UNIT 5 NON-DIGITAL TEACHING LEARNING RESOURCES

Structure

5.1 INTRODUCTION

All of us have memories of our teachers who had taught us during school or college days. A few of them were good, whereas others were not so good. Let us analyze why did we call them good? Yes, they were caring, sympathetic, and pleasant besides being effective in their teaching. One thing common among

This Unit has been adapted from Unit 8 of BES-002: Teaching, Learning and Assessment and Unit 5 of ES-361: Educational Teachnology of IGNOU

them was that they used new methods, techniques and different teaching-learning resources to make teaching interesting, thus, effective. Teaching -learning resources facilitate a teacher in achieving the learning objectives formulated by her/him prior to teaching-learning activities start. Teaching-learning resources cover a wide range of teaching-learning materials, devices and tools. Some of these resources are digital in nature, whereas others are non-digital in nature. Many of you may be using non-digital teaching-learning resources like textbook, chalkboard, chart, map, globe, models, etc. while teaching your students. With the advent of digital technologies, now teachers use a number of digital teaching-learning resources like radio, television, computer, Internet, mobile, etc.

In the present Unit, we will introduce you to various non-digital teaching learning resources, which are used to make classroom teaching and learning interesting and effective. In this chapter we shall discuss a variety of non-digital teaching learning resources used in classroom teaching. We will also explain how to prepare low or no cost teaching learning resources from locally available resources.

5.2 OBJECTIVES

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

- explain the meaning and purposes of teaching learning resources;
- explain the meaning of non-digital teaching learning resources:
- distinguish the uses of different teaching learning resources;
- demonstrate the skill of chalkboard writing;
- discuss the uses of non-projected and projected teaching learning resources; and
- prepare low cost TLM using locally available materials;

5.3 MEANING AND PURPOSE TEACHING LEARNING RESOURCES

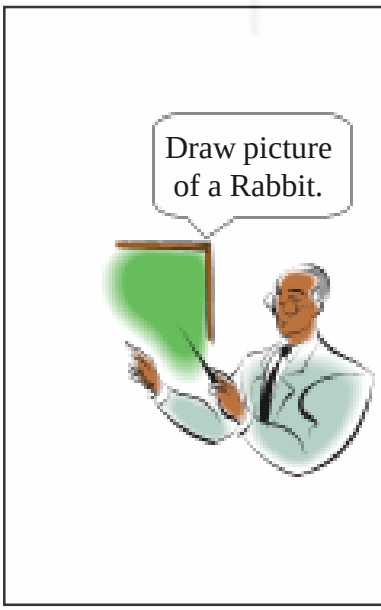


Figure 5.1: Instruction without the picture of a Rabbit

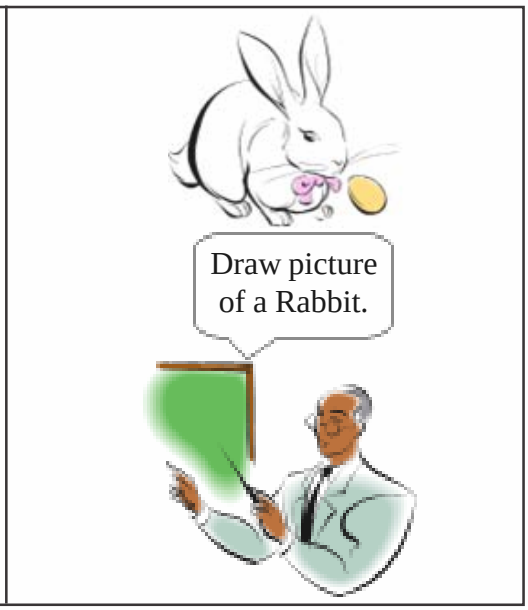


Figure 5.2: Instruction with the picture of a Rabbit

Look at these two pictures, what do you observe?

You are right that the learner will be more enthusiastic, willing to learn in second figure. Why? Because the picture of Rabbit in the second figure will help the child to learn, how Rabbit looks and draw its picture. The picture of Rabbit is a type of teaching learning resource about which you will study in this section.

Teaching learning resources are, therefore, tools, which are used by teachers to help learners learn concept with ease and efficiency. Teaching learning resources have been in existence in our educational system for a long time. The role of teaching learning resources in the classroom is to make learning real, practical and fun for children. Teachers use teaching learning resources to illustrate or reinforce a skill, fact or idea. Teaching learning resources also help in bringing novelty and freshness in classroom teaching as they relieve learners from anxiety, fear and boredom.

Teaching learning resources provide a range of learning experiences to learners from direct to indirect. Edgar Dale (1969) arranged the learning experiences on a continuum of 'directness to indirectness' which has correlation with continuum of 'concreteness to abstract'. He called it a 'Cone of Experiences'.

