out the salient features of the demonstration method.

- It is coming under the teacher centered approaches.
- Teachers' role will be dominated, when compared with students' role.
- It tries to concretize some of the learning concepts through illustrations and experimentation.
- Essentially a demonstration will have one or the other type of experiments, namely, illustrative experiments, investigatory experiments etc.
- Most of the time demonstrations are produced before the students like a drama is produced before the audience.
- The interaction between the teacher and the taught depends upon the whims and fancies of the teacher.
- It depends upon so many situational factors, like, success of an experiment, infrastructures, apparatus and chemicals etc;
- It needs a thorough experience, planning, practice and rehearsals, for its success.
- It can enhance the science process skills among the students, namely, observations, identification, classification, experimentation, hypotheication, inferring etc;
- Usually science lessons increasingly use demonstrations.
- Most of the time demonstrations appear like "One man show" because the whole teaching and learning process will be under the teacher's control.
- A good demonstration could be resulted through the use of adequate infrastructures, deliberate planning, and systematic execution associated with evaluation.

#### **'Check Your Progress' - 6**

State whether the following statements are True or False:

- a. Experiments are the essential part of demonstrations.
- b. Demonstration is not a 'one - man show'.
- c. Demonstration does not enhance the development of science process skills among the students.

d. Rehearsal of the demonstration is a pre-requisite for its effective presentation.

### **22.4.3 Merits and Demerits of Demonstration Method**

Demonstration method is of quite advantageous when compared to other methods in so many ways. So, now let us try to list out the advantages or merits of demonstration method.

#### **Merits:**

“The role of experience, freedom to make judgments and responsibility for the consequences of choice and action - are the very important points in effective learning (Marinate and Checkering 1982) In this context demonstration is a very good device both for a teacher as well as for students.

- It takes into account the active participation of the students, and gives a chance for observation, and draw inferences.
- Demonstrations are very useful teaching devices and several possible functions at the same time, for example, many laboratory skills as well as investigative skills cannot be developed other than in demonstration method.
- Demonstrations could be used as an effective means of teaching to illustrate a point, to solve a problem to give a review etc;
- It is quite economical with respect to materials involved, effort and time.
- It enables a teacher to utilize-activities that would be too dangerous for pupils, to carry out themselves.
- It is time saver, because it is easier to conduct one experiment than to supervise fifteen experiments; and also, it is true that, an experience teacher can perform the demonstration more smoothly, quickly than pupils.
- Demonstrations break the monotony in the class as a very good stimulus variation and it is a very good alternative for lecturing teaching method which has more power as an attention compeller.
- It is one among the child centered approaches and more psychological in its approach compared to the lecture method.

But this method could be highly beneficial with certain limitations of its own. Beyond such parameters it may become disadvantageous also. So, now we shall try to understand the demerits of demonstration method.

**Demerits:**

- A demonstration seen is not necessarily a demonstration understood, because, it suits for certain types of learning situation only.
- Demonstrations are often prone to the problems of visibility.
- Pupils have a little opportunity to become familiar with the materials. Usually the apparatus will be presented as “already assembled” or may be assembled so rapidly which would be out of grasping.
- Much scientific information cannot be grasped adequately by sight and sound alone. For example: Odours require close - up observation, texture by touch; and forces through muscular action.
- Many pupils may become too reluctant to raise questions when they fail to follow the steps in demonstration.
- Never encourages the active participation by the students. It is difficult to insure complete mental participation while the body remains inactive, and attention of the pupils could be easily lost due to both internal and external factors and also such loss of attention may go unnoticed by the teacher.

**“Check Your Progress” - 7**

1. Write any two merits of demonstration method of teaching.

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2. Write any two demerits or drawbacks of demonstration method of teaching.

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3. State whether the following sentences are True or False:

- a. It avoids the activities by the students which would be too dangerous to carry out by them.

- b. Demonstrations bring monotony in the class.
- c. Demonstration is one among the child centered approaches / methods.
- d. It is economical with respect to materials involved, effort and time.

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## **22.5 Project Method**

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The historical events in the field of education reveal a very important point about 'teaching', which is nothing but, a gradual progressive and evolutionary change from conventional and traditional teaching towards child centered approaches and child centered teaching methodologies. Several eminent educationists, psychologists and philosophers were advocating about the consideration of the child as a centre of teaching learning activity. They stressed, that, teaching - learning process must give due importance to child's interest, its freedom for learning, active participation, attitude towards learning as well as aptitude. Keeping such points in mind, American Philosophers proposed one particular method of teaching that is known as "Project Method". Mainly it is based on pragmatic school of thought. You will get more information about the meaning, nature and importance and also the merits and demerits of project method in the following discussion.

### **22.5.1 Meaning, Need and Importance of Project Method**

Project method mainly concerns with carrying out a useful task in a group in which all the students work with integrity and co-operation. The thrust area in any project will be having the practical and social perspective. Usually projects aim at solving problems. Now, you may get surprised about what are these "problems"? Isn't it?

Project method deviates little bit from the conventional teaching methods. Here a teacher, instead of his oral explanation, class room reading exercises, followed by a test or some sort of questions, he may introduce a subject briefly, point out the main problems and then let the pupils to seek the answers for themselves. This they can do in several ways, such as,

- Reading the text books.
- Using reference books in the library.
- Discussing among themselves.
- Or carrying out practical work in the laboratory, or in the form of some field worker.

So, a project means, it could be in the form of nature study with a strong practical

basics. That is to say, it must be practical as well as social. Because of the above said nature, the project method is considered as “Learning by doing”. And, it is also because it emphasizes “Learning by living”.

As this method involves social interaction to the maximum extent, it enhances learning through association, co-operation, and activity. To get little more clarity with reference to project method, let us take up some of the definitions that are contributed by eminent educationists.

- “A Project is a problematic act carried to completion in its natural setting” - Stevenson.
- “A Project is a whole - hearted purposeful activity proceeding in a social environment”. - Kilpatrick
- “A Project is a bit of real life that has been imparted into school”- Ballard.

Thomas and Long have given a modified definition of project method. According to them “Project method is a voluntary undertaking which involves constructive effort or thought and eventuates into objective results”.

If you analyse the above said definitions, one thing becomes very vivid. That is, project method involves, solving problems by individual student or small group of students over a period of few days or a few weeks. Sometimes a main problem may have several sub-problems. Projects could be as varied as pupils who undertake them. Dr. Kilpatrick has suggested four simple types of projects. They are as follows:

1. Producer’s type: This type of projects usually deal with the tasks like building constructions, building houses, maybe like, to execute a model of textile factory etc;
2. Consumer’s Type: In this type pupils will get a rich experience with some social enjoyment.
3. Problem Type: In such type of projects, the main purpose will be finding a solution to the selected problem.
4. Drill Type: In this type of projects, no new activity or finding solution is done. Rather the main purposes here will be about getting a mastery over certain skills. For this a time bound repeated activities are designed and executed with intermittent evaluation until the mastery over the particular task or skill is acquired.

After understanding the meaning and nature of the project method, now let us list out the characteristic feature of this method. By doing this you will get a better understanding of a ‘Project’ in particular.

Salient features of the project method:

1. The main objective of the project method is providing a live situation for children to acquire the knowledge in a natural setting.
2. By adopting Dewey's principle "Learning by doing", it reveals the significance and usefulness of learning through experience. Because, "experience" is the greatest teacher, which is a universal truth.
3. The most important essence of Project method is "freedom". It gives an opportunity for self-expression; and also allows child to develop himself fully.
4. Project method basically tries to build a strong link between the classroom level curricular transaction and the real life that is beyond the classroom boundaries.

All the above statements make it very clear that, it is the method which encourages and nurtures the personality development of the child in the social context. After all, education must enable an individual to be fit in his community and society. It inculcates social values, like co-operation, coordination, integration, mutual consideration and also a significant learning outcome.

In our country, with the democratic government, schools and educationists may feel that, project method is the need of the hour. If such is the felt need, then it itself reveals the importance also.

**'Check Your Progress' - 8**

1. Define 'Project Method' according to Kilpatrick.

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2. Define 'Project Method' according to Stevenson.

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3. Name the four different types of project.

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4. Which principles of Dewey's are very much highlighted in the project method?

### 22.5.2 Steps in Project Method

Project method aims at providing a natural setting for the purpose of learning. If at all it has to be brought into classroom contexts means, it needs a deliberate planning. For this, it has to follow some sequential steps, they are:

1. Providing a situation
2. Choosing and purposing
3. Planning
4. Executing
5. Evaluating
6. Recording

Let us take up the above steps one by one in detail.

**1. Providing a situation:** Most of the suggestions for Project work originate from the teacher only. A project is not told as "Here is a job for you to do", but the teacher must have a problem in mind and be able to raise interest among his pupils. In no case he should dictate what is to be done, but encourage and be initiative. Perhaps the most essential point in starting a project is to let the pupils have a free hand. He must stimulate the pupils to undertake the projects. For this there are many ways, like for example;

- He may provide the lists of suggested projects
- Take the students to science fairs and science exhibition, stamp exhibition, coins' exhibition etc; to trigger the idea of project in the students' mind.
- He can start several tasks through science club activities.
- He may encourage the students to search some information regarding certain current issues by reading text books, journals, publications of certain experimental studies,

survey reports, “do-it-yourself” science books etc;

Not only the above said points, what is needed essentially to carry out a project study, is nothing but enthusiasm, energy and faith. Apart from this, the environment which is rich in books, apparatus, libraries, museums, visual aids, CDs, electronic documentaries, Internet facilities, etc; also help a teacher immensely to provide situation for the project work.

**2. Choosing And Purposing :** The very first step here could be the organisation of the class room discussion, in which every student is given an opportunity to contribute knowledge, ideas, ask questions and make suggestions.

Here, the teacher must play a leading role, so that, he facilitate the children to learn, how to organize work for themselves and to accept responsibility in a co-operative activity. In this stage itself, the teacher should nurture the correct and proper understandings of the Project by the students, so that, the purpose of the project should be clearly defined and well understood by the pupils.

If it is a wrong selection by the students, then the teacher should tactfully guide them to see that their project is not worth enough and should allow them to choose another project.

And also you may ask them to write down the reasons for their selection. So, in this stage, as a teacher you are supposed to :

1. Decide how the major problem can be conveniently broken into subsections without losing sight of the main theme.
2. Decide which groups of children are to be responsible for the parts of the study and how they may carry out their work.
3. Decide how the various parts are ultimately to be related to each other and how this relationship may be kept in the foreground throughout and made clear at the conclusion of the work.

You may wonder by looking at the above said points! Yes, we say that project work provides freedom to the children, but yet the above said decisions, will intervene the process. Because, it is usually the teacher who alone is able to see the plan as a whole at the beginning. He must be constantly ready throughout the whole course of work, to help and encourage pupils.

**3. Planning :** Anyhow, as you have already guessed it, a project work does not fit easily in to the routine school work. In particular, there will be some work to be done

out of school hours, in the lunch hour, after the school and even before the school. It may involve the parents also. By doing such activities in turn it tries to influence the school life over the whole community and thus it tries to lay a foundation for social education. Therefore it is very important to plan the project properly before its real execution.

For this, teacher can ask “How do we plan our project work?” And then the students should plan out the scheme by taking the teacher’s guidance. Talking it over; hearing everybody’s views and reaching decisions through group effort is the essence of planning stage. Here, you have to encourage every child to participate in the discussion and to make some suggestions. Later you may tell all the students to write down the plan properly.

**4. Executing:** According to the plan the project should be executed. The plan gives the guidance with reference to the division of different tasks and assigning of different responsibilities among the members of the group etc; here the duties and the responsibilities are assigned to the different students according to their interests and ability.

For example: Students who show interest in reading, must be assigned on some reference work, to collect literary information, and collection of data etc; The one who is interested in physical work may be assigned to similar work, one who show drawing skill, must be provided the same nature of work. Execution of the Project will be the longest and the most dynamic step. Therefore it requires patience. Usually Project work promotes many great activities of knowledge. The teacher has to intervene in the ongoing project work in order to guide, encourage and watch the progress of the students..

**5. Evaluating:** A project work could be evaluated in several ways. However, the most common type of evaluation is done by taking the pre determined objectives as the basis.

As pupils work on their projects, the teacher should keep clearly in mind, like, what is the main aim of the project and has it been achieved comprehensively and adequately. Usually here the evaluation will be subjective. Because, a piece of work done by a student may be unworthy to compare with talents and abilities of the other student. So, each project should be evaluated on its own merits, not in competition with other projects. While evaluating, each individual’s abilities, interests, and background has to be taken with full consideration.

Beyond all the above said points, students should be trained to review their project and find out the mistakes if there are any, by themselves.

**6. Recording:** This being the last step, is done at the end of the project. For this students should be trained properly to keep a complete record of their project work - like, how they planned, what discussions were held, how duties were assigned etc; Students can prepare the interim reports also. The reports, i.e, interim reports as well as the final reports are valuable. Such records could be referred by the whole class and get benefited out of it.

Students need recognition. So, an opportunity must be provided for them to display such Records, to do some demonstrations, displaying models, results of experiments, some of their rare collections like, specimens, rare rocks, etc;

### **‘Check Your Progress’ - 9**

1. Mention the steps in a project method.
2. State whether the following statements are True or False.
  - a. The Project is objective based activity.
  - b. Planning will be done after the execution of the project.
  - c. ‘Execution’ takes longer duration of time compared to all the other steps in a project work.
  - d. Evaluation of the project is not at all an important aspect.

### **Illustration of a Project:**

#### **A Project on “The Study of Water”**

The above problem could be chosen, because it is within everyone’s comprehension, like it is used for almost in all of our works. And more than this, if you just critically look at the concept ‘water’ then you will come to know that the concept ‘water’ has a generative power, and it is the source of so many other related ideas, thereby helping in designing numerous projects. For example, students can carry out the projects on the problems like:

- The state of the water tank
- The effluents that are added to the river water
- The anxieties of flood and drought
- Water borne infections and epidemics
- pH values of water from different sources and their repercussions.

- Effect of pesticides and chemical fertilizers on the river water etc;
- The above said type of projects can cover many aspects, like; it calls for many kinds of activity. Provides co-operative work for those with widely different interests and abilities.

The design of the project work during the planning phase has to be plotted in the form of a schematic representation.

**For Example:**

Topic: pH value of water from different sources and its effect on other aspects.

<u>Work to do</u>	<u>Method</u>	<u>Group</u>
Make a list of local Water supplies	Use of your own knowledge	A group of student who are interested in carrying this type of activities
Classify as, Borewell, 'River, pond, etc,	Through observation	
Draw a large map of the location	Take the help from teacher	
Find the pH value of The respective samples	Do this in the lab.	
Survey the local areas For the water sources	Data collection	
Find the cor-relation Between pH value and other Aspects	Data Analysis	

So, such topics may be arranged in a smaller number of suitable groups. The emphasis should be on practical work by the pupils, with plenty of discussion at all stages.

**22.5.3 Merits and Demerits**

Project method, as it is one of the best child centered methods has several positive points. So, such points could be listed as merits. For example;

**Merits:**

- It gives a strong foundation for the practice of certain learning principles as prescribed by educational psychology, like, law of readiness, law of exercise, law of effect and learning by doing etc;
- It guarantees freedom to the students.
- It assures the intellectual development along with the process of socialization.
- Certain social values, like, democratic values, social adjustment etc; could be well inculcated through this method.
- It brings a good rapport between the school, individuals, and community.
- The development of Head, Heart and Hand could be brought about by adopting this method.
- This method gives firsthand information and experience to the learner.
- It enhances the development of science process skills, namely, observation, identification, classification and experimentation.
- It helps increasing the reasoning power, memory power among the pupils.
- It gives a chance for complete involvement to a learner, and thereby a learner gets the heartfelt satisfaction after a successful completion of the project.
- It indirectly teaches the value of dignity of labour.
- By giving each individual a chance to mingle with socio-emotional situation, the project method develops the confidence among the learners, which is the very basic thing for any progress in the life.

Project method though it appeals to you, is also, not free from pit falls or drawbacks. Such points can be considered as the demerits of the method.

**Demerits:**

- It doesn't suit a country like ours, where the curriculum, is highly structured, and imposed as a common curriculum or Nationalized Curriculum.
- Most of the time, the project method tends to be incidental
- It denies most of the practical-problems during its execution in context with the school's programme of work.
- Syllabus covering will become the major problem.

- Un-economical, and it consumes more time, effort and resources to cover very little of the curriculum part.
- It appears to be ambitious and also expects too much from the students' side.
- If they adopt this method, teachers are at higher risks, compared to their traditional teaching.

**‘Check Your Progress’ - 10**

1. List four merits of project method

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2. State any two demerits of project method.

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**22.6 Let Us Sum Up**

- A teaching method is one of the important devices in teaching-learning situation which is usually considered as a general way of presenting the subject matter. In most of the time it enhances the cognitive development among the students.
- Lecture method, demonstration method and project method are some of the effective teaching methods.
- Lecture method is considered as a teacher dominated method, -which involved informative speaking by the teacher.
- Lecture method sometimes, appears to be the best one for a developing country like India, but it falls back in creating a conducive learning environment to the pupils.
- Demonstration method is the one which tries to overcome the drawbacks that are

in the lecture method, and it also tries to impart the information more effectively than the lecture method.

- Demonstration method mainly aims at giving the knowledge to the students in a concrete form - But here also, in most of the time teacher dominates and there will be no much scope for the students to do the experiments.
- Project method is considered as a bit of live situation in which students participate whole heartedly in a socio-emotional setup.
- Project method is one of the best examples for child centered approaches.
- It is very difficult to adopt the project method to all sorts of subject matter in a school teaching.
- Some times the project method appears to be uneconomical, with reference to time, effort and resources.

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## **22.7 Answers to ‘Check Your Progress’**

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### **‘Check Your Progress’ - 1**

1. d) Teacher centered approaches
2. a) Acquisition of information
3. b) Sufficient preparation and self confidence
4. c) Monologue
5. d) Expository method
6. b) Teacher dominates

### **‘Check Your Progress’ - 2**

1. a) An autocratic performance by the teacher
2. d) Both (b) & (c)
3. d) All the above
4. d) All the above

### **‘Check Your Progress’ - 3**

1. Merits of lecture method are
  - a. It gives a chance for meaningful learning and it enhances students’ comprehension.

b. It is quite economical in time and energy because, it imparts information to any number of students in a short period of time.

2. Demerits of Lecture method are

a. It anticipates the students' rate of understanding will be the same as the teacher's rate of lecturing.

b. It is against to the principle of "learning by doing" and, it is not child centered in its approach, hence, it is un-psychological.

**'Check Your Progress'- 4**

1. d) All the above

2. d) Scientific concepts and principles

3. a) Inquiry

**'Check Your Progress'- 5**

1. a) Preparation, presentation and evaluation

2. a) True

b) False

c) True

d) True

**'Check Your Progress'- 6**

a) True

b) False

c) False

d) True

**'Check Flour Progress'- 7**

1. Merits of demonstration method:

a. It is a very effective method of teaching because, it acts as a time saver, and it is easier to conduct one experiment than to supervise many experiments done by the students. An experienced teacher can perform the demonstration more smoothly, quickly than pupils, and still can make students understand effectively.

- b. It is one among the child centered approaches, and hence psychological. It provides the information in concretized manner to the students.
- 2. Demerits of demonstration method:
  - a. It doesn't guarantee the students' learning, because, a demonstration seen is not necessarily a demonstration understood.
  - b. It does not enhance the acquisition of scientific information, because scientific information cannot be grasped adequately by sight and sound alone.
- 3.
  - a) True
  - b) False
  - c) True
  - d) True

**'Check Your Progress' - 8**

- 1. According to Kilpatrick "A project is a whole - hearted, purposeful activity proceeding in a social environment".
- 2. According to Stevenson "A project is a problematic act carried to completion in its natural setting".
- 3. d) Association, co-operation and activity
- 4.
  - i) Producer's type
  - ii) Consumer's type
  - iii) Problem type
  - iv) Drill type
- 5. "Learning by Doing."

**'Check Your Progress'- 9**

- I. The steps in a project method are
  - i) Providing a situation
  - ii) Choosing and purposing

- iii) Planning
  - iv) Executing
  - v) Evaluating
  - vi) Recording.
2. a) True
- b) False
- c) True
- d) False

### **‘Check Your Progress’ - 10**

1. Merits of Project Method:

- a) It nurtures certain social values, namely, democratic values, social adjustments, as well as enhances learning.
- b) It gives first hand information to the pupils.

2. Demerits of Project Method:

- a) It will become an over burden on the teachers and acts as an obstacle for the syllabus coverage.
- b) It is un-economical, because it consumes more time, energy, effort & resources.

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## **22.8 Unit-End Exercises**

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1. What is a method? Explain the meaning and importance of lecture method.
2. Define ‘Demonstration’ Compare the demonstration method with that of lecture method.
3. What is a project? Describe the steps involved in a project with an illustration.
4. What are the merits and demerits of Project Method.

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## 22.9 References

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## **UNIT - 23   □   ASSIGNMENTS**

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## 23.1 Introduction

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Assignments or what is called Home Works is one of the integral parts in teaching learning process. Sometimes these will appear as the last part in a teaching session, but they cannot be considered as the least part. It is because of their significance! If the assignments are of monotonous type, then, they will lose their significance. Usually assignments are done without teacher's supervision. In order to make it an yet another interesting endeavor, a teacher must show her creativity by giving a novel, challenging, and interest creating assignments. Assignments could be of different varieties, like, individual assignments or group assignments, text book based assignments or non-text book assignments, daily assignments or unit assignments. Similarly, oral or written assignments. Assignments can take up the form of 'Do it yourself' activity, Small Group discussion', 'Laboratory assignments'; and the "Reading assignments", also.

One thing is evident, that, assignments demand students' participation very actively. In the hands of a wise, professional and experienced teacher, it becomes the means of providing students exciting and new opportunities for self-directed learning. It is advocated that, a teacher has to develop tailor made assignments to meet the unique needs of the specific students. As a would be teacher, you should imbibe this quality. Having this point in mind, the present unit' has been designed. Here after going through this unit, you will come to know about some of the meaningful assignments, their nature and importance with respective merits and demerits.

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## 23.2 Objectives

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After studying this Unit you will be able to:

- Explain the significance of 'Do it yourself' type of activities.
- Give Examples for 'Do it yourself' of activities.
- List out the salient features of 'Do it yourself' type of activities.
- Mention the merits and demerits of "Do it yourself' type of activities.
- Describe the meaning and importance of Small Group Discussion.
- Give an account of salient features of a small group discussion.
- Compare the merits and demerits of a Small Group Discussion.
- Explain 'Reading Assignment'.
- List out the salient features of Reading Assignment.

- Compare the merits and demerits of Reading Assignments.
- Explain the meaning and importance of Laboratory Assignments.
- List out the salient features of Laboratory Assignments.
- Give an account of merits and demerits of Laboratory Assignments.
- Suggest a few Laboratory Assignments.

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### **23.3 ‘Do It Yourself’**

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As the term itself indicates, it is exclusively a student’s activity, where, a student’s active participation is strongly demanded. This gives a greater shelter for varieties of activities, where a student can learn on his own. The activities may be of long duration or short duration or easy one or difficult one. Some of the revised high school text books of recent days have already given a due importance for such activities. If you just open the school text books, you could see small boxes either at the top right end side of the page or at the bottom left end side of the page. These boxes contain a message or information or questions which aptly suit for ‘do it yourself’ activities. Some of them are laboratory experiments and some are just book reference type. So, in the following discussion you will come to know, the meaning, nature and importance of ‘Do it yourself’ type of activities and the salient features of such activities with merits and demerits. After going through this passage, you can also design a few ‘do it yourself’ type of activities.

#### **23.3.1 Meaning and Importance of “Do It Yourself”**

‘Do it yourself’ - the term itself is fascinating! Is not it? This is used as a phrase in teaching session. It is usually posed by the teacher to the students, so that, it will result in a arising interest, and challenges then to indulge in some of the dynamic learning activities.

‘Do it yourself’ could be a very good teaching strategy where, a teacher’s role will be almost nil but for providing some problematic situations or some academic puzzles. A teacher can use this as a device to motivate, to involve, and also to develop interest among the students. Hence during teaching it could be used at the beginning or while the process is going on or even at the end of the teaching session. Generally the subject science gives much scope for such type of activities.

‘Do it yourself’ activities usually include certain simple experiments, and some relevant learning activities. Such activities compulsorily have to be devoid of dangerous

applications and dangerous activities. Because these are going to be conducted by students themselves, that too in the absence of a teacher.

No doubt, that, 'Do it yourself' activities are child centered in their nature and hence are considered as very important in the system of education. Here the child's curiosity, interest, tremendous amount of energy- all will get channelized properly. Child's head, heart and hand- all will get coordinated. More than this, the freedom what is experienced by the students, gives them immense pleasure also and the success they get in such activities will act as a very strong reinforcement and thereby makes the stimulus response bond in terms of learning very stronger.

Since a teacher can generate quite a number of 'Do it yourself' activities based on the units to be taught, he or she can help students to do an in-depth study of that particular unit. By creating this type of learning situations, students are forced to think broadly, divergently, and put a number of hypothecations into action. So, their reasoning power also gets enhanced. Apart from all these points, it is like "joy of learning" i.e. to say, students enjoy learning. It also develops confidence among them, and there will be no question of humiliation because, it is highly individual specific. Most of the time, especially in our Indian education system the success or failure of "Do it yourself" activities does not influence the pass/fail i.e. promotion of any students! Because of this the students will have a mood of "feel free", and these activities will also be in the style, what is known as "learner friendly". So, the combination of the above said two points makes it a very good and strong nurturing process for their independent learning. Now you may feel, like, how these activities have to be constructed?

As you know it already, there are no any standardized, universal 'Do it yourself activities'. They have to be framed, designed by the teachers only. Teachers can do this by referring relevant literature, accessing through internet and consulting the experts. But this has to be done deliberately. Therefore it has certain sequential steps which are ought to be followed during their construction. So, now let us critically observe what those steps are and what is to be done in each step.

**A) Formation of Objectives :** This is very important, because a set of objectives with clarity can lead the process further very smoothly. Usually a teacher while constructing unit plan and lesson plans for a particular unit can get an insight of such activities. Therefore, the instructional objectives of teaching of that unit will definitely help the teacher to frame objectives for 'do it yourself' activities also.

**For Example:**

- i) The concept  $S = ut + \frac{1}{2} at^2$  has to be taught. Here an intelligent teacher can put 'Do it yourself' activity as a sandwich, i.e. in the regular teaching-learning situation. Ask a student to stand in the corridor of the top floor of a building. He is having a stop clock in his hand. Now ask him to calculate the height of the building without using any measuring tape! Of course, this question is completely theory based; because the student can start and drop the stop clock simultaneously from the location where he is standing. So, when the watch reaches the ground, the variable time taken for that will be obtained; here variable 'a' will be equal to variable 'g'. So, distance 's' problem.
- ii) The concept: Microbes. A teacher after teaching could assign a work to the students as follows: collect water samples from different sources/ponds. Mount a drop of water on slide, cover it with the cover slip and observe it under the compound microscope. Draw the sketches of the organisms that you observe under the microscope.

**B) Motivating the Students:** This stage is the one in which a proper encouragement should be provided by the teacher and it should be in such a way that, in no way students should-feel it as a forced activity or compulsion by the teacher. As it is told already, such activities are done in the absence of teacher it does not mean that can keep quiet, after initiating the students. Rather he has to keep an eye informally on them to get a guarantee about their active participation and complete involvement.

**C) Approval of The Results:.** This is the third stage, where a teacher has to give the feedback to the students. For example, a student may come and report that, he has identified several paramecia in his observation. This has to be verified and approved by the teacher. A teacher can use this as a first step to assign few more 'do it yourself' type of activities to the students.

So, the above said phases keep both the teacher and taught very busy in academic activities. The outstanding point here will be definitely the "enjoyment of learning". Because it will be always a thrilling experience for the students!

**23.3.2 Salient Features of 'Do It Yourself'**

Now let us try to put the salient features of 'Do it yourself' type of activities one by one.

- This is an exclusively a student's activity, which does not require teachers supervision.

- The source for such activities usually will be the teacher or the recent text books.
- The source for such activities usually will be the teacher or the recent text books.
- These activities are not going to be the deciding factors for the promotion of student from one standard to the next standard.
- Most of the time such activities are generated spontaneously or informally, by an experienced, talented teacher.
- ‘Do it yourself’ activities are the best platform in bringing co-ordination of cognitive, affective and psychomotor domains of student’s personality.
- These activities could be individualized or could be given to the group of students.
- ‘Freedom’ is the real essence of such activities, where students will feel free to undergo such experiences. It is also because; these activities are “learner friendly” in their nature.
- ‘Do it yourself’ activities will have a strong relevancy with the subject matter to be taught. Sometimes these increase the parameters of the syllabi, thereby keeping the learner in a continuously learning track.

### **23.3.3 Merits and De-Merits of ‘Do It Yourself’ Activity**

As a would be teacher, it is essential for you to know what are the merits and demerits of such an approach. Hence let us list out the merits and demerits one by one.

#### **Merits:**

- It is highly individualistic, and child centered, hence the learner will acquire the first hand information.
- Keeps the learner always in a continuous track of learning.
- Draw the attention of the learner, and keep the cognitive, affective and psychomotor domain of the learner in an active and highly dynamic state.
- Enhance the students learning ability, reasoning competency and also develop the science process skills among the students.
- Students can undertake these activities according to their innate rate of learning. There will be no chance of a serious comparison among the students.
- They give a thrilling experience to the students, because they are ‘learner friendly’ in their nature and students enjoy the full freedom in carrying out such exercises.

**Demerits:**

- There are no standardized 'Do it yourself activities'. Hence a teacher has to generate, which is again a burden for him.
- Time consuming, and demands certain minimum facilities, without which these cannot be executed.
- Sometimes they may drag the students out of the track.
- Since these are conducted in the absence of a teacher, they may result in some dangerous situation, which will be a risk factor.
- There will be no authentic recognition for such activities.

**'Check Your Progress' - 1**

1. Assignments are carried out by the students in the teachers'
  - a) Presence
  - b) Absence
  - c) Association
  - c) None of the above.
2. 'Do it yourself' activities enhance
  - a) Guided learning
  - b) Rote learning
  - c) Independent learning
  - d) All the above
3. 'Do it yourself' activities are
  - a) Child centered one
  - b) Teacher centered one
  - c) Subject centered one
  - d) Activity centered one
4. Mention the three essential steps that have to be followed while constructing 'do it yourself activities'.
5. Write any two salient features of 'Do it yourself' type of activities.
6. Mention two merits of 'Do it yourself' type of activities.
7. Write any two demerits of 'Do it yourself type' of activation.
8. 'Do it yourself' type of activities must be compulsory in the curriculum - what do you say? Give one reason for your answer.

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## 23.4 Small Group Discussion

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‘Discussion’- The term itself is having a magic power in it. I say this because, whenever, you see a ‘discussion’, you could obviously note the active participation of the individuals. Suppose, if the same type of discussion is brought to a class room, then one thing becomes very obvious, i.e. active participation by the students. Isn’t it? But this job is not that easy! However, by getting ourselves trained in bringing discussion method for teaching, our wish could be fulfilled! So, first, let us try to understand the term properly and later we shall proceed towards the other details.

By definition, a discussion is “talking over subjects” such discussions have some important functions in a teaching- learning session. But unfortunately what happens is, teachers usually tell “we shall discuss now” - and this will be followed by a lecture or sometimes it may happen in this way, like, teacher tells “Let us discuss the new topic” but it often means “I will now ask you some questions and you will try to guess the answers”.

In a true class - room discussion, all pupils should feel free to express their viewpoints. For this to happen, pupils must first have something in their mind that provides them with a few viewpoints. Because, they cannot discuss something about which they know nothing. And also it is true from the above said definition that a teacher should not dictate or influence the opinions of the pupils.

Discussions can be carried out in a number of ways. “For example, a teacher can treat the whole class as a single group and involve it in an active discussion. A forum made up of 3 to 5 members, could be another type, known as Forum Discussion. Here the forum will prepare and present the opinions or statements to the whole class on a given topic. The teacher will act as a moderator, and questions, clarifications will be taking place between the forum and the whole class.

‘Debate’ is another type, where *for* and *against* viewpoints are presented. Usually members of 2 teams alternate in making 5 to 8 minutes presentation.

Researchers have shown that, the greatest amount of learning occurs after a highly stimulating discussion as students leave the classroom. When students continue to argue on the way out of class, it gives vivid evidence that they have had a provocative session. This will motivate some students to learn more about the topic. They may continue the discussion at home with parents or friends. They may go to the library to read recent and relevant materials. But if the discussion takes the form of “a small group discussion” then its fruits will be long lasting. Hence, from next onwards, we

shall concentrate to know more about “small group discussion” - as a teaching strategy:

### **23.4.1 Meaning and Importances of Small Group Discussion**

Generally a small group will have 3-4 students, often employed by the teacher for different purposes. The division of classes into small groups and making them to get prepared for the discussion on a topic will be an excellent teaching technique. By doing this a teacher can give justice to individual differences: It will be an excellent way also, to encourage active pupils participation in the class.

If a teacher adopts, small group discussion as a teaching strategy, it generates quite significant positive effects on students learning. So, if you understand what these significant positive effects are, then you will very clearly know about the importance of small group discussion as teaching strategy in context with 21th century also.

Why do we need small group discussions?

- One of the most important reasons of using small group discussion is that, by doing so a teacher facilitate to achieve one of the most important goals of education, i.e. development of an individual as a perfect person to live and work within the society of men. It enhances the process of socialisation.
- It provides an apt channel for the pent-up energy among the adolescents, where they learn to listen as well as to speak meaningfully without unnecessarily becoming emotionally upset.
- The heterogeneity in the class will be a big problem. To some extent this is solved by making small groups to discuss on a selected topic in which at least a few students of “like minded” nature participate together.

Because of these statements you may feel like, grouping the students in a classroom. Isn't it? For that, a teacher should keep a few points in her mind before framing the small groups, for discussion. So now let us take a note on those points.

- A group must be formed by taking the common needs, interest, attitudes and abilities of the individuals.
- Forming the groups and assigning any tasks or involving the group in discussion should have a democratic atmosphere.
- Discussions in the absence of relevant information is meaningless. Hence it has to be planned and designed well in advance.

- A teacher must be well prepared to take up the role of a moderator and guard the process of discussion by going out of track.
- A discussion as far as possible must end with a due stress on specific conclusions.
- Avoid controversial agreements and do not allow the discussion to result in emotionalism.
- Small group discussion will be in vain, if it excludes less gifted students.
- A teacher should take care that the discussions are goal oriented and move continuously towards the desired objectives.
- Before initiating the discussion activity one must be sure that during discussion, the selected topic could be developed through an exchange of ideas.
- Discussions are commonly used for the motivation of pupil activities. They are effective when they raise problems that the pupils believe to be worth solving.

Now we shall have look at discussion activity as where will it fit in.

Usually, after dividing the whole class with different small groups a teacher can initiate the discussion by a number of tactics. As a moderator, there are certain duties to be followed by the teacher they are as follows:

- To keep the discussion moving
- To keep the discussion relevant to the topic under consideration.
- To encourage all pupils participation.
- To encourage acknowledge all contributions.
- To summarize frequently and keep the discussion clear.

### **‘Check Your Progress’ - 2**

State whether the following statements are True or False:

1. A small group discussion must be carried out in a democratic atmosphere.
2. In a small group discussion the teacher role will be nil.
3. Even knowing nothing also, pupils can discuss.
4. Small group discussion is possible only with gifted children.

### **23.4.2 Salient Features**

Small group discussion is characterized by the following features:

- Basically a discussion is a talking over subject matter from various points of view.
- Normally the whole class will be divided into small segregated group made up of 3 to 4 students.
- As far as possible the group will maintain homogeneity.
- The group will have the individuals with common goal, interest, attitude and aptitude.
- The small group discussion has the potentiality to come out as the best example for team work.
- It gives an ample scope for oral presentation.
- It will be impregnated with active students' participation by means of interactions between the audience group and the group that presents the discussion.
- In a small group discussion activity, the teachers' role is said to be a moderator's role.
- A well balanced small group discussion will always be the resultant of a deliberate planning in advance.
- All the participants who present the discussion must and should be having a background: that provides them with viewpoints.

### **23.4.3 Merits and Demerits**

Small group discussion as it denotes an extension of classroom teaching learning activity under a democratic situation has several positive points. So, these points can be considered as merits; and they could be listed as follows:

#### **Merits:**

- It provides an ample scope for active participation by the students.
- A good discussion assures certain amount of freedom, which is definitely enjoyed by the pupils.
- It helps for rational thinking, skill in putting one's own ideas logically, critical analysis among the students.

- It develops the team spirit, and makes the students to learn co-operation and work in coordination with the groups' consent.-
- It enhances the cognitive, affective and psychomotor development among the students.
- It brings interest in reference works as well as gives a chance to taste the intellectual work. Hence it could change a student's personality into a professional learner.
- But you know, the small group discussion strategy is also associated with some of the drawbacks. Now, let us list the demerits of the small group discussion:

**Demerits:**

- A teacher cannot go on providing this type of learning activity for all the topics for all the time.
- It is unconventional type of strategy so, it may pose varieties of incidental problems.
- A heterogeneous class, will feel it difficult to follow, because, some of the students may get neglected or shy natured students may not participate at all.
- Usual classroom discipline could be disturbed and may become problematic to maintain the normal classroom activities.
- Irrelevant discussions may creep into this strategy.
- Only a few students may lead the discussion and others may become passive learners.

**'Check Your Progress' -3**

1. State any two merits of small group discussion.

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2. State any two demerits of small group discussion.

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## **23.5 Reading Assignments**

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In any educational activity, most of the time, you come across reading and writing tasks. Reading, writing and doing some mathematical calculations form the conspicuous and major task in any system of education. As the title above is revealing itself, we are going to focus exclusively on “Reading Assignment” from here onwards. You know that Reading is an individual affair, because groups cannot read! Only individuals can read. Reading after all is a way of acquiring ideas, facts and information. This ‘Reading Activity’ deserves to be taught in secondary schools because; large number of pupils read so poorly that they need corrective work. It is also true that, reading approach differ with different subject matter. If at all a teacher wants to assign some Reading activity to the students, means, then he or she must know the depth and breadth of a reading activity. Therefore let us try to understand the nature, meaning and importance of Reading Assignments. And at the end we shall also take a note on merits and demerits of reading assignments.

### **23.5.1 Meaning and Importance of Reading Assignments**

Reading is a complex process and it is also a demanding act, which warrants reader’s attention. Usually reading is done (i) to get information and also for (ii) Enjoyment. Always, ‘reading’ will be individualistic. A successful reading will be analytical, intensive and extensive in its nature.

Reading analytically means, a reader will be reading in terms of questions! Like, for example, the pupil will ask, what the author is trying say? When the reader has discovered the answers to the right questions, one can say that, he has analyzed the book. That is why it is said that, ‘Reading is a straight - forward activity’ (i.e. making noises from a book)! But in reality (abled reader means), the act of reading essentially is a silent and motionless one. Here the purpose will be acquiring the message which the print medium conveys.

In all the above said points, you should notice that, ‘Reading’ means it is not fast reading, rather it is better reading. It may take up the different styles, namely, skim - read - Re-read and Re-reading intensively. And it could be associated with extracting the important ideas from a bit of writing, out-lining and note-taking. Exports say that teaching ‘Reading’ is a humanizing process. Reading activity involves several skills as well as thinking; but if you consider broadly, it affects the entire personality. Because the world of people and events encountered on the printed page may shape a reader’s attitude toward his fellows, toward school, toward parents and towards the life in general.

The teacher bears a great responsibility for the judicious selection of reading matter to which the learner is exposed and for providing expert guidance in the interpretation of what is read. A reading assignment keeps a learner very busy in certain functional tasks, namely classifying ideas, distinguishing between facts and fancy, facts and opinions, finding cause and effect relationships, making generalizations, interpreting idiomatic and figurative language; drawing inferences; recognizing emotional reactions, motives, judging relevancy - etc, and such so many activities.

**Illustrations:**

1. Students could be assigned to read two stories written by different authors, and asked to give a critique on that.
2. Students are asked to read two to three novels of the same author and make a comparative study.
3. The whole class has been divided into twelve groups and asked each to choose one of the members of the solar system for special study. The class then adjourned to the school library for the remainder of the period. The next day the groups reported on their findings. Many had done outside reading at home and in the community library.
4. Thirty five species of insects were collected on a Biology field trip. The teacher asked each pupil to select one insect and read about its eating habits and like pattern. As reports were made, the pupils entered the information in a table in their notebooks. This was followed by several other pupils volunteering to investigate the remaining species in order that the table is complete. So, thus they were motivated for 'Reading Assignment'.

Before assigning a Reading Task to the students, a teacher should know the following points, and allot the task according to the nature of the work as well as student's ability.

**1. Skimming:** It is searching through reading materials for a single piece for information, which could be a preliminary activity for further more careful reading.

**2. Very Rapid Reading:** It is clone while reading light, easy, fast-moving fiction for entertainment only.

**3. Rapid Reading:** Usually, the information in the newspapers and magazines are suitable for rapid reading.

**4. Average Reading:** Reading a relevant article assigned in the subjects like science, social studies, certain novels in language subjects.

**5. A Slow and Careful Reading:** A student is expected to read in such a way that, he can retain the details, weigh the truth of what he has read, it includes “thought time” as well as “Reading time”.

If Reading assignments are provided with some deliberate planning, then definitely the results will be of a better quality. Therefore a teacher, while adopting this technique to his or her teaching, has to be according to the following steps:

**a) Adopt a problem consciousness:** It should not be a problem simply because a teacher or a text - book suggests, rather there must be a purpose for solving the problem, and this may be achieved by several readings and analysis.

**b) Develop wide experience and broad background:** It is because textbooks have limitations. Therefore for the more able students, provisions should be made for wide reading to build background for understanding the laws, principles etc.,

**c) Activate the problem:** Students need proper motivation and encouragement before actually the work starts. Hence use diagrams, concrete objects, and blackboard illustration to focus the attention on the problem.

**d) Help students to ask meaningful questions:** Sometimes students may not have questions at all! It may be because, they have not read carefully. Guide them, through your own questions to read and analyse the problem again.

**e) Be sensitive to the student who is using an unsuccessful attack on the problem:** Encourage re-reading, careful and critical thinking. Help the student correct his procedures.

**f) Generalize the solution to every problem:** By doing this, it may get a chance of wide application in solving new problems.

The main aim of teaching Reading and using Reading Assignment strategy is that children should understand, and enjoy what they read. For this, supplementary reading materials, paperbacks, magazines, periodicals, newspapers, monographs, government publications, library materials must be available. Pupils could be allowed to select the reference materials. For this optimum books should be readily available, in a classroom library- Even, students can browse under supervision and in some rare cases a teacher can force a particular book on pupils to go through.

Reading literature is not the same as textbook reading. Therefore some of the results of the reading assignments done by the pupils independently should be shared with the whole class. For this, small group discussions, panels, interviews could be used. Later the results of such a major, work could be prepared as a written document.

Having reading assignments seem to be of immense value, because of its implied results. Hence, it is advocated at secondary school level. Based on the above discussion, now let us try to list out its salient features.

### **23.5.2 Salient Features of Reading Assignments**

- Reading is an individualized activity which involves reading analytically. Hence reading assignments enhance the mental ability among the students.
- It can be catering to all types of subjects, namely, social sciences, science, mathematics and also literature studies.
- Students will be independent in selecting the relevant reading materials. But here and there, intermittently a teacher can guide this type of assignments.
- It involves extensive study materials other than text books, namely supplementary reading materials, paper-backs, magazines periodicals and research publications etc.,
- It is purely an academic activity.
- Each pupil can be assigned this type of activity.
- Teacher plays a dominant role in assigning reading activity.
- It brings a bigger horizon for the concepts, principles and generalizations that are seen in the text books.
- It keeps the teacher and the taught as every busy individual.

### **23.5.3 Merits and Demerits**

Reading assignments have been considered as very important activities. It is because of its significant influence on the readers. This implies that, it has several merits under its credit. Hence, now let us list out the merits of reading assignments.

#### **Merits:**

- It enhances the cognitive development and intellectual ability among the students.
- It inculcates a critical taste and the ability to select suitable reading materials. Pupils can build their own personal libraries.
- It brings a sort of intimacy with the books.
- Pupil can locate certain significant lines based on his feelings, jot down those points, in his personal diary.

- It results in the development of good study skills.
- It develops functional vocabulary that is necessary for the understanding of the subject.
- Reading assignments can become a primary source of information for student's independent learning.
- It can give proper weightage to the students with their respective individual difference.

Now it is the time for us to look at the negative face of Reading Assignment activity. Such points could be categorized as demerits.

**Demerits:**

- Books and other reading materials will have severe limitations in their usefulness, mainly because of their one-way communication.
- Printed words and punctuation marks are symbols that are intrinsically meaningless. Before they can serve their function pupils must be able to interpret them.
- The most serious limitations of books and other printed materials which are mainly used in reading assignments are the limitations of words in general. Words are again symbols; they have no meaning in themselves. Unless and until the teacher interferes, this activity will remain as half done.
- It helps only the cognitive development to a-greater extent and the other two remaining domains are neglected.
- Just as there are no perfect reading materials, so there are no perfect readers.
- It is again a over burden on the teacher. It warrants more risk from a teacher. Because reading can affect negatively to the personality development of the students also it could be like, inculcating negative attitudes, values or habits. At this juncture the teacher is held for responsibility!

**'Check Your Progress' - 4**

1. State whether the following sentences are True or False:

- a) Reading Assignments are exclusively meant for teachers only.
- b) Any reading material could be selected for reading assignments.
- c) Reading is not an individualized activity.
- d) Reading habit enhances the critical thinking among the students.

2. Fill in the Blanks:

- a) Reading may take up the different styles, namely,.....,....., .....and ..... intensively.
- b) A slow and careful reading includes .....time” as well as time”.
- c) Reading assignments enhances the .....ability among the students.

3. Write any two merits of reading assignments.

4. Write any two de-merits of reading assignments.

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## **23.6 Laboratory Assignments**

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In this section you will come to know about one more type of very interesting assignment which is known as laboratory assignment. Laboratory assignments have a strong base of “Learning by Doing” principle. Experimentation is the essence of Laboratory work. Because of such activities, so many blind beliefs, and superstitions have been eradicated from the society, and in turn it has brought social welfare to the human society. Hence experts in the field of education have advocated that students must get trained in the skill of investigation and experimentation. A teacher can provide certain situation, in which students will explore the subject matter in a laboratory. This can be in presence of a teacher also. Sometimes a teacher can give certain safer experiments as laboratory assignments also. In the following discussion, you will come to know about what is meant by laboratory assignments? Why it is important? As well as the merits and demerits of such assignments.

### **23.6.1 Meaning and Importance of Laboratory Assignments**

As a novel approach a teacher can find it desirable to organize the whole class into several small groups of students in order that each group may perform a different type of experiment and present its findings to the entire class.

Experiments and laboratory work are almost but not quite synonymous terms in the secondary school science programme. It is also true that some laboratory activities cannot be called experiment. But in practice most of the experiments done by pupils are part of their laboratory work and most of their laboratory work involves experiments. Usually scientific experiments, originated work involves experiments, known as “open ended experiments”. Such experiments are different from illustrative experiments and investigatory experiments. An open ended experiment does not have a pre-determined outcome that the pupil is expected to obtain in order to consider the experiment a success. All experiments for that matter, if they are truly experiments, are open minded!

Generally, laboratory assignments as in the case of all assignments are expected to be carried out in the absence of a teacher's supervision. Hence, while assigning such laboratory tasks a would be teacher like you should have clear idea about this. Therefore, let us consider the following points:

- Laboratory assignments could be given to the students in the form of open-ended experiments, in which the experiment is used to answer a question.
- The pupil performing the experiment does not know the outcome of the experiment before performing it.
- The design of the experiment is frequently determined by the pupil.
- The pupil makes his own observations and draws his own conclusions.
- The conclusions drawn by the pupil serve as a basis for formulating new hypotheses which are similarly tested.

When the pupil has performed the experiment and has drawn his conclusions from the data that he has collected, he can then be asked to predict experimental results for related experiments. This implies that, a pupil has to think more to interpret his observations and data. They could also see that, open-ended experiments will lead to other experiments and it trains them in viewing an experiment from every angle. Such experiments or laboratory assignments may vary with the time taken, as long term or short term laboratory assignments. Even some of the experiments can be continued by the students as a homework assignment.

All the above said descriptions might have given you a clear picture of laboratory assignment. Isn't it? It is very interesting as well as a challenging aspect for a teacher who wants to utilize this strategy in his teaching. But one cannot deny its significance also! The importance of laboratory assignments could be thought of in different ways, for example:

- It takes the routine curricular program beyond its rigid parameters and enhances the development of an individual in totality.
- It encourages divergent as well as convergent thinking.
- It keeps the teacher and the taught always busy.
- It helps the students to form several hypotheses and gives an open opportunity to test them. Thereby it enhances confidence among the students.

Apart from the above said points you may be able to write few more, to express the importance of laboratory assignments. Isn't it? Then, why to waste the time? Come on, list few more points on your own!

### 23.6.2 Salient Features

Laboratory assignments have been appreciated by all because of its explicit advantages. This is also because of the specific characteristic features. So, now let us try to list out the salient features of laboratory assignments.

Laboratory assignments invariably involve the activities, observations and experiments which will be almost out of dangerous and risks.

Laboratory assignments involve the science process skills that are exhibited by the students. The laboratory assignments are very dynamic activities, which are made up of certain science processing activities, namely, observation, identification, classification, hypothecation, and experimentation etc.,

Majority of the time, laboratory assignments will be made up of open ended experimental activities.

These assignments consider the performance of the experiment as the important one than the final results or the findings.

A teacher can assign a variety of experiments to the students. After referring good books other than the prescribed text books, here are some of the experiments that could suit the above said type of assignments.

Type	Examples
1. Operation of devices	Electric bells, telegraph sets.
2. Testing Chemical properties	Acid base tests; starch tests etc.,
3. Finding physical properties	Focal lengths; hardness of materials
4. Microscopic examinations	Feather structure; microbes identification.
5. Anatomical studies	Stems, leaves, crystal shapes
6. Simple experiments	Heart rates; solutions.

Before assigning any experiment to the students, a teacher must see that whether the purpose of the activities be readily understood, and more than that, whether it challenges them! It is better if the following questions are taken into consideration, before the task is assigned.

- Is the purpose easily understood?

- Can clear cut directions be given?
- Are the procedures simple and direct?
- Can results be obtained in a short time?
- Are the materials familiar to pupils?
- Are the materials inexpensive, readily procured and easily stored?
- Are applications of the findings obvious?

**‘Check Your Progress’ - 5**

1. Laboratory assignments help in the development of:
  - a) Laboratory skills
  - b) Science process skills
  - c) Writing skill
  - d) Reading skill.
2. The essential point that a teacher must look into, before assigning Laboratory activities is,
  - a) It should involve teachers’ role as a dominating factor.
  - b) It must be challenging as well as suit the students level of understanding.
  - c) It must be very easy for the students.
  - d) None of the above.
3. Give any two examples for Laboratory assignments.
4. Mention any two salient features of Laboratory assignments.

**23.6.3 Merits and De-Merits**

Laboratory assignments are very much appreciated by the students. It is because of the thrilling experience they get while they conduct experiments. So, let us now list out the merits of such activities.

**Merits:**

- It is a very efficient and effective means to enhance the science process skills, namely, observation, identification, classification, experimentation etc., among the students.
- It is based on “learning by doing” principle; hence learning lasts for a longer period.
- Students’ confidence, skill of planning, hypothecation-will develop to a greater extent.

- Students personality, unknowingly will be taking the role of young scientists! This is definitely a very good aspect.
- It includes all the merits of child centered approach, like, child's interest, attitude, aptitude, his background and interest all will be taken into consideration.
- It caters for individual difference and tries to give justice for students learning. Now, let us take a note about the demerits of laboratory assignments.

**Demerits:**

- First of all, laboratory assignments need at least a minimum level of infrastructure facilities. But you know that, in reality so many schools are devoid of a simple laboratory.
- All subjects cannot be taught through this type of activities. It best suits for science and science related subjects.
- It is expensive, consumes more time and effort.
- Allowing students to conduct laboratory assignments on their own may lead to some dangerous situations.
- It mentally taxes the teacher by exerting more risky responsibilities.
- Usually one should be fit enough to carry out such activities. This is a cumulative result of the earlier learning's. In Indian situation, we cannot expect the students with all the fulfilling requirements from their primary and upper primary education.

**'Check Your Progress' - 6**

1. List any two merits of laboratory assignment.

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2. List any two demerits of laboratory assignment.

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## 23.7 Let Us Sum Up

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Assignments or what are popularly known as homework are one of the integral parts in teaching profession. Though the majority of the assignments are carried out in the absence of a teacher, they influence the students learning significantly! No doubt in it! Nowadays these assignments have taken a paradigm shift, in order to create interest and to extract commitment by the students. Hence an assignment could be ‘Do it yourself’ activity or ‘small group discussion’ or ‘Reading Assignment’.

‘Do it yourself’ activities are exclusively students activity which is considered as the best platform in bringing the co-ordination of cognitive, affective and psychomotor domains of student’s personality.

The essence of ‘Do it yourself’ activity is the “Freedom”. Where the students feel free to undergo such experiences and such activities will be “Learner friendly” in their nature, so that they enjoy learning. Small group Discussion is yet another type of unusual teaching strategy in which students flock is dynamically involved. One should be reminded that, a well balanced small group discussion will always be the resultant of a deliberate plan, which is done well in advance.

Similarly reading assignment also moves in a slightly deviated, practice where, reading habit is very much highlighted. It can be catering to all types of subjects and all types of individual. It is because; most of the time, reading will be an individualized activity. This could include extensive study materials, namely, supplementary reading materials, paper backs, magazines, periodicals and research publications.

All the above said activities are beneficial to the students in their own way. But it does not mean that they are free from demerits. Hence, a judicial use of all of the above said activities either in a collective form or separately must be utilized, well depending upon the situations.

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## 23.8 Answers to ‘Check Your Progress’

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### ‘Check Your Progress’ - 1

1. a) Absence
2. b) Independent learning
3. c) Child centered one
4. The three essential steps that have to be followed while conducting ‘Do it yourself’ activities are:

- a) Formation of objectives
  - b) Motivating the students
  - c) Approval of the results.
5. Two salient features of 'Do it yourself' activity are:
- a) 'Do it yourself' activities are said to be learner friendly activities, with an essence of 'freedom'.
  - b) These activities are subject based and sometimes they increase the parameters of the syllabi, conveniently.
6. The two merits of 'Do it yourself' activity are:
- a. It is highly individualistic and child centered in its approach.
  - b. It enhances the student's learning ability, reasoning power and also inculcates the science process skills among the students.
7. The two demerits of 'Do it yourself' activity are:
- a. It is un-economical and time consuming.
  - b. Usually these are conducted in the absence of a teacher's supervision by which is a prone to dangerous situations.
8. 'Do it yourself' activities have to be included in the high school curriculum, because, it is a very good means of all-round development.

**'Check Your Progress' - 2**

1. True
2. False
3. False
4. False

**'Check Your Progress' - 3**

1. Two merits of small group discussion are:
  - It gives a dynamic forum for active participation by the students.
  - It brings interest in reference works as well as gives a channel to taste the intellectual work; thereby it can change the student's personality into a professional learner.

2. Two demerits of small group discussion are:
- Such activities will have limited scope; hence these cannot suit all types of topics for all the time.
  - Usual classroom discipline could be disturbed and this poses a problematic situation.

**‘Check Your Progress’ - 4**

1. a. False  
b. False  
c. False  
d. True
2. Fill in the Blanks
- a) Skim, Read, Re-read and Re-read
  - b) “Thought time” and “Reading time”
  - c) Mental
3. Two merits of Reading assignments are:
- a) It develops a good study skill
  - b) It helps in developing functional vocabulary, which is necessary for the understanding of the subject.
4. Two de-merits of Reading assignments are:
- a) Books and printed materials have several limitations, in which a student may feel it very difficult to understand, because, after all the words, punctuation’s, sentences all are symbols only.
  - b) It doesn’t favour the all round development of the students.

**‘Check Your Progress’ - 6**

1. Merits of Laboratory assignments:
- a) Students will behave like young scientists and it assures them to become professional learners.
  - b) Students’ confidence, and skill in problem solving get enhanced.

2. Demerits of Laboratory assignments:

- a) It demands at least a minimum level of infrastructures and laboratory facilities.
- b) It doesn't suit for types of subjects and it involves certain amount of risk factor.

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### **23.9 Unit-End Exercises**

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1. Explain the meaning and importance of assignments?
2. What is meant by 'Do it yourself'? Illustrate your answer.
3. Explain the salient features of small group discussion.
4. What is meant by "Reading Assignment"? Explain it with two examples.
5. What are the merits and limitations of "Reading Assignments"?
6. Explain the nature and significance of laboratory assignments.
7. Compare the merits and demerits of laboratory assignments.
8. Suggest any two laboratory assignments.

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### **23.10 References**

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## **UNIT - 24 □ DESIGNING A TEACHING STRATEGY**

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### **Structure**

#### **24.1 Introduction**

#### **24.2 Objectives**

#### **24.3 Designing a Teaching Strategy**

##### **24.3.1 Factors to be considered**

##### **24.3.2 Instructional Objectives**

##### **24.3.3 Entry Behaviors**

##### **24.3.4 Available Resources**

#### **24.4 Creating an Appropriate Mix of Approaches and Methods**

#### **24.5 Let Us Sum Up**

#### **24.6 Answers to ‘Check Your Progress’**

#### **24.7 Unit-End Exercises**

#### **24.8 References**

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### **24.1 Introduction**

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In the beginning of this Block, you have come across the term “Teaching Strategy”. It is also said there, that the term “Strategy” has originated from military science. So, it is a plan deliberately prepared to fight and defeat an enemy. In the field of education, “Ignorance” is our enemy. Hence here a teacher has to plan more deliberately to fight this “invisible enemy” For this you, as a would be teacher should know some of the theoretical aspects of constructing such teaching strategies. So, in this unit we will be discussing on, how to design a teaching strategy, what are the factors to be considered while designing it and also about instructional objectives. At the end you can go through about entry behaviour concept and also how to locate and use the available resources.

A strategy is always considered as scientific in its approach. By telling this, it is implied that, a teaching strategy will have a sound basis of objective, based on which a

learning situation could be designed. A strategy caters to all the personality dimensions, i.e. cognitive, affective and psychomotor domain of the students. Hence, a criterion referenced test is advised to test the effectiveness of a teaching strategy. So, a strategy will have three essential factors in it, namely, (i) The objective or the purpose (ii) Teaching - learning situation in general and learning environment in particular and (iii) Evaluation that could be through a criterion referenced test. For fulfilling all the above said aspects a teacher has to understand the theoretical background of designing a teaching strategy, factors that influence while constructing this strategy. Hence the following discussion is presented for the above said purpose.

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## 24.2 Objectives

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After studying this Unit, you will be able to:

- Explain the process of designing a Teaching Strategy.
- Describe the factors to be considered while designing a Teaching Strategy.
- Define instructional objectives.
- Explain the nature of instructional objectives.
- Define entry behaviour.
- Explain how to make use of the available resources.
- Suggest the means of creating an appropriate mix of approaches and methods.

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## 24.3 Designing a Teaching Strategy

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You know that, while teaching a teacher will be obviously aware of the heterogeneity of his class. In spite of this, a teacher plans his teaching for the whole group. By doing this, he might have classified those learners into “special”, “advanced”, “college preparatory”, “terminal”, “heterogeneous” or “homogeneous” groups. Such grouping implies that, the teacher is trying to provide the information or facilitating learning based on the individual differences in a broad and general way. That is to say, teachers plan their objectives, materials, resources, techniques and teaching strategies to meet the needs and abilities of the majority of students within the total group. In the first unit of this block, you have already been introduced to certain new terms, like, technology of teaching, teaching strategies, and tactics. To conclude this block, let us again touch upon few more points on teaching strategies, and its allied terms, namely, objectives of teaching, instructional objectives, entry behaviors etc.,

### 24.3.1 Factors to be Consider

Teaching is a profession which involves certain skills as well as fund of knowledge. Teaching is helping pupils to learn. The professional teacher would estimate the situation and then select the most suitable strategy and tactics in accordance with his diagnosis of what the situation calls for. In this content, a strategy refers to the overall approach to teaching: In defining any strategy, it is important to remember that content i.e. the subject to be taught is very significant factor. That is to say, in deciding what strategy to use, one crucial factor is, deciding what subject matter to include. Thus content is a part of a strategy.

**To select a strategy means, it has to be done in context with several variables, but one general pattern could be adopted and this general pattern could have five steps, which are as follows:**

1. Diagnosis
2. Preparation
3. Guiding Learning
4. Evaluating the results of Learning
5. Follow-up

Let me tell you what all the above said steps mean in brief. Diagnosis is the step in which the teacher determines what should be done. Preparation refers to the teachers getting themselves ready to teach, motivating the pupils, and planning. Guiding learning includes the class proper the presentation, discussion, or whatever is done. In the evaluating step, the teacher attempts to assess the success of his teaching by finding out how much the pupils have learned. The follow-up is the process of filling in the spots that pupils seem to have missed teaching and if necessary and building on what the pupils have learned. The key step in all these of course is diagnosis. Without diagnosis one does not have an adequate basis on selection of any strategy. It is also obvious that, good diagnosis depends upon an analysis of as many of the variables in the particular teaching - learning situation as possible under the circumstances. So, now let us look upon those variables or the factors one by one.

- The first and the foremost factor to be considered for designing a strategy are the **objectives**. It could be overall objectives that influence the type of curriculum and overall strategy or grand strategy, sometimes more specific objectives that influence the choice of the content. And the objectives may confine to any of the domain,

namely, cognitive or affective or psychomotor domain, based on this, the relevant strategies have to be designed.

- The target group or the students are the one more factor. Because, each student will be unique and will be having his own interests, abilities, attitudes, potentials background, goals and style of learning. Consequently, the teaching strategies have to be designed. So, whenever a teacher is planning for teaching he must use his professional knowledge for both pupils in general and individual pupils in particular.
- Understanding and utilizing the knowledge of group dynamics can make one's teaching more effective.
- Nature of the subject to be taught is one more factor which influences the designing of a teaching strategy.
- Another factor is the technology that is available. By technology, I mean, both the techniques, tools and the infrastructure that are available. But of course, here the trick is to select the right combination of techniques, equipment and materials for specific occasions.
- Environment that surrounds the school is yet another factor. This includes both the community in which one lives and the society at large. Environment of the school is very important.
- Teacher himself can be considered as the last but not the least factor. It is because; every teacher has strengths and weaknesses, likes and dislikes. So, designing or selection of any teaching strategy is influenced by one's competence, ideals, general attitudes, and personality. Therefore it is advised a teacher should follow the style of teaching that he finds compatible.
- Teaching strategies and tactics should be consistent with good communication techniques.
- Although teachers must adopt the proper teaching strategies for the goals at which they are aiming, the success of it lies with the skillful use of it. For this, the teacher must consider not only his teaching goals but also the subject matter, pupils and other classroom variables.
- In order to know which strategies and tactics to choose and utilize, one must diagnose the situation.

In general, while designing teaching strategies, a teacher has to give due consideration to certain principles. Now let us go through those principles.

1. **Principle of selection:** Always a teacher must pool out all the available relevant man-material resources first, then he/she has to select the appropriate ones and then should give a good structured designing. So, selection, sequence and structuring constitute the principle of selection.
2. **Principle of maxims of teaching:** The maxims of teaching like from simple to complex, easy to difficult, known to unknown, concrete to abstract, etc., have to be given due importance while constructing a teaching strategy.
3. **Principle of variety:** Teaching strategies can be used, interchanged in any order without disturbing the continuum of teaching - learning process. Hence varieties of teaching strategic activities have to be used, to avoid monotony. For example: observation, collecting of materials / specimens / information or demonstrations and experimentation, educational games, dramatization, group discussion, any of this sort could be utilized by the teacher to enhance the quality of the learning process.
4. **Principle of motivation:** This being the basic to learning, teacher should judiciously adopt motivating factors in teaching strategies. For example: praising, rewarding, reinforcing etc.,
5. **Principle of co-relation with environment:** Teaching learning process occurs in a socio-emotional, bio-physical and cultural environment. Hence it has to be in co-relation with the learner's environment. Then only learning becomes more meaningful. Whatever the child learns in the classroom becomes valid only when it is applicable in his living environment.
6. **Principle of Feedback:** Feedback is an avenue to check the quality of teaching and learning process. A teaching strategy should have an in-built component of evaluation and feedback factor. A system of continuous evaluation plays an important role in providing regular feedback indicating strengths and weaknesses of the process. A vigilant teacher can make use of a number of strategies for the purpose of getting feedback, which ensures the effectiveness of his teaching in terms of learner's learning.
7. **Principle of Child's All Round Development:** Adopting strategies in teaching will give a chance for a teacher to perceive the child's / learner's personality completely. That is, not only his paper-pencil performance, but many other important factors of his personality. Hence, learner's strengths as well as the weaknesses can be diagnosed with suitable strategies. Based on this a teacher can plan remedial measures to overcome the observed defects in the learner - of course, this will be again through one or the other strategy/singly or collectively applied. All round development is not a single

process, but a duty conscious teacher with all the relevant commitment can put the sincere effort in this direction.

8. **Principle of Individual Difference:** You know that, in a classroom a teacher will get a group of heterogeneous individuals. It is a universal phenomenon that, no any two individuals are alike. But paying individual attention to the students is one of the fundamental duties of the teacher. This is in a way assuring the “equal educational opportunities” to the heterogeneous group in a classroom situation. Students with a special talent should be provided with opportunities to proceed at a faster pace and similarly, there should be provision for remedial instruction for those who lag behind as slow learners.

**‘Check Your Progress’ - I**

1. Mention any two principles that have to be followed while designing teaching strategies.

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2. Mention the factors which have to be kept in mind while framing teaching strategies.

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**24.3.2 Instructional Objectives**

Objectives are means to achieve the broader goals and aims. If objectives tend to become more and more specific, then they will take the form of instructional objectives. For our understanding, we can conceive the broad goals and aims as the horizontal dimension of an educational system, whereas the objectives constitute the vertical dimension. These objectives will determine the more immediate and detailed procedures, content and techniques to be selected for any given instructional unit.

An instructional objective is a description of what a successful learner will be able to do at the end of instruction. The statement of an objective must be written in observable terms, so that it can give an opportunity to test the learning of a learner. Hence such objectives are variously referred to as: “behavioural, “operational” or “instructional objectives”.

Instructional objectives may be stated for desired long or short range learning outcomes. For example, for the unit to be taught, which may take up almost the whole month, the objectives will be long range instructional objectives. Similarly, the shortest range objectives would be those for each daily lesson within the unit. Instructional objectives may apparently look very limited. Isn't it? The more limited an objective, the more likely that it can be attained within the allotted time with less danger of superficiality. There is more likelihood that verbalization of the pupils will approach the desired objectives if the statement of the objective is expressed in simple language.

While forming the instructional objectives, following criteria have to be kept in mind.

1. **Usefulness** : The desired learning should have value in the lives of the pupils.
2. **Timeliness** : Learning should be concerned with material familiar at the present time, not with obsolete devices and ideas.
3. **Fitness** : The learning should fit into a sequence leading toward broad objectives.
4. **Appropriateness** : The learning experiences provided to students must be appropriate for the maturity and backgrounds of the pupils concerned.
5. **Practicability**: Learning experiences that are needed for the development of a learner must practically be possible.

If the instructional objectives are stated with all clarity, then it helps the teaching process to run in a smooth way. Therefore, now let us list out the uses of well defined instructional objectives:

- It specifies very precisely the goals to be achieved with all clarity.
- Objectives are the valid criteria for evaluating students' achievement.
- These are the very good means for getting feedback. That is to say they can act as a very good frame of reference to decide, like, how far the students have learnt, as well as how much good, the teacher is in teaching!

**‘Check Your Progress’ - 2**

1. Write any two uses of instructional objectives.

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2. What are the five criteria that help in framing instructional objectives?

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Now let us go through some of the examples for instructional objectives:

Pupil will be able to :-

- Define cell
- Explain the process of photosynthesis
- Reason out the causes for failure of sipoy mutiny.
- Write the map of India.
- Write a labeled diagram of a human heart.
- Set up the apparatus for the experiment to show the reaction between an acid and a base.

In the above examples, you may notice that, the instructional objectives have been spread over to cognitive, affective and psychomotor domains. Bloom and et al, have further classified each domain into different categories. According to them cognitive domain has the following hierarchical categories,

- |              |                  |                |
|--------------|------------------|----------------|
| 1. Knowledge | 2. Comprehension | 3. Application |
| 4. Analysis  | 5. Synthesis and | 6. Evaluation. |

Similarly in the affective domain, the classification follows the hierarchy as given below:

- |                 |                      |            |
|-----------------|----------------------|------------|
| 1. Receiving    | 2. Responding        | 3. Valuing |
| 4. Organization | 5. Characterization. |            |

In the psychomotor domain, no standardized classification is available. However, the NCERT has taken all the above said taxonomical aspects into consideration and has prescribed its own parameters for national system of education. Hence, in practice, while writing lesson plans, the instructional objectives will spread over between knowledge, understanding, application and skill only. It is anticipated that, 'Application' level can subsume the instructional objectives of analysis, synthesis and evaluation level.

### **24.3.3 Entry Behaviour**

Instructional objectives, as it has been explained in the caption 24.3.2, help a teacher in teaching immensely. They give a general guideline, for the classroom transaction as well as throw light on the subject matter or content also. Based on this,- a teacher is able to carry out the content analysis. Most of the decisions a teacher takes is based on the above said procedure. All the activities that are carried out in a teaching - learning session will influence the personality of the learner. If the resultant of such activities is a desirable change in the learner's behaviour, then it is said that, '**learning**' has occurred.

Therefore before the start of actual teaching a teacher plans for it, the first and the foremost thing that has to be done while planning is, writing down the instructional objectives. This is followed by content analysis almost at the same time the teacher has to analyse the entry behaviour of the learner. Now you may ask a question, i.e. what is meant by entry behaviour? Go through the following explanation.

#### **Entry Behaviour:**

As you know it already, the teaching learning process is to be carefully planned for the purpose of attaining the pre-determined objectives. This is a complex task. Hence, in order to carry out this task smoothly, it is broken down into simple, sequential steps. It is known as analysis of the task or task analysis - as it is termed in educational technology. By definition "the process of breaking tasks down into their simpler components is called task analysis" (Gagne 1977). In planning the activities for attaining the teaching learning objectives, the task may be broken down into the subtasks, as follows:

- Identifying the entry behaviour of the learners and their performance deficiency.
- Identifying learning experiences to be given to the learners.
- Identifying the appropriate methods and strategies for providing learning experiences.

- Planning for the appropriate teaching learning situations or environment.

Now let us try to look at the first step again. It says about identifying the entry behaviour of the learners. This is a very important step. It helps a teacher to know about the potential abilities, previous knowledge of the curricular subjects, interests, aptitudes and attitudes of the learners.

So, if a teacher knows the levels of knowledge and understanding of the students, then he can plan perfectly for further teaching. Because entry behaviours influence the further learning very significantly. For example, if the students have acquired perfectly the knowledge of **addition** and **subtraction**, in the subject basic mathematics, then only they can learn the **multiplication**. If not means, whatever is done by the teacher with respect to the teaching of multiplication will be in vein. This is where; a teacher has to verify the entry behaviours of the children.

Acquisition of the knowledge of letters, words is very important for the learning of “sentence construction”. Here one thing you should know that, entry behaviour encompasses the behaviour of not only the cognitive domain, but also the behaviours of affective and psychomotor domain. Entry behaviours are the essential pre-requirements, for any teaching learning situation. Nowadays, most frequently heard term is “Entrance Test”. It is administered over a group of individuals, to know about their general mental ability, clerical aptitudes, mechanical aptitude or musical aptitudes etc., In order to take up the courses like Engineering or Medicine, one has to go through CET procedures! Similarly certain recruitments by the government as well as from the private sectors, is going to be based on written tests and viva voce. All this implies that, knowing about the entry behaviour of an individual helps a lot not only for further learning but also for conceiving any profession as the career.

### **‘Check Your. Progress’ - 3**

1. Entry behaviours are

- (a) The behaviours of the students before teaching.
- (b) The behaviours of the students after teaching.
- (c) The behaviours of the students while teaching.
- (d) None of the above.

2. Entry behaviours are identified through:

- (a) Annual Examination

- (b) Terminal Examination
- (c) Entrance Test
- (d) Achievement Test.

#### **24.3.4 Available Resources**

Whatever may be the strategies and tactics that are planned, one thing is evident that, teachers must choose their strategies and tactics partially on the basis of the tools and materials available to them. Usually, here, the material means books, encyclopedia, newspapers, periodicals, laboratory equipment's and other infrastructures. Apart from this, a teacher has to be sensitive enough to locate and identify some of the easily available materials that can be turned out as resources. For example, a school garden can give plenty of opportunities to generate several teaching strategies, and tactics. Based on this a teacher can design very effective learning situation.

As far as possible the daily experiences, common materials must come in priority as teaching resources. That is how, a simple, unwanted rusted iron piece, can trigger the idea of "oxidation" which is nothing but a chemical reaction between Iron and Oxygen. Likewise, "coins collection", "stamp collection" - if once done means, can be used as learning aides for many years. Charts, maps, scientific diagrams, models, two-dimensional and three dimensional learning aids, - whether prepared by the teachers and students or purchased all can be considered as a resource. Apart from this any apparatus broken or out-of-use, can be rebuilt, and in this situation, students active involvement can be generated, there by a broken apparatus can also become a resource

A good library, and well equipped laboratory - are the two essential resources for teaching. As you know, majority of the schools in our country are devoid of such a facility. There comes the question of "Available Resources" Therefore, a teacher must be resourceful enough to convert the ordinary and normal classroom itself as a laboratory and carryout the teaching process.

Radio programmes, T.V. programmes and certain educational channels which are exclusively meant for imparting educational information is yet another resource. Of course, their availability to the schools may be under question. Similarly, computers, CDs, computer aided instructions are the very effective learning aids. Efforts are being put by the government to supply the computers to several schools under different schemes and projects. Most of the time, while planning for the use of electronic gadgets, where a power supply is a must, one should think about the "power cut schedules" and "un-scheduled power cut" also. Then, a teacher has to decide, whatever is available, whichever is the best, a practically possible for use; that has to be selected.

Community resources are one more source for teaching. In this way, the botanical gardens, plant nurseries, zoo-garden, factories, post-offices, banks, transportation agencies - all these can be used as resources. Then the experts, subject specialists, experienced professionals also considered as resources, “Human Resource” rather. A teacher has to tactfully, use such persons and their expertise for the benefit of the students. So, a teacher may wish to have all the sophisticated equipment’s and resources to impart effective and efficient teaching. But reality may not be compatible for his anticipations. Hence he has to decide and select the best resource among the available ones, where he could reach and use them conveniently.

---

## **24.4 Creating an Appropriate Mix of Approaches and Methods**

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In the previous units of this block, you came to know about different teaching strategies, approaches and methods. That is, under approaches you have been introduced to teacher centered, learner centered, activity centered and subject centered approaches. In this type of approaches the “interaction” between the teacher and the taught was the deciding factor, associated with the nature of the subject matter. Later you have been introduced to conceptual approach, investigatory approach, inductive and deductive approach. Here the conceptual approach, inductive approach may look similar partially. Under conceptual approach, up to “concept formation stage”, it is exactly similar to that of “inductive approach”. Under investigatory approach you go for experimentation. Experiments may be for an inquiry or for an illustration. Here also, many experiments done to draw one generalization may look like an inductive approach. And all such activities definitely lead to concept formation and concept attainment.

So, that not only the cognitive development but also the affective as well as psychomotor development is enhanced. And coming to methods, which is nothing but a general way of presenting the subject matter can have an inter-woven network of different approaches. All this is practically possible, because, no one method or approach is having water tight boundaries. They can get mixed up homogeneously in any situation, depending upon the talent of the user, and to whom it is used. Whatever may the approach, strategy or method and tactics - all will aim for learner’s learning outcome only. Hence a teacher can have all the freedom to use judiciously the appropriate method, strategy and approach or it could be the combination of such approaches and methods also.

---

## 24.5 Let Us Sum Up

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In this unit, we again touched upon few more points with respect to teaching strategies, approaches and methods. While designing a strategy, there are certain factors which have to be considered, namely, diagnosis, preparation, guiding learning, evaluating the results of learning and follow up. And the principles to be followed are principle of motivation, principle of co-relation with environment, principle of feedback, principle of child's all-round development and principle of individual difference.

Instructional objectives are the means to achieve the educational aims and goals. These are in the form of statements, written well in advance of the actual teaching. Essentially these will be written by using action verbs, what are known as "Behavioural Terms". It must be brief, precise, empirical observable and free from ambiguity. While framing the instructional objectives, one should take care about its "usefulness", "Timeliness", "Fitness", "Appropriateness" and "Practicability".

Entry behaviour in. the one which will be located and identified before the actual teaching starts. By knowing this, a teacher will be aware of the student's level of knowledge and understanding. Based on this further learning situations are designed. Entry behaviours are the essential pre-requisites for teaching of any concepts. Entrance tests are administered over the students, to identify their interest, attitude and aptitude and thereby helping them to select the courses in which they fit or for career guidance also. Whatever may be the ideal learning situation that is expected by a teacher but the reality makes him to use the available, best suited resources only. For this a teacher must be very sensitive to identify the common, but the best and easily available resources. And also he must be efficient enough to use them effectively. This is also true with the case of different teaching strategies, approaches and methods. All these can blend or mix up to a homogeneous get-up. Hence whatever approach, strategy and method is suitable can be picked up and could be used collectively. This is again a subjective creation by the teacher.

---

## 24.6 Answers to 'Check Your Progress'

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### 'Check Your Progress' - 1

1. (a) Principle of Motivation  
(b) Principle of Maxims of Teaching
2. (a) Diagnosis

- (b) Preparation
- (c) Guiding Learning
- (d) Evaluating the Results of learning
- (e) Follow-up

**‘Check Your Progress’ - 2**

1. (a) They are the good frame of reference for the planning of teaching process.  
(b) Instructional objectives are the valid criteria for evaluating student’s achievement.
2. (a) Usefulness  
(b) Timeliness  
(c) Fitness  
(d) Appropriateness  
(e) Practicability

**‘Check Your Progress’ - 3**

1. (a)  
(b)

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**24.7 Unit-End Exercises**

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1. Explain the factors that are to be considered while designing a teaching strategy.
2. Describe briefly the principles of teaching strategy construction.
3. What is meant by instructional objectives? Why are they significant?
4. Explain the term “Entry Behaviour”.
5. Write a short note on selection of resources.

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**COMPULSORY COURSE 04 (CC-04)**  
**TECHNOLOGY OF TEACHING**

**BLOCK 05**  
**INSTRUCTIONAL AIDS**



## **B.Ed. CC-04 : TECHNOLOGY OF TEACHING**

# **Block**

# **5**

## **INSTRUCTIONAL AIDS**

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## **BLOCK 05 : INSTRUCTIONAL AIDS**

### **INTRODUCTION**

In order to bring an effective learning and also to help the students to learn in a smooth and easy going way, a teacher uses suitable, apt, supportive materials, what are collectively called Instructional Aids. So, this Block focusses on some of the instructional aids that facilitate a teaching-learning process. In **Unit 25** of this Block, a detailed information is given about Text Book; this will be followed by **Unit 26**, where you come across the information with reference to work books, charts, models, specimens, maps and globes. **Unit 28 and 29** deal with improvised aids and the last two units, namely 28 and 29 deal with technology dependent instructional aids and computers as instructional aids respectively.



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## **UNIT - 25 □ TEXTBOOK AS AN INSTRUCTIONAL AID**

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### **Structure**

- 25.1 Introduction**
- 25.2 Objectives**
- 25.3 Textbook**
  - 25.3.1 Meaning and Importance**
  - 25.3.2 Characteristics of Textbook**
  - 25.3.3 Uses of a Textbook**
- 25.4 Let Us Sum Up**
- 25.5 Answers to ‘Check Your Progress’**
- 25.6 Unit-End Exercises**
- 25.7 References**

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### **25.1 Introduction**

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You know that, every teacher wants to give a very effective learning situation to the students. Therefore apart from just presenting or imparting the information orally, a teacher goes in search of other resources and aids that facilitate learning. In this context, the ‘textbook’ takes up a very conspicuous role. Though the textbook does not reflect the whole curricular programme, it is considered as almost an inevitable and integral part. A teacher may feel that, he or she is incapable of teaching in the absence of textbook. It is true that, in most of the time, the textbook serves as a guide to the syllabus or becomes the syllabus. Other supplementary reading books, periodicals, newspapers, science journals, work books, laboratory manuals, teacher’s guide, etc., also facilitate the teaching - learning process. In this particular block, you will come to know about the prominent Instructional Aids.

Usually, in any education system, the objectives will be constructed at the first step. These objectives will be the means to achieve the broader educational goals and aims. Based on the objectives, curriculum will be designed and this will be followed by syllabus construction. Syllabus gives the whole curricular idea in a brief and precise language. Most of the time, the syllabus is equated with a telegraphic message! Whatever

that is told in the syllabus in terms of broken sentences will get the relevant expanded form in a textbook. Let us concentrate on the meaning, nature, importance, characteristics and advantages of a textbook.

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## **25.2 Objectives**

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After studying this Unit, you will be able to:

- Explain the meaning of a textbook
- Understand the importance of a textbook
- Identify the characteristics of a textbook
- Learn the uses of a textbook.

---

## **25.3 Textbook**

---

A textbook is considered as a synonym to syllabus. In any school system, you will come across three to four types of textbooks. That is to say, all the languages - whether it is first language, second language or third language will have their own specific textbooks. The students are supposed to study three languages through the three respective textbooks. Similarly science textbook and social science textbook are also there. They could be printed in any medium i.e language according to the requirements of studies. So, totally there will be the respective textbooks for three languages and three core subjects at the school level.

The textbook practically describes what should be taught. Therefore, while prescribing, writing, and selecting a textbook one must be highly cautious. The textbooks are used chiefly as a source of information, a course of study, a set of unit plans and a learning guide as well.

### **25.3.1 Meaning and Importance**

Though textbooks are inevitable to teachers now-a-days it is extremely important on their part to think about the general problems of the textbook, its functions, characteristics and the methods of using it.

The present-day textbook is usually divided into sections which are again sub-divided into chapters. Hence, it is perceived that a textbook is a course of study which may be used in its entirety. A textbook invariably begins with an introductory section, which sets the stage for the whole year's programme. The chapters are arranged

sequentially with a natural continuity of information and give a solid structure for the classroom academic activity. Along with the printed information, you could see the photographs and drawings. Each chapters may have several suggestions for supplementary activities, like, experiments, demonstrations, readings, long term activities, and short term activities etc;

Few textbooks, supplement the information with materials in boxes, or with footnotes. The boxes may also contain biographical sketches of scientists or of some of historians or of some great personalities. Sometimes, you may come across a section on glossary. Usually a textbook provides a provision for self evaluation. Anyhow, textbooks tend to be general and comprehensive. They are written for nationwide sale and therefore deal only with topics of national interest.

All these points explain the meaning and nature of a textbook in general. Now let its try to focus on the importance of a textbook. The main function of a textbook is to provide the body of knowledge. It is hence a strong teaching-learning bond between the teacher and the taught.

As it is already pointed out, it is an extended form of the prescribed syllabi. That is to say, it is a verbal explanation of the highly abbreviated syllabus. It is a very good and sound basis for the teacher to generate several learning activities. Through chapter-end exercises, it gives a scope for self-evaluation to a learner as well as to a teacher.

### **‘Check Your Progress’-1**

Fill in the Blanks

1. The textbook, most of the time plays the role of ..... ( Notes, teacher, syllabus, student)
2. The textbook is one of the .....(instructional aids, books, printed materials, written documents)
3. A textbook contains .....at the end of each chapter.  
(Self evaluator questions, pictures, photographs, graphs)

### **25.3.2 Characteristics of Textbook**

Now, if you ask a question to yourself, like “what types of textbook you want?”, then you will list out all the good characteristics of a textbook. Isn’t it? So, come on, now, let us do the same task. The characteristics of a good textbook are as follows:

- Textbooks are always in accordance with the aims and objectives of educational system.

- Textbooks provide a scope for the development of certain skills. Their skills may vary with the subjects, like, languages and the core subjects, namely, science, social science and mathematics.
- The textbook should have good external internal features also. External features (also known as the mechanical features are nothing but, get up, the quality of the paper, the printing, photographs, graphs, binding, background sets, etc; - All these should be attractive and mind catching.
- **Internal features** are, like, the standard and the method of treatment and presentation of the subject matter, clarity in the language used, accuracy of the facts, concepts and principles mentioned, the quality of the supportive diagrams etc.
- The subject matter should be presented in a psychological sequence. It has to catch the attention of the students, develop interest among them.
- The information within the textbook should reflect the essential criteria, namely, consistency, reality, etc., It should stand as a device to inculcate certain values, like, open mindedness, scientific attitudes, scientific method and disciplinary values.
- It should give a chance for the students to carry out certain projects or activities by good suggestions, so that pupils can understand the subject matter in a better way.
- Each chapter should begin with a brief introduction and end with a fitting summary.
- Each chapter should contain assignments at the end of the chapter with a due scope for different level of learning, namely, knowledge, understanding, application and skill.
- All captions and sub-captions must be bold type. The matter should be presented suitably with a varied and distinctive form.
- Each textbook should be made up of three essential parts, namely
  - i) Preliminary section
  - ii) Chapter
  - iii) Reference Section.

Under preliminary section, it should give the details of sponsoring agency, government officer, publishers, authors, table of contents and figures. In chapter's section, the subject matter has to be printed according to the principles and maxims of the teaching. In the reference section, glossaries, appendixes must be present.

- The language used in the textbook must be lucid, simple and precise one. It should

be free from ambiguity, use of double negatives in a sentence etc;

- It should suggest quite a good number of learning activities. It should be in such a way that, it draws the social community resources and school -society interaction.
- Textbooks of different subjects must bring a strong and positive correlation among science, craft, social environment and physical environment.
- Each textbook should be accompanied by a teacher's hand book, work book and laboratory manuals. (for the science subject).
- The content should be appropriate for the age level and experience background of the pupils. The concepts should not be too complex for the maturity level of the pupils.
- The contents should be consistent with the general objectives, goals and aims of the respective curriculum.

As far as the literary style and vocabulary is concerned, following points have to be taken care of by the author.