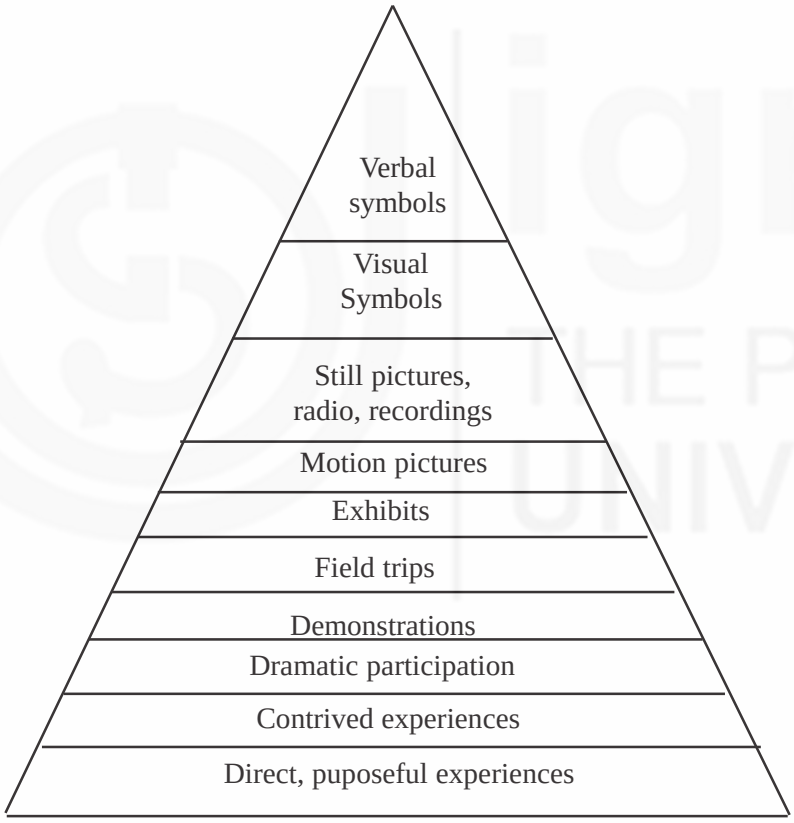


Fig 5.3: Dale's Cone of Experiences

The organizing principle of cone is progression from most concrete (direct) experience at the bottom of the cone to most abstract (indirect) at the top. According to Dale, the least effective method is at top i.e. more use of verbal/ textual symbols like reading or listening to spoken words. The most effective method is at bottom involving direct, purposeful, concrete learning experiences, such as hand on or field experience. As action learning results in upto 90% retention, teachers should strive for making classroom teaching nearest to direct-experiences.

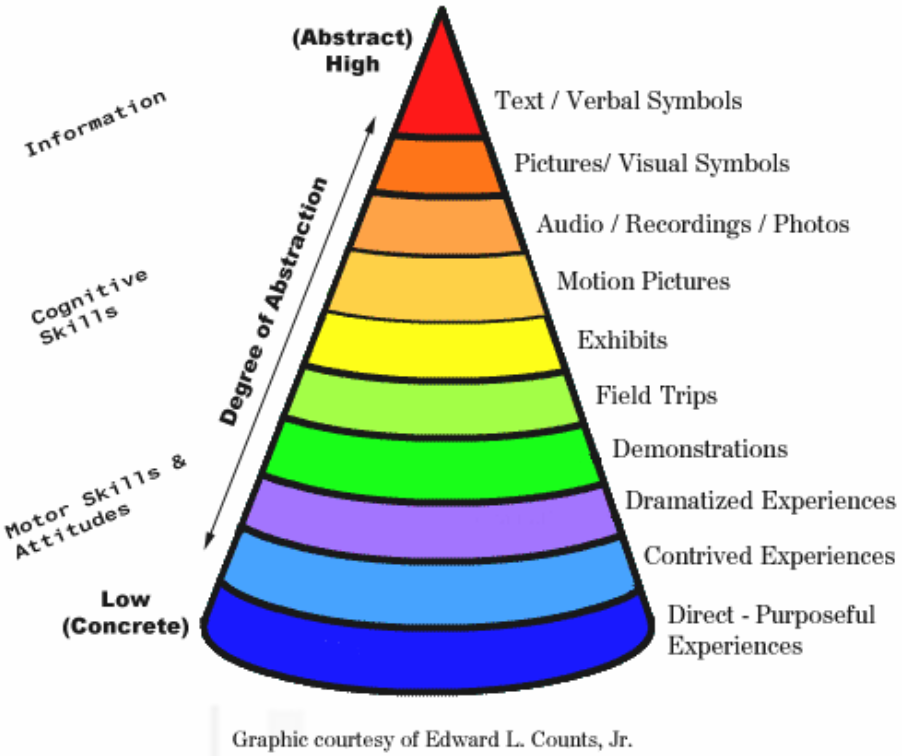


Fig 5.4: Dale's Cone of Experiences showing Degree of Abstraction

Source: http://www2.education.ualberta.ca/staff/olenka.Bilash/best%20of%20bilash/Images/dalescone2.gif

As field or hands on experiences are not possible in all the cases, a teacher should try and making the classroom instruction most direct using appropriate teaching learning resource. The kind of teaching learning resource used affects the learning of students. For example, the same content can be taught using different teaching learning resources and the retention will vary according to teaching learning resources used. If you want to teach parts of a plant, you can provide a continuum of direct to indirect experience to learners. You can provide real experience of plant, which a student can see, smell, touch, and handle in class. You may also bring a model or chart of plant to show its parts. You may also explain the parts of plant verbally with the help of diagram on chalkboard. Not all the learning experiences of the same content 'parts of plant' are similar and therefore, learning will not be similar as well. You want to guess in which case learning will be more effective and permanent. Yes, you are right, the learning will be maximum in providing real, direct experiences.

Therefore, learning outcomes are highly dependent on the learning experiences given in classroom using teaching learning resources.

5.3.1 Purposes of Using Teaching Learning Resources

Teaching learning resources are used to enhance the learning of students in classrooms. A teacher uses it to make teaching-learning effective. Teaching learning resources also help learners achieve the learning outcomes after classroom teaching and learning. Some of reasons to use teaching learning resources in classroom are-

- **Motivate Learners** – Capturing attention is the first step to any learning. Teaching learning resources help in capturing the attention of learner in

classroom. Once motivated to look at teaching learning resources, the children are curious to learn new things. Teaching learning resources provide a variety of stimuli, which help in making classroom teaching most effective.