- a. Length of sentences
  - b. Directness of sentences
  - c. Number of ideas per sentence
  - d. Continuity of thought.
- The text should have sufficient number of illustrations, clear photographs diagrams, like, they must be eye-catching.
  - The activities at the end of each chapter are to be in such a way that it should meet the needs of the teacher and the taught.
  - A textbook should help to reinforce learning that might have originated in the class room or laboratory or on the field trip or outside of school. Such reinforcement should come from self-study and assignment works.

In a nut shell, one can say that, a textbook should be assessed by means of its:

- 1) **Correctness of matter:** The subject matter presented in the book must satisfy these criteria by means of accurate, correct, integrated information.
- 2) **Language and communication:** A textbook language must be simple, clear and lucid in preference. It is good, if the regional textbooks, give the English terminology within the brackets for certain technical terms.

- 3) ***Simplicity of Diagrams:*** The diagrams presented in a textbook must be well labeled, with good proportion in size, so that; students can read the labels comfortably. Moreover, the diagrams and sketches must be self explanatory, with a bold *heading and relevant foot notes.*
- 4) ***Quality of Printing and Binding:*** The paper used to print the contents must be of a good quality. The binding must give a good get up to the text. The printing also should be appealing. The subject matter should be sequentially and psychologically arranged. Headlines and Sub-head lines should be discriminated by a proper 'font-size' and bold letters. It should contain a table of contents at the beginning and a subject - index at the end. If it is a science textbook, then glossary of some important scientific terms at the last part of a textbook is a must. So, a good text - book should satisfy at the above said points as far as possible.

### **'Check Your Progress'- 2**

State whether the following statements are True / False:

1. One of the external features of a good textbook says that, it should have a very attractive get up.
2. The difficulty level of the subject matter in a textbook must be very high.
3. Textbooks help in the formation of goals and aims of a curriculum.
4. There is no need to critically analyse a textbook.
5. The textbooks should have clear explanation good illustrations, appropriate vocabulary and a good writing style.

### **25.3.3 Uses of a Textbook**

If a textbook satisfies most of the criteria which are listed already, then, it will be very advantageous to both the teachers as well as the students. So, now let us list out the uses of a textbook.

- In most of the time, the textbook serves as a guide to the syllabus or constitutes the syllabus itself.
- It is also true that, a textbook enriches the syllabus, through suggested activities and suggested readings.
- The primary use of a textbook is that, it is used as one of the instructional aids in terms of reference, by the teacher as well as the students.

- It reinforces the learning that might have been occurred in the class room or the laboratory.
- Textbook, gives the ideas for home assignments, which could be effectively used by a teacher. The exercises at the end of the each chapter help for giving the drill work to the students.
- Since textbooks are developed with the common goals and objectives at the national level, thus they are the best devices in bringing national integrity.
- Textbooks facilitate individualized instruction.
- They are very cheap, economical and accessibility to the users.
- They encourage self-evaluation as well as self - directed activities.
- It will be the major source of information for the students to get prepared for the examination.
- A textbook knowingly or unknowingly, directly or indirectly keeps the school activities on a track
- Textbooks are the major source for developing ‘reading - recitation techniques’. - Here, as the term itself is suggesting, the pupils read a section of the textbook and then recite their learning. But it should not be overdone.
- A teacher may delegate to a group of pupils, the responsibility for presenting a section of a textbook unit to their class mates. This is called “pupil presentations of textbook material”.
- Reading assignments could be given to the students, based on the textbooks.
- Textbooks give quite a good number of illustrations. It also provides many photographs and diagrams, which could be used for extended discussion and for further applications.
- Textbooks are also used for summary and review; this is considered as one of the strongest uses of the textbook

**‘Check Your Progress’-3**

1. The textbook must be assessed from two points of views, they are its
  - a) Pictures and diagrams
  - b) Printing and chapter end exercises

- c) Table of contents and index
  - d) External or mechanical features and internal features
2. The instructional material which forms a strong bond between the teacher and the taught is
- a. Textbook
  - b. Teacher's guide
  - c. Work books
  - d. None of the above.
3. A textbook must be
- a. Attention catchy
  - b. Very light
  - c. Loaded with information
  - d Bulky enough
4. Write any two uses of textbooks.

---

## **25.4 Let Us Sum Up**

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Textbook is the most inevitable and integral part in teaching profession. It is considered as the most important instructional aid. It is an extended form of the whole syllabus of an academic year. A textbook will be constructed in accordance with general aims, goals and objectives of a curriculum. Textbooks are there for three languages and for three core subjects namely, science, social science and mathematics at secondary school level. A textbook is the source of information, which throws light on what should be taught. There are certain criteria, based on which a textbook has to be selected. Usually textbook will be very general and tend to be comprehensive. Textbooks are written for a national curriculum. The textbook gives an opportunity for the development of certain skills, namely, communication skills through language textbooks, observation, hypotheation and problem solving skills through the science, social science and mathematics textbooks.

A typical textbook must satisfy the criteria of external or mechanical features as well as internal features. Outward get up, its binding, quality of the paper, colour - etc; constitute the external or mechanical features of a textbook. Similarly, the subject matter

presented inside the textbook, the accuracy, clarity, of the information, its consistency, clarity in sketches, and diagrams, lucid, simple, meaningful sentences etc; all these constitute the internal features.

To have a good textbook in an educational system is really advantageous as it is used in several ways. Most of the times it serves as a guide to the teacher, by enriching the syllabus. It makes a pupil to get prepared well for the examination. They are the best devices in bringing national integrity. Based on the textbook exercises a teacher can design several drill works as well as an array of home assignments.

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## **25.5 Answer to ‘Check Your Progress’**

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### **‘Check Your Progress’ - 1**

1. Syllabus
2. Instructional aids
3. Self-evaluatory questions

### **‘Check Your Progress’ - 2**

1. True
2. False
3. False
4. False
5. True

### **‘Check Your Progress’ - 3**

1. d) External or mechanical features and internal features
2. a) Text book
3. a) Attention catchy
4. Write any two used from section 25.3.3

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## **25.6 Unit-End Exercises**

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1. What is a textbook? Explain its meaning and importance.
2. Explain the need of a textbook

3. List out the characteristic features of a good textbook.
4. Mention the uses of a textbook.

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## **25.7 Reference**

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## **UNIT - 26 □ OTHER INSTRUCTIONAL AIDS**

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### **Structure**

- 26.1 Introduction**
- 26.2 Objectives**
- 26.3 Work Book - Meaning, Types, Selection, Preparation, Usage**
- 26.4 Charts - Meaning, Types, Selection, Preparation, Usage**
- 26.5 Models - Meaning, Types, Selection, Preparation, Usage**
- 26.6 Specimens - Meaning, Types, Selection, Preparation, Usage**
- 26.7 Maps and Globes - Meaning, Types, Selection, Preparation, Usage.**
- 26.8 Let Us Sum Up**
- 26.9 Answers to ‘Check Your Progress’**
- 26.10 Unit-End Exercises**
- 26.11 References**

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### **26.1 Introduction**

---

A very enthusiastic teacher will always put sincere efforts to bring about qualitative learning among the students. For that many teaching strategies, tactics, skills are used. The strategies may include the teacher’s role as well as some material’s role. Since these materials help in the learning of the subjects that are imparted during teaching, they are called instructional aids. In the previous unit, you have come across one of the very important instructional aids, i.e. Textbook. In this unit, you will come to know about other instructional aids which facilitate the teaching learning session.

A child centered approach in any teaching situation, gives a pivotal place for the pupil’s participation. It anticipates his learning to be the resultant of his personal experience. This is, what is known as first hand experience. But in certain cases, such learning is obviously not possible. Take, for example, a physics student cannot see what goes on inside a vacuum tube, or a biology student cannot sit patiently watching

but while it opens or you cannot take the whole class near the Taj Mahal. In such situations, a teacher must use the substitutes for reality - like, photographs, drawings, models, recordings, CD's etc., Generally such substitutes are termed as audio - visual aids. It is because these learning aids capture the most important sense organs, eyes and ears. It is also true that they help in the learning of instructions or what is taught. Hence they are also grouped under the category what is known as instructional aid. The first and the foremost place occupied by the instructional aid, will be the textbook. This you have already learnt in the previous unit.

Next, the textbook has to be followed by teacher's guide, work books, laboratory manuals etc; as the integral parts in a curriculum. NCERT has taken a very strong step in this direction. The textbooks should be accompanied by work books. So, in this particular unit, we shall concentrate on work books which are followed by details regarding, charts, models, specimens, maps and globes - which are collectively called audio - visual aids. In all these cases, we shall go by their meaning, types, selection, preparation and usage.

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## **26.2 Objectives**

---

After studying this unit, you will be able to:

- Explain the meaning and nature of work book
- List out the characteristic features of a good chart
- Mention the criteria for the selection of models.
- Describe the procedures for the preparation of specimens
- Grasp the need for the use of maps and globes.
- Enumerate the general principles for the selection of instructional aids.

---

## **26.3 Work Book - Meaning, Types, Selection, Preparation and Usage**

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A work book is a printed device, which is produced as a supportive material for the already established textbook. This implies that, it exactly follows the textbook information. Most of the time a work book is used as an instrument for evaluation. At its best appearance, a work book can become an academic record, a summarisation of learning, an exercise in organisation, a medium for self - expression, an indication of

progress and a more dynamic book for giving chance of 'then and there' expression. Here the students have to read and write or respond on the concerned page itself. In this respect, a work book supplements the textbook. Though the students come across the questions, and exercises at the end of each chapter, they are not expected to write their answers on that same page. This criterion is fulfilled in a work book. Therefore a workbook supplements the respective textbook, but it is not a substitution to textbook.

By tradition, the chief function of a work book is evaluation. In a work book, the same sequential order of the chapters that are in textbook is maintained. So, you get equal number of chapters as it is in the textbook. In textbook you find exercises at the end of the chapter. But in a work book, the summary of the chapter will be given in the beginning. And this will be followed by questions with a provision for student's responses. But these questions are not the questions seen in the textbook; they are more than that. As far as possible, the questions will be distributed over different levels of learning, namely, knowledge, understanding, application and skills.

The work book is a readymade book for students' paper - pencil performance, it gives an opportunity to organise their learning. Usually, the questions will be objective based, and vary in types, namely, objective type, short answer type and one or two little bit long answer type questions. It may take the marks or weightage into consideration, and frame the questions as one mark, two marks, and four marks questions. Questions may test the students' ability to recall, recognition, observation, classification and identification skills. They may be asked to complete the sentences, diagrams or label the given figures etc. Under objective type questions, they may vary with multiple choice types, true or false type, fill up the blanks type, pick out the odd item etc;

With reference to types of work book, one can say that, language work books, science work books, mathematics and the social science work books are the possibilities. It is so said because, though the idea of a work book is good, you won't come across them much at the high schools that are run by the government. But in recent days, the state government is also putting its effort in bringing out work books. Certain private institutions also have initiated their efforts in this direction. As it is already told, NCERT, a national body produces the textbooks for central syllabus and this will be accompanied by the workbooks also.

There is no standardized design for a work book. Therefore they may vary greatly in content and organisation. For example, at one extreme, workbooks may reprint the pages of an associated textbooks, replacing key words with blanks that are to be filled in by pupils after reading their texts. But this type is not considered as a good one. On the other extreme, work books can give provisions for many different types of activities, like, forms for reporting data, diagrams to be labeled, blank spaces for sketches and

clippings, suggestions for supplementary work, study guides for reading assignments, and self-testing devices. Anyhow, work books are highly individualistic in their approach. This type of work books, will act as a good record or cumulative record rather, showing the student's level of performance unit by unit.

1. As a course of study it shows the pupil where he has been and where he is going;
2. As a study guide it gives him detailed instructions for his work;
3. As a record book it gives him a convenient depository for his findings.

As it is told already, the availability of work book is always under question. So, as a teacher, it is better if you know how to prepare the work book. If they are available, then you must be in a position to select the relevant, reliable, valid work book using the wise knowledge.

### **How to Select a Work Book?**

- It must give an ample scope for students' drill work and exercises
- It must give the study outlines, adequate worksheets, laboratory directions, suggestions for all the activities.
- They must be in such a way that, it becomes an easy job for the teachers to evaluate the students' performance on a work.
- They must facilitate students' self-learning more effectively.
- It must be comprehensive, well organised, and free from ambiguity and demand an active participation by the students.
- The questions on each unit must cater to different instructional objectives, namely, knowledge, understanding, application and skills.
- It should be consistent with textbook information.

A teacher must not be overwhelmed by the advantages of a work book. While selecting, he or she must be aware of the limitations of the workbooks also. So, that, care can be taken so that, as far as possible the limitations in the chosen workbook is less.

The limitations are as follows:

- Workbooks are relatively inflexible, i.e. the content is highly organised and cannot be altered easily.

- There will be little or no provision for the inclusion of new materials. Workbooks insist on uniform outcomes.
- If the workbooks dominate any educational programme, pupils have little opportunity to develop special interests and talents.
- It does not give any chance for pupils' participation during its planning process.
- It does not provide any incentive to independent work, any practice in formulating their problems and any encouragement to do their own thinking.

### ***Preparation of a Work Book***

First identify the objectives, for these instructional objectives will help you. Then select the content. Let it be divided into simple, sequential, natural, smaller bit of information. Then pool out different types of question, like, objective type, short answer type and long answer type. Let it be exclusively a paper - pencil test type. You have to test the students' performance at knowledge level, understanding, application and skills level. Construct the work book with due directions and adequate space for student's performance. Remember, each chapter in the textbook will have the respective work book exercises in the work book.

### ***Usage:***

Usually work books are appreciated, because, heavily burdened teachers find the better workbooks are useful in conserving time and energy, it is because,

- If the workbooks are available means, teachers are free from the preparation of study outlines, worksheets, and laboratory directions.
- They are also free from devising so many review and drill exercises. That means to say, soon after the particular lessons and unit is over, simply the work books could be used for many purposes, including home assignments.
- Workbooks could be used as a standardized record, which will be very easy to check.
- Workbooks could be used as a very good frame of reference, to know exactly what to do next and can realize that whether the pupils have been given adequate directions are not.
- Workbooks can help the pupils working under self direction to study more effectively.

- They are also helpful for pupils who have missed time because of illness or from having left school temporarily due to several reasons.

**‘Check Your Progress’-1**

1. Audio – Visual Aids are also known as
  - a) Materials
  - b) Instructional Aids
  - c) Machines
  - d) Teacher’s role
2. Workbook follows the same order as it is in the
  - a) Teachers’ guide
  - b) Laboratory manuals
  - c) Textbook
  - d) Note book
3. A work book is a.....for the textbook
  - a) Supportive material
  - b) Supplementary material
  - c) Complementary material
  - d) All of the above
4. A work book helps for
  - a) Teaching
  - b) Learning
  - c) Evaluation
  - d) Keeping the records
5. A work book demands .....by students
  - a) Paper- pencil performance
  - b) Oral answers

- c) Demonstrations
- d) Experimentation

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## **26.4 Charts - Meaning, Types, Selections, Preparation and Usage**

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Charts are visual aids, where the diagrams will have two dimensions, length and breadth. Hence these are called 2-D aids i.e., two-dimensional aids. Charts are standard equipments in any subjects, to be used in classrooms. They are the cheap and best, available teaching aids. They are very advantageous, handy and can be used meaningfully. They enhance the quality of teaching-learning session. Most of the charts contain diagram or a series of diagrams. It may contain the portraits of kings, pedigree tree, flowcharts etc; Science charts usually contain scientific diagrams, where as in case of the subject mathematics, you can locate graphs, pie-charts, charts showing geometrical figures. In subjects coming under social sciences, the charts may deal with some important points written boldly, connected by means of arrows, details of certain dynasty's chronological details etc.,

Charts are the devices of one-way communication when certain topics or concepts are to be taught regularly and they become more meaningful with diagrams. The charts are more economical, handy and also stimulating. For example, charts such as Periodic Table, the various systems of common plants and animals are studied in a science or biology class, the bacteria that cause disease, simple machines, certain flowcharts etc; are frequently used for several years. Charts could be purchased from companies, or it could be prepared also. Before knowing about the preparation of charts, let us try to locate or identify different types of charts.

**Types of Charts:** You know that, a chart is a combination of pictorial, graphic, numerical or statistical information which presents a clear visual summary. The most commonly used types of charts include outline charts, tabular charts, flow charts and organisation charts. Charts may be of technical diagrams charts and process-diagrams chart also. Recently, flip charts and flow charts are also being frequently used.

Charts could also be classified in terms of arrangements and the kinds of ideas that they express. In this type of classification, there are five major types, each type has further classification. Now, let us take up then one by one to understand clearly. The five types of charts are,

- 1) The narrative charts
- 2) The tabulation chart
- 3) The cause and effect chart
- 4) The

chain chart and 5) The evolution chart

**The narrative chart:** These charts include the facts and ideas arranged and expressed from left-to-right. For example

1. The events in a process, such as, soap making, plastination etc;
2. The information with reference to parliamentary activities, Election Procedure etc;
3. The information with reference to technological improvement over a period of time, like, developments in the field of computers and ITs improvement in transportation, communication etc;

**The Tabulation chart:** It is a chart showing a left-to-right, top-to-bottom arrangements of facts and ideas for expression. For example

1. Numerical data for making comparisons
2. Lists of products, rivers, schools in a particular area, examination centres etc;

**The cause and effect chart:** These include inter-related facts and information presented from left-to-right.

**For example:**

1. Relationship between entry behaviours and instructional objectives and evaluation.
2. Relationship between standard of living and, availability of natural resources, economic system, technological advancement etc;
3. Relationship between rights and responsibilities.
4. **The Chain chart:** These include a circular or a semicircular arrangement of facts and ideas. For example:
  1. A pi-chart showing details of literates, illiterates, among men and women population.
  2. Natural cycles, like, water cycle, oxygen cycle etc;

**The Evolution chart:** Includes a left-to-right arrangement of facts and ideas for expressions. For example:

1. Evolution of man
2. Evolution of life on earth etc;

**Graphs:** Graphs are flat pictures which employ, clots, lines or pictures to visualise numerical and statistical data. Graphs are of several types, namely, line graph, bar

graph and circle graph etc;

**Line Graph:** Here the data is represented with the help of simple lines horizontally or vertically drawn.

**Bar Graph:** A bar graph consists of bars arranged, horizontally or vertically from a 'Zero' base. The colour, length and size of the bars represent different variables and values.

**Circle Graph:** It is also known as Pie- Graph. Here the data is represented in a circle; it may make use of different colours to represent different variables.

**Selection of Charts:** Charts however may be good but cannot replace a teacher. Only thing is, charts are used to enhance the quality of teaching-learning process. Charts are advantageous, but they are not free from limitations. So, while selecting the charts, a teacher must choose the charts which have less limitation. So, how to select a chart? Let us see the following points.

1. Charts should always be large for general class use.
2. All lines should be distinct and the printing should be readable from all parts of the classroom.
3. Charts must have employed proper, colour background, bold letters with contrast color so that it will be eye catching.
4. Too much colourful charts will be a negative point, it leads to eye strain and confusion. Non-functional colour applied for decorative effects, should be avoided.
5. Each chart should be simple and uncluttered with adequate space between separate items.
6. They should contain only the essential details, with proper headings and footings, and correctly labeled diagrams.
7. A chart should be self explanatory with better clarity.
8. A chart should not contain too many details.
9. The teacher should make sure that there is a provision for hanging the chart
10. A proper care must be given in conserving and preserving the charts.

**Preparation of Charts:** Sometimes teachers feel that, to get a relevant chart for a particular concept is highly difficult. It is because, all types of charts to suit all types of concepts. Then comes the need for the preparation of charts. Anyhow, chart making is

an excellent project for pupils! They may do it, carry out either as a service to the teacher or as part of presentations which they themselves plan to make.

For temporary use, charts may be made by using a sketch pen on large sheets of wrapping paper or drawing sheets. But these charts are not very durable and are easily damaged during storage.

Permanent charts are made on special chart cloth. Outlines are drawn in pencil traced in India Ink with a ball - tipped pen, a drafting pen, or sketch pen. Coloured lines, labels and arrows may be added with coloured drawing inks. Coloured areas may be filled in with wax crayons, after which the wax is blended in by applying a warm iron to the reverse side.

An opaque projector is of great help in laying out a chart. The chart cloth is tacked to a bulletin board in a darkened room. A diagram from a book or a clipping is put in the projector and focused on the cloth. By moving the projector to and fro, the size of the image can be varied until it fills the desired space. The outlines are traced in pencil and can be inked later.

### **Usage of Charts:**

Charts could be used for the following purposes:

- To show relationship by means of facts, figures and statistics for a good explanation with clarity
- To summarize the information
- To give the concrete ideas for certain abstract concepts while teaching to motivate the students
- To develop, sustain and maintain interest throughout the teaching-learning session as a stimulus variation.
- Charts are the cheap and best attention compellers; hence a teacher should use them as support materials while teaching.
- A teacher must use the relevant charts with due consideration to the medium of instruction. For example, while teaching in a Bengali medium class, the charts with English labeling must not be used and vice-versa, is also must not.

### **'Check Your Progress'-2**

1. Charts are ..... aids

- a) Audio b) Audio-visual c) Visual d) Projected

2. Charts do ..... communication
  - a) One-way b) Two-way c) No d) Both a & b
3. Charts are used to give clarity for
  - a) Concrete ideas b) abstract ideas c) easy ideas d) visual ideas
4. Mention the different types of chart

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5. List out any four criteria for the selection of a chart

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6. Mention any two uses of charts

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## **26.5 Models - Meaning, Types, Selection, Preparation and Usage**

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Models are substitutes of real things and it is a three-dimensional representation of the real thing. Hence they will be concrete in appearance. Through its concrete appearance, a model helps in clear understanding of structure or functions of a real thing. It is also said that, a model is the replica of original things. It is the miniature of the original one, for gigantic original things. Practically to take all the students near a big industry, or any historical monument (Say Taj Mahal) is impossible. In such situations, models will fulfill the learner's need.

Models of specimens, steam engines, gasoline engines, a cross section of a leaf,

and the parts of a flower, an atom etc; are the replicas of the original ones. They will be exactly similar to the real objects except for size.

Sometimes, it so happens that, models are considerably larger than the real objects (for example, model of a human eye) and sometimes they will be small replicas of objects which are too large to be seen as a whole, (for example, model of an Airplane). In many cases working models of the original are used where the specific action of the original is duplicated and could be explained easily. In such cases, models have proved that, they are more effective than the reality.

**Types of Models:** Models fall into different classification. Basically, there are two types, namely working models and still (static) models. They can be classified as scale models, diagrammatic models, display models and operating models also.

- a) Working models and static models
- b) Scale models: enlarged and reduced scale models
- c) Diagrammatic models: emphasizing selected features and suppressing others for the sake of clarity.
- d) Operating models: Show the action of moving parts.

**Selection of Models:** A teacher has to select the models based certain criteria. For example, first of all a model must be of adequate size to be seen clearly from all parts of a room.

- For individualized works, you better go for smaller models.
- A model must be three dimensional, excepting certain cross sectional models.
- The value of a model lies in its presentation of the parts in their proper spatial relationships.
- One of the very important criteria is, the degree to which a model resembles the real object, that too, to what extent
- Models should not be over simplified
- You should consider in priority, the subject to be taught, model to be used and age level as well as maturity level of the learners.
- A model should not be made of fragile material.
- A working model will secure immediate attention and will serve as motivation. Thus, interest stimulated could be utilized to fullest advantage.

- Models should be used only if it is not possible to get real objects to the class room or when the real objects would not be helpful to give a better explanation.

**Preparation of Models:** Preparation of models could from a topic for project work. This activity will really fascinate the students. For this a teacher has to provide an opportunity as well as suitable guidance to them. Ask them to prepare a simple paper or clay or plastinated models in the beginning then, later to prepare the sophisticated working models. Model making, gives a very rich learning experience to the students. Models which can be dissembled and assembled by pupils have enormous learning value.

**Materials for Preparation of Models:** Models could be made up of plaster of paris, wood, metal, or cardboard and plastic also. So, depending upon this, the list of materials required will vary. Therefore, let us make a list of the respective requirements.

**Cardboard Models:** Cardboard of suitable thickness can easily be cut, desired shape could be formed, pasted and given a better look by coloured paper.

**Plastic Models:** Clay, bees wax and plasticence (available in several colours) could be moulded easily to desired shape and models prepared.

**Easily Workable Materials:** Thermocole could be easily cut with hot wire, bound together with fevicol, finished with sand paper and coloured with water colours using brush.

**Plaster of Paris:** Duplicate copies of objects with plaster of paris could be made easily.

**Wood:** Models could be made with wood -hardwood, light wood and easily workable also wood.

**Metal:** Most working models require metal - in the form of sheets, rods, tubes, angles, wires etc; and of course necessary tools for fabrication are required.

**Thermocole Models:** Thermocole is available in half sq. mt. sheets. Thermocole could be easily cut with a knife or an electrically heated wire. A surface finish could be affected using sand paper.

Modeling clay has several uses in the biological sciences. Plaster of Paris is a versatile material. It gives sharp castings; it may be drilled, sawed and sanded; it may be tinted and painted. It may be used for casting animal tracks found in mud.

**Use of Models:** Models are three dimensional; hence they give more clarity during

explanation when compared to charts. Following are some of purposes in which models serve as the best devices.

- Models evoke greater interest and help in enhancing the learning.
- Models concretise abstract concepts. They simplify complex objects and accentuate important features with colour and texture.
- Models are handy, and are of compact dimensions so that they can be used in the class room teaching. It is possible to reduce or enlarge the objects to an observable size.
- Practically, it is not possible to see the whole of a large industrial unit or even a large machine unit, but if a small scale model is used, it gives the correct concept for the students.
- A large process could be easily demonstrated by a model as it provides interior views of objects and machines.

**‘Check Your Progress’-3**

1. Models are ..... devices
  - a) Uni - dimensional
  - b) Two-dimensional
  - c) Three - dimensional
  - d) Four-dimensional
2. Basically models are of two types, namely, Static models and
  - a) Working models
  - b) Three dimensional
  - c) Still models
  - d) None of the above
3. Models .....abstract concepts
  - a) Complicate
  - b) Concretise
  - c) Duplicate
  - d) None of the above

4. State whether the following statements are true or false
- a) Models evoke interest and enhance effective learning.
  - b) Models are too large to be carried out
  - c) It is possible to reduce or enlarge the objects to an observable size.
  - d) Models should not be made of fragile material
  - e) The value of a model lies in its presentation of the parts in their proper combination.

5. Mention the types of models.

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6. Write any two criteria for the selection of a model.

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## **26.6 Specimens - Meaning, Types, Selection, Preparation, Usage**

Certain subjects are more problematic while teaching, so that, unless and until, some of the live examples are provided, the concepts cannot be understood properly. Biology is one among such subjects. Most of the time, it includes the study of weeds, insects, rodents, birds, fur-bearing animals, trees, shrubs, plant and animal diseases. When a teacher realized that, there is-a need to preserve certain organisms for multiple times of usage while teaching, then the need of a special technique in preserving them as live or dead, also arose. In such situations, an enthusiastic life science teacher, goes for collection of live organisms which could be utilised for illustrations during explanation. For example while explaining the concept of “adaptations in xerophytes”, a cactus plant is used. Similarly while explaining external features of birds or fish in general, live animals could be used. Isn’t it? The use of live organisms for illustrations is called specimens.

## What is a Specimen?

A specimen is an individual or part of an organism (plant or animal) taken as an example to illustrate the teaching points. Usually the live organisms are preferred. But this is not possible for all the times for all types of illustrations. In such cases dead plants and animals either as a whole or part which are preserved scientifically are used. These types of specimens are called preserved specimens. Now let us try to understand what are the different types of specimens and where are they used, and also a few procedures of preserving specimens.

Specimens are very special type of instructional aids that are made up of dead or alive individual part of plants and animals maintained and preserved scientifically. These are real objects and hence give three - dimensional effect, and concretise the abstract concepts. Because of this the learning process becomes easier and smooth going.

## Types of Specimens:

Specimens are basically of two types, namely microscopic and macroscopic. Microscopic specimens are so small that they cannot be seen by naked eye for examples Algae, Volvox, Protozoa, Bacteria etc. Macroscopic specimens are big enough to be seen by naked eye. For microscopic specimens a compound microscope must be used for observation. In both microscopic and macroscopic specimens, we come across, live and dead organisms. They could be plants, animals and micro - organisms. Specimens are also of bottle specimens type. Here usually, the dead plants and animals either as a whole or a part of it are preserved in the medium of formalin solution. Such specimens are called **Bottle Specimens**.

Sometimes, the organisms, after killing are dried and preserved. Such specimens are known as **Dry-specimens**. In case of plants, certain parts like, fruits, inflorescence, special type of leaves or modified parts are preserved. In case of animals, usually, molluscs and echinoderms are preserved as **dry specimens**. Invertebrate animals, their hard bones are preserved as dry-specimens. In case of plants, herbarium preservation is employed. It is also an example for dry -specimens.

## Selection of Specimens:

- Whenever the live, specimens are available preferably these have to be selected. But it has to be checked with facts, like, ease of handing them, dangers involved while handling etc;

- As far as possible select the specimens of such type, where children can learn by seeing it clearly, touching it and feeling it.
- If possible go for multiple number of specimens, so that, it becomes possible for you to give individualized instruction.
- While selecting the specimens, it is advised to follow a hierarchy, like, live specimens first and preserved specimens second. In preserved specimens, it can be formalin preservation, dry preservation and herbaria.
- Specimens are the best supporting materials, provided they are selected with proper relevance with subject matter to be taught.
- As far as possible, select the relevant specimens which are available abundantly in their natural habitat. Then, you can involve all the students very actively in identifying, locating, classifying, observing, comparing and also preserving the specimens in their natural habitat.

**Preparation of Specimens:** There are several methods of collecting, culturing and preserving which are quite useful and may be known to you. Here are some selected procedures which are intended to be suggestive rather than comprehensive.

#### **A. Preserving specimens in wax:**

**Materials Required:** Coffee can, sealing wax, newspaper, pair of pliers and leaf specimens.

**Procedure:** Melt some wax in a coffee can. Group the petiole with pliers. Dip the leaf in melted wax and remove quickly to allow the wax to cool and harden. Colourful leaves can be preserved in this way so that they will retain colour also.

#### **B. Alizarine Preparation:** (Embryo and small animals like fish)

**Materials Required:** Alizarine red, alcohol, glycerine, specimen jar and KOH. Alizarine gives stain to the bones and makes the body tissue transparent.

**Procedure:** Keep the embryo in 70% to 80% of alcohol and small animals i.e. fish, small lizards etc; in 90% alcohol for 24 hours. If the dehydration is not proper, it can be kept for 36 hours. Then change in 1 % solution of KOH, to be changed every day in the same concentration but with fresh solution till the muscles become transparent and bones are visible. This generally takes four to seven days depending upon the nature of the muscles in a particular animal. Now transfer the animal in Alizarine Red prepared in 90% alcohol or 4% Alizarine in 90%. Watch it carefully. If over-stained, wash it in pure glycerin. It can then be finally mounted under glycerin.

### **C. Preparation of Green Algae and Fungi Specimens:**

Take about 90 cc of 50% alcohol. Add to it 5cc of pure formalin (commercial formalin which is 40%). Shake the bottle properly, and then add 2.5cc pure glycerin + 2.5 cc, glacial acetic acid. Lastly, add to it 1/2 gms of copper chloride. In this solution the common algae can be kept for a number of years.

Or

For green algae only place the material in solution of 1% copper acetate + 2% formalin for 24 hours. Then preserve in 5% formalin.

Fungi: Take 25 gms of Zinc Sulphate and 1000 cc of water. Add to it 10 cc of 5% formalin. Preserve the fungus in it. It will maintain original colour of fungus.

### **D. Preparation of some animal specimens:**

**I. Sponges:** Collect the sponges from their aquatic habitat (most of them are marine, only a few are available in ponds, lakes and streams). They may be seen on sticks, stones and other objects submerged in the water, as soft white or brownish slimy blotches varying an inch or little bit more than an inch in diameter. Fresh water sponges could be preserved in a balanced aquarium. Other sponges can be dried and mounted in boxes. They can also be preserved in 5% formalin or 70% alcohol.

**II. Worms:** Planaria found in fresh water, and other parasitic forms of worms, namely, liver fluke, tape worm, round worms.etc., can be got from their respective habitat or host, such as birds, fishes, rats, dogs, cats etc;

Planaria could be collected by scrapping off from the submerged objects. Place one or more worms near the middle of a slide and cover them with a second slide. Put enough pressure upon the upper glass to flatten the worms, but be careful so, that they are not crushed. Place these slides in a shallow dish or pan and pour over them a solution of 5% formalin. Slightly tilt the slides, so that, the preservative will spread uniformly and fix the worms. Allow it to be submerged for a period of two hours or more.

**III. Fishes:** Collect the fishes from their respective habitat. If the animal is bulky, puncture it at places so that the preservative enter the animal body. Add 15% glycerin to the preservative, so that it avoids the animal body becoming stiff.

**IV Birds:** Birds can be preserved in 7% of formalin solution or they may be skinned off and stuffed.

## **Usage of Specimens**

Specimens could be alive or dead and preserved. They could be microscopic as well as macroscopic. Both types are highly advantageous for a teaching learning session. Let us list the occasions where such specimens are used to bring about efficient and effective teaching.

- Live specimens, give the chance for the observation of the external features, locomotion, type of its adaptations to the environment
- Students can gain first hand information through specimens.
- Certain rare or endangered species could be well studied through the preserved specimens.
- Preparation of dry - specimens, like sponges or herbarium sheets, gives ample scope for students' active participation and whole hearted involvement.
- Specimens help in concretising the morphological as well as anatomical features of organisms.
- Encouraging students to prepare the specimens can inculcate disciplinary values among the students.

### **'Check Your Progress'-4**

1. Specimens are usually made up of a sample or a part of or the whole of .....  
a) Plants and animals b) materials c) Machines d) Non-living things.
2. Specimens preserved in formalin are called  
a) Dry - specimens b) Stuffed specimens c) Bottle specimens d) Herbaria
3. Herbaria are prepared by using  
a) Parts of an animal  
b) Twigs of plants /whole plants (if they are small)  
c) Glass slides and formalin solution  
d) Parts of fossils
4. Write any two uses of specimens
5. Mention any two criteria for selection of specimens.

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## 26.7 Maps and Globes - Meaning, Types, Selection, Preparation and Usage

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Generally maps and globes are used both in Science and Social Science subjects. They are indispensable aid in teaching many subjects particularly, Geography, History and Economics. They are defined as “the graphic visual representations of the earth’s surface, or position of it. Maps may cover different themes as well as locations. They are constructed based on the information borrowed from various sources. However, map writing is a special skill which needs proper and adequate training and practice. A map will be accurate representation on plain surface in the form of a diagram drawn to scale, as, the details of boundaries of continent countries, etc. Geographical details like location of mountains, rivers, altitude of a place, contours of the earth surface and important locations can also be represented accurately with reference to a convenient scale with suitable colour scheme.

There are several points or aspects that make a map reading more meaningful. They may be listed as follows:

- Understanding and interpreting the key of index.
- Understanding the lines - i. e boundary lines, lines of communication, lines indicating the rivers, contours, meridians and parallels.
- Understanding the colours, tints, shadows and symbols in a map or a globe.
- The top of every map is not north, but the direction of northern pole is north.
- Distinction between the various types of maps, such as relief, political, distribution maps etc;
- For a better map understanding, the position of the earth in the universe has to be understood first. Many students suffer from a notion that the earth leans in June towards the Sun northwards and in December southwards and thus the seasons are formed. But, you know, earth never dances that way! It is because, the inclination of the earth is constant, and the seasons are formed due to its rotation around the Sun.

**Globe:** Globe is a spherical model of the earth. A good globe should provide correct information about areas, distances, directions and geographical shapes. Even the best flat map cannot achieve accuracy comparable to that of a good globe, as a flat representation of any segment of a spherical surface involves certain unavoidable

inaccuracies. The language of maps and globes is largely a language of colours and symbols, standing for locations, boundaries, rivers, routes and other features. Colour helps in legibility as well as beauty in maps and globes. Some symbols on a map look like the things that they are supposed to represent (like international road signs) while others are rather arbitrary and pupils should be trained to interpret them.

Before pupils understand maps, they should understand globes. Globes are of three types, namely:

**Political Globes:** which show the location, boundaries and place details of different countries;

**Physical - Political globes:** In addition to the above they also show physical features.

**Slated Outline Globes:** On which teachers and pupils can write using crayon or chalk. This is very useful for direct pupil activity.

Globes come in different diameter sizes; the 12" and 16" being the most commonly used. The larger sized globes have the advantage of readability. Globes differ in the level of information presented, depending upon the educational level for which they are intended. Globes are available suitably mounted with latitude scales, and free floating globes which could be taken out are also available.

Knowledge of map and the knowledge of globe - are reciprocal to each other. In fact, globe is considered as the true map. It is the true representative of the earth's physical personality. A globe gives a true idea of total environment at a glance in a classroom situation. It helps the students to understand more effectively, the abstract concepts, like, time, space, wind's planetary relations and proportions. Hence, every school should have globes. The following four types of globes may be kept in every school.

- 1) Political Globes
- 2) Physical Globes
- 3) Washable projection globes
- 4) Celestial globes.

**Types of Maps:** Maps are prepared on different themes. So, let us see some of the varieties of maps.

**Relief Maps:** (Regional and the world): This requires the knowledge of colours, symbols and other connected ethics of map making.

**Historical Maps:** This type of maps reveal the changing times and the growth

and decline of various kingdoms. To construct such maps, knowledge of lines of boundaries and other symbols is necessary.

***Distribution maps:*** There are several types of distribution maps. For example,

- a) Vegetation maps
- b) Population maps
- c) Economic maps
- d) Statistical maps
- e) Dot maps
- f) Pictorial maps
- g) Language, race and other human division maps, etc.,

***Geographical maps:*** Contour maps, weather maps, seismological maps, archeological maps, rainfall maps, geological maps etc; are grouped as geographical maps.

***Selection of Maps and Globes:*** Maps and Globes are known for their one-way communication. Hence they have to be self-explanatory while selecting the maps and globes a teacher should employ certain criteria, and they could be mentioned as follows:

- A map must be large enough so that, every detail depicted should be visible to every pupil in the class wherever he is sitting.
- It should not deal with too minute details or too much written matter. Whatever the key index are used, they have to be interpreted.
- A map should have clear boundary lines, lines of communication, lines indicating the rivers, contours, meridians and parallels.
- The direction, namely, north, south, east and west must be indicated very clearly.
- Maps and Globes must have a professional appearance by means of coloured papers, charting tapes and adhesive letters.
- Maps and Globes must be in such a way that, if they are used, they should create a suitable environment in the classroom.
- Each map should deal with the specific concepts, focused exclusively.

***Preparation of Maps and Globes:***

Globes with different sizes and with different information are available in certain

educational equipment dealers. They could be purchased from there. And some of them could be prepared by the teacher as well as from a group of students. Making maps and globes can become individual student projects. Some concepts in the social science subjects, like world map, map of Asia, distribution of vegetation etc; will be challenging as well as channelizing the students energy. A map should have proper headings as well as footings with bold and contrast colours. One thing must be kept in mind very clearly that, these instructional aids should be self-explanatory.

**Materials required for the preparation of maps:**

1. White drawing paper-white cartridge paper.
2. Black cartridge paper
3. Coloured cardboard
4. Pencil - drawing H, 2H, HB
5. Water colour tubes
6. Poster colours
7. Hair brushes nos. 1- 6, flat brushes 1.5 cms, 2 cms.
8. Water proof drawing ink assorted colours \_
9. Ruling pen, funnel pen
10. Script pen nibs - holder
11. Poster paper - assorted colour
12. Adhesive paste - gum
13. Felt pen - felt maker- assorted colours
14. Nylon fiber tip pens - assorted colours
15. Inks - different colours for felt and nylon tip pens.
16. Self adhesive tape - PVC - assorted colours 1, wire for edge binding.
17. Letter and number stencils
18. Stencil cutter - holder
19. Gauze cloth - (for backing)
20. Wooden reapers. 1/2" x 1" cross - section - any light wood.

The visuals to be depicted are to be pre - planned. A rough sketch may be drawn or a suitable book of diagrams could be selected. Textbooks, reference books, encyclopedias, journals, catalogues, etc., may serve as resource materials for preparation of maps.

Projection tracing is an easy way to make a large chart map from a small illustration. A small picture can be enlarged by using an opaque projector. The small book illustration can be placed on the projector and a cardboard can be attached to the wall. The size of projected picture may be adjusted to fit the required area by moving the projector closer to the cardboard (to make it smaller) or farther away from the cardboard (to make it larger) and focusing as necessary. The main lines of the projector picture may be traced with pencil. After completing the drawing, ink in the lines using pen or felt pen. This is one of the easiest and quickest ways to enlarge a picture.

The overhead projector can be used if a transparency or a slide of the original diagram is available. A photograph also may be used to enlarge or reduce pictures. By using the squaring method, a picture can be proportionally enlarged or reduced or even elongated and distorted purposefully. The lines drawn should be bold and of uniform thickness throughout. Felt marker will be highly suitable. Larger areas can be coloured uniformly by pasting suitable colour, poster paper over which shading could be done using felt pen, nylon tip pen or water colour etc.,

### **Uses of Maps and Globes:**

Maps and globes have innumerable practical value. So, now let us list few of them.

- They are essential to understand the whole range of human activities, such as interpreting weather, travel, understanding current world events, etc ;
- They are essential for a full understanding of the world, its people and the space around us.
- Map reading skills have to be developed in pupils so that they are able to readily interpret the information contained on maps.
- Maps enable us to see the complete world at one time; Globes reveal half of the portion of earth at a time.
- Effective use of maps and globes is based on map reacting readiness, for this extensive observation of the local environment and early experience with globes and global concepts, have to be planned and opportunities must be given to the students.
- Pictures and films are to be used to give greater meaning and usual imagery to the

features and symbols used in globes. Systematic instruction in geographical concepts enabling pupils to read and interpret globes and maps should begin at the middle school levels as an integral part of the geography, and history lessons.

**‘Check Your Progress’ - 5**

1. Globe is a .....
  - a) Round device                      b) Earth
  - c) Spherical model of earth        d) Sphere
2. A map is said to be .....
  - a) An instructional aid
  - b) A two dimensional aid
  - c) Self explanatory aid
  - d) The graphic - visual representations of the earth.
3. The language of maps and globes is
  - a) The language of colours and symbols
  - b) English language
  - c) Regional language
  - (d) None of the above.

4. Mention any three geographical maps.

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5. Name any three distribution maps.

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## 26.8 Let Us Sum Up

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In this Unit, the instructional aids other than textbook have been discussed. These are also known as support systems. They make the teaching - learning situations more effective and efficient. Details with respect to work-book, charts, models, specimens, maps and globes - have been narrated.

In all these cases, the respective, meaning, types, selection, preparation and usage have been explained. Among them, some are two-dimensional and some are three dimensional aids. But all of them are visual aids. A work-book in most of the time is used as a formative evaluation device. And it tests the intellectual or cognitive abilities that are developed after the teaching of a unit. Whereas charts, models, specimens, maps and globes enhance the quality of learning among the students. Each one of such instructional aids has its own criteria to get selected. A teacher, therefore, has to select the instructional aids very deliberately. Preparation of charts, models, specimens and maps can become a very good and interesting project work for the students. Usually preparation and use of specimens confines to the subjects under natural science. In all these cases, one thing is very clear, that, if these instructional aids are well prepared with good quality materials and preserved properly, then they can be used for several years.