- **Help in Longer Retention of Information** – The more the number of sensory channels involved in interacting with teaching learning resources, the longer will be the retention of information. Therefore, the learning will be effective and will last long.

- **Facilitate Holistic Learning** – You have read about Blooms –Taxonomy of Objectives. Learning objectives to be achieved through classroom teaching in all domains- cognitive, affective and psychomotor. Therefore, to achieve varied objectives, varied learning experiences need to be provided, which can be done through the use of teaching learning resources.

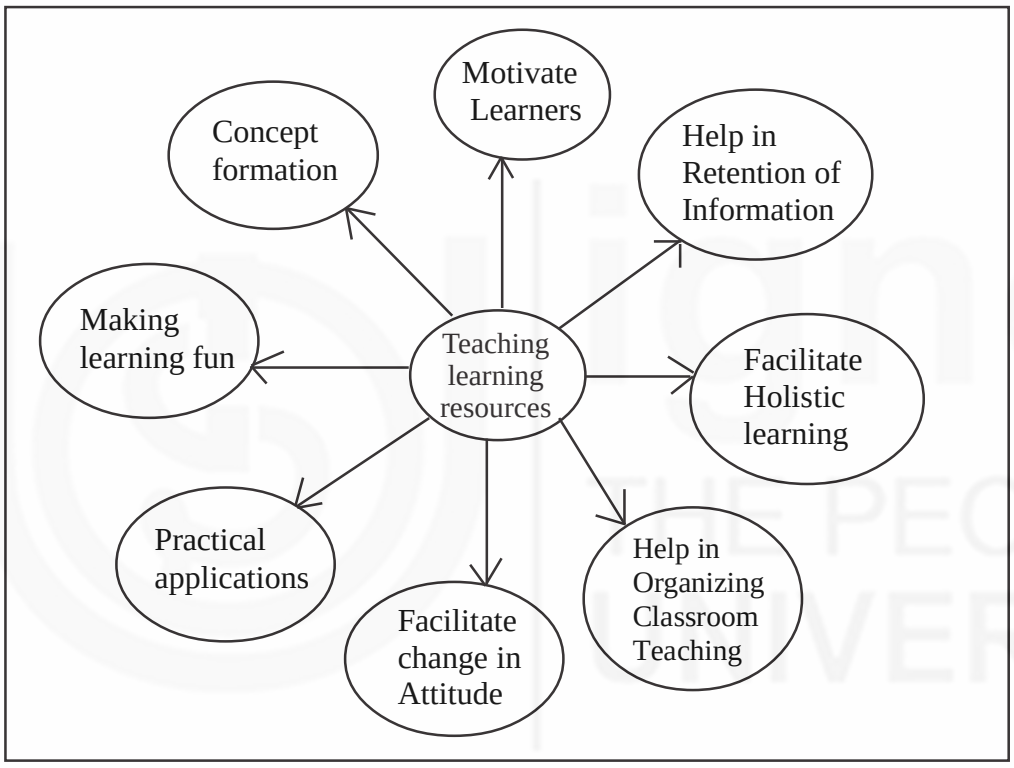


Figure: 5.5: Purposes of Using Teaching-learning Resources

- **Help in Organizing Classroom Teaching** – As a teacher you need to organize learning experiences, making them as realistic as possible. You can use visual or verbal teaching learning resources to present accurate data in sequentially organized manner. This helps teacher to verbal and visual communication in classroom. Thus, you may use teaching learning resources to overcome shortcomings in verbal or visual communication.

- **Facilitate change in Attitude** – Teaching learning resources also help in changing attitude of learners towards learning in general and subject content in particular. Pictures, models and other teaching learning resources help in inculcation of positive attitude of learners.

- **Application of Theoretical Knowledge into Practical Applications**- Teaching learning resources show application of theoretical knowledge into practical applications. The theoretical knowledge studied in class is shown in concrete form through teaching learning resources for effective learning.

- **Teaching learning resources help in making learning fun in the classroom.** Students enjoy the novelty of handling new objects and learn new concepts through them.

- **Teaching learning resources facilitate the formation and attainment of concepts among children**. They concretize the abstract concepts; thus children are able to understand them and not resort to rote learning.

Therefore, use of teaching learning resources in classroom teaching is an essential aspect about which you should focus your attention while designing and developing your lesson. There are a variety of non-digital teaching learning resources to choose from depending on the context, level of learners and availability. The next section will acquaint you with the various types of non-digital teaching learning resources available.

Check Your Progress

Notes: a) Write your answers in the space provided.

b) Compare your answers with the one given at the end of the unit.

1) Explain the purpose of using teaching learning resources in teaching-learning process.

.....

.....

.....

.....

.....

5.4 NON-DIGITAL TEACHING LEARNING RESOURCES

5.4.1 Meaning of Non-digital Learning Resources

Non digital teaching learning resources, as the name suggests, means those teaching learning resources which are developed or used by a teacher or any other individual, not with the help of digital technology. Prior to the availability of digital mediums like computer, Mobile, Internet, etc. a teacher used to take the help of teaching-learning aids developed by him/her in his/her teaching activities. These teaching-learning aids which are developed by teacher himself/herself mainly constitute non-digital teaching learning resources. For example, pictures, models, charts, etc. are developed and used by teachers in classroom teaching. Let us try to study a few of these non digital teaching learning resources in detail, which you can easily use in your classroom teaching.

5.5 CHALKBOARD

The chalkboard provides the teacher with an opportunity to create verbal and visual messages in the class. If properly developed, the words, graphics and visuals on a chalkboard can contribute immensely to classroom learning. As a

teaching-learning resource, the chalkboard has always occupied the pride of place and alongwith the textbook, is the most used aid.

5.5.1 Types of Chalkboards

To begin with, chalkboards used to be black in colour and hence the name blackboard. This was so because the black surface would provide the perfect contrast to the white chalk. However, due to functional reasons one now finds the chalkboards to be made up of green ground glass painted from behind and called the 'green board'. The glass green board, unlike the blackboard, which is wooden, is also found in shades of green, yellow and grey. A third type of board is the white board which is made of mica or hard plastic. Since the board is white in colour, you would know that the white chalk cannot be used for effective presentation. With such boards one uses ink and marker pens. Writings by these pens can be wiped out and are user friendly as they do not create chalk dust to which some people are allergic.

Apart from the material of which they are made or their colour, chalkboards can also be classified on the basis of their arrangement and mounting in a classroom. Normally, chalkboards are either painted or mounted on the wall. But they are also mounted on a stand with three/two legs or hung on the wall or can be rolled-up. The roll-up board has two rods on both ends and is made of flexible plastic, or rexin. The stand mounting and the roll-up boards are portable.

Chalkboards may have other fittings also. The wall mounted board may have a wooden frame, concealed tubelights on top and firments to place chalks and duster at the bottom. Chalks are also available in different colours such as blue, yellow and red even though the white chalk is most extensively used, as it contrasts well with black, green and grey background. Needless to say, all colours are not equally visible for students on all chalkboards and hence one should know the colour that contrasts most and otherwise. So, while using more than one colour, maximum writing is done with the most contrasting colour.

5.5.2 Chalkboard Writing

Skill in chalkboard writing is not difficult to acquire though it needs hard work and a lot of practice. Just as handwritings are different for different persons, chalkboard writing also differs from person to person. As a teaching-learning medium, for chalkboard writing there are certain guidelines to be followed for increased effectiveness in chalkboard writing:

1) The matter written must be important, since a chalkboard is not a scribble pad.
2) The matter must be sequentially and logically arranged.
3) Utilize the space available so that the chalkboard writing is organized and balanced.
4) Maintain appropriate size to enable all learners to read without difficulty. Authors suggest a size of 3 cm letters for a 6 m deep room.
5) Write from top downwards.
6) If the board is too long, divide the space into two by drawing a dividing line in the middle, if necessary.

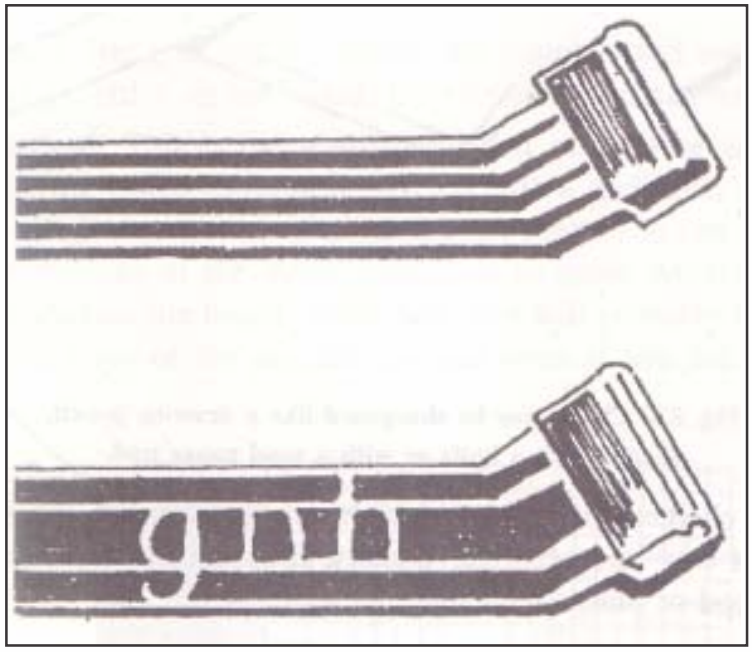


Fig.5.6: The multiple chalkholder used by musicians

7) If, in the beginning, the writings are not parallel to the base use guidelines for practice.

8) Avoid running hand, write bold, independent letters.

9) Underline important words and sentences, use different colour, if necessary.

10) Let the chalkboard writing be in points. Avoid writing notes on a chalkboard.

11) Try to preserve the writing for a review at the end of the lesson.

12) Half a stick of chalk is better to write with than a whole stick. Hold it between the thumb and forefinger so that an inch or less projects.

13) The most convenient place to stand is towards the left side of the board. This allows convenient turning to face the class or board.

14) Use a duster to erase the writing and not your hand.

15) For the sake of practice, try drawing parallel lines from one end to the other vertically, horizontally and diagonally without lifting the chalk.

5.5.3 Chalkboard Drawing

You know that the visual material on a chalkboard is not restricted only to writing. A chalkboard is used for drawing diagrams, stick/line figures, action scenes and pictures. Of all this, you would agree that diagrams are the most frequent drawings on a chalkboard. A diagram is a visual made of straight and curved lines or geometrical figures, unlike a picture, a diagram merely represents something or idea. You may remember the following, while drawing diagrams.

1) Straight and curved lines are the most common components of diagram. So, practice drawing lines of different types at different heights on the chalkboards.

2) It is easier to draw short lines and curves on a chalkboard. Practice drawing lengthy lines and curves.