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## 26.9 Answers to 'Check Your Progress'

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### **'Check Your Progress'- 1**

1. b) Instructional aids
2. c) Textbook
3. d) All the above
4. c) Evaluation
5. a) Paper-pencil performance

### **'Check Your Progress'- 2**

1. c) Visual aids
2. a) One-way communication
3. a) Concrete ideas

4. The different types of charts are,
  - a. The narrative charts
  - b. The tabulation chart
  - c. The cause and effect charts
  - d. The chain charts
  - e. The Evolution chart
  - f. Graphs.
5. Write any four criteria from selection of charts in section 26.4
6. Write any two uses of charts from usage of charts in section 26.4

**‘Check Your Progress’- 3**

1. c) Three - dimensional
2. a) Working models
3. b) Concretise
4. a. True  
b. False  
c. True  
d. True  
e. True
5. The two types of models are,
  - i) Working models and ii) Static models
6. Write any two criteria from selection of Models in Section 26.5

**‘Check Your Progress’- 4**

1. a) Plants and animals
2. c) Bottle specimens
3. b) Twigs of plants / whole plants (if they are small)
4. Write any two uses of specimens from usage of specimens in section 26.6

5. Write any two criteria for selection of specimens from selection of specimens in section 26.6.

### **‘Check Your Progress’- 5**

1. c) Spherical model of the earth
2. d) The graphic visual representatives of the earth.
3. a) The language of colours and symbols
4. Mention any three geographical maps from types of maps in section 26.7
5. Write any three distribution maps from types of maps in section 26.7

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## **26.10 Unit-End Exercises**

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1. What is a work-book? Explain its nature in detail
2. What are the characteristic features of a good chart?
3. How models are selected? What is the basis for their selection?
4. Explain any two procedures for the preparation of specimens of your choice.
5. What are maps and globes? Where are they used?
6. What are the general principles for selection of any instructional aid?

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## **26.11 References**

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## **UNIT - 27 □ IMPROVISED LEARNING AIDS**

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### **Structure**

#### **27.1 Introduction**

#### **27.2 Objectives**

#### **27.3 Improvised Learning Aids**

##### **27.3.1 Concept**

##### **27.3.2 Importance**

##### **27.3.3 Need**

##### **27.3.4 Merits and De-merits**

#### **27.4 Let Us Sum Up**

#### **27.5 Answers to ‘Check Your Progress’**

#### **27.6 Unit-End Exercises**

#### **27.7 References**

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### **27.1 Introduction**

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In the previous Units you have come across several instructional aids. Sometimes they are purchased and sometimes they are prepared. Though due importance is given towards the durability or the longevity, after a few years, the instructional aids get distracted; may become broken. At this situation, it is easy to discard but we need to think and ask “Can anything be done to this equipment?” “So that, it get repaired or improved and becomes fit enough for re-use?” This is where the concept of “improvisation of aids” gets originated. So, in this particular unit, we shall focus on, meaning, importance and need for improvising the learning aids. You will get a list of merits and demerits of such apparatus. Inspiring illustrations also will be there.

Sometimes, teachers feel it is highly difficult to teach certain concepts without the support systems i.e. instructional aids. Especially in a subject like Science, several experiments have to be carried out, students must get training in scientific method, scientific attitude should be inculcated - all these are expected. Isn't it? For this, a well

equipped, sophisticated laboratory is needed. But in a developing country like India, all high schools with such a set up is so far from the reality. In this circumstance we cannot wait for that day, when the government will provide all facilities for teaching Science, and other allied subjects. As a solution to this problem, “improvisation of apparatus” - concept is generated. Its essence lies in the principle what is known as “Low-cost and No-cost materials” in which many learning aids are prepared by simple articles found in homes and other places. The only thing required is the ingenuity and resourcefulness of the teacher and his willingness to work. So, let us devote some of our time, to understand this concept and try to inculcate this value based skill into our personality with an honest effort.

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## 27.2 Objectives

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After studying this Unit you will be able to:

- Explain the meaning of “Improvised Learning Aids”
- Justify the need for developing skills in preparing Improvised Learning Aids
- List out the merits and demerits of Improvised Aids

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## 27.3 Improvised Aids

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By going through the introduction part this unit, you should not come to a conclusion that such an effort is confined to Science only. Even the subjects under Social Science category, give an ample scope for improving the apparatus and equipment. See, the principle here is “Nothing is waste; and a waste is not a waste”! As far as possible, think about the re-usage, re-cycling of the materials. This holds good irrespective of any subjects. Take for example, in the Geography, a globe, with faded colours and lines invites you to improvise it. Similarly, it could be an old periodic table, or a physical balance prepared by using the cheapest materials!

### 27.3.1 Concept

When a school budget does not permit the purchase of learning aids and other scientific equipments, to be used for instructional purposes, then the teacher may wish to solicit the aid of other faculty members and the students as well, in creating such equipment. For example;

- Calorimeters can be improvised with the help of several “tin” cans

- Christmas tree electric lights and wiring can be employed in teaching Series and Parallel circuits.
- Principles of light can be taught with the help of ordinary face mirrors found in the home.

While performing such activities, students' complete involvement will be a boon. Because they will be glad to bring simple machines from home, like, nutcrackers, screws, hammers and other tools. All the above said examples imply that, an improvised aid is not the new one, purchased from the market, but a self prepared or repaired apparatus. And for such a preparation, the expenditure will be completely nil or very low. Most of the time, the thrown out materials and un-wanted waste materials are collected and get a touch of re-cycling process or repair, so that they could be re-used.

Such improvised aids have their own characteristic features. It becomes in priority, that one should know such special characteristic features, before jumping into their preparation. Hence, now, let us list out the characteristic features of low-cost educational materials or what is known as Improvised Aids.

- i) They are made up of some of the raw materials that are available either free or at low cost in the local environment.
- ii) The materials do not involve specialized skills and can be made by pupils, teachers or members of the community.
- iii) The materials will be fit enough, so that they can be easily and effectively used by the teachers and pupils in clarifying the set objectives.
- iv) The process involved in the production of the materials is simple and inexpensive.
- v) The material is simple, accurate, and appropriate to the age level of the users.
- vi) The material stimulates thinking, reacting, and discussing, experimenting or further study.
- vii) The material is free from distractions, conflicts or bias.
- viii) The production of the materials is not time-consuming.

All the above mentioned characteristic features, make it very clear that, improvising equipment will lead to an application or translation of a scientific idea. In such cases, talented, creative students are identified. Hence, some of the equipment construction activities by pupils should be encouraged even if there is sufficient budget to purchase many of the required laboratory supplies. For example, in teaching life sciences, the

teacher can use initiative and resourcefulness in creating some basic equipment, like a micro-projector can be assembled from one microscope and an ordinary slide projector which is used as a source of light. By tilting the microscope so that the viewing cylinder or barrel is parallel with the surface of the table, the image can be projected on a screen placed in front of the ocular. It is necessary that the mirrors and light box be removed and that the source of light (slide projector) be directed close to the stage of the microscope to permit the light to enter the objective and leave through the eye-piece on the screen. The size of the projected image on the screen can be controlled by varying the distance between the screen and the eyepiece of the microscope.

### **27.3.2 Importance**

Improvising the learning aids is a challenging job both for the teacher as well as the pupils. A success in such activities always will be thrilling experience! No doubt in it. Hence such activities become very significant in a school life. So, let us now list out certain points which reveal the fact of importance of the activity of improvising instructional aids

- It brings a common forum for the teacher and the students to get involved completely with a constructive approach.
- It encourages the team spirit, and many talents among the students flourish, which otherwise would not have been expressed at all.
- As it is, there is a greater lacuna in providing the infrastructures and the learning aids to the schools. Especially in few subjects, there will be a serious dearth as far as learning aids are concerned. In these circumstances, the quality of teaching and learning will get affected. Hence construction of learning aids or improvising the instructional aids becomes very important.
- It is a fertile area for the all-round development of a student's personality, if used properly. It brings a coordinated development of cognitive, affective and psychomotor domains of a student's personality. Because, students use their ideas (cognitive), do the work with utmost zeal and interest (affective) and honestly, industriously perform it. (psychomotor)

Apart from these, you may find some more relevant aspects that reveal more about the importance of improvised aids; so go ahead and enrich the concept.

### 27.3.3 Need

The concepts, namely, the importance of improvised aids and the need for improvised aids may apparently look overlapping. But there is a subtle difference also! So, in this caption we shall concentrate the same concept from a different angle, ie. need for improvised aids.

To understand this concept, we should take a swift look at the economic status of our schools. It is really pathetic. There are many schools even without the basic facilities, then what about the case of instructional aids? You may be surprised, to know that, there are certain schools even without a single instructional aid also. Before teaching any concept, the objectives are framed first. These objectives may spread over the cognitive domain, affective domain and psychomotor domain. In order to achieve such objectives, mere oral explanation definitely will not suffice. If the learning aids are already available, it will be OK! Imagine, no instructional aids are there, then, there arises a need either to prepare low -cost instructional aids or to improvise them.

There might be some artistic values hidden in the students' personality. As it is, the fixed schedule of the time-table may not give a chance to nurture the student's hidden talent. But this has to be taken care of with some priorities. For this improvisation of aids is the best platform.

### A Few Illustrations for Improvised Aids

Biology, there is ample scope for improvising aids. Let us have a look at the following examples:

Animal cages, terraria, aquaria, herbaria, and flower boxes, that provide adequate use for many interesting species of plants and animals.

A living laboratory consisting of frogs, birds, fruit flies (*Drosophila melanogaster*), earthworms, snails and fish can provide students with worthwhile experiences in the care and feeding of animals. Here biological principles can be taught effectively through the use of living as well as preserved specimens.

The above said activity, needs some simple materials like, mesh wire from the hardware store, sheet metal or tin plates, coffee cans, discarded glass jars and bowls, plate glass, and a few wooden crates are the basic materials for making homes for representative plant and animal life.

- Museum jars for display and study purposes are invaluable as teaching aids in biology. Empty pickle, fruit, coffee containers and large jars can serve as museum jars to house preserved biological specimens.

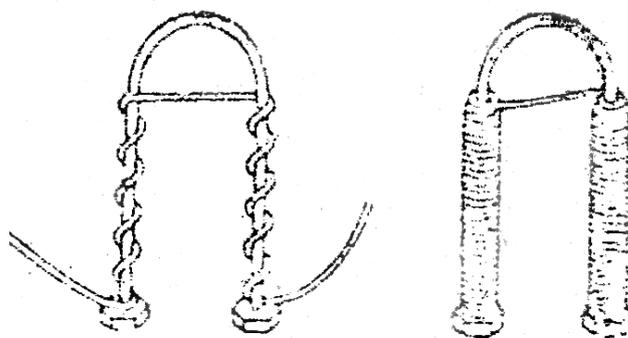
- Many insects can be preserved in glass jars that are filled with 70% alcohol.
- Aquatic snails, clams, fish, small mammals, can be preserved in jars containing 8% formalin. Worms and frogs can be preserved in 5% solution of formalin.
- An ordinary ink - pot can be improvised as a spirit lamp.

**Voltmeter:** Take a plastic glass and pierce two holes at its bottom. Insert two copper wires one in each hole. Fill the glass with acidulated water and invert two test-tubes of water one on each wire. On connecting the wires to the two term of a battery, water will begin to decompose into Hydrogen and oxygen which get collected in the two test tubes. This is known as Voltmeter.

**Astronomical Telescope:** Take two cardboard tubes one fitting in the other. Fix two lenses of different focal lengths at the end of each tube. The lens of low focal length of around 2 cm or 3 cm serves as the eye piece and of 15-30 cm as the object lens.

**A simple syringe pump:** Take a broken glass or metal tube and close its one end with a cork carrying a glass tube. A small metal rod and a cork wrapped with rag will serve as a piston.

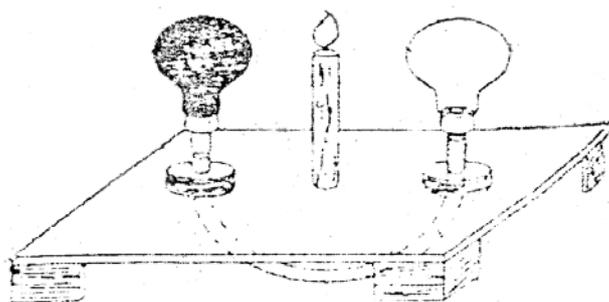
**Electromagnet (horse-shoe):** Obtain a U-shaped piece of iron about 5 mm in diameter. Wind a coil of several layers of bell wire on each arm of the magnet leaving the curving part. Begin at the end of one arm leave about 30 cm of wire sticking out for connections. Wind about three layers on this pole, then carry the wire across the top to the other end; be sure to wind this pole exactly as shown in the diagram. Connect the open ends of the wire to a battery and test for polarity with a magnetic needle. One end should be north pole and the other south pole. If both ends have the same polarity, you have wound the second coil in the wrong direction. In that case unwind the coil and rewind it in the opposite direction.



**Electroscope:** Push a thick wire through the cork stopper of a jug or bottle. Bend the wire so that a hook is formed and place a piece of aluminum foil over it. Lower the wire in jug until you can cork the jug. Any charged article brought near the open end of the wire will make the foil react.



**A Simple Thermoscope:** Fit corks and glass tubes in two used light bulbs and fix them on a wooden board as shown in the figure. Connect the open ends the glass tubes with rubber tubing. Blacken one bulb. Remove one bulb and pour any liquid into the U-tube until about 7 cm above the base board. Replace the bulb and slide the tube in or out a little so that the liquid is at the same level. Place a lighted candle in the middle of the two bulbs and see the effect on the level of the liquid.



A round bottom plastic vessel used as water container (water pot) can be improvised as a globe with suitable lines and colours.

A used up Refill, can be improvised and could be converted, used to drop the stains during microscopic mountings.

### **27.3.4 Merits and De-Merits**

The details with reference to the meaning, nature and importance of improvised aids, might have created in your mind. All those could be considered as merits of improvised aids. But remember, this also is not free from demerits. So, while you jump into such creative activity, you must know merits and demerits, its pros and cons very well as improvisation cannot be a panacea for all the educational problems. Therefore, let us first list out the merits of improvised instructional aids.

#### **Merits:**

- It is the best measure to overcome the problems of low economic status and instructional aids enhancing learning among the schools.
- It inculcates the value of dignity of labour, in which both the teacher and the taught will be handling the so called wastes and un-wanted materials, and making the re-use possible.
- It gives a very good social forum for the students to share their ideas, creativity and responsibility with a team spirit.
- It is a thrilling experience, for the students in which, whatever they learn will last for a longer period.
- While assuring the efficiency and effectiveness to the teaching-learning sessions, it assures a sort of “belongingness” and “oneness” among the individuals.
- Such types of activities are actually the culminating point in which, student’s head, heart and hands get coordinated.
- Improvisation of aids is the best opportunity for self-learning. Children will be facing it as a great challenge both for their mental ability as well as their energy.

#### **Demerits:**

- Whatever may be the result improvised aids also, sometimes need money. The question comes like, who has to pay for this? Reluctance of teachers and administrators may not find it interesting; then the whole philosophy behind such activities fail.
- All the teachers and pupils may not be very skilled in preparing such instructional aids. Under this situation, it will be simply a pressure or burden on the teachers and the student.

- It is time consuming. And there will be no special provision for such activities with due weightage in the time table.
- There is a need to get trained first, so that, improvisation of aids is possible at its best level. Hence, appropriate training in the development, production and utilization of low-cost educational materials as well as improvised instructional aids, should occur in priority.
- Check on the internet. You will find amazing ideas to enrich your learning aids.

### **‘Check Your Progress’ -1**

State whether the following sentences are ‘True or false:

1. Waste is a waste
2. Improvisation of instructional aids means repairing the broken ones.
3. ‘Improvisation of aids’ - is against to purchasing learning aids.
4. Improvisation of aids is similar to re-cycling and re-using technique.
5. To prepare improvised instructional aids, a laboratory is needed.

### **Fill In The Blanks:**

1. Improvisation of aids is possible irrespective of .....
2. The process involved in the production of improvisation of aids is.....  
and .....
3. Improvising aids is a ..... job.
4. The common solution used for the preservation of organisms is .....
5. The activity of improvising instructional aids inculcates the value of .....

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## **27.4 Let Us Sum Up**

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To bring about a quality improvement in the teaching - learning process, several instructional aids are used. But sometimes, one may not find or get any one, relevant instructional aid at least. It may be because of the poor economic status of the schools also. Such incidents are not rare in India. Improvisation of aids is one of the several

ways to overcome the above said problems. The Philosophy behind this is “A waste is not a waste” And “Nothing is a waste”. It emphasizes the repair of broken or unwanted equipments with minimum expenditure and insisting their re-use. Such aids are also known as low-cost educational materials. In this process both the teacher and the taught get involved actively. It is possible in all the subject areas. Like, preparing or repairing the old charts, maps, globes and other certain working models also. Usually, unwanted bottles wire mesh, glass jars, etc., are used in the Biology to keep plants, insects and other non-dangerous animals for observation. Any vacant or empty refill of a ball pen can be used as a stain dropper during microscopic mountings.

The activity of improvising instructional aids has several positive points, like, it inculcates certain social values, namely, dignity of labour, belongingness, oneness, togetherness etc;. It makes the students learn and take up social responsibilities. It tries to provide the best service with minimum or no expenditure basis.

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## **27.5 Answers to ‘Check Your Progress’**

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### **‘Check Your Progress’- 1**

1.
  1. False
  2. True
  3. False
  4. True
  5. False
2.
  1. Any subjects
  2. Simple and inexpensive
  3. Challenging
  4. Formalin
  5. Dignity of labour

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## **27.6 Unit-End Exercises**

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1. What is meant by “Improvised Aids”?
2. Explain the need and importance of instructional aids.

3. What are the merits and demerits of improvised aids?
4. Illustrate the concept of improvised aids' with any two examples.

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8. Nathan. S. Washington, *Teaching Science Creatively (1967)*

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## **UNIT - 28 □ TECHNOLOGY DEPENDENT INSTRUCTIONAL AIDS**

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### **Structure**

- 28.1 Introduction**
- 28.2 Objectives**
- 28.3 Over-head Projector**
  - 28.3.1 Meaning, Advantages of OHP**
  - 28.3.2 Maintenance of OHP**
  - 28.3.3 Preparation of Transparencies**
- 28.4 Slide Projector**
  - 28.4.1 Meaning, Advantages of Slide Projector**
  - 28.4.2 Maintenance of Slide Projector**
  - 28.4.3 Preparation of Slides**
- 28.5 VCP, TV and Video Cassettes - Advantages, Usage**
- 28.6 Let Us Sum Up**
- 28.7 Answers to ‘Check Your Progress’**
- 28.8 Unit-End Exercises**
- 28.9 References**

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### **28.1 Introduction**

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Instructional aids could be as simple as charts, maps and globes. It could be as complex as a computer, overhead projector and slide projector etc. You can find a categorical difference between the above said types of instructional aids. The first category does not depend upon any power supply, and they are easier to handle. These do not demand any technical knowledge or a perfect technician. No doubt, that a teacher can use both the types, but the latter ones may pose some technical problems while using in a class room situation. Hence a teacher must know some of the technological aspects of such instructional aids. So, in this unit you will get detailed information with respect to technology based instructional aids, namely overhead projector (OHP), Slide projector, TV and other electronic gadgets. The advantages of such aids and the mode of their usage also shall be discussed.

As has already been pointed out, all the instructional aids are broadly classified into two types as, Technology dependent instructional aids and Instructional aids that do not depend upon technology in general and projectors in particular. So, Overhead projectors, slide projectors, and TV are obviously, technology dependent instructional aids. These machines will work as the instructional aids by a good combination of their hardware and software parts. So, machinery parts may confine to hardware section, where as the information on, like, electromagnetic tapes, cassettes, CD etc; are said to be software. A teacher must know how to use the machines and how to maintain such machines. Apart from this, a teacher also should know the preparation of software parts, namely, transparencies, cassettes, slides, etc. It is because, the transparencies, slides or CDs relevant to certain concepts to teach may not be readily available, and therefore, if you know the procedure for such preparations, then your knowledge could be best utilized.

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## **28.2 Objectives**

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After studying this Unit you will be able to:

- Explain the meaning of an Overhead Projector
- List out the advantages of an Overhead Projector
- Describe the procedure of maintenance of an Overhead Projector
- Explain the procedure for the preparation of transparencies
- Explain the meaning of Slide Projector
- List out the advantages of a Slide Projector
- Explain the procedure of maintenance of a Slide Projector
- Explain the procedure for the preparation of slides
- Mention the advantages and uses of VCP, TV and Video cassettes

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## **28.3 Overhead Projector**

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Overhead projector is one among the projected aids. This will become useful under the condition of a constant power supply. That is to say, all projection equipment requires electric power for operation. It can project the diagrams that are on transparencies, with a bright and magnified size. On transparencies, any figure, diagram, statistical

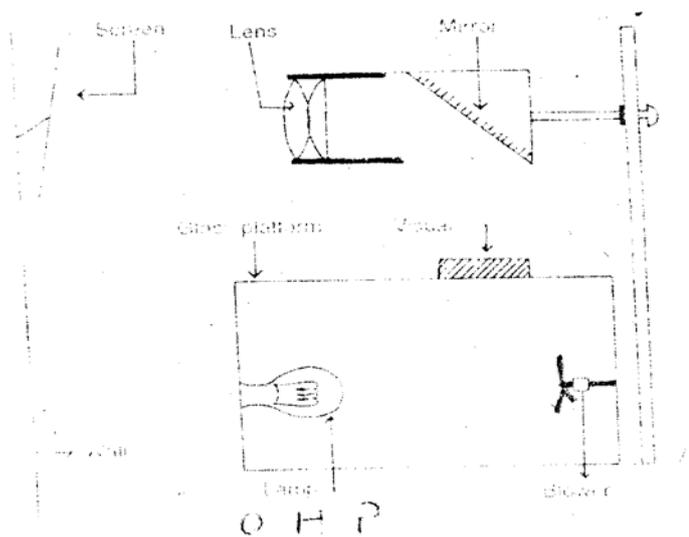
information, tables, etc; could be drawn, and projected by using OHP. The projected diagram on the screen or upon a white wall before the students in a class becomes one of the best instructional aids.

### 28.3.1 Meaning and Advantages of OHP

The name 'Overhead Projector' itself conveys the meaning of the device. It is so named, because of the fact that the projected image is behind and over the head of the speaker. In an overhead projection, a transparent visual is placed on a horizontal stage on top of the light source. The light passes through this transparency and then is reflected at an angle on to the screen at the back of the speaker,

**The Design of OHP:** It consists of a strong source of light, reflector (concave mirror), condensing lens, slide carrier and objective lens. All these elements are contained in a light weight metal case.

It contains an area of vertical projection besides the straight horizontal path of the light available with the usual projectors. The path of the light rays is again changed to a horizontal one by a mirror placed at  $45^\circ$  angle and continues over the shoulder of the teacher to the screen as may be evident from the diagram given below.



- It contains a large aperture of the size 25 x 25 cm or 20 x 20 cm for placing the slides and other visual materials.
- It provides for the focusing of the image on the screen by vertical movements of the projection head (containing the objective lens and mirror).
- There is a provision of constant flow of air past the lamp by a cooling fan in the base of the projector.

***Advantages of Over-Head Projector:*** Overhead Projector is far better when compared with other two - dimensional, non - projected instructional aids. With suitable transparencies, an OHP seems to be an effective and efficient device for the presentation of any information. So, now let us list out the advantages of the Over-Head Projector.

- It makes the teaching process quite illuminative, illustrative and impressive. Even in the illuminated room, it could be operated. Therefore there is no need of darkening of the room.
- It saves the time of drawing the diagrams on tile board and also, a good transparency prepared at leisure well in advance gives confidence for teachers.
- The transparencies once prepared can be preserved for the re-use.
- The image is projected over the shoulder of the teacher; therefore, he may face the class all the time.
- It allows the teacher to use the screen as a “black board”. He can write on the transparencies, with a marker pen, or wipe off etc. Any opaque sheet can hide the portion of a diagram, and the teacher can make use of this opportunity to explain any diagram step by step by projecting a portion of the diagram as he wants.
- If he uses a pointer on the slide, it gives a more effective explanation. He need not turn towards the screen and locate the parts of a diagram.
- The operation of the OHP is quite easy. It simply demands turning of the power switch, placing of the slide on the projection stage and focusing of the image on the screen.

### **28.3.2 Maintenance of OHP**

Overhead Projector needs a very careful handling. And a few aspects are to be kept in mind in order to maintain an OHP in a good condition. Those aspects could be listed as follows :

- The projector should not be subjected to mechanical vibrations.
- A voltage stabilizer is a must to avoid the bad effects of voltage fluctuations.
- Halogen lamps particularly will not withstand heavy surge in voltage. The lamp should not be touched by hand.
- OHP should not be kept in operation continuously for long periods.
- The Fresnel lens is protected by a glass plate on top. It is necessary to remove dust or dirt on the protecting glass and also from the outside lens surface by flat camel hair brush.
- Surface silvered or aluminized reflector should not be cleaned.

### **28.3.3 Preparation of Transparencies**

The overhead projector is useful only by means of transparencies; otherwise, it becomes just a machine. But there transparencies will be available as blank sheets, on which the required diagram, table or any information has to be drawn or written. Hence you must be aware of the procedure for the preparation of transparencies. These transparencies could be prepared by any of the following four methods.

***Hand - drawn Transparencies:*** The acetate sheet is placed over the paper and kept in position by paper clips or pins or self-adhesive tape. The sketch is carefully traced using a marker pen or sketch pen with quality Indian ink. Water colour impressions and brush pens also could be used. But the water colour impressions could be easily erased. Hence, if the transparency is required for permanent use, the impression carrying surface should be protected by either clear varnish spray or keeping acetate sheet over it.

Acetate sheet may be coated with good quality gelatin. About 5 gms of gelatin is dissolved in 25 gms of water by boiling. The solution is applied evenly with a flat brush on acetate sheet. On the coated side, it is to draw with good quality Indian Ink. The sheet can be coloured using transparent water colour.

***Photographic Transparencies:*** Employing reflex printing process, negatives on reflex printing paper can be made complicated diagrams or rare pictures printed on books or composed diagrams using Indian ink. With these negatives, positives can be printed on sensitized dia-positive acetate. The acetate film is available as sheets of 10" x 12" or rolls. The picture can be coloured using transparent water colour. The dia-positive acetate sheet also can be used as bromide paper and direct enlargement made

on it from any photographic negative using an enlarger. The enlargement can be coloured.

**The Diazo Process:** To make a large number of copies of transparencies, diazo chemical coated acetate can be used along with master drawn on translucent paper. The two are kept together exposed to sunlight or ultraviolet source for a suitable time (2 to 3 minutes). The image will develop on exposure to ammonia vapour. Beautiful coloured overlays can also be prepared by this process.

**Copying Machines:** Copying machines produce the positive and negative transparencies from the original material. In the infra-red copying machine, the transparency film is placed in contact with the original. The exposure dial is adjusted to provide desired image density. The original and film are fed into the machine and in just 4 seconds, a transparency can be obtained in black and white. OHP transparencies may be made easily and quickly by such thermographic processes. (eg.: using a copier like Xerox)

### **‘Check Your Progress’-1**

1. Technology dependent aids are characterized by
  - a) Machines and power supply
  - b) Techniques
  - c) Machines
  - d) None of the above
2. While using an OHP a teacher can explain
  - a) Turning towards the screen and pointing the figures or diagrams
  - b) Facing the students as well as pointing at the diagrams or figures on the screen
  - c) By standing at one end of the class room and pointing towards the figure or diagram on the screen.
  - d) None of the above
3. State whether the following sentences are True or False:
  - a) OHP allows a teacher to use the screen as a “blackboard”.
  - b) While using OHP the classroom must be devoid of light i.e. the class room must get darkened.
  - c) The Projectors should not be subjected to mechanical vibrations

- d) OHP should not be kept on continuously for long periods.
- e) One cannot get a hand — written diagrams on the transparencies.

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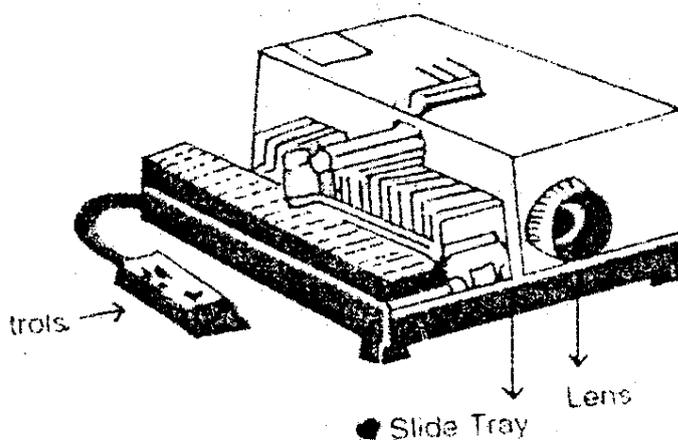
## 28.4 Slide Projector

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Slide Projector is yet another projected instructional aid. It could be worked with the power supply. Similar to transparencies in OHP, slides are used as software part here. So, in the following discussion you will come to know about the meaning and advantages of slide projector, and the procedure for the preparation of slides.

### 28.4.1 Meaning and Advantages of Slide Projector

Slide Projector is used to project the slides. Here the slides are projected by an instrument equipped with a powerful light source in a lamp house and carrier for holding slides of suitable sizes. It is a simple mechanism and the essential elements in it are the same as in a film strip projector. Usually a double slide carrier is fitted into the projector so that when one slide is projected on the screen, a second slide can be kept ready. When the class views the second slide, the first slide can be removed and another inserted in its place. There is a “thumb mark” or guide marker on the upper right hand corner of each slide. Most 2" x 2" slide projectors today use drums or cartridges in which many slide can be loaded in proper sequence in advance. The projectors can be operated and focused by remote controls. It is also possible to record the narration in a tape-recorder and the latter may be hooked up to the projector in such a way as to give necessary commentary even in the absence of a teacher. This is said to be Slide - Tape sequence.



### ***Advantages of Slide Projector***

The slide projector is quite handy and portable with several advantages. Now let us list out the advantages of slide projector.

1. It is light and easy to transport
2. It is non - fragile and non - inflammable
3. It is available on moderate expenditure
4. Availability of projector with low voltage lamps or petromax lamps making it possible to use the same even in non - electrified areas.
5. Complete darkening of the room is not absolutely necessary. There may be sufficient light to enable the pupils to take notes.
6. The projected image has greater power to catch the attention of the pupils.
7. Varieties of information may be given incorporating maps, drawings, photographs etc, through the slides. The teacher can give suitable commentary making use of the books or can record the commentary on a tape and replay it during the use of a slide projector. Further the pictures can be retained on the screen as long as necessary.

### **28.4.2 Maintenance of Slide Projector**

Slide Projector like any projector needs a Careful handling. The machine has to be maintained properly. Therefore we shall try to list out the factors that result in the maintenance of the slide projector. The machine needs a still platform while it is used; and it should not be subjected to mechanical vibrations.

Like in any electronic gadgets usage, here also a stabilizer is needed, which could avoid the adverse effects of the power supply fluctuations. Any sort of exposure moisture should be avoided because this may result in fungi attack, and there by spoiling the machine or rusting of the iron parts.

- It must be always dust and dirt free. This is the most important aspect.
- It has to be used often and often, so that the machine will remain in a good condition.
- Proper use and keeping it back in the position after the use is also important.

### **28.4.3 Preparation of Slides**

In order to prepare the slides one has to follow several steps. These steps have been explained below: First select a suitable topic from the syllabus after considering the possibilities of depicting the subject - matter by drawings, diagrams, photographs

or still pictures etc; Then prepare of detailed script, describing the contents of each frame indicating the method of preparing it i.e., whether by art work or something else. Make rough sketches of the figures on the paper so as to serve as guide when final sketches are drawn. Draw the sketches in suitable sizes on white drawing paper with Indian Ink to suit the 2" x 2" slides then reproduce the same on the slides. Arrange the drawings and photographs according to the script and number them in sequences. Prepare the guide book which is to follow the slide sequence explaining the details of each frame. The commentary may even be recorded on tape and it may be used in combination with the slides. An audible signal like the stroke of a bell recorded with the commentary may indicate when the next frame should be shown.

The general procedure of making simple slides may be outlined as under:

- Try to select the base material for preparing slides. It can be plain glass, cell - plane, etched glass, a clear transparent cellulose acetate film.
- First of all a rough layout is laid down. For this purpose, the outline of the projection areas is to be marked off on the tracing paper. Then the basic illustration is to be sketched and other symbols or lettering is to be positioned according to plan.
- Now a sheet of transparent base material (glass or cellulose acetate etc.) is placed over the original sketch or layout. A drawing pen or marking pencil is used for tracing the figure, art work or lettering directly on the transparent sheet.
- For better illustration, one can add colour, symbols and patterns by use of any pencils, inks, tapes and coloured adhesive sheets.

Photographic slides can be produced with the help of suitable camera by taking photographs of the objects or events. The process begins with exposure. After exposure the photographic film is developed and printed on a transparent glass plate. After its development, the positive print is covered with glass are taped together along the glossy edges and the slide is ready for projection.

### **‘Check Your Progress’ - 2**

1. Slide Projector is
  - a) Over-head projector
  - b) Non - Projected aid
  - c) Made up of a series of slides
  - d) None of the above.

2. A slide projector usually will have
  - a) A double slide carrier
  - b) A triple slide carrier
  - c) No slide carrier at all
  - d) None of the
3. State whether the following sentences are True or False
  - a) The Projectors can be operated and focused by remote controls
  - b) Slide projectors are very heavy and it is very difficult to transport
  - c) Slide projectors can be used even in non-electrical areas
  - d) The machine should not be exposed to any sort of moist
  - e) Preparation of slides includes the preparation of the relevant guide books also.
  - f) Each slide will have some information which is termed as “frame”.

### **28.5 VCP, TV and Video cassettes - Advantages and Usage**

**Television** : Television is another technology dependent instructional aid which attracts both the senses, namely auditory as well as visual sense of the learners. Hence, it is considered as very powerful device in the transmission of knowledge. The successful placing of the satellites into orbit, has added new dimensions in the use of television for instructional purposes. A regular educational service (EDUSAT) for schools and college students in the shape of model lessons and other instructional programmes can now be seen on the TV screen. Television with a slight modification can be converted as CCTV i.e. closed circuit Television. The close circuit television broadcasting is a sort of micro level local arrangement limited to a single school or several schools lying in a particular region. It is connected by a cable or micro wave system. This telecast exclusively restricted to the terminals which are connected by a network. That means, the telecast cannot be received by other sets outside the selected network. Anyhow, you cannot deny but just accept that, Television is a powerful agency of communication. Live programmers and motion pictures can be broadcast in television. Television has all the advantages of a projected aid and dynamism of motion picture. Television provides multimedia learning experience. Since the programmes are announced earlier, the institutions can prepare the pupils in advance to view and listen to the telecast.

Many telecasts, in addition to programmes exclusively for schools, can be considered educational in a general way and viewed by pupils with advantage. Hence Educational Television (ETV) includes programmes whose primary interest is to educate rather than entertain. ETV generally includes instructional television and non-commercialized television programmes.

Instructional television (ITV) includes programmes related directly to an organized programme of formal instruction and is directed to individual viewers who come under non-formal education programme. In all these cases, suitable follow-up work by the teacher is essential to consolidate the gain of knowledge. Education through television involves careful planning. Training of teachers to make the best of the equipment and programmes telecast is necessary. The centre for educational technology of the NCERT has launched such training programmes of resource persons drawn from the ranks of teachers of primary schools, who will in their turn, train further teachers.

**Video Cassette Player (VCP):** Some times pre-recorded video tapes can be played through television in the classroom. Video films on educational topics shown through television in the class room have the same effect on the students as the ordinary cinematic educational films do. Video films have the added advantage over ordinary films in that the arrangement is compact and requires little space and time for manipulation. It is the most convenient of all audio-visual teaching-learning materials.

**Video Cassettes:** These are very popular electronic devices now a days. They have equally spread over both in the field of education as well as entertainment. The potential advantage of video cassette lies in the fact that control of the equipment and the learning process is placed in the hands of the learner through control over the mechanics of the machine i.e., stopping, starting, timing, reviewing and previewing and consequently the capacity to order the sequence of events, controls the rate of learning, and facilitates practice sequences.

The potential exists for providing the basis for learning wide range of motor, intellectual and cognitive and interpersonal skills as well as affective aspects. Only the text book or any other printed material cannot deal satisfactorily, as it could be with a television, video cassettes and VCPs.

In some countries, video cassette programmes are being built round the study centre concept, a location where several video machines are available to which students bring their study notes. The students run the programmes as individuals. Sometimes study centres provide for group sessions during which video cassettes are played.

In other countries some institutions assure that students can gain access to such equipment and make programmes which will be used on an individual basis either

supplementary learning material or integral to the teaching programme.

The problems associated with television programme production are:

- a. Cost of production of programmes.
- b. Equipment costs cannot always be kept down by using lower quality equipment.
- c. Cheaper equipment formats do not enable technical material such as animal or plant tissue to be represented adequately.
- d. Video production for educational purposes calls for new techniques different from the entertainment modes. Producers, directors, script-writers need to be knowledgeable about teaching and learning. Many of the old techniques of film and television will a longer be useful. For example, the very basic concept that programmes must have a beginning, middle, and an end will no longer apply as a cassette could just as easily consist of a series of short video events which sets a problem, teaches a technique or brings together a range of visual material to make concepts or principles clear.

#### **Advantages and Uses :**

- Television is considered as the best instructional aid, because it warrants visual as well as aural sense organs there by making learning a very smooth process.
- It can help the teacher in several ways, starting from his professional growth to bringing quality learning among the students.
- Television brings cheerful learning experience blended with entertainment among the student. They can view and hear the work and talk of an eminent educationist, renowned teacher, creative scientist and excellent demonstrator, musician or artist. Their presence on the TV screen may provide them clue warmth and nearness for drawing maximum educational and psychological advantages.
- The instructions imparted through television have the potentiality of improving the process and products of learning as they involve thorough planning, systematic presentation and integration of a wide range of audio - visual material and appliances.
- Televised programmes prove helpful in upgrading the curriculum and enriching the educational programme more easily and economically.
- Any information from any nook and corner of the world can be displayed as a five programme with reality. This could be used in the class room teaching.
- The expertise and the talents of good teachers from any part of the world could be electronically stored and used through tele-programmes, so that shortage of good teachers, classrooms, audio - visual aids and other resources may be overcome through such planned televised programmes, to some extent.

- Television instructions may bring greater equality of opportunity for all pupils. For example, the pupils studying in remote rural or under-privileged areas may be equally benefited by the TV Programmes.

**‘Check Your Progress’ - 3**

1. Television is considered as:
  - a) Visual aid
  - b) Audio - aid
  - c) Audio-visual aid
  - d) Learning aid
2. When several televisions inter connected by means of a closed circuit in a particular area, the system is called \_\_\_\_\_
  - a) Educational TV
  - b) Instructional TV
  - c) Close Circuit TV (CCTV)
  - d) None of the above
3. The potential advantage of video cassettes lies in the fact of control of the equipment and learning. Process can be manipulated by
  - a) The teacher
  - b) Student
  - c) The parents
  - d) Elder persons
4. Video cassettes provide an opportunity to display the educational programmes for
  - a) Only one time
  - b) Two times
  - c) Multiple times
  - d) None of the above
5. The organisation which caters for the training of teachers with respect to planning

and execution of educational tele-programmes is .....

- a) State government
- b) Central government
- c) NCERT
- d) NGO

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## **28.6 Let Us Sum Up**

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In this particular unit you have come across detailed information with respect to technology dependent instructional aids in general and Overhead projector, slide projector, VCP, Television and video cassettes in particular. In all these items, the machines will work as instructional aids by a good combination of their hardware and software parts. Overhead projector and slide projectors are the best visual aids. In case of a overhead projector, the magnified diagram will be behind the teacher, so that a teacher can face the class without turning towards the screen, but can make the students to observe the exact parts of a diagram by directing them. It makes the teaching process quite illuminative, illustrative and impressive. While using an OHP, there will be no need of darkening of the room. Details regarding different methods of preparing transparencies are also discussed. Slide Projector is yet another projected instructional aid. Being a light, non-fragile, portable machine it will be very advantageous to teach with the help of a slide projector. Here complete darkening of the room is not absolutely necessary.

So, with sufficient light, students can easily write or jot down some points. Television has surpassed both the Overhead projector and slide projector in so many ways. But it has its own demerits also. Anyhow, the televised programmes through instructional television and education television are very much appreciated by professionals. It enables one to make use of live programmes and motion pictures by means of broadcasts in learning experience. Any information from the nook and corner of the world can be displayed as a live programme with reality. This could be shared by the students in the classrooms. The expertise and the talents of good teachers from any part of the world could be electronically stored and used through tele-programmes, Televised programmes are actually considered as a strong means in bringing equality of opportunities for all pupils belonging to different strata of society.

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## 28.7 Answers to ‘Check Your Progress’

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### ‘Check Your Progress’-1

1. a) Machines and power supply
2. b) Facing the students as well as pointing the diagrams or figures on the screen
3. a) True  
b) False  
c) False  
e) True  
f) False

### ‘Check Your Progress’- 2

1. c) Made up of a series of slides
2. a) A double slide carrier
3. a) True  
b) False  
c) True  
d) True  
e) True  
f) True

### ‘Check Your Progress’- 3

1. c) Audio - visual aid
2. c) Closed circuit TV (CCTV)
3. b) Student
4. c) Multiple times
5. c) NCERT

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## 28.8 Unit-End Exercises

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1. What is OHP? What are its advantages?
2. How will you prepare the transparencies to teach a particular concept?
3. Mention the factors that help the maintenance of slide projector

4. What are the educational uses of TV?

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## 28.9 References

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## **UNIT - 29 □ COMPUTERS AS INSTRUCTIONAL AIDS**

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### **Structure**

- 29.1 Introduction**
- 29.2 Objectives**
- 29.3 Computers as Instructional Aids**
  - 29.3.1 Interactive Software - Meaning, Need, Importance, Usage**
  - 29.3.2 Development of Power Point Slides**
  - 29.3.3 Power Point Presentation**
- 29.4 LCD Projector-Meaning, Advantages**
- 29.5 Let Us Sum Up**
- 29.6 Answers to ‘Check Your Progress’**
- 29.7 Unit-End Exercises**
- 29.8 References**

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### **29.1 Introduction**

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The quality of education is always determined by an efficient and effective set of learning outcomes. To achieve this goal the teaching process in general has undergone tremendous modifications. Here the quality of learning has become more important than the quantity of learning. It is more important to know how much a student has learnt than how many have learnt. This implies that, a teacher must give individual attention while teaching. But practically this appears to be a Herculean job. Hence a teacher with other support systems, namely, audio - visual aids can try to achieve the above said goal. In the previous units you have come across the information with respect to audio - visual aids. In this particular unit you will learn about a very special device, what is known as COMPUTER, and its role in teaching- learning process.

Very strongly, now - a - days, it is felt by each and every one that, advancement of any society or nation depends upon the quality of education being imparted there. In

turn, the quality of education demands, the adoption of modern and easily understandable techniques of teaching. In this context, computers are fast becoming effective and efficient devices in teaching - learning process. Computers, if used properly, can help to teachers and students in several ways. For example, they can take over the most of the drudgery of schooling like, classifying children according to abilities, time-table preparation, etc., They can provide direct interaction between student and the subject matter to be learned; even they can engage the students in tutorial interaction and dialogue. Usually, it is observed that, students spend varying amounts of time and practice to achieve mastery of specific instructional objectives. So, computers used as an aid while teaching, are considered, as instructional aids. A computer is the best instructional aid, because it gives a multi - media approach to teaching - learning process. Hence in this particular unit, we shall discuss on the topic, 'computers as instructional aids', interactive software, its meaning, need, importance and uses. We shall also focus on the development and presentation of power point slides, as well as techniques of using an LCD and its advantages.