3) Diagrams are accurate and proportionate visual representations. In doing so, lines of different thickness may have to be drawn. Sharpen and shape chalk with the help of blade, knife of sand paper to get desired effect. Holding the chalk at different angles to the board also gives lines of different thickness.

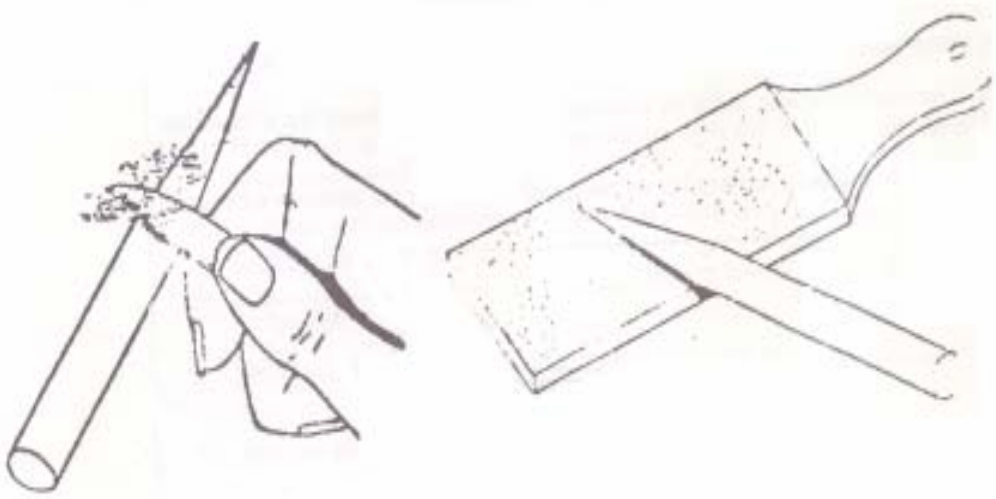


Fig.5.7: Chalk may be sharpened like a drawing pencil, shaped with a knife or with a sand peper pad

4) Several types of chalkboard drawing devices are available in the market. They make drawing diagrams easy and accurate. Uusally, they are oversized geometrical drawing tools made of wood or plastic.

5) Templates and stencils are other aids for chalkboard drawing. One could make them using hardboard or wood.

6) Even thread can be a useful device in drawing lines, circles and curves on a chalboard.

7) For enlarging a small diagram on a chalkboard, methods such as use of grid/squares and projection are useful.

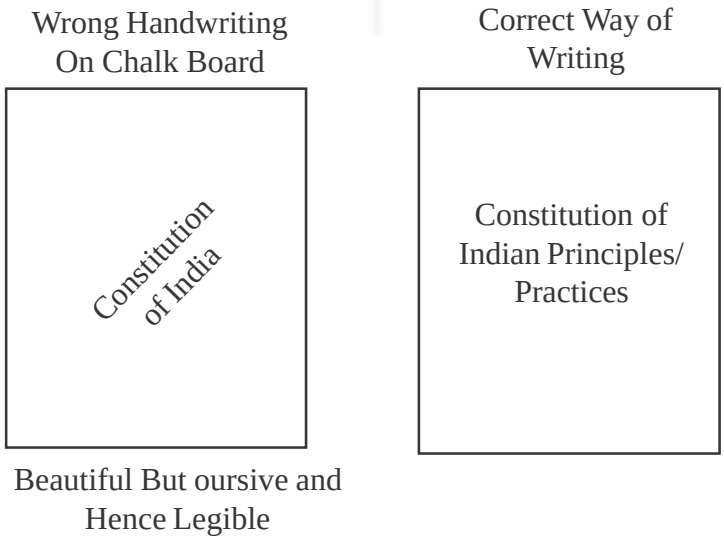


Fig 5.8: Cursive script and correct way of writing

5.6 PRINTED MATERIALS

5.6.1 Textbooks

Fig 5.9 : Picture of a Textbook

Source: http://commons.wikimedia.org/wiki/File%3ATextbook.JPG

You must have read many books. In books, text is the method of communicating. Books are written by authors for learners to help them learn new things. The book specially written by authors for learners of a particular course is known as textbook. Textbook is very important basic teaching learning resource. It is written specifically to satisfy specific needs of the syllabus. In most cases, a textbook serves as a focal point base for organizing learning activities. In some textbooks like the NCERT textbooks both teacher's and pupil's activities are included in form of questions, suggestions, experiments, topics for discussion, etc. As often they are prescribed by the schools, and are based on specified syllabus under a curriculum, they are often referred to as curricular resource.

Textbooks are predominantly textual with some images. Normally, content in a textbook is organized under chapters, units and lessons. Most textbooks are written in factual or information giving style with little or no interactivity inbuilt in the text. When textbooks are written in conversational style with activities, they serve as a basis of self-study as well. They, therefore, assist learners to acquire good reading skills and develop language comprehension. If textbooks are well illustrated and written in interesting style, they act as interesting individualized learning materials for the learners. Thus, the quality and utility of textbook depends on the author.

While writing a text book for students at secondary level, the author needs to keep in mind the following points:

i) Text book should provide authentic content knowledge.

ii) Contents in the text book should be logical, coherent and sequential.

iii) Language used in the textbook needs to be simple and comprehensible by students.

iv) Presentation of contents needs to be conversational and based on sound pedagogic principles.

v) Concepts and propositions need to be explained with examples and illustration.

vi) There need to be a lot of activities, cases built into the textbook.

vii) Presentation of contents needs to motivate the learners throughout the process of learning.

Activity

Analyze the textbook of your class with respect to following points:-

1) Is it relevant to the prescribed curriculum?

2) Is language suitable for the grade?

3) How many illustrations are there?

4) Do you find any difficulties using it in class?

5.6.2 Workbook and Copybook

As the names would suggest, workbooks and copybooks are meant for the learner to perform a written exercise or undergo writing practice. Normally, they support textbooks in the sense that they cover those responses of the learner which involve writing. It is not necessary, though, that every textbook should have an accompanying workbook. Normally, a workbook or copybook does not give the learner any new information. Workbooks and copybooks provide learners with graded exercises which proceed from easy to difficult tasks.

5.6.3 Programmed Learning Material (PLM) and Self-Instructional Module

Unlike textbooks, programmed learning material (PLM) and other variations of it like the open university course materials are used exclusively by the learners and they are designed to be so. If a text or supplementary book presents matter in one chunk, the PLM and other 'self-instructional material' provide the content in meaningful and convenient 'bits and steps'.

Also, unlike the textbook, the SIM ensures 'learner participation' and involvement by presenting answers to them. This ensures that the learner 'evaluates' his/her progress. The answers provided to the questions help him/her do so and they act as 'reinforcement' in learning. However, the SIMs have one thing in common with textbooks and that is 'self-pacing' or the possibility for the learner to proceed with learning at a speed convenient to him. Such a thing, for example, is not possible at the speed with which the material in a lecture is delivered.

5.6.4 Newspapers and Magazines

Newspapers are usually for a mixed age group of readers and carry items of news and current affairs. They contain sections for school age children on varied

subjects. Magazines are published for the public at large and also for school age children. A few important applications of newspapers and magazines in teaching-learning are: current events study and analysis, study of local, national and world problems, practice in the reading, study of written expressions and styles; and visual and pictorial support to classroom work.

5.6.5 Case Studies and Case Reports

Simulation and case reports are specially designed materials that centre around a problem or issue. They present the learner with the background and necessary data on one or more problem or issue which may be of general interest or may pertain to a particular subject of study. If some of them require 'assuming a role', most of them involve the learner effectively. Decision-making and problem-solving are other important features of case studies and case reports.

Case studies are normally used in business/management programme and case reports are normally used for discussion in medical/legal education programmes. The learner is either made to analyse the decision of someone else or is himself required to make decisions and solve problems. The most common drawback of simulation and case reports is that they do not provide factual information or 'hard content'.

Check Your Progress

Notes: a) Write your answers in the space provided.

b) Compare your answers with the one given at the end of the unit.

2) Fill in the blanks.

a) Material which ensures learner participation and which provides for self-pacing is .....

b) Printed material that presents matter in chapters, units and lessons for the learner to read and remember is .....

c) Materials that are designed to support a textbook are ..... and .....

d) For study of written expression and styles, one may use ..... and .....

e) Materials which are problem or issue-centred and which involve the learner are ..... and .....

5.7 NON-PROJECTED TEACHING LEARNING RESOURCES

5.7.1 Charts

A chart is a diagrammatic representation of a system, process, and historical sequence of event. It is visual representation used to summarize, illustrate, compare or contrast, communicate the subject matter in effective and concise way. Charts are used in all subjects for concept formation and development among learners. For example, in order to teach solar system, the science teacher can make use of a chart depicting solar system comprising sun and other planets.

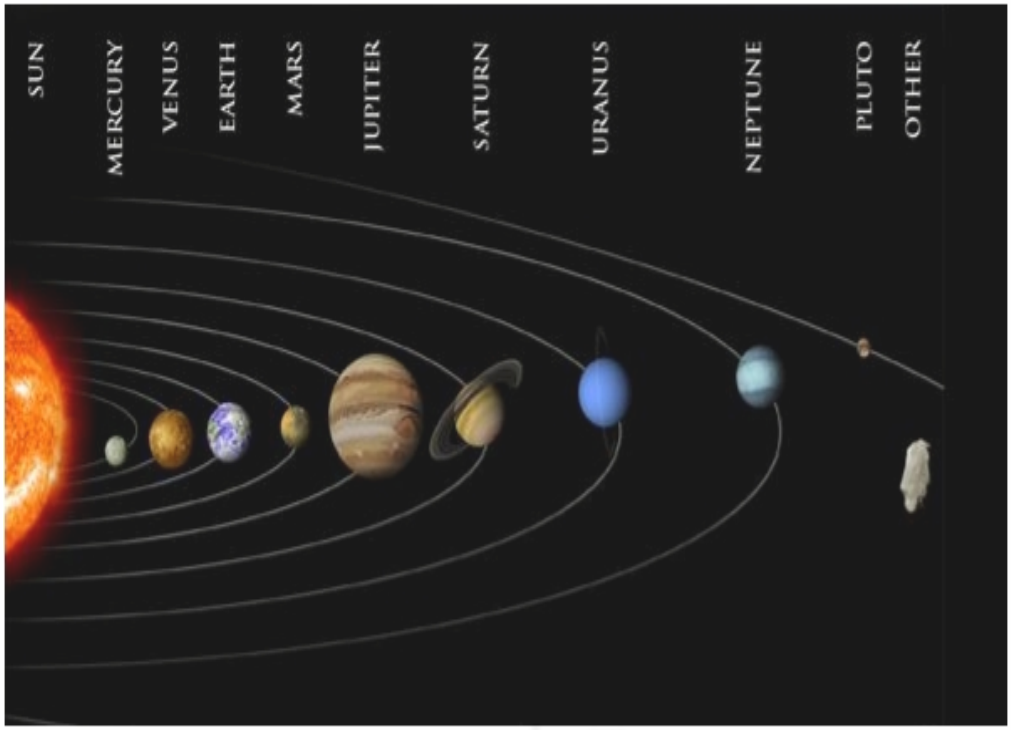


Fig 5.10: Solar System

Source : http://centros1.pntic.mec.es/cp.alcarria/solar_system.jpg

If you look around, you will find wide variety of charts being used. The different types of charts are-

1) **Process charts** – which are used to show steps in a process. Life cycles of insects, energy cycles, etc are shown as cyclical processes. Stepwise making of a slide box or any other object may also be shown with the help of process chart.