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## 29.2 Objectives

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After studying this Unit you will be able to,

- Explain the meaning of “computers as instructional aids”
- Justify the need and importance of Interactive Software
- Explain the procedure for the development of Power Point Slides.
- Describe the techniques of Power Point Presentation
- Mention the advantages of LCD

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## 29.3 Computers as Instructional Aids

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Although a computer can be used in many ways in the educational programmes, the following are some of the areas where it proves to be effective in the instructional process. They are:

- Drill and practice
- Tutorial dialogue
- Simulation and games
- Information handling, etc;

Alongside the specific examples of application of computers in education, different terms are used with specific purposes, For example, terms like, computer assisted or aided learning (CAL), Computer assisted / aided instruction (CAI), and computer

managed learning (CML). These terms are used by different authors in different context. Indeed every author seems to have his own definitions and classifications for some technical terms. Anyhow computers have been considered as very effective instructional aids, though they intervene in almost all the aspects of the educational field. Most of the time, computers are used to provide individualized learning situations to the students. This type of activity is termed as computer assisted instruction. Computer assisted instruction has its origin from programmed learning. This is a form of individualized instructional where a student works at his own pace through written material displayed usually on the computer terminal.

The computers are influencing the school field like anything. They perform a dual task, like; they expose students to modern technology and also inculcate in them a new and scientific approach to leaning. Computers have touched upon almost all the nook and corner of the educational development, administration and management, educational planning, documentation, scoring and processing of examination results, researches and surveys.

Apart from the above list, there are certain major areas, where a computer acts more as an instructional aid, they are:

- It relieves the teacher in many of his/her tedious time - consuming tasks. It makes the teacher, the students and computer work in close co-ordination.
- The teacher can prepare the course materials, and utilize it while teaching and help the students in learning.
- Students also can select the course material which will be of their interest and need based.
- Computers motivate students to achieve aims in an optimal manner.
- Computers can assist in the achievement of instructional aims and objectives by providing appropriate material for students of diverse capacity and achievement levels.

**‘Check Your Progress’ - 1**

1. Computers facilitate .....
- a) Individual learning
- b) Rote learning
- c) Good handwriting

- d) All the above
2. Computers play their role in .....
- a) Teaching process
  - b) Learning process
  - c) School administration and management
  - d) All the above
3. Computers are doing a dual work, as .....
- a) Playing the role of a teacher and student
  - b) Teaching and learning
  - c) inculcating in them a scientific approach to learning
  - d) None of the above
4. Computer assisted learning has its origin from .....
- a) Programmed learning
  - b) Military science
  - c) The subject mathematics
  - d) All the above
5. Programmed learning is a type of .....
- a) Team teaching and team learning
  - b) Individualized instruction
  - c) Mass communication
  - d) Regular classroom teaching- learning session.

### **29.3.1 Interactive Software - Meaning, Need, Importance and Usage**

You must know that, a computer is useful only with its loaded software packages. These software packages could be, of any type, like, system software, operating software, utility software or user friendly software etc., In this list, you can have one more type, what is known as interactive software. So, in the following discussion you will come to know about the meaning, need, importance and uses of Interactive software.

Software is the one, which makes the computer functional. Likewise, interactive

software will be user- friendly, and provides a two - way communication between the student and the subject matter. A good interactive software programme will start its work by identifying the way a student seems to learn best. It can review his past history of learning and then presents a programme built on his strength. Even it can store all the information gained from all students who have worked on it. This information may be re-analysed and, much of the teaching strategies which were not effective may be rejected and strategies which have succeeded may be continued.

Problem solving experiences also could be given to the students, in the following manner:

A problem is presented on the screen of the computer. The student responds by typing relevant related decision on the computer. Based on this, feedback is displayed on the screen. A new problem is then presented directly related to the feedback to the learner regarding the previous mode of decision. Again, the student types a choice to be made involving perhaps four alternatives in a multiple - choice item. Feedback is again provided to the student on the quality of decision made, as well as new sequential problem presented on the screen.

In the context of learning, the rapid response to a learner's action is of particular benefit as there can be quick reinforcement of good ideas which the learner has and any misconceptions may be corrected. Many motor skills can only be learnt by direct use of the equipment concerned. Computer - assisted instruction, being one of the interactive software, facilitate teaching -learning situations in several ways. It could be used for drill work or for repetitive review.

The most powerful advantage of a computer is its continuous dynamic activity. A computer will not become frustrated. Each student using a computer terminal may experience the learning items. A learner may read a few statements or see a demonstration on the screen of the computer. He may respond to a multiple - choice or completion item. Then the computer screen may show a smiling face if the response given was correct. If incorrect, the student may try again to answer or respond correctly. If here also, the answer becomes wrong, then, the correct answer is provided on the screen.

So, all the above said points have done two aspects simultaneously, namely, they have explained you the meaning and nature of an interactive software as well as their need and importance. Now let us list out some of the uses of Interactive software programmes.

- With clear directions in a realistic situation the interactive software programmes creates a high level of interest and maintains it throughout the learning process.
- They can provide information in a very precise but in an effective way.

- They are highly individualistic in their nature, so that each and every student can learn according to his own pace of learning.
- Immediate feedback is the essence of such programmes which further makes the learning stronger.
- They check up how well a learner understands a topic through questions.
- An interactive programme could be of any of the following type, namely, drill and practice, simulations and games.
- Such programmes enable the student to make models of real life situations, formulate and test ideas and hypotheses.
- A computer data bank helps the student to obtain data and process it quickly and meaningfully.
- A student can take a test with the computer and can obtain immediate feedback so that he can rectify his deficiencies and improve his learning.

**‘Check Your Progress’-2**

1. The interactive software provides an opportunity for interaction between .....
  - a) The teacher and the students
  - b) The students and the students
  - c) The students and the subject matter
  - d) All the above
2. The computer becomes functional only with the association of .....
  - a) Soft wares
  - b) Machines
  - c) Subject matter
  - d) Teachers
3. The best advantage of an interactive software is its .....
  - a) Course ware
  - b) Immediate feedback
  - c) Interaction

- d) None of the above
4. State whether the following sentences are True / False.
- a) Computers cannot surpass the teachers
  - b) Computers are known for their swiftness and accuracy
  - c) The computer fails to appreciate the emotions of the students.
  - d) Interactive software provide one way communication
  - e) Computers motivate students to achieve educational aims in an optimal manner.

### **29.3.2 Development of Power Point Slides**

Power Point slides have to be developed with proper planning. So, you have to frame the instructional objectives first. This has to be done with reference to the concept selected. Like, for example, if the selected concept is “Photosynthesis”, the following instructional objectives could be framed.

Students will be able to:

- Define photosynthesis
- Give examples for the plants which do photosynthesis
- Explain the process of photosynthesis
- Mention the two phases of photosynthesis
- Describe the Light reaction in photosynthesis
- Explain the dark reaction in photosynthesis
- Compare the light and dark reactions in the photosynthesis

Based on the above said objectives students can first write down the relevant points to the respective objectives. You can do the clipping of different pictures, use animation technique and also can give the sound effect during the Power Point slide preparation. After this preliminary work, you have to do the remaining work on the computer.

### ***Introduction to Power Point Presentation***

When we have to make a sales presentation, present a new product idea to an audience, PowerPoint can give an effective presentation means. It includes a few ways to create a new presentation and several different slides, options. Only thing we have to

do is select most effective options, to present the subject. Power Point offers mainly three ways to create presentations.

**Blank presentations:** This is to give an entirely new presentation which we have start from the scratch.

**Using Templates:** This gives an initial idea in selecting the look of the document.

**Auto-content Wizard:** With this option PP (Power Point) leads us step by step to create a presentation.

**Creating a presentation:** Click Start > Programs > Power Point > (choose from the options)> OK

**Auto-content wizard:** From the PP dialog box click Auto-content wizard, a dialog box appears. Go step by step from Start to Finish by clicking the check boxes and choosing from the options.

Or Click File > New > General > Auto-content wizard

**Using a Template:**

Start > Programs > PowerPoint > Templates (choose from the options) > OK

Or Click 'File > New > Design Templates (choose from the options) > OK

**Blank Presentations:**

Click Start> Programs > PowerPoint > Blank presentation Or Click File > New > General > Blank presentation

**Inserting Text into a Slide:** Click the Place Holder (Dotted outline box) > Type the text > Click outside the place holder. Editing the formatting of the text in the place holder is done in the same way as that we do in word processor programs. We can insert almost anything like Charts, Tables and Pictures into the place holder in the same manner as we do in MS Word.

**Moving between the slides:** When we create a slide, we see only a single slide on the screen. This view (called as slide view) helps to work on that particular slide. But when we add more than one slide and want to work on different slides we can navigate between the slides easily. One way is to use the scroll bar / Page Up / Down keys. Another way is to use the icons located in lower left corner of the window. They are:

**Slide view:** Shows individual slide.

**Outline view:** This view gives an outlined overall flow of the presentation and we can add or edit text.

**Slide sorter view:** This gives a thumb nail view of the entire presentation.

**Notes Page view:** This view is to setup speaker notes.

**Slide show:** This is used for on-screen slide show of the presentation.

**Editing Text:** Select the place holder in which the text you want to edit is contained then proceed to make changes much the same way you do in MSWord.

**Editing a Chart:** Double click the chart. PowerPoint selects the chart and displays the relevant data sheet make the changes much the same way as you do in MS excel.

**To change the chart:** Click Insert > Chart > Chart (Now on menu bar) > Type (Choose from the options) > OK.

After a careful formulation of individual slides if you want to see whether the flow of the subject is effective or has to be altered, go to slide sorter view and see if you have to add or remove or rearrange the order.

***Rearranging of Slides:***

Click the Slide sorter view icon and you come to that view. Click and drag the slide to the new location. Note: Double clicking on slide in the slide sorter view changes it to slide view.

***Deleting Slides:*** In slide sorter view, click the slide and press delete.

In slide view, click Edit > Delete or click on the icon representing the slide, which are displayed on left hand upper corner of the window and press delete.

***Changing of fonts on all slides:***

Click Format > Replace Fonts (Choose from the options) > OK

***Aligning text:*** Click Format> Alignment (Choose from the options) > OK

***To add text:*** Click Insert > Text box. Click and drag on the slide. To add chart: Click Insert > Chart

***To add a clipart:*** Click Insert> Picture > Clipart.

***To draw on slide:*** Drawing Tool bar is similar to that of what is in MS word and the method also is similar for its utilization.

***Major look change:*** So far we have been through editing and formatting of the slides

on an individual basis. But to change the overall design of the presentation for a better appearance and effectiveness may sometimes be called for. In that case PowerPoint offers these changes to be effected without much fuss.

***Applying a Design:***

Click Format > Apply design (click on the options to get the preview) > Apply

***Changing the color scheme:*** PowerPoint offers only few options in the color scheme one for the background, one for the text and a set of colors for charts, (however the place holders have all the options available as that of in MS word).

Click Format > Slide color Scheme (Choose from the options) > Apply / Apply to all.

***Using a different background:*** Click Format > Background (Choose from the options) > OK

***Slide Show:*** To start and see how the presentation looks on a show,

Click View > Slide show, First slide in the presentation is displayed. Either click on the screen or press Space Bar to go to the next slide. At the end of the shown PowerPoint reaches to last view we were in.

***Adding Transition effects:*** Presentations to make it further effective, by inducing special effects to the slides at the time of their appearance on the screen.

Click Slide Show > Slide Transition (Choose from the options and preview) > Apply

***Creating Speaker Notes:*** During the presentation one might need to have some notes to speak about the particular slide, which can be created in PowerPoint having reference of the slide, without any mix-up.

Click View > Notes Page: Notes page is displayed. Type the notes and click on the next slide and type the text. Repeat the same until you have finished.

### **29.3.3 Power Point Presentations**

PowerPoint presentation has many uses for an educator. For example

PowerPoint presentation is made to accompany an oral presentation. If the goal is to print out the slides, you might as well use word processing software. Note that you may decide to print out the slides (without background color) and create overhead transparencies as a backup, however, on most occasions, you won't be printing, you'll be presenting. This raises the issue of how best to present these slides. You basically have three choices, and I'll present them in order of cost, cheapest to most expensive.

## **Projecting to a Television Screen**

Projecting to a television is the least expensive option. A projection box and a television are all that you need. Most schools have multiple televisions, some even on carts for ease of movement and sharing.

When using this system, you will want to think about the placement of the television and student seating arrangements. One television in a room offers good viewing for those seated within 10-12 feet of it. In most classrooms, many students sit farther away than that, so you might want to allow them to move up to watch your presentation. Also, a television mounted too high on the wall, does not offer a good viewpoint for students.

To go from the computer to the television, all you have to do is this:

Connect the Focus box to the back of the computer and to power. Connect the cord to the TV into the Video-In plug. Push the Input button on the television. Now what's on the computer screen will appear on the television. So what are the advantages and disadvantages of this system?

### **The Pros:**

The cost: You need not spend much on Slide presentations that are mostly graphic images show up very well on a television. Slide shows with a few, large sized words show up well too.

### **The Cons:**

Slides with lots of writing do not show up well at all. Words can look somewhat fuzzy. In going from the computer screen to the TV screen, you sometimes lose three edges of slides-particularly the bottom edge. So you have to create slides with that awareness.

## **Projecting with an LCD Panel**

An LCD panel connects to a computer and sits on top of an overhead projector. So, this option lets you project to a large screen. To use an LCD panel, do the following:

Set the panel on top of the overhead projector. Plug into power both the panel and the projector with a cable (included with the panel), connect the LCD panel to the back of the computer monitor. What you see on your computer is what is projected to the big screen. So what are the advantages and disadvantages of this system?

**The Pros:**

View work on a large screen. Good for slides high in either graphics or words

**The Cons:**

Fairly expensive, as school budgets go. The only way to size the screen is to move the overhead. Focusing is difficult. Just like on most overheads you've worked with, the top and bottom of the screen look fuzzy and only the center of the screen looks really in focus. The overhead doesn't have enough bulb power resulting in a dim screen. You have to get the room dark with all the lights off and curtains closed.

**Projecting with an LCD Projector**

Using an LCD projector is the best way to showcase your PowerPoint slides. However, as you might expect, it is also the most expensive. The good news is that these projectors are getting better and better and that the price is going down, as with most technology products. To use an LCD projector, all you need to do is this:

Connect the projector to power. Connect the projector to the back of the computer monitor, using a cable included with the projector. Special attachments for PC or Mac are included. What you see on the computer will be projected to the screen.

Be aware that these projectors will also display video, so there are cables included to connect a VCR to the projector. In fact, even on the less expensive models, you can connect up to two computers and two VCRs to one projector and bounce between them in a presentation. So what are the advantages and disadvantages of this system?

**The Pros:**

View work on a large screen. You can easily size the projection to match your screen size. The focus is a true one, from top to bottom of your slides. The projection is very bright. You can even have the lights on and the curtains open and still see the image. Obviously, if you have a less expensive model, it looks better with the darkened room. Depending on the quality of your projector, you can set up at the back of the room and project to the front, so students viewing it do not have to peer around equipment. You can show video, not just computer work.

**The Cons:**

Even the lamp replacement is expensive. You get up to 500 lamp hours out of one.

After a thorough planning and preparation of the PowerPoint slides, the rest lies with its presentation. A teacher has to give the proper background explanation before

teaching the concept. Then, while presenting the concept before the student, the PowerPoint slides could be synchronized. It becomes a very effective presentation with the use of an LCD Projector.

Following are the simple steps that you have to follow while doing PowerPoint presentation:

1. Select 'PRESENTATION VIEWER'.
2. Select 'COMPUTER' & browse for the required file.
3. Select the file & click 'VIEW'.
4. The file will be projected on screen. You may control your presentation using your Laptop/Notebook.
5. At the end of presentation, click 'END SHOW'.
6. Press 'OFF' on the keypad.
7. Thank you for your cooperation.

The movement of slides could be in two different types. Like you may fix time-limit, say once in two minutes, the slides successively change themselves or, you can manually control the slide change by mouse operation or by a remote controller. In both the cases, the rate of explanation and the PowerPoint slides show should have an appropriate co-ordination. And you have to keep one thing in your mind that, the class should have the interaction also. It should not be a passive one-way communication. You can use the magnified, projected diagrams or tables or any statistical points, on the white screen, very effectively. Mean while students also can jot down the points or take down.

### **'Check Your Progress'-3**

1. The first step in the preparation of PowerPoint Slides is .....
2. The three types in creating PowerPoint Slides are .....and.....
3. The steps to be followed to delete a slide are ..... and.....
4. A thumbnail Slide Sorter View entire presentation of LCD is given by .....
5. PowerPoint Presentation becomes more effective by the use of an .....

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## 29.4 L.C.D. Projector- Meaning, Advantages

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The LCD projector in the lab may be used for instruction there or may be used for presentations in the main Library or Library Classroom. Occasionally, it is moved to C-3 for presentations as well. As a general rule, we do not use the projector in individual classrooms. We own only one, and it is usually need in the lab. Also, the lamp assembly is delicate and may shatter if the projector is moved while it's still hot (ie, between classes to other locations).

When using the projector either in the lab or the library, keep these tips in mind: The projector should be about 10-12 feet from the screen. Leg locks are on the front of the projector to adjust the level. Please leave the projector on the cart and move it carefully. Also, please make sure that an adult moves and sets up the projector, not a student aide. (The projector costs Rs. 25,000 and lamp assemblies are around Rs. 20,000 each.)

### *Side Panel*

The On/Off switch is located on the side of the projector. Also on the side, you will notice where one computer and one VCR are connected to the projector. There is room for one more of each, if you needed that much equipment.

When you turn on the projector, look at the panel on the top of the projector for the controls. Notice that the light beside the "On" indicator is amber. This means that the projector is on, but the lamp is on standby. To turn the lamp on for projection, press down on the standby button (right) until the amber light begins to blink green. The lamp will come on, warm up, and project to the screen.

The "Input" button allows you to select what you project-either a computer or video. By default, the system is set up to project the #1 computer in the lab. However, if you need to show a video, or part of one, turn on the VCR and then click on the input button until you get to video I and a blue screen. Then push Play, just like with normal VCR operation.

Notice that you may make the screen size larger or smaller and a focus button allows for easy adjustments. There are many Menus to look through, but the only one you will probably use is the Set Up Menu for volume, brightness, and contrast.

When you have finished using the projector, press the Standby button until the green light begins to blink amber. The lamp will go out immediately but the amber light will continue to blink and the fan will continue to blow until the projector has cooled itself sufficiently. This takes from 1-5 minutes, depending on how long the projector has been in use.

**Note:** Do not turn the projector off until the fan has turned itself off. Then you can safely turn off the projector. If you turn it off prematurely, the excess heat remaining in the projector may blow up the lamp assembly.

### **Advantages of LCD Projector**

LCD Projectors provided an immense help to a classroom teacher. It gives an option to have meaningful picture clippings in terms of PowerPoint presentation. Students get the main points very easily when it is presented through an LCD.

- A teacher can face the class and guide the students, what point / part of a diagram that they have to see on the screen.
- A projected diagram can be made still or moved off according to the need felt by the teacher as well as the students.
- LCD projectors are light weight, handy and easily portable.
- The projected items will have it pleasant brightness, good clarity and hence become attention catchy.
- Even any video cassettes also could be projected before the class, as it was just with the computers.

### **'Check Your Progress' - 4**

1. LCD projection is ..... expensive  
a) Least            b) Moderate            c) Most            d) None of the above
2. While using the LCD projector, it has to be kept ..... feet from the screen  
a) 5 to 10   b) 10 to 12            c) 20 to 25            d) 30 to 50
3. Even if you use the 'stand by' button after the projection work, the amber light continue to blink and the fan will continue to blow for about  
a) 1 to 5 minutes   b) until the projector gets cooled  
c) 10 minutes   d) None of the above
4. PowerPoint Presentation is made to accompany an ..... presentation  
a) Mass    b) Classroom  
c) Oral            d) All the above

5. A computer associated with an LCD makes the PowerPoint Presentation more
- a) Effective and efficient
  - b) Beautiful
  - c) Interesting
  - d) All the above

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## 29.5 Let Us Sum Up

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Intervention of computers in the field of education is the 'MANTRA' of these days. Here one need not know the hardware part or software programming necessarily, but should know how to use that as an aid in teaching learning process. Computers are used in almost all sectors in the field of education. For classroom purposes, they are used for drill and practice, for simulation and games, as computer aided instruction etc,. A computer as learning aid gives a highly individualistic and the best quality of learning experiences. You may find many types of software but for teaching - learning purpose, it must be interactive software. Of course much has to be developed in this direction. Here most of the time, the courseware will be in the form of programmed instructions. Whereas for the presentation of information, PowerPoint slides are the most preferred one, PowerPoint slides have to be prepared based on proper planning and also should have a strong base of content analysis. This gets more impressive presentation through an association of LCD projector. Liquid Crystal Display (LCD), though quite expensive, is the best one for a classroom presentation. It is so felt because of its multifarious advantages.

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## 29.6 Answers to 'Check Your Progress'

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### 'Check Your Progress' -1

1. a) Individual Learning
2. d) All the above
3. c) Exposing students to modern technology and inculcating in them scientific approach to learning.
4. a) Programmed learning
5. b) Individualised instruction.

**‘Check Your Progress’ - 2**

1. c) The students and the subject matter
2. a) Software
3. b) Immediate Feedback
4. a) True  
b) True  
c) True  
d) False  
e) True

**‘Check Your Progress’ - 3**

1. Framing the Instructional objectives
2. Blank presentation, using templates and Auto content wizard
3. Slide view, Edit and delete or click on the icon representing the slide
4. Slide Sorter View
5. LCD

**‘Check Your Progress’ - 4**

1. C) Most
2. b) 10 to 12 feet
3. c) Until the projector gets cooled
4. c) oral
5. d) All the above

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**29.7 Unit-End Exercises**

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1. What is meant by “Computers aided instruction”?
2. ‘Interactive software’ are of importance now-a-days Justify your answer
3. How will you develop the PowerPoint slides? Explain in detail.
4. What is LCD? What are its advantages?

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## 29.8 References

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## **UNIT- 30 □ CO-CURRICULAR ACTIVITIES AS INSTRUCTIONAL AIDS**

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### **Structure**

- 30.1 Introduction**
- 30.2 Objectives**
- 30.3 Co-curricular Activities**
  - 30.3.1 As Instructional Aids**
  - 30.3.2 Merits and De-merits**
- 30.4 Let Us Sum Up**
- 30.5 Answers to ‘Check Your Progress’**
- 30.6 Unit - End Exercises**
- 30.7 References**

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### **30.1 Introduction**

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‘Co-curricular activities’, as the term itself suggests, are associated activities, accompanied with the regular curricular activities. This implies that Co-curricular activities are not one and the same as the curriculum, but are essential and integral part of it. These activities supplement the regular curriculum. They fulfill the other non-academic or non-scholastic activities which otherwise would not take place at all. For the development of a balanced personality of the child both scholastic and non - scholastic activities play an equal role. So, in this unit you will come to know about the meaning, nature, and importance of Co-curricular activities. You will understand that co-curricular activities also are one more type of instructional aids. At the end, you come across the merits and de-merits of such activities.

As it is has already been explained co-curricular activities are the best supplementary programmes that compensate certain lacuna of a regular curriculum. However the line of differentiation between these two is very thin. Because each experience makes the child learn something or the other! A few decades back, the same concept was recognized by the term “Extra Curricular Activities”. This was implying that “such activities are

of less importance” Hence the term has been replaced by “Co-curricular activities”. Co-curricular activities contribute for the physical, social, moral, intellectual development of an individual. Especially these will play an immensely important role for the emotional development of the individual. These also influence in widening the knowledge, and cognitive development. Certain scientific hobbies, cultural talents, varieties of clubs, namely, science club, eco-club, nature club etc; are very well developed under a broader canopy what is known as Co-curricular activities.

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## **30.2 Objectives**

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After studying this Unit you will be able to,

- Give examples for Co-curricular activities
- Justify the importance of Co-curricular activities as instructional aids
- List out the principles of organising Co-curricular activities
- Mention the types of Co-curricular activities
- List out the merits and demerits of Co-curricular activities

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## **30.3 Co-Curricular Activities**

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Co-curricular Activities and Curricular activities are complementary to each other. Hence both of them focus on the benefit of the students. Co-curricular activities could be designed based on varieties of objectives. Some experts say that, co-curricular activities provide a fertile area to utilize the important and significant basic drives and energy to achieve the broader educational goals. By participating in these activities, students get prepared for a democratic society. These activities also help the students develop confidence and ability for self-direction and auto-guidance. It makes them learn ‘co-operation’. It seems to be a very good means for developing interest in school activities in general and school in particular. This most significant output could be the development of a positive attitude for preserving as well as maintenance of law and order in the society. It is a very good forum for the identification and nurturing of any special talent among the students. Thus, co-curricular activities encompass a wider area without disturbing the regular curricular activities. However, these activities prove themselves more effective, if they are deliberately planned and executed. For this to happen one should know certain principles of organising co-curricular activities. Therefore, now let us list those principles one by one.

### **Principles of Construction of Co-curricular Activities**

- The activities must bring out the integration of Curricular and Co-curricular programmes. So, that both of them become complementary and reciprocal to each other. That is to say, a co-curricular activity should not stand as an isolated piece from the regular Curriculum.
- If one or two periods are preserved for such activities, then it is better to show that in the regular time table itself.
- Co-curricular activities must be constructive and creative in their nature. It is true that, each and every student cannot participate whole heartedly with full commitment in all the types of co-curricular activities. But still a teacher should take care that, every student will participate actively in one way or the other, and no individual is denied. Otherwise it just becomes the show of one or two dominating students or dominating groups. This has to be avoided.
- While selecting and assigning different responsibilities for such activities, make use of democratic principles as well as the individual abilities of the students.
- Co-curricular activities must cater to the interest, abilities, and attitudes of the students. They must go in consonance with students' interest, competencies and attitudes.
- It is true that students will get more freedom in co-curricular activities. Hence a teacher must know that, his role will be just giving the directions and guidance; and all the rest should be by the students only. And he should take care that; each student will learn to perform the role of a leader as well as the role of a follower. They must learn the dignity of labour.
- While planning for novel co-curricular activities, began after thorough discussion, clarifications with the experts and concerned persons. You must be very clear with the objectives and method of its execution as well as its associated pros and cons.
- Any activities for their success, depend upon the administrative support. Hence the letter correspondence, documentation, maintenance of the budget - etc; have to be taken care off with due importance. It is not only the administrative support but also, a sort of supervision that makes a programme grand success. Hence, the authorities of the management and administrators have to take more responsibilities in this juncture.
- The activities that are conducted outside the school campus need more discipline and prior precautions and cautious arrangements.

- If you are sending competitors from your school to any “prestigious competitions”, then select the appropriate and suitable’ candidate based on his talent. As for as possible avoid the political pressure, or any other type of influences.
- Even co-curricular activities also, should be evaluated. Based on the results, rectify or eliminate the wrong steps and plan with more clarity for further co-curricular activities.

**‘Check Your Progress’ -1**

1. A few decades back the ‘co-curricular activities’ were termed as
  - a) Curricular activities
  - b) School activities
  - c) Extra Curricular activities
  - d) Teaching activities
2. Curricular activities and Co-curricular activities are ..... to each other
  - a) Opposite
  - b) Parallel
  - c) Complementary
  - d) Vertical
3. Special talents of the students are ..... through Co-curricular activities
  - a) Identified and nurtured
  - b) Neglected
  - c) Hindered
  - d) Suppressed
4. Co-curricular activities must be ..... in their nature.
  - a) Destructive
  - b) Distractive
  - c) Constructive
  - d) Non-creative

### 30.3.1 Co-Curricular Activities as Instructional Aids

You must not develop an impression that co-curricular activities occur at the peripheral level and do not lead to learning of the subject matter. In fact, there are considered as one of the best media of learning. They are used by the teachers as instructional aids. They can take any form of activities. It varies from school to school and year to year. Each school will perform a number of and a variety of co-curricular activities. It could be cultural activities, competitions, hobbies, field trips and excursions etc.,. In all the activities, the main objectives will be educational as well as entertainment. It could be on AIDS, Environment or Computer awareness programmes. So, to understand their educational value, let us classify the Co-curricular activities and see their respective influence in imparting the instructions.

***Activities for physical development:*** NCC, Yoga - classes, sports, Indoor games and outdoor games - all these will help the students to learn co-operation, execute the responsibilities and much more than what could happen within the four walls of a class room.

***Activities for civic development:*** visits to civic institutions like the Gram Panchayat, Zilla Panchayat, Town Hall, etc; and celebrating national festivals like, Independence Day, Republic Day, Teacher's Day etc, and organising Students' self- government, mock parliament, mock court etc;

***Activities for aesthetic and cultural development:*** Folk dance, folk - songs, classical dance, organising exhibition and fancy dress - competition in all the above said activities, arranging drama or any cultural activities for benefit show will inculcate the cultural heritage as well as helping nature among the students.

***Activities for motor development:*** Spinning, weaving, tailoring, card-board work, basket making, flower gardening, kitchen gardening, leather work etc; will make them to learn as well as earn some thing as a monitory benefit.

***Activities to promote literary and educational value:*** Bringing out school magazine, debates, quiz programmes, panel discussion, special lectures, guest lecturers symposia - all these help immensely in developing literary and educational values.

***Activities that nurture healthy hobbies:*** Organising Photographers Club, Eco-Clubs, Science Clubs, Bird-Watching, etc;

***Multipurpose activities (or projects):*** Beautifying the school, village survey, city survey, running a dispensary in the school, running a post office, and organising annual celebrations with a wide variety of activities and functions lasting for a week or so.

We may sum up, therefore, that co-curricular activities cater to the development of the child's entire personality, draw out the latent powers of children varying temperaments and aptitudes supplement the academic work, socialise the pupil in the rich social milieu of school - society, and perform the real functions of education.

### **Objectives**

- To achieve the welfare of the school
- To give citizenship training so that the students will become fit to live in the democratic society
- To develop the qualities of a good leader as well as a good follower.
- To develop harmony between the students and the teachers, among the students, and through this, developing "Our school" concept
- To integrate the co-curricular activities with the Curricular activities of the school

### **Organisation:**

- Discuss the purpose of establishing a school government with all the students.
- Decide the structure of school administrative committee, number of members, designation and the mode of selection of discussing with the students.
- Construct the administrative committee
- Prescribing the rights and duties of members and office bearers of the administration committee.
- Decide the time and how many times the general body meetings should be conducted, how to execute the work, how it has to be documented, rules and by - laws of the society, and actions to be taken for the member who doesn't abide the rules of the society, deciding the activities that are to be conducted for the current year, how to lay down the principles, rules and regulation, if need arises, how these principles could get renewed etc;
- Design the mode of evaluation for the assessment of current year's activities.

### **Clubs:**

A number of clubs can be started in the school. A co-operative clubs and school bank can be cited as examples here:

**1. A Co-operative club:** The club is meant for the development of 'Co-operation' among the students as it is the result of the co-operative movement. The club is used for buying stationery, books and other articles. Boys contribute the shares, and from there shares purchases of books etc; are made. The pupils work as salesmen. Regular meetings are conducted to decide the selling rates, the amount of new purchases, and the distribution of the work and the checking of accounts. At the close of the year, the dividends are shared. The society can also be registered by State Government.

**2. School Banks:** These teach children to save systematically and to spend conservatively as there is an incentive to saving and to invest wisely. A convenient spot in the school building is selected, banking hours are fixed, and the student accountants manage the bank work. The bank must be under the direct control of the headmaster. Honesty should be maintained. The bank should be attractive enough to stir the imagination of the pupils. It should not be too easy to deposit money, but not so easy to withdraw. But the entire procedure must be known to the pupils.

**3. Photography and Motion Picture Club:** May be started by some pupils for recreational purposes. The pupils may learn the use of an ordinary camera and a movie camera, and operating upon the documentary film machine. The pupils may arrange the display of document in the villages. Documentaries can be borrowed from the public relations office, state audio visual unit and the National Institute of Audio - Visual Education, Delhi. Nowadays DVD's and CD's of great academic value are available. We can choose the best among them for use.

**4. School Publications:** A varieties of publication could be brought out as school publications, let as have a look at some of them.

i) **News - bulletins** : Can be issued by the school weekly or monthly publishing news about the school (especially regarding sports, tournaments, athletics, debate and other activities) Humorous skits, cartoons and comments on local news can also find place in the same. The bulletin can be distributed among the pupils or displayed on the bulletin board. Arrangements can be made with the local newspapers for printing the news.

ii) **School magazine:** It is the chief literary organ of the school. It will contain literary contribution of the pupils (poems, stories, skits, play, tit-bits, etc). News about the school activities during the year, information about the functioning of the school, the results, the changes that take place from time to time and all other matters which will interest parents, public and higher authorities.

**Organisation:** First editorial board has to be selected. This could be for various sections, like, English section, sports section etc. For such students editors, the teaching staff (one or two) i.e. staff - editors will give guidance and directions. Guidance must be given to the students as to what type of contributions will be accepted, and in what manner they should write. The editorial board should not only select the best, but also correct the language and the material also, so as to make the same presentable. Care must be taken that the magazine works as the publication of the pupils and not merely of the staff. The editorial should give an appealing introduction about the school. The magazine must accommodate contributions of as many pupils as possible. Proof reading must be done and the printing mistakes must be avoided. All illustrations and snaps must be imposing and colourful. The magazine must be distributed among the pupils, and also presented to the higher authorities and prominent public men who are connected with the school. Few copies have to be kept in the library section for the documentation purpose.

### **‘Check Your Progress’ - 2**

1. State whether the following sentences True / False:
  - a. Co-curricular activities do not help in teaching process
  - b. Co-curricular activities have both educational as well as entertainment values.
  - c. “School Government” activity leads to the development of “our school” concept among the students.
  - d. Sports and athletics activities must be optimized in a school programme.
  - e. Music, dance and other cultural activities in no way help a student to pass the exam - so, they must not be encouraged.

### **30.3.2 Merits and De-Merits**

As you know it, co-curricular activities and their success, highly depends on correct planning and systematic execution with a good organisation. Hence subjected to situational factors or any other conditions, these activities are also not free from their merits and demerits. So, let us focus on this point now.

#### **Merits:**

The advantages of co-curricular activities are varied and numerous. Their educative

functions are so important and necessary that we cannot do away with them. For example,

- ***They promote physical development of the students*** by providing a useful channel for the superfluous energy of the pupils. For this, sports, athletics, games are suggested.
- ***They meet the psychological needs of the pupils*** Like, they act as agents for the sublimation of the instincts. They train their emotions. When a variety of activities are presented, every pupil can find some or other activity that suits his interest and aptitude.
- They help in the development of qualities of leadership as well as qualities of a follower. They promote civic value among the students.
- The social value, aesthetic value, the cultural value and the recreational value all these could be inculcated very well through co-curricular activities.

***Demerits:***

A number of defects in the organisation of these activities have been noticed, they nullify the very purpose of these activities.

- It depends upon suitable facilities, like 'lack of equipment', may make a programme hopeless. No programme of activities can succeed- without proper equipment and provisions. Some schools have no play ground, no space for indoor games etc;
- Lack of variety: This may be another limitation. Some schools organise the activities that are the same and repeated. For example, one annual function, one tournament and an occasional competition.
- Lack of pupil participation: It is a common observation that majority of the pupils do not take part in their activities. It is because of lack of interest, proper motivation and encouragement by the staff.
- Lack of adequate staff: Some schools do not possess a full strength of staff even for academic work, with the result that the sole burden of organizing there activities falls on the existing staff. The staff members naturally try to shirk work and avoid the responsibilities.
- Over emphasis on examination is yet another factor which plays a dominating role in weakening the strength of co-curricular activity.

### **‘Check Your Progress’ - 3**

1. Mention any two merits of Co-curricular activities.

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2. Mention any two de-merits of Co-curricular activities

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### **30.4 Let Us Sum Up**

Co-curricular activities were termed as ‘extra-curricular activities’ - a few decades ago. But now, these have become an integral part of the curriculum and hence term ‘Co-curricular’ activities. By giving this term, we have accepted its existence more positively, with its educational as well as recreational value. Most of the time these are utilised as the best instructional aids also. That is why, curricular and co-curricular activities are said to be complementary to each other. Co-curricular activities could be designed based on varieties of objectives. This has to satisfy the principles of construction or organisation of co-curricular activities. These activities facilitate the physical development, psychological development, civic development aesthetic and cultural development, motor development, among the students. They also promote literary and educational values.

Co-curricular activities could be of any type, like, for example, a trip, field visit, arranging and conducting different competitions, like, quiz, cultural competitions etc; A school government, different clubs with some purpose etc; could be established. A magazine could be brought out from the school. So, in this way co-curricular activities have encompassed a wide educational area, and hence are suitably recognized as “instructional aids”. However, there activities have to be deliberately planned and executed. Some of the plus points of such activities can be considered as merits, namely, promoting physical development of the students, emotional development, developing

leadership qualities and confidence among the students. As it is they may not pose any demerits, but certain other factors may make them to appear defective, like lack of varieties in co-curricular activities, lack of interest among the pupils, hence passive participation or nil participation, lack of motivation and encouragement from the staff, over emphasis on examinations, etc; may weaken the strength and effectiveness of the co-curricular activities.

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## **30.5 Answers to ‘Check Your Progress’**

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### **‘Check Your Progress’ - 1**

1. c) Extra - curricular Activities
2. c) Complementary
3. a) Identified and nurtured
4. a) Constructive
5. b) Democratic Principle

### **‘Check Your Progress’ - 2**

- a) False
- b) True
- c) True
- d) False
- e) False

### **‘Check Your Progress’ - 3**

1. Any two merits of co-curricular activities are to be written from section 30.3.2
2. Any two de-merits of co-curricular activities are to be written from section 30.3.2

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## **30.6 Unit-End Exercises**

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1. What is meant by “co-curricular activities”?
2. Give two examples for co-curricular activities and explain them in detail.

3. Explain the importance of co-curricular activities as instructional aids.
4. What are the principles that govern the construction of co-curricular activities?
5. List out the merits and demerits of co-curricular activities.

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### **30.7 References**

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1. Safaya R. N. and Shaida B. D. (1964): *School Administration and Organisation* (1964)
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**COMPULSORY COURSE 04 (CC-04)  
TECHNOLOGY OF TEACHING**

**BLOCK 06  
MONITORING THE PROGRESS AND  
FOLLOW-UP**

## **B.Ed. CC-04 : TECHNOLOGY OF TEACHING**

# **Block**

# **6**

## **MONITORING THE PROGRESS AND FOLLOW-UP**

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## **BLOCK 06 : MONITORING THE PROGRESS AND FOLLOW UP**

### **INTRODUCTION**

This Block has been named as “Monitoring the Progress” and it focuses mainly on, the quality maintenance of teaching - learning process. Most of the time students’ learning is more stressed. Hence it is rightly named as ‘Monitoring the progress’. In the first unit of this Block, you will come to know about, the meaning of the progress, its maintenance and importance in general. And also, you will come across some common techniques of monitoring the progress in context with during and at the end of a lesson as well as at the end of a unit. In the second unit, especially you get the information with reference to Follow - Up activities in terms of measures. In the third unit, the discussion will be on Diagnosis in particular, its need and importance, and some techniques of diagnosis. In the fourth unit, you get the information on steps of diagnostic tests in languages, sciences, mathematics, and social studies. The last unit deals in detail with remediation techniques. Here you will come to know about meaning, nature, need and importance of remedial measures like some techniques of remediation, like, self-instructional programmes, giving reading assignments, group studies, peer tuition and also individualised tuition. Each unit will have ‘Check Your Progress’ -, intermittently as well as Unit End exercises.

‘Monitoring’ is nothing but regulating. Here you will learn about the monitoring or regulating the progress. Definitely, it will be with the students’ learning. You may wonder why this concept has been introduced. Isn’t it? See, many a times, it is said that, “whatever best quality of teaching might have been imparted; that does not give any guarantee of Learning”! So, this is experienced by almost all teachers in one time or the other. Therefore the above statement has been accepted as a universal truth. In turn, this has resulted in bringing a dichotomy between the teachings - learning process. This altogether being a different perspective, has generated many concepts, like the one above said, as well as diagnostic tests, and the respective remedial measures, and also, the concept like continuous, comprehensive evaluation etc; So, now let us-further concentrate to know about ‘ Monitoring the Progress’ in detail, in the forth coming discussion.

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## **UNIT - 31 □ MONITORING THE PROGRESS**

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### **Structure**

- 31.1 Introduction**
- 31.2 Objectives**
- 31.3 Monitoring the progress - Meaning, Importance**
- 31.4 Common Techniques of Monitoring the Progress**
  - 31.4.1 During the Lesson**
  - 31.4.2 At the end of a Lesson**
  - 31.4.3 At the end of a Unit**
- 31.5 Let Us Sum Up**
- 31.6 Answers to ‘Check Your Progress’**
- 31.7 Unit-End Exercises**
- 31.8 References**

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### **31.1 Introduction**

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You know that, a quality teaching is the one which keeps “watching eye” on the students’ learning. Many new techniques and strategies have to be adopted to monitor the progress. It may take up any incidental events, like; it may be during the lesson, after the lesson or even at the end of a unit. It need not be mere asking questions and getting answers from the students. Rather it may take up any form of evaluation. So, in this unit we will be discussing on the concept of monitoring the progress - its meaning, and importance. You also learn some common techniques of monitoring the progress that could be while the lesson is going on in a classroom, at the end of the lesson, or even at the end of the unit.

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### **31.2 Objectives**

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After studying this Unit you will be able to

- Explain the meaning and importance of “Monitoring the Progress”
- List out some of the common techniques of monitoring the progress.
- Mention a few techniques of ‘Monitoring the progress’ that could be used during the lesson
- Explain the techniques that are used to monitor the progress at the end of a lesson
- Describe the techniques that could be used to monitor the progress at the end of a unit.

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### **31.3 Monitoring the Progress - Meaning and Importance**

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Monitoring the progress is the utmost important aspect in an educational system. The term ‘monitoring’ refers to ‘controlling’ of the progress. Here the progress is an obvious resultant of teaching - learning interactions. Hence monitoring progress means, it is the controlling functions of the teacher on the process of teaching - learning. For this, teaching - learning process will have to be managed properly in order to get the desired results. ‘Monitoring’ thus occupies the pivotal role in assuring progress, right from the planning level up to the execution and the final level i.e. results.

According to I. K. David (1971), “In teaching, controlling is the work a teacher does to determine whether his plans are being carried out effectively, organization is sound, leading is in right direction and that, how for these functions are successful in realizing the set objectives”.

The above definitions, in a way, clearly, emphasizes that monitoring is very much essential for the following dynamic educational activities,

- a. Framing the objectives as well as carrying out the task of planning of teaching as Effectively as possible.
- b. Organizing the ‘teaching—learning’ transaction in a systematic way and
- c. Checking the right movements of the teaching—learning in an educational set up.

The above analysis implies that, monitoring progress means, it has to be started at the planning level, during organization and should be continued up to the end results, i.e., students’ learning outcome. This will be well predicted in terms of instructional, objectives. How far these instructional objectives have been achieved, is the major question. And this needs an assessment. This in turn, can work as a controlling factor for the proper functioning of the total teaching - learning process. This process is considered as very significant one because, it brings into lime light the strengths and

weaknesses of the instructional system by assessing and measuring the teaching - learning outcomes, in context with the pre - determined objectives.

Finally, we can say that, the assessment of teaching - learning outcomes or “Progress” in general, it becomes a necessity for exercising desirable control over the **Input** and **Process** of the teaching - learning system. Here the progress is nothing but a desirable behavioural change in the learners. Usually, such types of learning outcomes are measured qualitatively. The teaching - learning outcomes in the form of acquisition of skills and information can be monitored through simple techniques like, achievement tests.

But it is also true that, the field and scope of teaching - learning outcomes cannot be limited to the mere acquisition of information and skills. Because, the main focus of teaching - learning process will be the all-round development of the personality. That is to say, the main goal of teaching - learning process is to bring desirable changes in overall behaviour of the learner covering all the three behavioural domains i.e. cognitive, affective and psychomotor.

So, not only the students’ acquired knowledge and skills, but also, their progress in the areas like interests, attitudes, habits, temperament, personal and social adjustment etc., all these also have to be monitored properly. Hence, the monitoring the progress both quantitatively as well as qualitatively is a must. This is comprehensively termed as “EVALUATION”. Because, according to Ronal Doll “Evaluation is a broad and continuous effort to inquire into the effects of utilising content and process to meet clearly the defined goals”. It is also because, evaluation helps in knowing about the changes in behaviour related to all the domains of the learner’s behaviour as a result of the process of teaching - learning.

### **‘Check Your Progress’ - 1**

1. ‘Monitoring the Progress’ means.....
  - a) Taking care of teaching - learning process
  - b) Controlling the students’ learning
  - c) Regulating the teaching process
  - d) None of the above
2. ‘Monitoring the Progress’ includes
  - a) Learning out come only

- b) Class room teaching only
  - c) Teaching - learning session only
  - d) Planning, organisation, and up to the end results.
3. 'Monitoring the Progress' encompasses, the abilities of
- a) Cognitive Domain only
  - b) Affective Domain only
  - c) Psychomotor Domain only
  - d) All the above
4. 'Monitoring the Progress' is one of the functions of
- a. Pupils
  - b. Teachers
  - c. Subjects
  - d. All the above
5. Give the definition of I. K. Davis that deals with controlling of teaching - learning process.

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### **31.4 Common Techniques of Monitoring the Progress**

It is very important to know about the status of progress. What, I mean here is, say, teaching -learning process is going on, and based on this some desirable changes have taken place among the students' folk. These desirable changes may be seen in cognitive, affective as well as psychomotor domains. In this juncture, it becomes very important to know how far or how much progress has taken place. For this one, initial frame of reference becomes the necessity. Based on this, the so called final state of achievement, say, at the end of a lesson or a unit can be gauged. Then only one can very well manage as well as monitor the progress. This cannot be done by merely asking questions to the students at different levels. Hence, several special techniques on devices have been

designed for this purpose. Such techniques and devices represent the ways and the teaching - learning outcomes. The techniques could be quite formal sometimes, or entirely a novel one or it could be just in informal methods also. For example,

- Oral tests
- Developmental and evaluator questions during the teaching - learning process.
- Written tests and examinations consisting of essay, objective and short answer type questions.
- Techniques and devices like observation, discussion, questionnaire, inventory, interview, checklist, attitude scale, rating scale, case study, projective techniques, assignment project work, creative and production work of the students etc.

In order to monitor the progress, a teacher checks the teaching - learning process by three major kinds of evaluation, namely, diagnostic, formative and summative. This will help them to take proper decision as the three stages of their instruction before, during and afterwards. If a teacher knows the background of the students thoroughly, like, their, already acquired competencies, what they know about certain concepts, or the information relevant to the subject to be taught to them. Based on this a teacher can plan his teaching process as the best suitable one according to the needs, interest and abilities. This is very important, because, if the students' interest and attention is captured, then teaching may succeed. So, to get a guarantee of progress this seems to be the first step. This is nothing but, knowing about the "Entry Behavior" of the students.

Likewise, a teacher can take up formative evaluation, while the lesson is going on and a sort of summative evaluation at the end of a lesson or even at the end of a unit. All such sorts of activities are done to get a guarantee of the quality of instruction. But the individual difference possessed by the students makes it a very problematic situation. In order to find out the individual difference in learners and their quality learning you should have a researcher's mind and commitment. There is evidence that some students learn quite well through independent study, while others need highly structured teaching - learning situations. (Congreve, 1965). That is to say, some students will need more concrete illustrations and explanations than others; some will need more examples to get an idea than others, some will need more approval than others, and reinforcement than others and some may need to have several repetitions of the explanations while others may be able to get it the first time.

We all believe that, if every student had a very good tutor, most of them would be able to learn a particular subject to a high degree. In a way, it implies that, the quality of

instruction has a direct influence on the ability of each student to understand the instruction and acquire mastery over that instruction. And you also should know that, assessing or checking the level of performance or their progress in general with an emphasis upon a single subject matter achievement or specific skills and abilities is markedly different from “monitoring the progress” which stresses more on the appraisal of broad personality changes including interests, powers of thinking, and personal - social adaptability. It is like, when the child is learning arithmetic or science, or history, he is at the same time learning attitudes, developing interests, and also making emotional and social adjustments. If he is frustrated by too difficult tasks, or if he is bored by too easy tasks, then his attitudes and emotional and social adjustments will be adversely affected in the learning situations and his progress in general.

The teacher, therefore, must remain aware of the various aspects of a pupil’s behaviour, even though the major purpose of a particular learning experience may be to master the formula for finding the area of a rectangle or recognize the chemical symbol for salt. Every learning situation includes multiple learning, involving not only intellectual concepts and skills but also physical, emotional and social adjustments. Usually, in abroad, they make use of several techniques to record, maintain and check the progress of the students namely, tests, interviews, case studies, group discussions, anecdotal records, observation, files of sample materials, questionnaires, rating scales, check lists, inventories, diaries and sociograms. Even they will have followed - up studies. Tests could be of individual tests as well as group tests; and subjective as well as objective scoring, performances and paper - pencil types, and also could be done for diagnostic purposes.

**‘Check Your Progress’ - 2**

1. Teaching - learning process and the progress is checked by means of.....
  - a) Examination
  - b) Tests
  - c) Questions
  - d) Evaluation techniques
2. The first step in monitoring the progress is that, a teacher should know about.....of the students.
  - a) Terminal behavior
  - b) Entry behavior

- c) Obedient behavior
  - d) Disobedient behavior
3. A teacher can take up..... evaluation while a lesson is going on
    - a) Normative
    - b) Summative
    - c) Formative
    - d) None of the above
  4. Every learning situation includes.....
    - a) Multiple learning
    - b) Uni-directional learning
    - c) Linear learning
    - d) All the above
  - 5). The sign of progress is.....
    - a) Desirable behavioural changes
    - b) Undesirable behavioural changes
    - c) Some behavioural changes
    - d) All the above

**31.4.1 During the Lesson**

A teacher has to be very alert in order to manage and monitor the progress of the students. To check the progress, it need not always be at the end, and rather it has to be a part and parcel of the teaching- learning process itself. So, while a lesson is going on, a teacher can take up formative evaluation techniques like, when a teacher has taught some content, may be in terms of one or two concepts, principles or any theory, he or she may feel to know the effectiveness of his or her teaching similarly, students also need to know about their progress in the path of learning. If the formative evaluation is carried out, then it gives very useful information to both the teacher and the students about the progress is general, and their strengths and weaknesses in particular. Based on this, in between modifications in the teaching - learning process, rectifying the mistakes, maintaining the quality of teaching - learning process, assuring the mastery

learning by the students, all these could be made possible. Most of the time, during a teaching - learning session, informal, listening to students comments and conversations, observations of their active participation in terms of answers, or performance of simple experiments - all will help a teacher to gauge their progress. Such frequent formative evaluatory activities pace the students learning and help motivate them to put forth the necessary effort at the proper time.

The appropriate use of such tests helps ensure that each set of learning tasks has been thoroughly mastered before subsequent tasks are started. It also helps a teacher to know, where the students are feeling certain concepts as very difficult to learn may be through their incorrect answers to the questions asked, the ideas, skills and process that they have not learnt adequately. In a teaching - learning session, when a lesson is going on, a teacher will have the freedom of checking, whether the students are with her or not, at anytime. But still abruptly checking may affect the smooth going of the lesson. Hence, you may plan it previously like, when, where and how, the teaching - learning process could be monitored. Like, for example after transacting a natural bit of information, you may feel like verifying. This could be done by mere informal observation and also could be by provoking students to do some activities; asking developmental, interrogatory and evaluatory questions; arranging a short debate on a particular issue between boys and girls; highlighting the illustrations given by the students etc. Apart from this, you may use number of strategies for monitoring the progress while a lesson is going on. Some of them could be as follows.

- Allowing the students to identify and locate the places on a chart or a map in social science classes.
- Similarly, providing an opportunity to students, to locate and name the different parts of a science diagram.
- Allowing the children to solve the mathematical problems.
- Asking the students to construct their own sentences by using the new terms that are taught in the period, this could be done in all the language classes.
- Making the students to recite and singing the poems in poetry classes.

If the above steps are utilised during the lesson, the progress in terms of learning by students is monitored properly. The advantages of such a process could be as follows:

- It gives awareness to the students about their progress mainly about the amount they have yet to learn before achieving the set objectives

- Because it remains informative, relevant to the things being taught, timely, be more beneficial to the learner.
- It also gives a feedback to the teacher by providing him qualitative and quantitative data for bringing necessary modification in his teaching.
- It helps a teacher in guiding the students, planning remedial instruction and prompting them to ask for necessary help.

### **‘Check Your Progress’ - 3**

**Complete the following sentences:**

1. In order to maintain the progress of students, the knowledge of their ..... and .....is necessary.
2. While a lesson is going on, a teacher can check the progress in an .....way also.
3. Frequent formative evaluator activities .....the students’ learning.
4. The appropriate use of formative evaluation .....that each set of learning tasks has been thoroughly mastered before the subsequent tasks have been started.
5. Based on the formative evaluation .....and.....modifications could be brought out, in a teaching - learning process.

#### **31.4.2 At the End of a Lesson**

Usually at the end of a lesson a teacher assigns some sort of homework to the students. But if the given homework is not properly checked and corrected by the teacher means, it serves no purpose. Because, at the end of a lesson, what all will reflect regarding the learning outcome or the progress has to be monitored and verified properly. It could be usually a few oral questions asked by the teacher. In the language of an educationist, it is called ‘Recapitulation’. Here the teacher asks a variety of questions pertaining to all the concepts that he had taught. Prior to that, he may consolidate the information that is taught in the period. The fundamental law of psychology regarding learning is that the consolidation of knowledge takes place only when the knowledge learnt is applied to similar situations. When the acquired knowledge is put and verified in new situations, then it becomes not only very clearer but also, part and parcel of the mental makeup. Here you should note the difference between application and recapitulation. For that, re-capitulation merely denotes revision or repetition of the knowledge learnt

in the lesson, whereas, application requires a good deal of mental activity to think and apply the principles learnt to new situations.

So, here monitoring the progress, can take place in both the forms, like, re-capitulation as well as different forms of activities at the application level. For example, the activities like, constructing working models, projects, still models, solving problems, writing an essay, and drawing of maps, charts or models etc. Re-capitulation could be in the form of objective type tests, oral - tests and daily assignments. The objective type tests help immensely in measuring the factual knowledge, and there are more reliable type of tests. Oral tests are essential for judging pronunciation, comprehension, and verbal expression in languages, practical ability in science, mental calculation and computation in mathematics, and social book with normal speed and accuracy, answering questions orally, reading a thermometer, locating a town on the map, poem - all these could be used with an apt combination or isolated at the end of a lesson. It not only gives the proper feedback but also keeps the progress in a moderate - to - optimum pace.

**Similarly assessment of the day - to- day work will include:**

- The work done in the class, the impression got by the teacher in the class and participation in discussion etc; in the class room.
- Assessing the work finished in a given amount of time corresponding to the successful completion of a task.

Apart from the above assessments, certain other aspects, like regularity and attendance, comprehension of the subject- matter, hand writing and spelling, ability in expressions with originality also should be taken care off.

**31.4.3 At the End of a Unit**

After the completion of the whole unit it becomes very essential, to know about the progress among the students. Sometimes, it is done through summative evaluation. Actually it represents a final test or measure of the students' progress or gains made by him as a result of a course of learning. Both formal as well as informal techniques may be used for conducting such evaluation. The formal techniques may include unit tests i.e. a teacher made test or even a standardized test (if available), structured interviews and oral tests, use of questionnaires, rating scales, home assignments, projects - group project as well as individual project etc. Informal techniques may include observations, discussion, comments and feedback given by the students etc., such type of evaluation is chiefly characterized by the following features:

- It gives a total perspective of the final progress of the students as a result of a course of learning a unit.
- It is conducted less frequently than that of formative evaluations, usually at the end of a unit or course of instruction.
- The results of such evaluation could be used for multipurpose. You can compare the students, place them in an order of merit or even what are their learning disabilities what is their level of performance, what measures could be taken to solve their defective learning style, etc.

Through summative evaluation, that is given at the end of a unit, a teacher can check the program, in which several skills or concepts would have combined together to make a broader competency among the students. It is true that the progress monitored during the lesson has to be continued and maintained upto the end of that particular unit. This gives a gestalt picture to a teacher. It is also true that it gives a reference of the cumulative effect of teaching that has been throughout the unit. It helps in assigning grades to the students, certification of skills and abilities, not only this, even the prediction of success in subsequent courses, and initiation point of instruction in a subsequent course, etc., could be done in an efficient and effective way.

A teacher by experience can estimate the difficulty index in a particular area of learning. And by administering the respective tests at the end of a unit, a teacher can identify all the students with their level of performance and also discriminate the students as well. It also gives a functional feedback to the students at the end of a unit. Like, the interpretations of scores, on achievement tests at the end of a unit, will direct students' attention to useful things he may do to make up his deficiencies. At the end of a unit a teacher has to construct a test in such a way that, the test items can reveal various processes, that could be reasonably generalisable about the performance level of the students.

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## **31.5 Let Us Sum Up**

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In this particular unit, you have come across a special concept, what is known as “Monitoring the Progress”. The implied meaning of this term very well matches with the concept of evaluation. Evaluation could be formative and summative. Evaluation could be used for the diagnosis also, where a teacher will become aware of strengths as well as weaknesses of the students. Intermittently, the teaching - learning process has to be watched of, and evaluated to get an assurance for progress and also to get the knowledge of results. So, monitoring the progress being a dynamic activity could be

conducted by a teacher, like, during and after the teaching of a lesson as well as at the end of a whole unit taught. This unit has mentioned several tools and techniques for formative and summative evaluation. Both the type, of evaluation may make use of techniques and devices like, simple oral questions, simple and objective type tests, rising debatable matters among the students etc. We, say that learning is a desirable behavioural change in a learner; it is a notion for progress. Hence, the desirable changes that are occurring in cognitive, affective and psychomotor domain all these three have to be monitored properly. For this, a teacher has constructed tests or can utilize a few standardized tests also. However, it has to be maintained cumulatively. Even the techniques like formal and informal observations, structured and unstructured interviews, discussions, are of questionnaires, inventories, check lists, attitude scales, rating scales, case studies, projective techniques, assigning project work etc., are used for monitoring the progress. Such checking process can take place during the lesson, after the lesson and the completion of the unit also.

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## **31.6 Answers to ‘check Your Progress’**

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### **‘Check Your Progress’ -1**

1. a) Taking care of the students’ learning
2. a) Planning, organising and up to the end results i.e., students’ learning
3. d) All the above
4. b) Teachers
5. I.K. Davis definition states that “In teaching, controlling is the work a teacher does to determine whether his plans are being carried out effectively, organization is sound, leading is in right direction and that how far these functions are successful in realizing the set objectives”.

### **‘Check Your Progress’ - 2**

1. d) Evaluation techniques
2. b) Entry behavior
3. c) Formative
4. d) Multiple learning
5. a) Desirable behavioral changes

### **'Check Your Progress' - 3**

1. Strengths and Weaknesses
2. Informal
3. Pace
4. Ensures
5. Qualitative and Quantitative

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### **31.7 Unit-End Exercises**

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1. Explain the importance of monitoring the progress
2. What are the techniques used to monitor the progress? Give examples
3. Mention the techniques that are used to monitor the progress while a lesson is going on
4. How will you check the progress of the students at the end of a lesson?
5. Describe any two techniques that are used to check the progress at the end of a unit

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### **31.8 References**

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1. Benjamin S. Bloom, *Handbook on Formative and Summative*.
2. J. Thomas Hastings, George. F. Madaus, *Evaluation of Student Learning*.
3. Mangal S. K, *Foundation of Educational Technology*, Tandon Publication, Ludhiana (2001)

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## **UNIT - 32 □ FOLLOW UP OF MONITORING**

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### **Structure**

- 32.1 Introduction**
- 32.2 Objectives**
- 32.3 Follow up - Meaning, Importance**
- 32.4 Follow up – Techniques, Meaning and Importance**
  - 32.4.1 Self Maintained Progress Report**
  - 32.4.2 Reporting To the Parents**
  - 32.4.3 Diagnosing**
  - 32.4.4 Remediation**
- 32.5 Let Us Sum Up**
- 32.6 Answers to ‘Check Your Progress’**
- 32.7 Unit-End Exercises**
- 32.8 References**

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### **32.1 Introduction**

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Follow up activities are very significant in monitoring the students' progress. As the term itself is suggesting, follow up activities are the post activities that are executed after the actual, intended programme is over. It can take up any design. For example, the same activity could be conducted on more number of students or it could be further an in depth study. If a follow up activity is not there means, all the prior activities, like, whether it is an enrichment programme or remedial measures etc., will lose their significance. Students also will not take up the special, intended activities very seriously. Hence, the purpose with which an enthusiastic teacher has started the special type of teaching - learning activities will be half done. So, in this Unit you will come to know about the meaning, nature, and types as well as importance of follow- up activities, and also about the follow -up techniques.

After getting the information about the level of performance among the students, a teacher may get quite a good number of ideas with reference to follow-up activities. These follow-up activities may be highly individual specific or group-specific. Depending upon this, a teacher will select the apt activity either as only one or as collective activities and further executes them. Some follow - up activities may take the students for further learning in a linear mode, some may come in the form of diagnostic activities and even some others may come as remedial measures. It could be in the form of feedback given to the students, to their parents, to the teacher himself or to the administrator of a particular school. In the recent days, 'self-maintained progress reports' are also playing a significant role in monitoring the progress.

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## **32.2 Objectives**

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After studying this Unit, you will able to

- Explain the meaning and importance of follow-up activities.
- Mention the techniques of follow-up activities
- Give examples for self - maintained progress reports
- Justify the need of reporting to the parents
- Explain the nature of diagnosis
- Illustrate with examples for remedial measure

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## **32.3 Follow up - Meaning and Importance**

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Follow-up activities are the most essential and integral part of monitoring the progress. These are the continued programme to check the effectiveness of the already established programme. For example, a teacher has taken an extra effort to help them in learning effectively or in overcoming their learning disabilities or learning difficulties. This has to be or ought to be followed by a follow-up activity as this process keeps the learner on the track as well as helps him to be focused on the task of learning. If we analyse teaching -learning session as Input, Process and Output, then follow-up activities in order to maintain the progress, can be taken up at both the process level as well as at the out-put level. Usually at the end of a lesson or a unit or a chapter, a teacher gives tests to the students. Like this, at the end of a fortnight or a month at least a series of tests (say three to four) could be conducted and a systematic valuation of such series of

tests give a continuous picture of the students. If it is documented and maintained properly, by having a glance on such documents, anyone can gauge whether a student is progressing or not and also can tell is that progress occurring at an optimum level.

The interpretations of the follow-up activities help the teacher, administrators and supervisors in many ways. All these personnel can join together and design a plan collectively, so that, various instructional problems are perceived with more depth and breadth, and depending upon this more meaningful and functional measures could be conducted. Such follow-up activities help in,

- Determining the status of each pupil in various subjects and in various objectives of curriculum.
- Discriminating identifying and nurturing the respective needs of the “gifted Pupil”, “normal pupil” and “slow -learning pupil”
- grouping pupils for varieties of instructional purposes within the class
- Analyzing or diagnosing an individual pupil’s difficulties and rate of growth.
- Getting a comparative perspective of the status of the individual or class at the beginning and at the relative end of the term.
- The use of all the pertinent data to advice or guide pupil in his physical, mental, emotional and social growth and development. This in turn aids the pupil in selecting appropriate course of study or changing his programme of studies, motivating him to complete high school, selecting a college, understanding his interests and abilities and improving his personal adjustment.

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### **32.4 Follow up - Techniques—Meaning and Importance**

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Follow-up activities most of the time becomes highly subjective. It is because, a teacher decides the nature and design of a follow up activity in context with the need of the individual or group of students or depending upon the feedback obtained..Say, for example, in one context, a teacher may like to have a sort of interrogation with the parents of a particular student, and counselling the child before them. So, that he can take all these members into his confidence for his further actions. Follow -up activities can be based on several techniques and strategies, namely, maintaining anecdotal records, observations, use of rating scales, personal reports, interviews, and sociometric methods. These are very significant, because, they aid the teacher to assess as well as guide more wisely the growth and development of pupils. If the anecdotal records, observations, rating scales and interview methods have been systematically used to collect data on

personal and social adaptability, the results or findings will have very high significant roles. Like, the results or the knowledge of results could be utilized in a number of ways, for example:

- To identify pupils who are well adjusted and those who are poorly adjusted.
- To diagnose the probable causes or contributing factors for maladjustment and
- To set up individual and group conditions and situations to aid, whenever possible, growth towards better adjustment.

Likewise, sociometric methods may be used as an aid to identify “Leaders” and “isolates” among a pupil group and to establish social relationships in the classroom that will contribute to the maximum social development of each pupil.

Similarly, interest inventories may be used to identify pupil interests in reading or other educational and vocational activities, thus permitting the teacher to counsel the pupils and adapt the curriculum to their needs. Although the case study is usually reserved for application to the seriously maladjusted pupil, the cumulative record should be studied as a method for evaluating and guiding the growth and development of every pupil.

Carefully designed curricula are sometimes made as follow-up activities, for example, of the effectiveness of different methods of teaching reading or teaching arithmetic or meeting the personal social needs of pupils. Occasionally, one may design and conduct a follow-up activity to judge the effectiveness of a curriculum or part of curriculum or an enthusiastic researcher may develop a supplementary curriculum, and use that as follow - up activity based on his initial survey.

Follow up activities could be, enrichment programmes, special classes, bridge courses, certain project works also. Such type will be planned and designed based on the thrust areas as well as need of the target group.

Anyhow a follow-up activity essentially could be of any of the following mode or a good combination of the following also:

That is, a follow-up could be in the form of

- Self maintained progress report
- Reporting to the parents
- Diagnosis and
- Remedial measures

Therefore we shall take up the above said aspects one by one to understand them clearly in the following discussions. Prior to that, you just check your progress by answering the following questions.

**‘Check Your Progress’ - 1**

1. Follow up activities are.....part of monitoring the progress
  - a. Partial
  - b. Complete
  - c. Integral
  - d. Independent
2. Follow-up activities helps a student to be on the track as well as to be.....on the task of learning.
  - a. Confused
  - b. Focused
  - c. Negligent
  - d. None of the above
3. Follow-up activities are correlated with.....of the students
  - a. Discrimination
  - b. Students’ poor performance
  - c. Good performance
  - d. All the above
4. State whether the following statements are true or false:
  - a. Diagnosis is one among the several follow-up activities
  - b. Diagnosis need not be followed by a remedial measure
  - c. Sociometric methods help in the identification of “Leaders” only
  - d. ‘Self-maintained progress report’ is also an indication of follow up activity
  - e. Follow-up activities are designed based on the need of the target group.

**32.4.1 Self Maintained Progress Report**

Self maintained Progress Report is that type, in which an individual (maybe the

student or the teacher) maintains his own progress report. It is a best example for autonomy. He can set goals based on his abilities and competencies. Then work in a very deliberate manner to achieve that goal. Usually, the monthly tests, unit tests, mid-term and annual examination all these will give a chance for the student to get self assessed, apart from the teacher's valuation. A student can compare himself with his level of performance in different tests and examinations. Similarly a teacher also can maintain his own documentation to get a comparative idea about her own teaching in different lessons or units, and also the effectiveness of the strategies used. In both the cases, the progress may take up a positive and linear mode or some variations also may occur. Anyhow, here a teacher keeps the records or the progress report of the individual students for herself and it may not be used for any official purpose. And, it could be used for finding the cor-relation between the style of teaching or methods of teaching or use of different strategies with that of learning style of students as well as the level of their achievement.

Similarly, students also could be encouraged to maintain their own progress report. And also, they are advised to check and compare their level of performance often. This is very much appreciated by the students because; in such cases they are seldom compared with other students, and no chance of getting humiliated. This gives an awareness in them that, they should work hard and get good quality results for the sake of learning; professionally, and to make others get impressed or to get any appreciation from others. This is where they learn one philosophical principle what is known as "Learning Knowledge for knowledge sake". Hence, he learns for self satisfaction. If it is done systematically, he will be like a very confident individual in the class. In all learning situation he will be like a "Leader" and not as a follower. Here you should know that, a follower is the one who does the tasks, for the sake of others, i.e., to get recognized, to get identified etc. As soon as such external incentives or popularity is lost, he the follower too will lose interest in studies. Hence, maintaining a progress report on his own may bring about a special commitment in the studies. And such commitments will make him a leader in the task of learning, and he takes care of his own pace of learning. Self maintained Progress Reports need not always be on achievement level only. Even the activities under co-curriculum also could be maintained. For example, a student may appear for a debate competition, at the intra school level in the beginning, followed by inter schools, district level, zonal level, state level and even to the national and international level also. Apart from the school maintaining the progress report on such events, the student also maintains this with all pride! Here also, while moving upward sequentially, the earlier experiences will help him very effectively. Similarly it can happen in the chess tournament also. Even in case of drama competitions or take any type of

co-curricular competitions or extra talents like, becoming an NCC cadet, or member of different types of clubs doing social services etc., could be maintained by the individuals themselves. Suppose a student appears for the competitions at the higher order of hierarchy, then all the certificates, testimonials have to be maintained by himself only, is it not?

From all the above description, it becomes very clear that, a teacher as well as the students can maintain their own progress reports, which may not be used for official purpose to some extent. But it is evident that, this type of awareness will really bring an enhancement in the progress of an individual. A student can spread the whole academic activities for a stipulated time, and prepare the respective time schedule and start studying. Intermittently, he can take up the tests on his own, corrects his answer papers and can see how far he has achieved, his own predetermined goals. This helps in developing confidence in him to face the final examination with a cool mind. Hence, it has its own significance though it may not answer systematically for the aspects like validity and reliability. Therefore it is said that such self - maintained reports are very rarely referred for official purposes or to announce promotion of a student from one grade to another. Because it is maintained by the individual only, the question of mal-adjustments cannot be ruled out. But one actually maintains the self - progress reports for his sake, for his own confirmation sake. Hence it has its own significance though there are weak points also.

### **‘Check Your Progress’ - 2**

State whether the following sentences are true or false:

1. Self - maintained progress report is a documentation done by the teacher about the students
2. Self- maintained progress report is a must for the promotion of a student from one standard to another.
3. Self - maintained progress report enhances the confidence for learning among the students.
4. A teacher may use the self - maintained progress report to correlate his style of teaching and level of achievements by the students.
5. Self -maintained progress reports exclusively confines to academic achievements only.

### **32.4.2 Reporting to the Parents**

School and the family is the place where a child spends most of the time during his school days. All that could not be met within family premises that are made available in the school. That is, being one with all, peer group interactions, co-operation, etc., is possible only in the schools. Therefore school as a unique unit in the society tries to get associated with the people or parents in the community. The important means of securing co-operation between the school and home is sending the reports on the work and progress of children to their parents. This could be on each occasion when an assessment is made. The cumulative record of each pupil maintained in the school should be sent to parents for information and signature as the child is promoted from one class to another class. This will enable the parents to know in detail about the physical, academic, social and moral development of their children in school. Thus, it becomes a very important event in bringing a rapport between the school and the community.

Sometimes, it becomes so inevitable to the teacher to call the parents of certain students, in order to bring some desirable changes in them. It may be with reference to attitudinal changes, their absenteeism, or some problems created by themselves in learning tasks etc., so, a report maintained cumulatively on such incidents, has to be sent to the parents. It is because, the follow up activities are depending upon the co-operation and support by the respective parents. Hence, whatever is deliberately planned will be executed with a joint venture of the school as well as the parents. In this context, a teacher alone cannot do anything. For the sake of progress of the child, the parents also should co-operate. Say for example, a follow-up activity has been thought of in terms of “bridge course” or “special - course” for those students who are lagging behind the normal group. Evidence on this has to be sent to the parents. And they have to be informed about the special curricular treatment their wards are going to receive and its nature also. Suppose for this, such students may be asked to stay apart from the school hours, then, about this the parent must be informed and later on information about the effectiveness of such programmes also, to be sent to them.

So, such a continuous effort, will really help the child to overcome his learning disabilities or any problems faced in the task of learning. Sending the progress reports to the parents, and insisting their signature on it will bring a sort of discipline, and it gains more weightage from the students’ views also. Therefore, keeping the parents well informed about their children’s program, will make, the teacher, the administrator, head of the institution, management, parent and all the available human and material resources to become more focused in bringing an all-round development among the students. Here also, the cumulative records, and other non - scholastic records, statistical

intimation with reference to attendance, etc., can also be sent to the parents. All such efforts will have their positive influence on the whole process of teaching and learning.

### **‘Check Your Progress’ - 3**

**State whether the following statements are True / False:**

1. Reporting to the parents about the progress of their children will not help in learning process
2. Reporting to the parents is one way of having co-operation between the home and the school
3. ‘Reporting to the parents’ - involves only the marks card of the sequential tests.
4. Insisting parent’s signature on the report sent to them is unpsychological
5. Cumulative record is one of the reports that could be sent to the parents.

### **32.4.3 Diagnosing**

‘Diagnosis’ is the term usually referred by the doctors. But here a teacher is going to diagnose the learning disabilities, learning difficulties that are faced by the students. A student may be quite intelligent by his IQ score, but he may not score at least to the optimum level in context with his potentiality. In such situation, a teacher uses the diagnostic strategy. Here you should understand that, diagnosis, shifts the emphasis from learning outcomes. Placement is concerned with educational status of an individual; whereas, diagnosis is an effort to probe into and analyze specific deficiencies that may make for low status of an individual.

Diagnosis emphasizes that “the failure of the pupil to develop and grow in terms of his own organism pattern - that is, in terms of his own native ability and rate of growth towards socially desirable goals”. Really speaking, it is not the student who fails; it is the school, the teacher, the method of instructions and the conditions which we pose on the students have failed. Diagnosis tries to bridge the gap between the expected and actual achievements of students. Simultaneously it also tries to solve the problem of wastage and stagnation. Diagnosis will be incomplete without remediation. It is because, diagnosis and remediation go hand in hand and no remedial programme can be planned without having diagnosed the weaknesses of students.

Good Carter is of the opinion that, “educational diagnosis is the determination of the nature of learning difficulties and deficiencies; of course, it cannot stop only at the identification of weaknesses in learning but has to go a little deeper to locate their

causes and also suggest remedies for getting rid of them”. He also opines that, remediation for under achievers and enrichment programmes for over achievers, both must be there after the process of diagnosis. In both the cases, we have to study the student in relation to his inherent capacities and potentialities. If he has not reached the level of his capacities he is an under-achiever and needs remedial programme to bring him up to his level. If he has already crossed his level, he is only in need of some enrichment programme to excel him. However, we may say that the immediate concern of the teacher may be correction but the ultimate aim will always remain prevention. A diagnosis will have the following interrelated sequential steps.

1. Identifying students who are in need of remediation.
2. Finding the nature of difficulties.
3. Locating the causes of the disabilities.
4. Providing remedial measures.
5. Preventing the difficulties in further learning.

In order to diagnose, a teacher first should sort out the students into groups, particularly, of underachievers and overachievers in the context of educational diagnosis. Most of the time the evaluation tools help in the above said type of classification of students. But to know about the students who are below or above the average of a group is not going to seem any useful purpose here. It is quite possible that a student who is above average in relation to the group may well need some remedial programme while on the other hand the one below average may not warrant any. .

**1. Identification of Students:** Diagnostic classification involves the reference point for each student in such a way that, the reference point of each student should rightly be his own expected achievement and we have to sort out the students with regard to their levels of expected achievement. If they have not reached their levels, they will be the ones who are in need of remediation. Suppose, they have already crossed their levels, we may not become complacent about them, but may plan some enrichment programme to help them improve their achievement further.

Usually, through unit tests, the achievement levels of the students could be assessed. But what is very difficult is, to estimate the expected achievement of students. For this job, ordinarily available intelligence tests, scholastic aptitude tests and achievement tests are quite adequate.

**2. Find the Nature of Difficulties:** In this phase, we have to pin point the specific areas where the students experience difficulties. Although a unit test throw some light

on the nature of students' weakness, it will not pinpoint their learning disabilities and difficulties. To diagnose such difficulties on scientific lines, specially designed diagnostic tests are required. You will come to know about the construction of diagnostic tests in the coming units. As a rule, such tests have a limited scope but they try to explore the area more thoroughly as they cover as many learning points as possible. Diagnostic tests, like all tests, deal with the products or learning outcome. Interested as we are in locating and correcting the difficulties in learning, our attempt appears only to be indirect. However, the analysis and the interpretation of the results of the diagnostic test helps in locating the weaknesses of the students. So, when the weak spots have been located, it becomes necessary to probe into their causes before any remedial programme can be planned. You should know also about that, under achievement may be due to factors within the student, or environmental factors outside the control of the student or a combination of the two. But, while planning remedial programmes the teacher can directly take care of only the factors within the student. Anyway, the environmental factors if they are known, will lead to better planning of remedial measures.

Most of the causes internal to the student may, however, be located in the areas of:

1. Scholastic aptitude
2. Retardation of basic skills
3. Work study habits
4. Physical factors and
5. Emotional factors

Let us take the subject mathematics as an example to understand the factors clearly. A student may not have a good aptitude in that subject, though he is quite intelligent. This lack of aptitude may be clue to absence of motivation, or more interest in some other subject, or may be due to many other factors. Most of the students feel that mathematics is a dry subject and this negative attitude hampers their achievement level in mathematics. A good teacher never lets it happen and will take immediate steps to check it, and gives the remedial measures.

The weakness may also be traced to the deficiencies in the acquisition of basic facts and skills in mathematics. This is because in mathematics each concept is a pre-requisite to learn the next concept. A break in the link somewhere can retard learning. If the students have developed wrong work-study habits, it also results in learning disabilities. Each concept demands a constant practice and drill before it is mastered. Even poor health, certain physical disabilities hinders learning. Learning of any subject

needs hard work. Diseases, ill health, causing absence from school may create their own problems. Defects in eye-sight, and hearing, hinder the student in getting full benefit from classroom teaching. Similarly, an emotionally disturbed child dissipates his energy before it is used for learning.

In addition to the above factors for an under - achievement, there can be a number of environmental factors also, over which a school or a teacher may not have control. But there are certain factors like economic condition of the parents, their literacy and the locality from which the pupil comes etc., could be rectified to some extent.

To go in detail for all the above factors, may not practically be possible. But in less serious cases, just a skillful interview can give many clues. In some cases there the tools like check-lists, rating-scales questionnaires can also be used.

**‘Check Your Progress’ - 4**

1. Diagnosis by a teacher results in.....
  - a) Finding learning disabilities and learning difficulties
  - b) Physical ill-health
  - c) Giving medicines
  - d) None of the above
2. Diagnosis tries to bridge the gap between the.....
  - a) Teacher and the taught
  - b) Parents and the children
  - c) Expected and actual achievements
  - d) All the above
3. Diagnosis will be incomplete without .....
  - a) Remediation
  - b) Counseling
  - c) Enrichment programme
  - d) Bridge course
4. Diagnosis helps to identify.....
  - a) Students

- b) Teachers
- c) Parents
- d) Both under-achievers and over-achievers

5. Diagnosis usually will be started by administering

- a) Unit test
- b) Criterion test
- c) Examination
- d) All the above

6. Mention the internal causes that result in an underachievement by a student

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7. Mention the sequential steps of diagnosis

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8. What is educational diagnosis according to Good Carter?

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#### **32.4.4 Remediation**

In the previous discussion you came to know about the meaning and the nature of diagnosis. And you also know that without remediation a diagnosis is incomplete or it is half done. Thus remediation becomes very important. But remediation cannot occur

on its own. It needs the foundation of a diagnosis. Hence, diagnosis and remediation are complementary and reciprocal to each other. Therefore in this section, let us try to understand the meaning and nature of Remedial measures.

Remedial measures are applied on the basis of a thorough understanding of a pupil's difficulty in learning. But there is not any set pattern for remedial measures. So, in some cases it may be a simple matter of review and re-teaching. In others, it may need an extensive effort to improve motivation, correct emotional difficulties and overcome deficiencies in work-study skills may be required. In spite of this, two students may be suffering from the same type of learning difficulties, but they differ in the cause for it. And hence, it has to be tackled differently. Likewise remedial measures vary with the subjects also. That is to say, the ends may be the same, but the means will be different.

But, despite the different methods and techniques needed in remediation, there are certain guiding principles that apply to all subject areas and provide a frame work in which the teacher can operate. They are,

- Remediation should be accompanied by strong motivational programmes.
- Remediation should be individualized in terms of the psychology of learning.
- There should be continuous evaluation giving the pupil knowledge of results motivation being the first step, plays a very significant role in remedial measures. The purposes of the measures should be related to the needs of the students who should feel convinced of their utility. Students should take up the remedial activity willingly.

Similarly, you should be aware of the fact, remedial measures will be individualistic and learner specific. Remedial measures given on individual basis will, no doubt, be more motivating. But individualizing the remedial measures in all the cases will be impractical. Hence let us not much concentrate on this fact. And also, there will always be students having similar difficulties caused by factors which can be taken care of collectively, at least in the scholastic field. Such students could be conveniently grouped together accompanied by a continuous evaluation. You should know that remediation does not end the moment remedial activities are given to the students. That is rather the beginning. So many times, remedial measures will be changed depending upon the situational factors also! After all, the remedial programme should be modified to meet the demands of the situation.

Remedial programmes also should fit into the normal school activity. But it is true that they will always mean some extra work for both the teacher and the target group. In

hard cases, some extra time may also be required. In spite of this, a little more attention to underachievers keeping in mind their weaknesses during the class work, and well planned assignments oriented to remove the difficulties will do the trick. Remedial teaching is not some different type of teaching; it is just good teaching.

It is said that prevention is better than cure. This holds well in education also. Educational diagnosis should preferably be carried at a level where the need for remedial measures is completely eliminated. Prevention is not only better but also easier than cure. A proper diagnosis should help a teacher in getting an insight into the types of errors that are likely to occur in learning, their possible causes and the ways of preventing them in future classes. Thus diagnosis should be for improving instruction, modifying its curriculum and also for refining instructional materials. Actually speaking, the ultimate goal of educational diagnosis should be prevention. The knowledge gained through the use of diagnostic procedures must also help in the prevention of learning difficulties and learning disabilities.

### **‘Check Your Progress’ - 5**

State whether the following statements are true or false:

1. There are quite a good number of easily available standard remedial measures.
2. Even re-teaching can be one of the remedial measures.
3. There is no need of evaluating the remedial measures.
4. Remedial measures involve motivation of the target group as the last resort.
5. Same Remedial measures could be imparted on a homogeneous group of the students, who have the same type of learning difficulties.
6. Remedial measures also should fit into the normal school activity.
7. There is no use in giving home assignments as one of the remedial measures.
8. Remedial measures are individualistic and learner specific.
9. A good teaching is also a remedial teaching.
10. Learning difficulties also could be prevented.

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## **32.5 Let Us Sum Up**

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In this particular unit, follow-up activities, their nature and importance have been discussed. Follow-up activities actually keep the process of monitoring the progress on

the track. Follow-up activities bring a sort of dignity as well as discipline to the profession as a whole. There are quite a good number of follow-up activities. Most of the time they will be highly subjective and learner specific. Findings or the results of follow up activities play a very significant role in rectifying the learner's mistakes. The special type of follow - up activities discussed in this section are four in number, namely, self-maintained progress report, reporting to the parents, diagnosis and lastly the remedial measures. Self -maintained progress Report, though may not be used much for official purposes, it will have its own advantages. Like, for example, if it is properly maintained, a learner will studiously learn like a leader, not as a follower. And reporting to the parents is yet another but meaningful and functional follow-up activity. By this the gap between the school and the society is filled up.

Both the family and the school which are the two significant units of society can focus their attention for the welfare of the pupils. And third type of follow up activity discussed is about diagnosis and the last one is remedial measures. Both the diagnosis and the remedial measures are complementary and reciprocal to each other. Diagnosis helps in detecting both the strengths and weaknesses of a student. Based on this the remedial measures are planned. It will be remedial measures for the under achievers and enrichment programmes for over achievers. However in both the cases, there are no standardized tests or techniques. All the time, these are ought to be or have to be constructed based on the local need and requirements.

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## **32.6 Answers to 'Check Your Progress'**

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### **'Check Your Progress' - 1**

1. c) Integral
2. b) Focused
3. a) Discrimination
4. a) True  
b) False  
c) False  
d) True  
e) True

**‘Check Your Progress’ - 2**

1. True
2. False
3. True
4. True
5. False

**‘Check Your Progress’ - 3**

1. False
2. True
3. False
4. False
5. True

**‘Check Your Progress’ - 3**

1. False
2. True
3. False
4. False
5. True

**‘Check Your Progress’ - 4**

1. a) Finding learning disabilities and learning difficulties
2. c) Expected and actual achievements
3. d) Remediation
4. d) Both underachievers and the overachievers
5. a) Unit Test
6. The internal causes that result in under-achievement are
  - Lack of adequate scholastic aptitude

- Retardation of basic skills
  - Defective work-study -habits
  - Physical and emotional disturbances
7. The sequential steps of a diagnosis are:
- Identification of the students who are in need of remediation
  - Finding the nature of the difficulties
  - Locating the causes of disabilities
  - Providing remedial measures
  - Preventing the difficulties in further learning.
8. According to Good Carter “Educational diagnosis is the determination of the nature of learning difficulties and deficiencies, of course it cannot stop only at the identification of weaknesses in learning but has to go a little deeper to locate their causes and also suggest remedies for getting rid of them”.

**‘Check Your Progress’ - 5**

1. False
2. True
3. False
4. False
5. True
6. True
7. False
8. True
9. True
10. True

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**32.7 Unit-End Exercises**

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1. What is meant by ‘Follow-Up’? Why is it important?
2. List out the techniques of follow-up activity.

3. Explain the concept of self - maintained progress report.
4. Justify the need of reporting to the parents.
5. Explain the meaning and nature of diagnosis.
6. What is Remediation? Illustrate your answer.

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## **32.8 References**

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1. Singha H. S: *Modern Educational Testing (1974)*
2. Wrightstone, Justman & Robbins, *Evaluation in Modern Education.*
3. Radhunath Safaia and Shaida. B.D, *School Administration and Organization.*

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## **UNIT - 33 □ DIAGNOSES - INTRODUCTION**

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### **Structure**

#### **33.1 Introduction**

#### **33.2 Objectives**

#### **33.3 Diagnosis**

##### **33.3.1 Meaning, Nature**

##### **33.3.2 Need and Importance**

##### **33.3.3 Characteristics**

##### **33.3.4 Techniques**

#### **33.4 Let Us Sum Up**

#### **33.5 Answers to ‘Check Your Progress’**

#### **33.6 Unit-End Exercises**

#### **33.7 References**

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### **33.1 Introduction**

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‘Diagnosis’ is the term that belongs to the field of medicine. There doctors diagnose the diseases based on the symptoms. They give the medical prescription, a course of treatment based on the diagnosis. The same term “diagnosis’ is also utilised in the field of education with a different context. Here instead of patients, the students with some learning disorders, learning disabilities are treated. And the teachers diagnose such learning disabilities, and provide suitable curricular treatment to the students. Quite interesting, isn’t it? In this unit, we shall discuss the meaning, nature, need and importance of diagnosis and some techniques of diagnosis in detail.