2) **Organizational chart** – are used to represent functional relation among the different components in our organization whether manmade or natural. Food chain, administrative hierarchy in institution, etc. can be shown on organizational chart.

3) **Time Chart** – are used to represent events, occurrences in chronological sequences. Evolution of human beings, political empires, etc can be shown using time chart, which helps learners compare and contrast events in relation to time. It is very important for wholistic comprehension of the topic or subject under study.

4) **Tabular chart** – represents data in tabular form for easy comparison and understanding. For example, types of crops, plants, etc. are represented in tabular form, which makes comprehension easier.

5) **Tree chart** – shows growth and development from single source to many branches like in a tree. In a time chart, it is generally a single line representation whereas in a tree chart many branches are there like a tree. For example, family tree is a familiar example.

6) **Stream chart** – is opposite to tree chart wherein may branches come together to converge into a single stream. For example – many rivers like Yamuna fall in Ganga, which then flows down to fall in the sea.

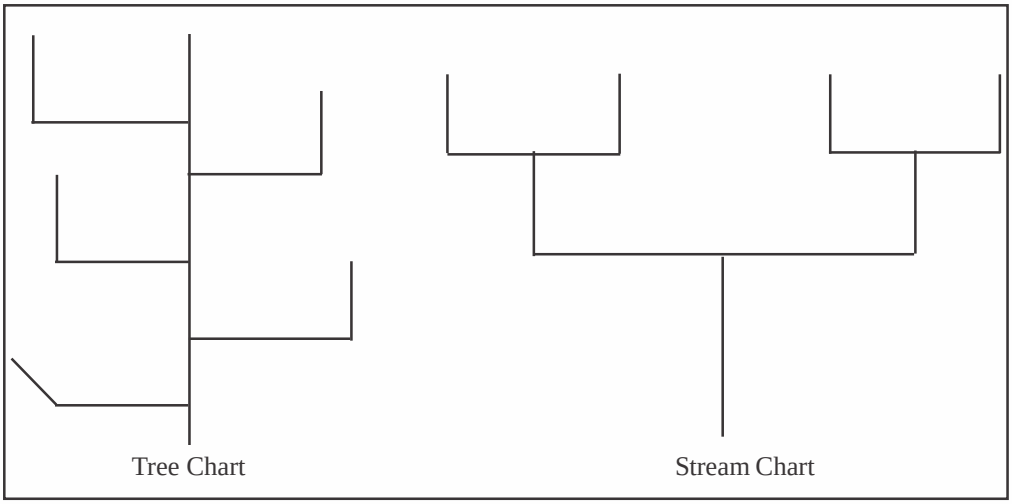


Figure 5.11: Examples of Tree and Stream Charts

Source: IGNOU (2000)

7) Sequence Charts or Flip Charts are collection of charts like flip charts used to show many events or series of events in succession.

The flip chart is like a calendar with a sheet each for twelve months. As the month changes the sheet is flipped over. Actually, flip chart consists of several charts arranged in a sequential order and fastened together at one end with this spiral, metal or wooden strip. (IGNOU, 2000)

5.7.2 Maps

Fig 5.12: A Topographical Map of India

Source: http://en.wikipedia.org/wiki/File:India_topo_big.jpg

You must have used maps to find your way to a new place. Google maps have become almost indispensable finding our way around places. Maps are scaled down representations of the real earth's surface on paper. Every map is symbolized summary of earth's surface; therefore, it provides information in condensed form. The symbols used are through lines, dots, colours, words and signs.

Maps are useful tool in every discipline. In social science, it is very important for learning geographical, historical, and economical concepts. Details in map at elementary level are kept simple enabling learners to locate places, different physical features and to read directions.

Maps are broadly classified into following categories:

- **Physical Maps**, which show climate, soil, forest areas, resources, rainfalll, etc.
- **Political Map** which show political divisions of countries and places.
- **Economic Maps** are those maps showing the crop distribution, land use, transport, etc.
- **Social Maps**, show demographic distribution, in country. The literacy rate, language, tribes etc. are shown on maps for easy comprehension.
- **Historical Maps** show boundaries, of the empires, routes taken by travelers, places of war, treaties, etc.

Map reading skills should be taught to students. Some significant aspects of map reading skills are: symbols of places; location of places – longitude, latitude; different physical features – land form, water form; human factors; climate and resources; distances; transportation.

Activity

Go to Google maps (https://maps.google.co.in/?hl=en). Find out the location of your school. Also find out the route from your school to your home

Check Your Progress

Notes: a) Write your answers in the space provided.

b) Compare your answers with the one given at the end of the unit.

3) Distinguish between Map and Chart.

.....

.....

.....

.....

.....

.....

.....

.....

4) What are the various types of Maps?

.....

.....

.....

.....

.....

5) Draw an example of process chart.

.....

.....

.....

.....

.....