Diagnosis in the field of education takes a sound basis from the process of evaluation. Here the evaluation which results in diagnosis is termed as Diagnostic Evaluation. Though it is a distinct type of evaluation, it is closely related to formative and summative evaluation. It involves valuation, determination, description and classification of some aspect of student behaviour. Diagnosis can serve many purposes.

For example it could be conducted to place the student properly at the outset of instruction or to discover the underlying causes of deficiencies in student learning. So, the further discussion in this line will reveal more information to you.

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## **33.2 Objectives**

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After studying this Unit, you will be able to

- Explain the meaning and nature of diagnosis
  - Justify the need of diagnosis
  - List out the characteristic features of diagnosis
  - Describe the techniques of diagnosis
- 

## **33.3 Diagnosis**

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Diagnosis is also a type of evaluation. Based on the purposes, several types of diagnoses are possible. Like, for example, a teacher may do diagnosis at the beginning of an academic activity, to explore the entry behavior of the students. Diagnostic evaluation performed while instruction is underway has its primary function as determining the underlying circumstances or causes of repeated deficiencies in a student's learning. Apart from this, a teacher needs to know, which strategies and tactics to choose, for this also diagnosis is needed.

### **33.3.1 Meaning and Nature**

The word diagnosis is used in education, more or less in the same sense as it is used by doctors. The only difference perhaps is that in medical diagnosis it is a physical or an organic breakdown that is investigated, while in educational diagnosis it is the failure of the process of education or learning that is located and attempted to be remedied. In earlier days, educational diagnosis was confined for most part of the area of academic knowledge and skills. But, now it is emphasizing all aspects of the pupils' growth and development. Therefore, the teacher is concerned with the development of the non-intellectual aspects of the pupil's personality as well as with his academic knowledge and skills. Further more research has shown that personal - social adjustment and personality development cannot be divorced from the learning of knowledge and skills. And it is also found that, pupils with severe subject matter disabilities have often been found to have serious personality disorders. Thus, diagnosis is to be understood in a much broader sense so as to include all the areas of pupil growth. It never confines to

any specific area, but legitimately covers all the domains - cognitive, affective, and psychomotor - of the human growth.

Diagnosis is usually done for placement of students. It could be for determining the presence or absence of pre-requisite skills. May be for determining the student's prior level of mastery, or classifying the student according to various characteristics known or thought to be related to alternative modes of instruction. Diagnosis is also done for the determination of underlying causes of repeated learning difficulties. It makes use of formative and summative instruments for pretests, standardized achievement tests, standardized diagnostic teacher - made instruments, observations, and check lists. Based on placement diagnosis, alternative teaching strategies are developed, as well as alternative curricula could also be developed.

### **33.3.2 Need and Importance**

Educational diagnosis is of utmost important, because, it has emerged as the basic need in an education system. Though we have launched several programmes, like, compulsory primary education, education for all, Sarva Shiksha Abhiyan and also as the constitutional right, the country is facing the problem of wastage and stagnation. Enrolment of the children, their retention, and also their quality learning or mastery in learning - all such aspects is subjected to critical analysis and verification. At the lower stages where the government is constitutionally bound to provide equal educational opportunity, it has assumed gigantic dimensions and has almost become a national problem. There are perhaps economic and social causes of wastage in education but the major blame must be laid on the educational system.

Wastage and stagnation are generally defined in terms of the percentage of students who enter a particular stage of education and fail to complete it or take more time to do it. A student is declared to have failed if he gets less than a certain percentage of marks in different subjects and / or in the aggregate. Failure should not be taken in the narrow sense of inability to reach an arbitrary level but it should be taken as the failure of the pupil to develop and grow in terms of his own organism pattern -that is, in terms of his own native ability and rate of growth towards socially desirable goals. So, if we want to strike at the root of wastage and stagnation, we should primarily concentrate on improvement in the quality of education ensuring scientific educational diagnosis of students and remediation.

We know that, the current examination system is not correct, because it checks only the memory power of the pupils. In fact it should not be restricted only for the

appraisal of achievement but should also aim at the total improvement in a student's personality. That is why one of the criteria for good evaluation is that it should be a dynamic process, meaning thereby that it should provide for a constant feedback with the help of which both teaching and learning are improved. This aspect in the process of evaluation is nothing but educational diagnosis. Diagnostic does the job of rectification of the weaknesses, here it is called "corrective diagnosis" But the highest form of the diagnosis is the preventive one by which the teachers are enabled to take measures to prevent weaknesses among the students from occurring.

Diagnostic evaluation does the function of placement of the students, which is closely related to the question of educational "grouping". It involves grouping and placing the students in the proper instructional group according to their level of prerequisite entry behaviors. And also, helps in discriminating the students as "bright", "average" or "slow". It may be conducted before the instructional process gets started as well as could be as an ongoing process carried out in conjunction with the formative evaluation. Diagnostic evaluation that is carried out during ongoing process, in conjunction with formative evaluation will try to determine whether factors unconnected with instruction are the cause of the breakdown in learning.

The process of diagnosis is so comprehensive that, it takes care of cognitive, affective and psychomotor behaviors of a student. And also diagnoses the physical, psychological and environmental factors that may hinder or enhance the process of learning. It traces out the underlying causes of repeated learning difficulties. All the above said points imply that diagnosis has a very significant role in the education, and because of its significance the need is also felt.

### **'Check Your Progress' - I**

1. Diagnosis is closely associated with .....
  - a) Evaluation            b) Educational policies
  - c) Infrastructures      d) All the above
2. Diagnosis helps to know the causes for .....
  - a)Wastage and stagnation            b) Repeated failures
  - c) Effective teaching strategies      d) All the above
3. Failure of the pupils is nothing but, .....

- a) Promotion withheld                      b) Failure of the educational system
  - c) Repetition of the course                d) Extra burden on the teacher
4. Diagnosis done for the placement of students determines .....
- a) Presence or absence of prerequisite skills
  - b) Weaknesses of the students
  - c) Strengths of the students
  - d) None of the above
5. To solve the problem of wastage and stagnation, .....
- a) Diagnosis and remediation are needed
  - b) Government policy is needed
  - c) Literacy is needed
  - d) All the above
6. What are the major functions of diagnosis?

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### 33.3.3 Characteristics

In the previous captions you have understood the meaning, nature and importance of diagnosis. By that previous knowledge, now let us try to lay down the characteristic features of Diagnosis.

- The first and foremost thing that you have to understand is that diagnosis is also a sort of evaluation but it is distinct from formative and summative evaluation.
- The major functions of diagnosis at preliminary level will be valuing, determination, description and classification of some aspects of student behaviour
- It serves two purposes in an educational set up, namely,
  - a. To place the student properly at the outset of instruction and
  - b. To discover the underlying causes of deficiencies in student learning as the instruction unfolds.

- It is used to determine the entry behaviour of the students, to detect the causes for learning disabilities or deficiencies, and to bring about quality improvement in teaching -learning process as a whole, but it is never used as deciding test for the sake of students' promotion from one standard to the next standard.
- Diagnosis tries to pinpoint the reasons for the observed symptoms of learning disorder, may be unrelated to the instructional methods and materials parse, but may instead be physical, emotional, cultural or environmental in nature.
- Diagnostic approach tries to fill the gap between the expected learning outcome and the actual earning outcome.
- Diagnosis helps a teacher to design and impart remedial measures to underachievers and enrichment programme to over-achievers.
- Diagnosis becomes in vain if it is not followed by either remedial measures or enrichment programme.
- Diagnosis discriminates students by giving utmost importance to their individualistic abilities and competencies. It can place the students in rather broad tracks, such as "bright", "average" or "slow", and forms the "teachability groups".
- Through diagnosis a teacher can change or use an apt methodology of teaching, so that it results in optimum learning out come by the students.
- Since the diagnostic tests are highly specific and localized, they are not available easily. Hence, these are going to be prepared by the teachers then and there itself. Hence, you do not get any standardized diagnostic tests. If at all available, they will be very less in number.

### **'Check Your Progress' - 2**

**State whether the sentences are True or False :**

- a. Diagnostic evaluation is distinct from formative evaluation and summative evaluation
- b. Diagnosis detects the only weaknesses of the students
- c. Diagnosis without remedial measures will be of no use.
- d. Enrichment programmes are meant for under achievers
- e. Remedial measures are meant for over- achievers
- f. Diagnosis is done to explore the entry - behaviour of the students.

### 33.3.4 Techniques

‘Diagnosis’, as it is pointed out already, has to be conducted in a methodical way. It has its own procedures and techniques to be followed. So, in this section, we shall concentrate on the systematic procedures and the techniques that are to be followed.

Educational diagnosis is done according to the following five distinctive but inter-related and integrated levels, namely:

- a. Classification i.e. identifying students needing remediation
- b. Finding the nature of difficulties
- c. Etiology i.e. locating the causes of the disabilities
- d. Remediation i.e. providing remedial measures
- e. Prevention i.e. not allowing the difficulties to occur

It is actually at the level of locating the causes of the disabilities, a teacher has to deal the situation with critical analysis. Here we have to use a special type of achievements called diagnostic tests.

The diagnosis of weaknesses in the relatively general prerequisite abilities can begin with the administration of a standardized achievement test battery. Such tests allow the teacher to compare the performance of a child of a given grade level or age with that of a normative group in such basic areas of vocabulary, reading, spelling language, usage, arithmetic computation and arithmetic problem solving. First the procedure starts with identifying the general deficiency then it will be followed by the administration of more analytical diagnostic instruments to pin point the nature of learning retardation. Then based on the test marks the teacher prepares the individual profile charts of each student. This provides a graphic picture of the student’s overall level of achievement in relation to either his age or his grade group.

Usually, the standardized achievement test can alert the teacher to the fact that a student is weak in certain general area like reading or arithmetic computation when compared with some normative group, but it does not reveal the exact nature and cause of the difficulty. More sensitive diagnostic instruments are needed for this task. Very often, a technique called use of item data is employed to achieve a somewhat finer diagnosis of weakness on particular sub test. This technique involves examining the item response pattern of a student. If a student misses several items all dealing with the principle of carrying in addition, then a workable hypothesis might be that, the student needs remedial instruction in this skill. A teacher can himself construct such a type of test, so that it gives an individual or group item analysis profile on how each item was

answered. For example see the table given below.

Table 33.1 An example of part of an Item Analysis Chart that Could Be Constructed by a Classroom Teacher

	1	2	7	9	10	12	14	3	4	5	6	11	13	15	16	18	19	20	21	22	23	24	25	26	
Shymala	+	+	+	+	+	+	+	+	+	+	0	0	+	0	0	0	0	0	+	+	+	+	0	+	
Ramshesh	+	0	+	0	0	0	0	0	0	0	+	+	0	0	0	0	0	0	+	0	+	+	0	+	
Swaroopaa	0	+	+	0	+	+	+	0	+	+	0	0	+	+	0	+	+	0	+	+	+	+	+	+	
Pruthvi Raj	+	+	+	+	0	0	+	0	+	+	0	0	+	0	0	0	0	0	+	0	+	+	0	+	
Indira	0	0	0	+	0	+	+	0	+	0	0	0	+	+	0	0	0	0	+	0	+	+	0	+	
Vani	+	+	+	0	+	+	+	0	0	0	0	+	0	0	0	+	+	0	0	0	0	+	+	0	+

Here the teacher simply lists the name of each student in his class (the patterns for only six students are shown in table). Along the top of the chart, term numbers are entered, arranged according to sub test, objective, content or behaviour; vertical lines enclose each group of related items. A plus sign indicates that the item was answered correctly and a zero that it was answered incorrectly. If the chart is read across, the individual's pattern of responses on the related items is revealed; if the chart is read down, the pattern of the class response is shown. These patterns can then be examined to determine whether it appears that an individual or the class as a whole is consistently missing a certain type of item and therefore might be in need of remedial instruction.

In some cases, there are some standardized tests, which provide remedial charts designed to suggest possible causes of low scores on various subsets of the battery.

So, you must be very clear that once general deficiencies have been identified, more analytical diagnostic instruments should be employed to try to pinpoint the nature of the learning retardation. Then diagnostic test evaluates a particular sub skill in much greater detail than it is possible for an achievement test, which must cover many general areas rather broadly. Likewise, since a diagnostic test is designed to assess the weaknesses of students performing below average on a sub-skill, these instruments have many more easy items than do achievement tests, which are designed to measure the entire range of performance.

Apart from this, there may be some non-educational causes of learning disability, namely, physical, psychological or environmental in nature, for example, a student's poor general health may in turn be caused by the parent's inability to provide an adequate diet. Again, a student may be emotionally upset over a long period of time because of

some abnormal condition in the home. So, if a teacher suspects a non-educational factor to be the cause of learning disabilities, he should look for behavioral symptoms of physical, psychological or environmental problems. If he observes several such symptoms, he may use available screening devices to check his hypothesis further. And, based on the acceptance or rejection of the hypothesis, he should take the relevant action on it.

In the category of physical problems visual, auditory, motor, speech, dietary, general health, glandular, or neurological conditions may cause or contribute to students' learning disability. If the problems are related with emotional factors, the diagnosis and the respective remedial measures will take up a different design altogether. Psychological problems; in the form of emotional factors, could impair a student's ability to profit from the instruction. Poor self-confidence the negative emotions, neurosis etc., or simply the tensions associated with adolescence can all complicate the control function of teaching and may make it impossible for a student to get benefits from the usual type of learning experiences.

Similarly, the category of environmental problems includes many factors which can contribute to a student's learning difficulties. For example, certain factors that are due to cultural deprivation, such as poor language, and reading skills, etc. But a teacher cannot become a "Super Hero", to solve all types of problems. The teacher is not expected to be an expert on deep - seated non - educational causes of learning disabilities. But he should recognize the symptoms associated with such causes. And also should be diverting the problems that are beyond his limit towards the right path to get solved.

**'Check Your Progress' - 3**

1. To diagnose the weaknesses in the Pre-required abilities we need.....
  - a) Achievement Tests
  - b) Observations
  - c) Questioning
  - d) All the above
  
2. The learning disabilities may be due to.....
  - a) Poor Economic Status
  - b) Illiteracy of the parents
  - c) Physical, Psychological and Environmental Factors
  - d) All the above

3. In order to pinpoint the learning retardation,.....
  - a) More analytical instruments are used
  - b) Repeated tests are given
  - c) Critical observation is done
  - d) None of the above
4. State whether the following statements are True /False:
  - a. The Diagnostic test evaluates a particular sub-skill in much greater detail than is possible for an achievement test.
  - b. Diagnostic test items will be much easier than the achievement test items.
  - c. Learning disabilities always are caused due to some environmental factors.
  - d. Emotions do not have any role in causing learning difficulties.
  - e. A teacher is not responsible to solve all sorts of learning difficulties.

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### **33.4 Let Us Sum Up**

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In this particular unit, detailed information with reference to Diagnosis is discussed. Here the diagnosis is done to identify, locate and solve the problems that are related to students' learning. As we have seen the fact of individual difference, so is the case of learning difficulties. These learning disabilities or difficulties are individual specific. But as far as achievement goals are concerned, individuals with some type of learning difficulties could be grouped together and further diagnosis could be carried out. Diagnosis is a methodical process. It may be conducted before the teaching of a particular unit, which gives clear idea of the student's entry behavior or it could be conducted while the course is going on. Here both the weaknesses and strengths of the students are explored. Based on this followup activities are going to be designed. Like, for under-achievers, certain remedial measures have to be implemented and for over-achievers enrichment programmes have to be imparted. Apart from the need and importance of diagnosis a detailed account of techniques with reference to diagnosis is also discussed. Now, you go through the 'Check Your Progress' as well as Unit End Exercises and try to answer them.

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## **33.5 Answers to ‘check Your Progress’**

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### **‘Check Your Progress’ - 1**

1. a) Evaluation
2. d) All the above
3. b) Failure of the educational system
4. a) Presence or absence of Prerequisite skills
5. d) All the above.

### **‘Check Your Progress’ - 2**

1. True
2. False
3. True
4. False
5. False
6. True

### **‘Check Your Progress’ - 3**

1. a) Achievement tests
2. c) Physical, Psychological and environmental factors
3. a) More analytical instruments are used.
4. a) True  
b) True  
c) False  
d) False  
e) True

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### **33.6 Unit-End Exercises**

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1. What is diagnosis? Explain its nature.
2. Is 'Diagnosis' important? Justify your answer
3. What are the salient features of diagnosis?
4. Explain the techniques of Diagnosis

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### **33.7 References**

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1. Benjamin, S. Bloom : *Hand Book on Formative and Summative Evaluation of Student Learning*.  
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## **UNIT - 34 □ DIAGNOSTIC TESTING – 1**

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### **Structure**

- 34.1 Introduction**
- 34.2 Objectives**
- 34.3 Diagnostic Tests**
  - 34.3.1 Meaning, Nature**
  - 34.3.2 Construction - Steps**
  - 34.3.3 Interpreting Results**
- 34.4 Let Us Sum Up**
- 34.5 Answers to ‘Check Your Progress’**
- 34.6 Unit-End Exercises**
- 34.7 References**

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### **34.1 Introduction**

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In the previous unit you have already been introduced to the term ‘Diagnosis’. And also, you have come across the nature and significance of diagnosis in the field of education. Most of the time, as it is told earlier, the teacher takes up the responsibility of diagnosing the learning disorders among the students. ‘Diagnosis’ being methodical process, needs a thorough preparation. Usually diagnosis is done for the placement of students, to determine the presence or absence of pre-requisite skills. It is also done to classify the students for alternative mode of instruction; as well as for the determination of underlying causes of repeated learning difficulties. In this context a teacher needs diagnostic tests to administer over the students. And also you should know that, the availability of standard diagnostic tests is very less. Apart from this each learner will have his own learning difficulties that may be very specific to him. Hence, it becomes inevitable for a teacher to construct the diagnostic tests based on the felt needs. Hence in this particular unit we shall concentrate on the meaning, nature of diagnostic tests and also about the steps in the construction of a diagnostic test as well as the interpretation of the results.

Usually after getting a feedback by the students in the form of their level of performance in any sort of achievement tests, a teacher can reflect over the actual causes for the students' wrong answers, low scorings, or learning disorders or learning disabilities in general. In such cases general unit tests will help a very little to the teacher. In order to pin point the learner's weaknesses in learning, there is a need of scientific analysis and educational diagnosis. Most of the time, the critical analysis will be done through a special device known as Diagnostic Tests. Construction of a diagnostic test is not an easy job. It has its own steps to be followed. So, the following discussion will help you to explore those steps and may guide you to prepare the diagnostic tests.

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## **34.2 Objectives**

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After studying this Unit, you will be able to

- Explain the meaning and nature of diagnostic tests
- List out the steps of diagnostic test construction
- Explain the different steps of diagnostic test
- Justify the significance of interpretation of results.
- Describe the process of interpreting the results.

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## **34.3 Diagnostic Tests**

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Basically diagnostic tests are of paper-pencil (pen) type tests that could be of one of the achievement tests. The process of diagnosis is a phased activity in which a teacher not only checks the achievement of student but also aims at the total improvement in the student's personality. Hence, this needs not only evaluation, but something beyond that known as educational diagnosis.

The Diagnosis which is used for the rectification of the weaknesses is called "Corrective Diagnosis". At the level of locating the weaknesses of students we need special purpose achievement tests called diagnostic tests. Before knowing the construction of diagnostic tests let us try to understand the meaning and nature of diagnostic test.

### **34.3.1 Meaning and Nature**

It is neither formative test nor a summative test, but can take up the support of these two. Diagnostic tests are utilized for the placement of students, i.e. before the

instruction begins. This often depends upon the results of summative evaluation. Such type of diagnostic test determines the status of students in relation to prerequisite behaviors, level of mastery of each unit, aptitude, or interest thought to be pertinent to a particular type of instruction.

If the diagnostic tests are used to see the effectiveness of teaching, it is administered during an ongoing process, may be in conjunction with formative evaluation. If a student is not showing learning outcomes at a satisfactory level, and continues to exhibit symptoms of failure or disinterest, then diagnostic tests probe deeper to try to discover the cause. It may be through forming hypotheses here. Like, a teacher hypothesizes about the reasons for those persistent learning difficulties based on observation, and then systematically checking each hypothesis, often by referring the student to medical psychological, guidance or remedial specialists.

In many ways, diagnostic tests resemble aptitude tests, particularly in that they give subscale scores for important skills and abilities related to the performance being diagnosed. For example, a diagnostic test on Reading Competence give scores for the following important general characteristics of reading performance; Silent Reading, oral reading, oral vocabulary, reversals, phrase, perceptions, spelling etc.

In certain commercial diagnostic tests, the performance of a student on the group of items making up a sub scale is compared with the performance of a normative group of some kind. The student's score may be in terms of how his performance compared with that of students at various age or grade or in terms of his rank. That is, one is told that he is more or less proficient than others in each of the characteristics being measured.

Diagnostic tests used for placement of the students, usually will result in the formation of individual profile. Diagnostic tests will contain the questions or items that are exhaustive to cover each and every learning point. That is to say, on each learning point there has to be a multiplicity of items in a diagnostic test. The items on each learning point actually constitute a sub-test. We get the diagnostic value of the test from the fact that the total score consists of a large number of part scores on these sub-tests. It is the analysis of these part scores that helps us in diagnosis. We can hence say that, the coverage in a diagnostic test is always much more detailed than in any achievement tests. Therefore, as a natural corollary, it has preference to be based on a smaller subject area than any other tests. As we want to cover each and every learning point, a diagnostic test requires a very careful analysis of the content and detailed study of the common errors made by students.

Another characteristic feature of a diagnostic test will be that by and large, the questions or the items of a diagnostic test are of low difficulty level because the purpose here is not to discriminate among students but to locate their weaknesses.

In a diagnostic test generally no time limit is prescribed. And the test items in a diagnostic test will be arranged around corresponding learning points which are themselves sequenced in order of their complexity.

### **'Check Your Progress' - I**

1. Basically the diagnostic test are ..... type
  - a) Paper - pencil Performance
  - b) Oral
  - c) Performance
  - d) All the above
2. The diagnosis which is used for the rectification of the weaknesses is.....
  - a. Placement Diagnosis
  - b) Corrective diagnosis
  - c) Diagnosis of entry behavior
  - d) None of the above
3. The placement diagnosis is done.....
  - a) After a unit is taught
  - b) While the unit is going on
  - c) Well before the beginning of the unit
  - d) Just before the completion of the unit.
4. In many ways, a diagnostic test resembles.....
  - a) Aptitude test
  - b) Achievement test
  - c) Norm referenced test
  - d) Criterion referenced test.
5. Diagnostic tests will contain the questions or items,
  - a) As exhaustive as possible
  - b) As limited as possible
  - c) Upto a moderate level
  - d) All the above

### **34.3.2 Construction - Steps**

Though there are certain standardized, commercial diagnostic tests, the teacher made diagnostic tests are more meaningful and relevant to the learner's problems in learning. Teacher made diagnostic tests will largely be more economical and effective than standardized tests. Usually, the norms which constitute a strong point with

standardized tests are not called for in diagnosis, as the purpose is to discover the weaknesses of individual students, rather than compare their achievements. The preparation of a diagnostic test requires a special technique different from the one used for building other types of tests. (Norm - referenced, criterion referenced etc.,) Only thing, that the standardization could be done for the improvement of the quality of questions, that's all! Hence, we shall concentrate only on the construction of teacher made diagnostic tests.

The different, sequential and inter-related steps of construction of diagnostic tests will be as follows:

- a. Planning
- b. Writing items
- c. Assembling the test
- d. Providing the directions
- e. Preparing the scoring key and making the scheme
- f. Reviewing the test

In order to be able to make correct diagnosis a teacher needs much more data on the specific difficulties of pupils. Diagnostic test have therefore to be much longer than the achievement tests, to make necessary sub-tests sufficiently reliable. It needs much more detailed, rather exhaustive content analysis. The unit on which a diagnostic test is based should be broken into learning points with an attempt not to omit any of them. If, suppose, some learning points are omitted, the test will become faulty as the weaknesses of those students who are deficient in them will go untouched. The diagnostic procedure is based on the assumption that mastery of the total process can be no stronger than that of the weakest link in the chain of related concepts and skills.

Accordingly, each concept, skill or learning point called into play in the total process is identified at the time of designing and then measured. Here we are not interested in deciding their relative weightages. The basic principle is to cover all of them to give an unbroken sequence. How to cover them effectively is the real issue. Perhaps on each learning point an adequate number of questions will have to be given to provide decisive evidences. If objective type or very short answer questions are used, there should preferably be an odd number of them and never less than three on each learning point. For most of the diagnostic tests in various subjects, the process part will tend to merge with the content, unless process is required to be separated from content for special reasons. All the forms of questions can be employed for testing different learning points.

As we want to collect evidences on all the points, it is desirable to use their short answer or objective type questions. But in case of objective type questions, the number of responses is limited and there will be a serious handicap in case of the student who wants to respond in a different way from what is provided for in the responses. Hence, for diagnostic purposes, short - answer questions involving one or two steps should by and large, be preferred, especially in subjects like mathematics.

But the questions must and should be of easy type in general. A few questions here and there may be of average difficulty level but seldom should a question be difficult for the average students of that age or grade.

Diagnostic tests should not have time restrictions. And diagnosis should be individualized as much as possible and every student should be allowed as much time as he reasonably needs. For the sake of administrative convenience some time limit in which students should try to finish may be indicated along with clear directions that they take more time, if required. It is worth while you to note that, as we do not have to relate content and process, the preparation of a blue print may altogether be avoided in case of a diagnostic test. But you may somewhere notice the number of questions to be asked on different elements.

Writing items for a diagnostic test is not, in any way, different from writing items for a general achievement test. The questions have to be specifically related to the learning points and should be so designed as to throw light on the weaknesses of students. And also these questions must be put in simple and unambiguous language. The scope of the answer or the level of precision expected should also be made clear.

After the items on different learning points are written or selected, they have to be assembled into a test. The basis of arranging questions in a diagnostic test is entirely different from that of other tests. There appears to be a good deal of justification in favor of clubbing questions around points, even when they are of different forms. The learning points themselves can be arranged in order of their complexity. If they are so arranged, the students do not have to change their mental sets very frequently. Moreover, this arrangement also helps in analysing the responses of students with a view to identify their weaknesses, which is one of the important tasks in diagnostic testing.

To complete the test, a set of instructions have to be drafted. It should also be provided with a scoring key and marking scheme. It has to be finally reviewed and edited. This is done to weed out inaccuracies or lapses of wording etc., An analysis of the test listing down learning points with corresponding questions may be prepared at least for the use of other teachers.

## **‘Check Your Progress’ - 2**

### **I. State whether the following statements are true or false:**

- a. Usually the norms which constitute a strong point with standardized test are not called for the Diagnostic tests.
- b. Diagnostic tests will be much longer than the achievement tests.
- c. Content analysis is not an essential step for the construction of a diagnostic test.
- d. Essay type questions are the most used items, in any diagnostic tests.
- e. Scoring key and marking scheme are the integral parts of diagnostic test.

### **34.3.3 Interpreting Results**

It may be of the fundamental notion by the teachers that a conduction diagnostic test is going to be an extra burden on them. But, you should know that, it is not expected that diagnostic tests will be routinely and regularly used as unit tests or like that of some other tests.

Most of the diagnosis will continue to be done, as at present, with the help of achievement tests supplemented by teacher’s observations and school records. It is very true that for locating the weaknesses of students specially designed tests prove themselves to be more scientific. Nevertheless, it is neither necessary nor practicable to give such a test to the class for each and every unit. Hence a teacher should in fact draw up some minimum programme for diagnostic testing. For example, in case of mathematics, the concepts will be sequential and hence, weakness in any concept is bound to have implications for all subsequent units. But there are certain very crucial areas like four fundamental operations which play a very important and crucial role in the comprehension of the subject. The teacher should identify such areas for which diagnostic testing may be provided for in the minimum programme. For other areas, he may continue depending on unit tests and other crude means of educational diagnosis. What is needed is an awareness of the significance of diagnosis. Some sort of diagnosis is always there as it is an inseparable part of good teaching. All that is required is consciousness on the part of the teachers for the use of diagnosis and to put it on a scientific basis, as far as possible.

In the above context, you might have felt by this time, that if the diagnostic tests are constructed and administered over the target, the job is not over. It is the analysis of the student’s performance which becomes more significant, involving scoring and interpretation of the results. However, the scoring procedure and scheme of evaluation is determined during the construction of a diagnostic test itself. Based on this a teacher

will evaluate the students' performance. 'Interpretation of the results, is nothing but, giving meaning to marks - This is better done with the help of a student - item chart. A sample of it that can be used in case of objective type or very short answer questions given in Table 33.1 of modifications in case of short answer and long answer questions.

This is similar to the item analysis chart. It is a two-way grid in which students are listed along the vertical axis while items for various learning points are listed along the horizontal axis. It is preferable to take the students in ascending or descending order of their performance on the test. The learning points and various items on them should as far as possible be arranged in ascending order of their complexity or difficulty level in the test itself so that in the student item chart we have only to keep them in serial order. The answer sheet of each student is separately analysed putting 'X' against the item done wrongly, '0' for the item which is omitted and leaving the space blank if the question is attempted correctly. If sufficient time has been given, then assuming that there is no guessing, the questions omitted should convey the same meaning as those done wrongly. If the ordering of the items is correct, the 'crosses', and 'omits' will tend to occupy a compact portion of the student item chart towards the lower right hand corner, if the students are arranged according to the descending order of their performance.

The above explained analysis helps in locating the weaknesses of the students as revealed by the test. If most of the students come out to do poorly on a particular learning point we get an indication that something is wrong with the instruction relating to that learning point itself. But the causes of such weaknesses have to be explored properly before any remedial programme can be planned.

### **'Check Your Progress' - 3**

1. Diagnostic Tests.....
  - a. Need not be routinely and regularly used
  - b. Should be used as unit tests
  - c. Need unit tests
  - d. None of the above
2. Diagnosis is .....
  - a. Inevitable programme
  - b. An inseparable programme of good teaching
  - c. A burden on the teachers

- d. All the above
- 3. Analysis of diagnostic tests involves .....
  - a. Scoring
  - b. Collection of data
  - c. Scoring and interpretation of the results
  - d. Remedial measures
- 4. Diagnostic test items, usually will be
  - a. Questions of essay type answer
  - b. Questions of short answer type
  - c. Objective questions
  - d. Objective type and very short answer questions.....
- 5. On an item analysis, any information has to be arranged .....
  - a. Either ascending or descending order
  - b. Ascending order only
  - c. Descending order only
  - d. Haphazardly

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### **34.4 Let Us Sum Up**

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This unit particularly has dealt with the information pertaining to diagnostic test. Diagnostic test is one amongst the powerful tools in the hands of a teacher in bringing a quality improvement in educational processes. Diagnostic tests could be used either for the placement of the students in terms of knowing their entry behaviour or could be used to explore the strengths and weaknesses of the students. As far as possible, standardized diagnostic tests are seldom used. It may be because of lack of their availability. But most of the time, diagnostic tests are constructed and used depending upon the needs of students.

Hence, teacher made diagnostic tests are more needed, as they seem to be more appropriate. Diagnostic tests are paper - pencil type tests. These tests will contain an exhaustive number of test items, covering each and every learning point. It will be much more detailed than any achievement tests. Usually the items that constitute a

diagnostic test will be of low difficulty level, because, the purpose here is not to discriminate among the students but to locate their weaknesses. The steps of constructing diagnostic tests include, planning, writing items, assembling the test, providing the directions, preparing the scoring key and making the scheme, lastly reviewing the test. Scoring the interpretation of the diagnostic test results is quite different from other type of tests. It is done with the help of a student's item chart. Instead of giving importance to the weightage, and acquiring marks by the student, the correct responses from the students are highlighted. Each answer of every student will be analysed to know its correctness or to know the mistakes done by the students. This type of analysis helps in locating the weaknesses of the students. And based on this, the suitable, remedial measures will be planned and implemented.

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### **34.5 Answers to 'Check Your Progress'**

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#### **'Check Your Progress' - 1**

1. a) Paper - pencil performance
2. b) Corrective diagnosis
- 3' c) Well before the beginning of the unit
4. b) Achievement test
5. a) As exhaustive as possible

#### **'Check Your Progress' - 2**

1. True
2. True
3. False
4. False
5. True

#### **'Check Your Progress' - 3**

1. a) Need not be routinely and regularly used.
2. b) An inseparable programme of good teaching
3. c) Scoring and interpretation of the results

4. d) Objective type and very short answer questions
5. a) Either ascending or descending order.

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### **34.6 Unit-End Exercises**

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1. What is diagnostic test? Explain in detail
2. Describe the steps of diagnostic test construction
3. Do we need diagnostic tests? Justify your answer.
4. How scoring and interpretation of the results vary with other tests?

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### **34.7 References**

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1. Singha H.S: *Modern Educational Testing* - (1974)

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## **UNIT - 35 □ DIAGNOSTIC TESTING - 2**

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### **Structure**

- 35.1 Introduction**
- 35.2 Objectives**
- 35.3 Special Features of Construction of Diagnostic Tests in**
  - 35.3.1 Languages**
  - 35.3.2 Sciences**
  - 35.3.3 Mathematics**
  - 35.3.4 Social Studies**
- 35.4 Let Us Sum Up**
- 35.5 Answers to ‘Check Your Progress’**
- 35.6 Unit-End Exercises**
- 35.7 References**

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### **35.1 Introduction**

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In the recent days diagnostic tests are occupying a dominant role than any other form of evaluation. Definitely this speaks about its significance. The quality improvement and the diagnostic tests are inseparable, integral parts, - according to the new demand set by the society, now a days. You might have noticed that, the school system has been changed from annual examination pattern to trimester system. And here, it is decided to have more and more number of diagnostic tests, and it is prescribed that each unit has to be followed by such diagnostic tests and the respective follow - up activities. In this context, all the subjects are taught, and will be followed by the respective diagnosis. Students are allotted the grades. Here the essence is not to gauge the student by means of his scores but to get a confirmation about his level of learning outcome.

The philosophy behind the construction and implementation of the diagnostic tests will be the same irrespective of the subjects. But still each subject will have its own specificity as far as its diagnostic tests are concerned. It is because, each subject, whether

it is language or any of the core subjects, is designed with its own general objectives. And these general objectives will be broken down into specific objectives or instructional objectives, confining to the prescribed instructions. And these objectives are achieved by means of developing the required competencies among the students. This is how a teacher plans. Suppose, such achievements are not possible with a certain group of students, then diagnosis is needed. For such cases, each subject should have quite a good number of diagnostic tests. It is in this context, the present unit has been designed. So, in this particular unit, you will come across the special features of construction of diagnostic tests in languages, sciences, mathematics, and social studies. And intermittently you get the 'Check Your Progress' items also. And lastly a brief summary is given.

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## **35.2 Objectives**

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After studying this Unit, you will be able to:

- List out the special features of construction of a diagnostic test in languages.
- Construct a diagnostic test in the language subject.
- Mention the special features of construction of a diagnostic test in science.
- Construct a diagnostic test in the science subjects.
- Point out the special features of construction of a diagnostic test in mathematics
- Construct a diagnostic test in the subject mathematics
- List out the salient features of construction of a diagnostic test in the subject social studies
- Construct a Diagnostic Test in the subject social studies.

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## **35.3 Special Features of Construction of Diagnostic Tests in**

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As it has been implied in the objectives of this unit, each subject area will have its own salient features as far as the construction of a diagnostic test is concerned. Hence, apart from the general perspective of the above said task, we shall have the specific information now. So, we shall look into the procedure and salient features of constructing diagnostic tests in languages and core subjects sequentially one after other with suitable examples.

### 35.3.1 Languages

To diagnose the learning difficulties among the students, a teacher as a first and foremost rule, must be very thorough with the objectives in general and instructional objectives in particular. The instructional objectives or the general objectives help a teacher to inculcate certain competencies among the students. These competencies are nothing but the learning outcomes. The competencies usually developed through language teaching will be pronunciation, communication skills, writing ability, sentence construction, summarizing, which could be categorized under knowledge, comprehension expression and appreciation objectives.

According to the guidelines and the directions prescribed by ‘Sourabha’, Training manual for trimester system - for primary and secondary school teachers - DSERT – 2004, a teacher must assess the achievement of students by keeping 25%, 45%, 30% and 50% weightage to the competencies that are coming under the objectives, knowledge, comprehension expression and appreciation respectively.

The directive principles have clearly set the characteristic features of a diagnostic test, they are as follows.

- a. Diagnostic tests caters to the individual differences.
- b. It detects the learning difficulties / deficiencies as well as their nature that are faced by the students.
- c. It helps the personality development of the students through systematic analysis
- d. Every diagnostic test will have its own specific objective.

The directive principles also say that, the child entering to the secondary school stage, must get diagnosed first. This will be for the placement purpose. Here the weaknesses of the students will be identified. So, a sample of such diagnostic tests in the I Language Bangla and II Language English has been cited below. You can take these tests as frame of reference and later, construct your own diagnostic test, depending upon the need that arises.

Eg : 1 Diagnostic Test in English

Eg : 2 Diagnostic Test in Bangla

## DIAGNOSTIC TEST - ENGLISH

Marks: 50

Time: 90 minutes

### I. Complete the following sentences filling in blanks with suitable words from those given within the brackets

- 1) This is a secret. Please don't tell.....  
(Something, somebody, anybody)
- 2) Helen is studying law ..... University  
(In, At, On)
- 3) Silvia took a key ..... her lay and opened the door  
(Over, from, out of)
- 4) Rani did very..... in her exams  
(Good, well, letter)

### II. Rewrite the following sentences using adjective given in the brackets

1. Rama is the owner of the father property (lawful)
2. A war was brought between Puru and Alexander (Fierce)
3. I saw a mountain; it was a sight (Wonderful)

### III. Give one word substitute for the following

1. Young member of noble family
2. An act of killing one self
3. A person who goes to holy places
4. A man whose wife is dead

### IV Fill up the blanks with suitable preposition

1. I have been invited to a wedding ..... 14 February
2. Hurry up! We have got to go ..... five minutes
3. There are usually a lot of parties..... New Year's Eve
4. The Telephone and the door bell rung ..... same time.



Vallabhabhai Patel was concluding cross examination in the court, when the telegram was put into his hands, if the cross - examination was not continued and completed that day. The case might well go against his client. Patel controlled his grief and continued the cross examination. This shows that he put service above self of course he felt very sorry that he was not by the side of his wife's death bed. He was only thirty three. When he became bereaved his friends and relatives forced him to marry again. But he firmly refused. His wife had let him a son and a daughter in whom Patel found solace.

### **Questions.**

1. If Patel continued cross examination, without acting on the telegram, what does it show?
2. Why did doctor conduct an operation in Patel's absence?
3. Why did Patel return to Borsad soon after he admitted his wife to a hospital in Bombay?
4. Why did Patel continue and complete cross - examination that day?

### **35.3.2 Sciences**

Like in all the subjects, science teaching also aims at developing certain competencies among the students.. The competencies that are to be developed through science teaching have been recognized as "Science process skills". These science process skills include observation, identification, classification, experimentation, drawing inference, hypothecation etc. The diagnostic tests help a teacher, to check whether these competencies have been acquired by the students or not. This is always done after the completion of a unit or one or two units collectively. You can go through the following diagnostic test as a sample, which has been designed for 9th standard students.

**Standard: IX**

**Time: 90 minutes**

### **Part – I and part - II**

#### **Instructions:**

1. **Four alternatives are given below for each question. Select the correct answer and indicate by putting a tick mark.**
  2. **All questions are compulsory**
1. A piece of transparent material that has at least one curved surface is called a

- a. Mirror
  - b. Lens
  - c. Glass slab
  - d. Prism
2. A myopic eye can be corrected by using a
- a. Convex lens
  - b. Concave lens
  - c. Concavo Convex lens
  - d. Plano concave lens
3. An object of 2 cm height is kept at twice the focal length of convex lens. The height of the image formed in cm is
- a. 1
  - b. 2
  - c. 3
  - d. 4
4. A small electric lamp placed at the focal point of convex lens after refraction will produce a beam of light.....
- a. Parallel
  - b. Converging
  - c. Diffused
  - d. Diverging
5. The most suitable pair of lenses for construction of compound microscope is
- a. Two convex lenses of different focal lengths
  - b. Two convex lenses of same focal length
  - c. Two concave lenses of different focal lengths
  - d. Two concave lenses of same focal length

**(Part I and Part II)**

**Instructions:**

1. **Four alternatives are given below for each question. Indicate by putting a tick mark.**
  2. **All questions are compulsory**
1. The planet which is nearest to the Earth is .....
- a. Venus
  - b. Mars
  - c. Mercury
  - d. Pluto
2. Most of the asteroids are found between the orbits of.....
- a. Mercury and Venus
  - b. Venus and Earth
  - c. Earth and Mars
  - d. Mars and Jupiter

3. The first planet discovered through telescope is .....
  - a. Saturn
  - b. Uranus
  - c. Neptune
  - d. Pluto
4. Ozone layer protects us from.....
  - a. Ultra Violet Rays
  - b. Infrared radiation
  - c. Solar wind
  - d. Magnetic storm
5. Venus is the brightest planet because it is
  - a. Nearer to the sun
  - b. Self luminous
  - c. Has thick atmosphere
  - d. Moves in orbit
6. The number of valence electrons in an oxygen atom is
  - a. 2
  - b. 4
  - c. 6
  - d. 8
7. Which of the following is a strong electrolyte?
  - a. Potassium Nitrate
  - b. Ammonium Hydroxide
  - c. Acetic acid
  - d. Water
8. Butter is an example for which type of colloid?
  - a. Solid in solid
  - b. Solid in liquid
  - c. Liquid in solid
  - d. Liquid in Liquid
9. Atomic mass of Cu is 64 and its valency is 2. The chemical equivalent of Cu is
  - a. 32
  - b. 62
  - c. 66
  - d. 128
10. Which one of the following exhibits Tyndal effect?
  - a. Sugar solution
  - b. Dilute milk
  - c. Dilute acid
  - d. Salt solution
11. The phenomenon used for cloud seeding is
  - a. Coagulation of colloids

- b. Brownian movement
  - c. Tyndal effect
  - d. Electrolysis
12. The factor on which the mass of the metal deposited on the cathode, during electroplating depends on
- a. Strength of the current
  - b. Thickness of the anode
  - c. Thickness of the cathode
  - d. Concentration of electrolyte
13. The size of the colloidal particles is
- a. Less than  $10\ \mu\text{m}$
  - b. From  $10\ \mu\text{m}$  to  $1\ \mu\text{m}$
  - c. From  $1\ \mu\text{m}$  to  $20\ \mu\text{m}$
  - d. Greater than  $20\ \mu\text{m}$
14. In the upper atmosphere, Oxygen is converted to Ozone by the absorption of this radiation
- a. Visible      b. Infrared
  - c. Ultraviolet    d. Gamma
15. 1.008g. Silver Nitrate is produced when 1 Coulomb charges flow through a solution of Silver Nitrate. Then the electro chemical equivalence of silver is.....
- a.  $0.001118\ \text{gm} / \text{Coulomb}$
  - b.  $0.118\ \text{gm} / \text{Coulomb}$
  - c.  $0.00811\ \text{gm} / \text{Coulomb}$
  - d.  $1\ \text{gm} / \text{Coulomb}$
16. The method of dehydration adopted in the preparation of milk powder is.....
- a. Vacuum drying
  - b. Sun drying
  - c. Hot air blowing

- d. Evaporation by heating
- 17. In irradiation method, the food is exposed to
  - a. Alpha rays
  - b. Beta rays
  - c. Gamma rays Ultra Violet rays
  - d. Evaporation by heating
- 18. A Fumigant will be effective when sprayed
  - a. In the open field
  - b. Between stored bags
  - c. Near the rat holes
  - d. Inside the bags before filling
- 19. Generally we keep curds in a fridge during summer the reason for this is to :
  - a. Avoid further fermentation of the curds
  - b. Keep the curds cool for the season
  - c. Increase the taste of the curd
  - d. Prevent from contamination
- 20. The permafrost is a characteristic feature of
  - a. Desert biome            b. Deciduous Forest
  - c. Tundra Biome            d. Aquatic Biome
- 21. One of the following is not true with regard to diverse animal life in euphotic zone
  - a. Abundant availability of food
  - b. Optimum penetration of light
  - c. Maximum availability of oxygen
  - d. Less danger of predators
- 22. The correct order of ecological units is
  - a. Biosphere, Population, Community, Biome
  - b. Biome, Community, Biosphere, Population
  - c. Population, Community, Biome, Biosphere

- d. Community, Biome, Population, Biosphere
23. The group of organisms which occupy the same trophic level
- Bear, Fox, Wolf
  - Tiger, Cow, Zooplankton
  - Hawk, Snake, Lion
  - Phytoplankton's, Larva, Kingfisher
24. Man has developed both power grip and precision grip due to?
- More number of joints in each digit
  - Thumb opposing all the other digits
  - Powerful muscles of the digits
  - Greater flexibility of the wrist
25. In a cross between a tall and dwarf plant in the F1 generation all the pea plants were found to be tall. Which one of the following explains this?
- Dominance
  - Segregation
  - Unit characters
  - Independent Assortment

## **Part - II**

- Write two differences between real and virtual images
- Why does a concave lens produce virtual image irrespective of the position of the object?
- How is crust of the earth useful to living beings?
- Explain how distribution of heat is possible in the earth?
- Draw a neat diagram of the experiment to verify the Faraday's second law and label its parts.
- Construct any two types of food chains out of the following organisms and name each type  
Fallen Litter, Tree, Protozoa, Algae, Bird lice, Fishes, Earthworm and Birds
- How does the tropical evergreen forest biome differ from the desert biome with respect to the following?

a. Annual Rainfall      b. Distribution of Flora

8. Indicate with a diagram, F<sub>2</sub> generation is a Dihybrid Tall plant with grey seed coat (TG) and Dwarf plant with white seed coat (tg)

### 35.3.3 Mathematics

*A teacher will sense* a sort of dissatisfaction when the expected or anticipated learning outcome has not been achieved while analyzing the student's performance, either through oral interaction or through unit test. In order to understand this drawback, a teacher uses the diagnostic test. This Diagnostic test reveals the competencies which have not been achieved by the students.

- The competencies which have not been attained at the mastery level will be listed
- Based on the mistakes or the wrong answers, further analysis will be carried out.
- That will be followed by the listing of competencies, teaching points and learning outcomes.
- Arranging them in an ascending order so that the teaching point, learning outcomes and competencies will be moving from easier level to difficult level.
- Each concept or teaching point must be tested at least through three questions
- Care must be given to see the adequacy of the diagnostic test so that, it will have optimum to maximum number of questions that exceeds the total number of questions in a unit test.
- All the directions must be clearly specified.
- Usually time should not be fixed, but a teacher can manage suitably according to the situation.
- Diagnostic tests could evaluate by means of item analysis method.
- Based on the obtained results or the finding the appropriate, suitable remedial measures have to be framed.

In the subject, mathematics, based on decimal fractions, a diagnostic test could be constructed as follows:

(As only short answer questions have been used, the student item chart used for analyzing responses will need modification. For indicating questions, on the chart which

are partially correct, some appropriate symbol like 0 may be used. A marking scheme for the test has also been provided.

### **Diagnostic Test on Decimal Fractions**

#### **Instructions:**

1. This test will not affect your final result in any manner. It is only meant to find out your strengths and weaknesses so as to guide your teacher.
2. Try to work out all the questions in the test.
3. There is no time limit but try to finish the test in two hours.
4. You may find some of the questions difficult. In such a case do not waste time, go on to the next.
5. Solutions to questions may be written on the answer book provided for the purpose. All the working may be shown as a part of the solutions.
6. Marks are immaterial in this test. Nevertheless, each correct answer will fetch two marks.

#### **Answer the Following Questions**

1. Express 32.81 in words
2. What is the place value of 7 in 1.3472?
3. How many times is the place value of 3 to the left of the decimal point than that of 3 to the right in 135.632?
4. How many ciphers can be annexed to the right of 6 in .6?
5. How many times is .700 of .7?
6. Which one of .390, .039 and 0.39 is different from the other two ?
7. Add 8 and .75
8. Add .03 and 20
9. What will be the sum of 19 and 1.32?
10. Add 7.5 and 1.2
11. Simplify  $13.8 + 18.3$
12. Add 15.7 and 15.05
13. Add 5.34 and 53.4
14. Simplify  $3 + 15.7 + 29.003$

15. Subtract 7 from 18.34
16. Subtract 28 from 28.15
17. Simplify 49.01-40
18. Subtract 1.1 from 7.5
19. Subtract 17.39 from 28.78
20. Simplify 65.32 - 6.5
21. Simplify .5 - .19
22. Subtract .0075 from .02
23. Subtract 11.5 from 30
24. Simplify 31 - 3.003
25. What decimal fraction when added to 364.0356 gives 1000?
26. Simplify  $3.7 + 7.3 - 1.1$
27. Simplify  $8 - 10.5 + 3.11$
28. How much does the sum of 32.03 and 17.96 exceed the sum of 25.67 and 8.7?
29. Simplify  $89.321 \times 100$
30. Simplify  $75.1 \times 10^2$
31. Multiply 7.4 by 1000
32. Multiply 3.29 by 2
33. Multiply 42.51 by 12
34. Simplify  $.3125 \times 16$
35. Multiply 6.25 by .08
36. Multiply .25 by .25
37. Simplify  $16 \times .125 \times .3125$
38. Divide 37.3 by 10
39. Divide .41 by 100
40. What will you get on dividing 31.5 by  $10^5$ ?
41. Divide 2.87 by 7

42. Divide.216 by 6
43. Simplify  $3.2 \div 25$
44. Divide 25 by.5
45. Divide 6 by .15
46. Divide 35 by.56
47. Divide 1.69 by 1.3
48. Simplify.  $1 \div .0005$
49. Simplify  $.00143 \div .065$
50. Simplify. $7 \times .001 \div 35$

### Marking Scheme

1. Three tens, two units, eight tens and one hundredth	2	2
2. One thousandth	2	2
3. Correct place values Correct Answer	$2 \times 1\frac{1}{2}$	2
4. Any number	2	2
5. They are equal	2	2
6. .039	2	2
7. 8.75	2	2
8. 20.03	2	2
9. 20.32	2	2
10. 8.7	2	2
11. 32.1	2	2
12. 30.75	2	2
13. 58.74	2	2
14. 47.703	2	2
15. 11.34	2	2

16.	0.15	2	2
17.	9.01		2
18.	6.4		2
19.	11.39		2
20.	58.82		2
21.	.31		2
22.	.0125		2
23.	18.5		2
24.	27.997		2
25.	635.9644		2
26.	Correct addition Correct and Answer as 9.9	1 1	2
27.	Correct addition Correct subtraction and answer as .61	1 1	2
28.	Correct additions $2 \times \frac{1}{2}$ Correct subtraction and answer as 15.72	2 1	
29.	8932.1		2
30.	7510		2
31.	7400		2
32.	6.58		2
33.	510.12		2
34.	Correct multiplication of Nos. Correct placement of decimal point and Answer as .5		1
35.	Correct multiplication of Nos. Correct placement of decimal point and Answer as .5		1
36.	Correct multiplication of $25 \times 25$ Correct placement of decimal point and	1	

Answer as .0625	1		
37. First correct multiplication	1		
Second Correct multiplication and Answer as .625			
38. 3.73	1	2	
39. .0041	2	2	
40. .00315	2	2	
41. Correct division of 287 by 7	1		
Correct placement of decimal point and Answer as .41	1	2	
42. Correct division of 216 by 6	1		
Correct placement of decimal point and answer as .036			
43. Correct division of 3200 by 25			
Correct placement of decimal point to give Answer as .128	1	2	
44. Correct division of 25 by 25	$\frac{1}{2}$		
Correct placement of decimal point to give Answer as 50	$1\frac{1}{2}$	2	
45. Correct division of 60 by 15	1		
Correct placement of decimal point to give Answer as 40			
46. Correct division of 3500 by 56	1		
Correct placement of decimal point to give Answer as 62.5	1	2	
47. Correct division of 169 by 13			1
Correct placement of decimal point and Answer as 1.3			

48. Correct division of 10 by 5		$\frac{1}{2}$
Correct answer	$1\frac{1}{2}$	2
49. Correct division of 1430 by 65		1
Correct answer	1	2
50. Correct multiplication		1
Correct division and answer as .00002		

### Analysis of the Diagnostic Test

Learning Point	Various Aspects of the Learning point	Questions
1.0 Concept of a decimal fraction	1.1 Place value	1-3
	1.2 Any number of ciphers can be annexed to the right of decimal fraction	4-6
2.0 Addition	2.1 Addition of a whole number to a decimal	7-9
	2.2 Addition of two decimals	10-14
3.0 Subtraction	3.1 Subtraction of whole number from a decimal	15-17
	3.2 Subtracting one decimal fraction from another	18-22
	3.3 Subtracting a decimal from a whole number	23-25
	3.4 Addition and subtraction combined	26-28
4.0 Multiplication	4.1 Multiplying by powers of 10	29-31
	4.2 Multiplying by whole numbers	
	4.3 Multiplying one decimal by another	
5.0 Division	5.1 Dividing by powers of 10	38-40
	5.2 Dividing by whole numbers	41-43

5.3	Dividing a whole number by a decimal fraction	44-46
5.4	Dividing one decimal fraction by another	47-79
5.5	Multiplication and division combined	50

### **‘Check Your Progress’ - 1**

**State whether the sentences are true or false:**

1. Usually a teacher constructs a diagnostic test based on the analysis of performance of the students on a unit test.
2. Diagnostic test should not have time restrictions.
3. Diagnostic tests are evaluated by means of item analysis.
4. In diagnostic test, the focus will be on the content and the competencies.
5. All the directions must be clearly specified in a diagnostic test.

#### **35.3.4 Social Studies**

The teaching of social studies at secondary school level aims at developing certain competencies among the students. The major competencies that are identified by the educationists are data collection, interpretation, prediction, extrapolation, analysis, synthesis, evaluation based on internal and external evidences, etc,. After teaching a natural bit of information, a teacher can check whether the students have acquired some of the above said competencies. This could be done by administering a diagnostic test over the students. A sample of the diagnostic test has been given below for your reference.

**Standard: IX**

**Time: 90 minutes**

**(Part I and Part II)**

**Instructions:**

**Part - I**

- a. *Four alternatives are given below for each question. Select the correct answer*

*and indicate by putting a tick mark.*

*b. All questions are compulsory*

1. The Author of “Canterbury Tales” in English
  - A. *Baccacio*
  - B. *Dante*
  - C. *Petrarch*
  - D. *Chaucer*
2. The Pacific Ocean was discovered by
  - A. *Cabral*
  - B. *Christopher Columbus*
  - C. *Balboa*
  - D. *Amerigo Vespucci*
3. Division of labour helps to reduce the cost of
  - A. *Production*
  - B. *Machinery*
  - C. *Raw materials*
  - D. *Powder*
4. The Commander in chief of all the armed forces of our country is
  - A. *President*
  - B. *Vice-President*
  - C. *Prime Minister*
  - D. *Defence Minister*
5. Important type of primary occupation is
  - A. *Lumbering*
  - B. *Banking and administrator*
  - C. *Education*
  - D. *Transport and communication*
6. The main components of Economic infrastructure are
  - A. *Housing and civic amenities*
  - B. *Education, trading and research*
  - C. *Transport and Communication*
  - D. *Welfare and Culture*
7. Which policy requires to import less and export more to increase a country’s wealth?
  - A. *Mercantilism*
  - B. *Capitalism*
  - C. *Socialism*
  - D. *Communism*
8. The year in which Portuguese navigator circum navigated the earth
  - A. *1500 A.D*
  - B. *1520 A.D*
  - C. *1522 A.D.*
  - D. *1525 A.D*
9. Which Scientist proved that planets revolve round the earth in an elliptical path?





- c. Equality and fraternity
  - d. Secularism and equality
23. Which president of America sacrificed his life for the sake of abolition of slavery?
- A. *George Washington*
  - B. *Abraham Lincoln*
  - C. *Roosvelt*
  - D. *John F. Kennedy*
24. Which countries had border clashes with India and now heading for harmony?
- a. Bhutan and Nepal
  - b. China and Pakistan
  - c. Myanmar and Bangladesh
  - d. Nepal and Sri Lanka
25. Sunder Lal Bahuguna is a famous .....
- A. *Writer*
  - B. *Environmentalist*
  - C. *Social reformer*
  - D. *Political Worker*
26. ....is the place where air pollution is very high.
- A. *Delhi*
  - B. *Chattisgad*
  - C. *Punjab*
  - D. *Uttar Pradesh*
27. Identify the recent means of communication
- A. *Mobile van*
  - B. *Colour TV*
  - C. *Internet*
  - D. *Radio*
28. Identify the invention of Compton
- A. *Spinning Jenny*
  - B. *Cotton Gin*
  - C. *Mule*
  - D. *Steam Engine*
29. The meaning of Mixed farming is
- a. Growing food crops and live stock
  - b. Poultry farming and sericulture
  - c. Rearing of cattle and sheep
  - d. Growing fruits and vegetables
30. Which country is noted for lumbering?

A. U.S.A

B. Brazil

C. Canada

D. Chile

**Part - 11**

1. Which are the four developmental causes for the emergence of Modern Age ? 2
2. Which are the banks established to provide loans to farmer? 2
3. How did scientific discoveries help in the exploration of the new sea route? 3
4. How are river plains of the developing countries suitable for agriculture? 3
5. Which were the factors that favored unification of Germany? 3
6. Explain the part played by Sunderlal Bahuguna in environmental protection? 3
7. Explain the role of defence forces during peace time. 4

**‘Check Your Progress’ - 2**

1. The competencies that are developed through language teaching are.....
2. The objective of teaching science subject is to develop.....
3. By learning mathematics students acquire the competencies of.....
4. ‘Map reading’ skill is acquired by learning the subject.....
5. The teaching of history will result in the development of competencies like.....

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**35.4 Let Us Sum Up**

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In this particular unit, information with reference to diagnostic test has been presented. Diagnostic tests could be utilized well in advance before starting the teaching of a unit. Then the purpose is said to be to decide the placement of the students. If the diagnostic test is administered after the teaching of a unit, then it tries to explore the strengths and weaknesses of the students and based on this, a teacher can design the enrichment programme or remedial measures. However, the philosophy behind a unit test will be the same, irrespective of any subject. But still each subject will have its own specification that makes it quite different from other subjects. Hence, languages and core subjects prefer to have the diagnostic tests with content specificity. In this unit, the salient features of constructing diagnostic tests in languages as well as the core - subjects

have been described. This is followed by a sample of diagnostic test respectively.

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## **35.5 Answers to ‘Check Your Progress’**

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### **‘Check Your Progress’ - 1**

1. True                      2. False                      3. False                      4. True                      5. True

### **‘Check Your Progress’ - 2**

1. Acquiring knowledge; comprehension; appreciation and expression
2. Science process skills
3. Computing; hypothesizing and problem solving
4. Geography
5. Data collection; Interpretation; prediction and extrapolation

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## **35.6 Unit-End Exercises**

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1. How do you construct a diagnostic test in languages?
2. What are the salient features of constructing a diagnostic test in the subject science?
3. Construct a diagnostic test in the subject mathematics of any standard of your choice
4. What competencies are evaluated through diagnostic test in the subject History?

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## **35.7 References**

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1. D.S.E.R.T Publication : Shikshanda Gunamatta Hechchisuva Nittinalli Pariksha vidhanadalli Sudharanegalu (2005)
2. Singha. H.S. : Modern Education Testing (1974)
3. Fred.J. Schonell : Diagnostic and Attainment Testing (1965)

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## **UNIT - 36 □ REMEDIATION**

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### **Structure**

- 36.1 Introduction**
- 36.2 Objectives**
- 36.3 Remediation**
  - 36.3.1 Meaning, Nature**
  - 36.3.2 Need and Importance**
  - 36.3.3 Principles**
- 36.4 Techniques of Remediation**
  - 36.4.1 Remedial Instruction**
  - 36.4.2 Self Instruction Programmes**
  - 36.4.3 Reading Assignment**
  - 36.4.4 Group Study**
  - 36.4.5 Peer Tuition**
  - 36.4.6 Individualized Tuition**
- 36.5 Let Us Sum Up**
- 36.6 Answers to ‘Check Your Progress’**
- 36.7 Unit-End Exercises**
- 36.8 References**

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### **36.1 Introduction**

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The analogy expressed between the teaching profession and the profession of medicine, is known to you. So as the doctors prescribe the medicines based on the symptoms, the teacher gives the curricular treatment by means of remediation. This unit especially deals with different varieties of remedial measures and also their respective significance.

Usually, diagnosis done while the instruction is going on will be to determine the underlying circumstances or causes of repeated deficiencies in a student's learning that have not responded to the regular instruction. Based on the observed symptoms of the learning disorder, the possible remedial actions are designed and executed. The causes for a student's failure in a formative unit may be physical, emotional, cultural or environmental in nature. Hence, the respective remedial measures also vary. Hence in this unit you will learn about the meaning, nature and importance of remediation. You will also come across the principles of remediation and later, you get the information with reference to techniques of remediation in general, and a few remedial measures in particular. For example, you get the details of remedial instruction, self instruction programme, reading assignment, group study, peer tuition, individualized tuition, as varieties of remediation.

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## **36.2 Objectives**

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After studying this Unit, you will able to

- Explain the meaning of remediation
- List out the principles of remediation
- Describe the techniques of remedial instruction
- Explain the process of self - instruction programme as one of the remedial measures
- Narrate the techniques of reading assignment
- Justify the significance of group study
- Explain the nature of peer tuition
- Explain the importance of individualized tuition

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## **36.3 Remediation**

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Once the pupil's difficulty is understood, we can proceed for applying the remedial measures. But you should be aware that, there is no set pattern or cut and dried formulae for remediation. In some cases it could be a simple matter of review and re-teaching. Where as in other cases, an extensive effort to improve motivation, correct emotional difficulties and overcome deficiencies in work study skills may be required. So, in the further discussion we shall try to concentrate on meaning, nature, need and importance of remedial measures.

### 36.3.1 Meaning and Nature

As you know the fact that “No two individuals are alike” - similarly, the problems faced by the students in the process of learning also varies from individual to individual. And also the hard fact is that there are no patent remedies in educational practice, for two students having the same learning difficulty may have suffered it because of different causes and may have to be tackled differently. Moreover, since each subject has its own genius and personality, remedial programmes will have to be planned accordingly. Obviously the planning of remedial programmes will differ slightly from subject to subject. That is to say “The ends may be the same, but the means will be different”.

If we take the example of language - teaching the teacher may locate problems faced by the students while learning, as follows:

#### I Type: Capitalization and Punctuation:

Possible causes of low test scores	Evidences
1. Lack of knowledge of specific and punctuation situations, capitalization	1. Types of errors made on the Tests and in student's other written work.
2. Tendency to over capitalize, over punctuate	2. High proportion of errors involving overuse of capitals or punctuation.
3. Carelessness in proof reading	3. Erratic and careless work in daily written expression in other subjects limited ability to detect errors in written copy.
4. Failure to associate sounds of letters and syllables with spelling of words	4. Results of individual informal test types of spelling errors in daily work
5. Failure to master a method of learning to spell	5. Poor methods of studying spelling.
6. Instructional emphasis on different vocabulary	6. Low score on test in contrast with good record for spelling in daily work.
7. Difficulties in seeing and learning	7. Handicaps detected by observation or medical examination
8. Poor reading comprehension	8. Low scores on standardized reading comprehension tests
9. Low mental ability	9. Low IQ as shown by reliable mental test.

Based on the analysis and exploring the possible causes for low scoring in tests the remedial measures are given respectively. Say for example, if the possible cause is, “poor reading comprehension”, then the remedial measure could be, providing instruction in vocabulary and reading comprehension at the level suggested by test results. And if the possible cause is “Inability to sense what is missing in sentence fragments” the remedial measure could be, giving practice in identifying complete subjects, and complete predicates, particularly in own writing. Provide exercises requiring recognition and completion of sentence fragments. So, in case of the subject mathematics if the possible cause is lack of computation skills, then the remedial measure could be on giving more stress on drill work.

### **36.3.2 Need and Importance**

As would be teacher, you might know the recent developments in the field of education. It is equalization of educational opportunities, education for all; and now education has become a birth right to all Indians. Apart from this, universalization of education, in terms of universalization of enrolment, retention and attendance should also be assessed. This is again extended to declare the universalization of “quality learning”.

In order to bring a quality enhancement in the system of education especially at the primary level several projects have been launched by both central and state government. Sarva Shiksha Abhiyan is the running movement now. In order to achieve the ultimate goal in all the above said aspects, diagnosis and remediation will become the most inevitable factors. In order to remove the dichotomy between the rural and urban; men and women; the rich and the poor; we need a quality education. The class problems, learning difficulties and learning disabilities have to be detected and eradicated. This cannot happen without diagnosis and remediation. Hence, these are the strongest devices in the hands of a teacher.

### **36.3.3 Principles**

Though the remediation varies with nature of the learning problems, subjects and the individuals, it has one thing common. That is the principles of remediation. Despite the different methods and techniques needed in remediation, there are certain guiding principles that apply to all subject areas and provide frame work in which the teacher can operate.

These guiding principles are as follows:

1. Remediation should be accompanied by strong motivational programmes.
2. Remediation should be individualized in terms of the psychology of learning.
3. There should be continuous evaluation giving the pupil knowledge of results.

Now let us try to understand the above said principles in detail by taking one by one.

**Remediation and Motivation:** The importance of motivation cannot be over-emphasized. No remedial measures can succeed unless the students are duly motivated to take them. “You can take the horse near a pond; you cannot make it drink”. The horse has to do it. Therefore the purposes of the measures should be related to the needs of the students who should feel convinced of their utility. Students should take up the remedial activity willingly. Like the horse in the above said proverb, the students should be made to feel the thirst for remediation.

**Individualized Remediation:** Inter-related with motivation is the question of individualization of remediation. It is because remedial measures given on individual basis without any doubt will be more motivating. But it is also true that to individualize all sorts of remedial measures is highly impossible. It is because of so many practical problems. In this context, a teacher can visualize the fact from a different angle. That is, there will always be students having similar difficulties caused by factors which can be taken care of collectively, at least in the scholastic field. Such students can be conveniently grouped together.

**Continuous Evaluation:** Remediation does not end the moment remedial activities are given to the students. Rather it will be the beginning step. Appropriate steps should be taken to find out as to how far they have succeeded. Remediation should be continually evaluated because as it proceeds new problems, new difficulties and new needs among students may arise necessitating a rethinking. Hence, the remedial programme should be modified to meet the demands of the situation.

But experts are of the opinion that, prevention is better than cure in education as elsewhere. Educational diagnosis should preferably be carried at a level where the need for remedial measures is completely eliminated. It is also felt that prevention is not only better but also easier than cure. A creative teacher makes use of diagnostic test and gets an insight into the types of errors that are likely to occur in learning their possible causes and the ways of preventing them in future classes.

**‘Check Your Progress’ - 1**

1. To give remedial measures.....is important
  - a. Understanding the Pupil’s difficulty in learning
  - b. Availability of resources
  - c. Parent’s co-operation
  - d. Permission from the head of the institution
2. Planning of remedial programmes will:
  - a. Be similar in all the subjects
  - b. Slightly differ from subject to subject
  - c. Be same to all the students
  - d. None of the above.
3. Remediation should be accompanied by
  - a. Diagnostic tests
  - b. Teaching -learning process
  - c. Strong motivation
  - d. All the above
4. Remediation should be.....
  - a. Same to all types of problems
  - b. Collectively given
  - c. Individual specific
  - d. None of the above
5. Remediation should have.....
  - a. Active participation by the students
  - b. Concern by the teacher
  - c. Intermittent modification
  - d. Continuous evaluation

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## 36.4 Techniques of Remediation

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Remediation is the one which reciprocates the diagnosis. Hence, while it is executed, it should happen in a conducive environment. It should be a friendly, pleasant and encouraging attitude by the teacher. You should not by look, action or word indicate that the child is facing a difficult situation. Another important point is “humour”. Humour is the most effective element in any human situation. Children are attracted to adults who can occasionally introduce some humour in the day’s round of activities.

Encouragement and praise are powerful incentives with children and adolescents. With the general qualities, you can take up several types of remedial measures. For example, it could be in the form of remedial instruction, self instruction programmes, reading assignment, group study, peer tuition, individualized tuition etc; now let us take up the above said techniques one by one for a clear understanding.

### 36.4.1 Remedial Instruction

This is the one used by the majority of the remedial situations, and as you know it, for any type of remedial measure, the basic source of information lies with diagnosis. Hence, while diagnosing, if a teacher comes to know that the root cause for the low scoring or lagging behind in learning by a student is his absenteeism. It also could be because of the ill-health of the student. Though the teachers in the beginning of the academic session start their work with a determination to see a reasonable and desirable achievement by the pupils, they come across some low-achievers, against their determination. In such cases, “Remedial instruction” is advised.

Remedial Instruction is a phased activity, and the phases are as follows:

**I. Grouping of Students:** The students who are in need of remedial measures will be grouped based on the analysis of the diagnostic test. This diagnostic test reveals the areas of weaknesses, like for example, in certain areas of physics and mathematics they are below average in their performance. So, simultaneously both subjects have to be taken care of. Hence you have to prepare a timetable.

**II. Planning:** Depending upon the weaknesses located in both the subjects, a special course has to be designed, which will be used to re-teach for the needy. For example, to remove the weaknesses in mathematical concepts, and physics, a course consisting of elementary arithmetic, algebra, trigonometry and geometry could be designed, and these concepts can have application and use in the study of physics.

**III. Execution:** The course will be taught to the target group in mathematical concepts. And also its application will be explained to them in questions and articles of physics explaining at every step how a certain mathematical formula had been used at a certain place in deriving a formula of physics.

Besides the regular class in physics, the selected students will get an extra - hour teaching i.e., “remedial instruction” every day as per time table. It will be in such a way that on every turn, one mathematical formula will be taught, its application shown in derivation of some formula of physics and use of formula of physics explained in solving numerical problems. In the similar lines, an extensive drill work will be given. It will have an integrated approach between the subjects mathematics and physics. Sufficient home assignments will also be given. And these home works also will have novelty in them, unlike to that of conventional home works.

**IV. Evaluation:** At the end of the remedial instruction, an achievement test will be given in both the subjects. The results of such a post test will reveal the effectiveness of the remedial measure. That means to say; a teacher can easily compare the level of performances of the students in both the tests i.e., a pretest (prior to the remedial measure) and a post-test (after the remedial measure). Here the gain in scores indicates the effectiveness of the remedial measure. If the result is not satisfactory then some other activities in the name of remedial instruction has to take place.

### **‘Check Your Progress’ - 2**

1. Mention the different phases of Remedial Instruction

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2. Remedial instruction involves:

- a. Re-teaching
- b. Re-learning
- c. Evaluation
- d. Diagnosis

3. Remedial instruction will be,
  - a. Supplementary to the regular teaching
  - b. Exclusively given, excluding regular teaching
  - c. Just the regular teaching
  - d. All the above
4. The effectiveness of the remedial instruction will be confirmed through
  - a. Observation
  - b. Measurement
  - c. Evaluation
  - d. Student's performance

#### **36.4.2 Self Instruction Programmes**

Self instruction programmes are one of the best remedial measures. It is a technique in which a learner will learn according to his own rate of learning. One more advantage here will be, the learner will not be faced with any humiliating situation; there will be no comparison between the two learners. This technique allows the learner to be in the regular teaching as well as to undergo himself in a self - instruction programme. This technique individualizes the instruction to a greater extent. Hence, here the learning will be self - initiated, and self - directed. The main purpose of this technique is to enable the individual to "Learn to Learn". The programmed learning, instructional modules, computer aided instructions, self-learning packages, and teaching machines are some of the self – instruction programmes. In this type, the students are free to select the materials and methods to achieve the goals.

As usual, self instruction programmes like any other educational programmes is a phased activity. And also, a variety of methods are used to prepare individualized instructional materials. The materials can be in the form of printed material, films, machines, laboratory sets. The materials prepared in the form of small learning packages are called Modules. These modules are self - contained, and sometimes will be multi-media packages. The different steps of the preparation of a self - instruction programme is explained below:

- Select a topic and break it down to small manageable units. (That could be finished in a week or two).

- Prepare performance objectives for the learning unit or module.
- Identify the activities for the student to meet the objectives. These activities should be arranged in a logical sequence and may be plotted on a chart to see the progress of the learner.
- Determine the level of mastery or competency needed by the student to begin the activities. For this purpose a pre-test may be given to find out what knowledge and skills the learner already has.
- Now prepare an outline of a study guide for the use of the learner. The guide should include the title of the module, the performance objectives, the sequences of activities, some definitions and references, and basic instructions to help the learner to begin, some exercises for self – evaluation and indicators which tell the student when to get his work checked by the teacher.
- Prepare instructions for helping the student proceed through the module.
- Tryout the module with a few students and observe whether or not the sequence of instructions and available materials are adequate.
- Refine the module from your observation and comments of students and your colleagues.

Self Instruction programme provides a learning environment that encourages the learner to be motivated intrinsically. And also, through such an approach, each learner's interest, abilities and mode of learning is well taken care of. Programmed learning is one of the self instruction programmes. It is "the arrangement of materials to be learned, in graded steps of difficulty, in such sequence and in such manner of representation that, it will result in the most efficient rate of understanding and retention". Programmed learning is primarily based on the principle of "reinforcement". Here the guidance, satisfaction and assurance of knowing immediately how well the child has done enable him in general, to learn faster and retain better. It allows the learner to learn even in the absence of a teacher. These programmes may be in the form of books, cards and computer packages.

### **Types of Programming:**

Generally two types of programming are used, namely

- ii) Linear (B.F. skinner)
- ii) Branched (S. L. Prissy and N.A. Crowder)

### Linear Programming:

It has the following salient features:

- A stimulus in the form of statement and a question (S)
- A response by the pupils (R)
- An answer against which the pupil matches his own answer and receives immediate feedback whether he is right or wrong (A) and
- A Linear sequence which everybody must follow.

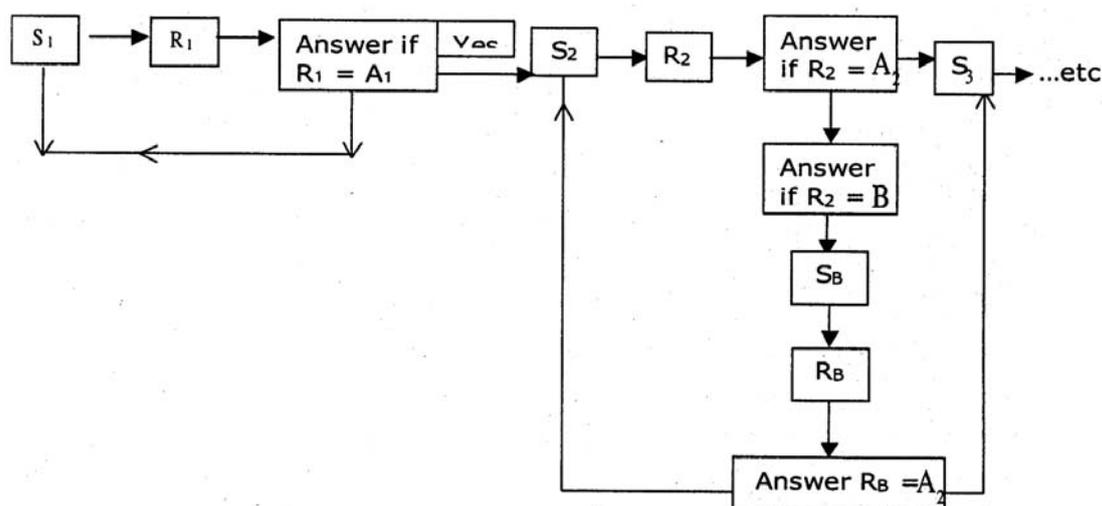
The linear programme can be diagrammatically represented as follows :



### Branched Programming:

Here a scope for diagnosis and rectification is found. Similar to the linear programming, the branched programming also contains stimulus, responses and answers.

Crowder used intrinsic programming in which multiple choice items are employed. Here the incorrect answer will result in directing the pupil to materials or information which will correct and guide him back to the correct programme sequence. The branched programming can be diagrammatically represented as below shown below :



### **‘Check Your Progress’ - 3**

1. The self -instruction programmes enables an individual to learn
  - a. Even in absence of a teacher
  - b. In the presence of a teacher
  - c. Under the guidance of somebody else
  - d. All the above.
2. The essence of self instruction programme is
  - a. Live and let live
  - b. Learn to learn
  - c. Acquisition of Psychomotorian skills
  - d. All the above
3. The programmed learning materials employ
  - a. Passive learning technique
  - b. Meaningful learning environment
  - c. Reinforcement technique
  - d. Active learning technique
4. Self instruction Programme is one of the
  - a. Remedial measures
  - b. Diagnostic techniques
  - c. Traditional teaching technique
  - d. Psychological approaches
5. In self - instruction programmes, the motivation is
  - a. Extrinsic
  - b. Intrinsic
  - c. Not at all there
  - d. Both extrinsic and intrinsic.

#### **36.4.3 Reading Assignments**

It is usually felt by the teachers that especially the children at secondary school

level are weak in their expression. Because they lack interest in reading English books or any other books, other than their text book and also they are poor in the use of words, structures, and sentence patterns. Especially these defects more confines to learning of English language. They concentrate on reading only text books and supplementary books are hardly read. It is really a problematic situation for the teachers. 'Comprehension' is a general ability, which is necessary for all the subject areas.

Remedial measure in terms of reading assignment involves several steps and those steps are explained in brief, in the following discussion.

Based on the diagnosis; (by making use of a diagnostic test) the sample or the target group will be identified with their areas of weaknesses. Later, if it is in the subject English, the planning and execution will have the following details.

- Graded comprehension passages to suit the level of the target group will be prepared by referring to English Readers and other supplementary books.
- After the preparation of graded passages, assignments in the form of test items will be framed for each passage.
- The pupils will be asked to read the passage, comprehend it and try to answer the questions given at the end of each passage. These answers will serve as an index of their ability to comprehend.

Pupils may be assigned certain tasks which require the use of books. For example:

- During the teaching of a unit, electrochemistry, the class could be divided into groups of three each. They are asked to look in the various books listed on the assignment sheet for demonstrations of electrolytic processes that could be presented to the class.

Pupils may be encouraged to find suggestions for activities that are not closely associated with regular class work; but the activities will be enriching or helping to remove the learning weaknesses of the students. They may present their results during the time regularly set aside for special reports. For example: Each Tuesday, the science teacher provided time for special reports. During such occasion, the weaker students also feel a sort of satisfaction, and feel free to express their findings.

In this way Reading Assignment can become a very apt, challenging activity as a remediation to the students.

#### **'Check Your Progress' - 4**

State whether the following sentences are true or false:

1. Reading assignment is not a remedial measure
2. Reading assignment could be used as a remedial measure only in languages.
3. Reading assignment involves the activity of reading of supplementary books other than text books.
4. Use of reading assignment is a phased activity
5. “Reading Assignment” can use a pre-test and post-test technique

#### **36.4.4 Group Study**

Usually, group study technique is used in adult education. Since the high school students are at the threshold of adulthood, with suitable modifications, this technique will suit the adolescent group also. For a remedial purpose, group study stands for more effectiveness than other techniques. Hence, Beal, Bohlen and Raudabaugh (1962) have defined Group technique as a pre-designated pattern for human instruction that offers a better potential for progress towards goals than does instructed random behaviour. Here the students are allowed to learn together. Generally, we say that, remedial measures should be individual specific because; it is the question of individual difference. But sometimes, it is well to put a few of the individuals who will have common weaknesses into one group, in which they often do better than when forced to work with pupils who are more successful. The students who need remedial measures are handicapped chiefly by a reduced experience background and a feeling of inferiority in academic matters. These pupils find it meaningful and interesting to learn through direct experiences such as field work, and supplemented by audio-visual aids such as films, slides, pictures and CDs. To profit fully, these pupils must feel that, what they are doing is worthwhile and that they have important abilities. They need the confidence that comes with success.

Group study technique provides many opportunities like they can set up electric circuits, make models, perform experiments, do reading assignments etc; because they will be having common goal, common interest and common abilities, they share learning experiences and complement with each other. Hence it gives a more conducive and encouraging learning environment and thereby fulfills the purpose of remedial measures.

#### **‘Check Your Progress’ - 5**

**State whether the following sentences are true or false:**

1. Usually group study technique is used in adult education
2. Group study technique will be employed over a homogeneous group

3. Group study technique hinders individual's learning
4. Group study technique does not provide a chance for the expression of an individual's talent.
5. All the members in a group share their learning experiences under group study technique

#### **36.4.5 Peer Tuition**

Peer group means, it is a group made up of the individual members (say six to eight) of the same age, who will be studying in the same standard. A peer group will have the members who possess common interest, and common goal. Teaching a peer group is a new idea in the field of education. Actually this has its origin in American system of education in 1954. Peer tuition is a special type of teaching in which a special type of instructional organization involving teaching personnel and the peer group assigned to them, work together, for all or a significant part of the instruction of some group of students. Peer teaching is a technique of teaching the students in an active form which makes teaching more effective and a joint venture. Here the teaching will be of joint responsibility, means it includes, instructional planning and other aspects of teaching. Hence, peer teaching is essentially co-operative teaching. It is also a phased activity, in which, the peer group will be identified, and then a special scheduled programme will be launched. In this technique, the best teachers in a school are shared by more students. It involves certain arrangements as follows:

- Re- organisation of teachers, students and schedules.
- Re-assignment of curriculum and class schedules in context with the pre-determined weaknesses of the learning.
- More and extensive use of technological aids.
- Teaching every subject by specialists, yet preserving the inter-relations of content and learning.
- Usually inter-disciplinary approach is advised.

#### **36.4.6 Individualized Tuition**

This is a remedial technique, which has the greatest influence on the learner. Usually, the teachers who handle the class can locate and pin-point where the learner is feeling the difficulty in learning. Hence, it is the teacher alone who can cure this defect, based on his / her first hand information, while interacting with the child. Each student will

have his own style of learning. Like, for example, some children will learn with only one sitting, or some may learn a simple circuit after reading about it without writing up a circuit. Some may understand a point perfectly after hearing it explained; some need to see pictures; some need to read about many need to do it.

So, you may see some distinguishing factors between individual tuition and group study or peer tuition. They are,

- The instructional objectives will be learner specific.
- The content points could be given to the student.
- All students are not expected to achieve the same objectives.
- All students do not use the same instructional materials.
- All students are not expected to follow the same procedure while in classroom.
- All students do not work at each subject for the same amount of time.
- These programmes are individually diagnosed and prescribed programmes in their nature.

In order to provide an individualized tuition, a teacher has to schedule a special time table, and it has to be devoted solely to the sample, and needy student. No doubt, it is an extra burden to the teacher, and while executing it poses many practical problems. In spite of this, if it is properly planned and judiciously executed, then the resultant will be of an excellent quality. Here also, as usual, based on the detected learning disabilities of the learner, a teacher can frame the learning objectives. And, the content could be re-analysed, designed with enriching and encouraging learning environment. Here a face to face communication takes place with utmost subjective care by the teachers. It should be in such a way that a student must feel free to participate and learn, rather it should not make him to become doubly conscious. As the teacher knows and pin-points the learner's defect, it is to the satire extent get rectified. So, this is also a phased activity starting from the formulation of instructional objectives, followed by planning, execution and evaluation respectively. This could have some follow up activities as well as record maintenance. This is done parallel to the regular curricular transaction in the class hours so that the child never loses the regular classes.

**'Check Your Progress' - 6**

1. Peer group means .....
  - a. Group of individuals of the same age, interest and attitude.
  - b. Class mates.

- c. Friends.
  - d. All the above.
2. Peer tuition means .....
    - a. Class-room teaching.
    - b. Individual teaching.
    - c. Self-learning.
    - d. Teaching the peer group.
  3. Individualized tuition, means .....
    - a. A group of students are taught
    - b. Private Tuition system
    - c. Teaching an individual with special care
    - d. All the above
  4. The first step in individualized tuition is.....
    - a. Formulation of instructional objectives
    - b. Content selection
    - c. Teaching
    - d. Evaluation
  5. The person who can give individualized tuition to the learner because of his / her clear perspective of the learner's difficulty.
    - a. Head master
    - b. Parents
    - c. Class teacher
    - d. All the above

### **36.5 Let Us Sum Up**

In this unit, exclusively you have come across a variety of remedial measures. In the beginning of the unit, the meaning, nature and importance of remediation is explained. And also three important principles of remediation are pointed out. This is followed by a brief introduction with respect to different techniques of remediation in general. Next, you see in detail the information with respect to specific remedial measures, namely, remedial instruction, self -instruction programmes, reading assignments, group study, peer tuition and individualized tuition.

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## **36.6 Answers to ‘Check Your Progress’**

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### **‘Check Your Progress’ - 1**

1. a. Understanding the pupil’s difficulty in learning.
2. b. Slightly differ from subject to subject
3. c. Strong motivation
4. d. Individual specific
5. d. Continuous evaluation

### **‘Check Your Progress’ - 2**

1. i. grouping of students  
ii. Planning  
iii. Execution  
iv. Evaluation
2. a. Re-teaching
3. a. Supplementary to the regular teaching
4. c. Evaluation

### **‘Check Your Progress’ - 3**

1. a. Even in-the absence of a teacher
2. b. Learn to learn
3. c. Reinforcement technique
4. a. Remedial measures
5. b. Both extrinsic and intrinsic

### **‘Check Your Progress’ - 4**

1. True
2. True
3. False

4. False
5. True

**‘Check Your Progress’ - 5**

1. True
2. True
3. False
4. False
5. True

**‘Check Your Progress’ - 6**

1. a. Group of individuals of the same age and attitude
2. d. Teaching the peer group
3. c. Teaching an individual with special unit
4. a. Formulation of instructional objectives
5. c. Class teacher

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**36.7 Unit-End Exercises**

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- a. What is Remediation?
- b. Explain the principles of remediation
- c. What is remedial instruction?
- d. Describe the technique of self - instruction programme
- e. Explain the technique of reading assignment as one of the remedial measures
- f. Justify the significance of group study
- g. What is meant by peer tuition?
- h. What is the importance of individualized tuition?

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## 36.8 References

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