5.7.3 Models

Model is recognizable imitation of real thing (eyes) or abstract thing (magnetic). Usually a model is similar to the original object in every aspect except the size. The size of an object may be reduced or enlarged. When size is reduced, the object is simplified to show only the essential parts. For example, globe is model of earth simplified to show earth's essential parts only. On the other hand, when size is enlarged, it shows the details of the object. For example, model of eye is enlarged to allow all the details to be seen easily and clearly.

Fig 5.13 : Model of Eye

Source: http://www.keystone.fi.edu/photos/nikidonato/001.jpg

Models are useful as these:

- Simplifies difficult concepts.
- Reduce large objects to a conveniently observable size.
- Demonstrate interior structure of an object or system.
- Help learners to understand difficult part of object or system.

It simplifies difficult concepts, processes or complex situations by focusing on essential features only and eliminating complex details, which may hinder in understanding the concept. Models are useful teaching learning resources. While using models certan points need to be to the taken care of-

- Models should be large enough to be seen easily by everyone in the class.
- Models may be supplemented with other teaching learning resources like chart to help leaners understand the relationships.
- If it is working Model – check before you use in your class.
- Leaners should be allowed to touch the model and feel it for effective learning.
- True colour should be used in models for realistic learning. It also makes the model more eye-catching.

Model can be of two types:

1) **Stationary or Non-working Model-** Stationary or non-working model is the type of model in which all the parts of model are stationary i.e there is no movement. It is easier to make and is widely used as teaching learning resource, for eg. Model of eye is a non-working model.
2) **Working Model-** Working Model is a model in which either all or some parts are moving to show the process in the system. They appear interesting to learners. Solar system where all planets revolve around Sun is an example of working model.

Preparation of models

The following standard techniques may be used to prepare models (IGNOU, 2000)

- Use cheap materials such as cardboard, wood and are to prepare static models like models of a dam, a building and the like.
- Use materials like modelling clay and plastic line to produce realistic models of living creatures, organs of a human body, etc.
- Use materials like plaster of paris and paper mache to produce a physical map of a continent, or a country, or landscape of a particular area.

5.7.4 Poster

Poster is symbolic representation of a single idea. As a single idea is depicted posters are usually bold, eye-catching to attract learners for giving a message. Posters have both visual and textual components. Visual component is to attract the attention of learner and thus has to be colourful and eye-catching. Text is used to convey message related to visual and is called ‘Caption’. Caption conveys the important message and the visual is to attract attention and therefore to support

the message to be converged. Ministry of Health for generating awareness regarding Rural Health.

Fig 5.14 Poster on National Rural Health Mission

(Source: http://commons.wikimedia.org/wiki/File:Nrhm_logo.jpg#)

Posters show creativity in their designing and development. In addition, various Ministries release attractive posters regularly for generation of awareness.

Activity

A) Find out the various posters published by Sarva Shiksha Abhiyan (SSA).

B) Give a Caption to the following Poster.

(Source: http://www.ssapunjab.org/images/1.jpg)

5.7 .5 Puppets

Puppets are a very useful media in the teaching of history, drama, and literary topics. They are available in the market or can be prepared locally according to the requirements. Puppets can be made of cardboard, cotton, colour and other locally available materials. They are used to dramatise any historical events like war, life of people during a particular historical period etc.

Check Your Progress

Notes: a) Write your answers in the space provided.

b) Compare your answers with the one given at the end of the unit.

Tick on the right option-

1) Poster

a) represents Earth's surface

b) Has only textual message

c) Is a type of flip chart

d) Is symbolic representation of a single idea.

7) Distinguish between the two types of Models.

.....

.....

.....

.....

.....

5.8 PROJECTED TEACHING LEARNING RESOUCES

5.8.1 Overhead Projector (OHP)

Fig 5.15: Over Head Projector

Source: http://i.classificadosmil.com.br/i-a/Ltxd-14.jpg

Overhead Projector (OHP) helps in displaying still visual material as projection on a screen. It is a simple projector which is very easy to operate and therefore, popular among teacher. It is better than using chalkboard as it helps teacher to talk and show visuals at the same time. As a teacher, you can observe the reaction of students and interact with them. It also helps in saving time as you can use these visuals / transparencies again and again. OHP does not require a darkened room and is easy to handle and transport from one classroom to another.

You need to use visual material either textual or pictoral by preparing transparencies.

Transparencies need to be designed and developed for achieving the objectives of the teaching-learning. There are two forms of OHP transparencies. One is single transparency. If you want to use ten transparencies, then you may have to make ten single transparencies. Second is using a continuous roll of OHP transparencies. As you proceed with your classroom teaching, you unroll and show it over OHP platform.

Single transparency – Thick transparent Acetate sheets are used to display visual or textual material while talking in class. They can be stored in boxes with blank sheets of paper in between two transparencies to ensure that they do not stick together.

Continuous roll – OHP has provision of winding acetate rolls from one end to other. You may start from one end to use it as you proceed through the class. Some may use it in lieu of chalkboard. Some may use it for calculation, derivations, etc. Roll may also be used where visuals need to be shown in continuity for better comprehension.

Points to be kept in mind while preparing OHP slides.

1) As blank acetate sheets are slightly larger than the top glass frame of OHP. You should leave margin on all four sides.
2) Prepare slides in landscape or horizontal position. If you need to use in portrait or vertical position, try not to use bottom 1/3rd portion.
3) Use water-soluble or permanent marker pens according to context. When the slides are to be reused again, use of permanent pens are preferred, whereas for one time use of water-soluble pens are preferred.
4) Bold strong colours like Black, Red, Blue, and Green are preferred as they provide good contrast on transparent sheets.
5) Preferably eight lines should be written per transparency and eight words per line. This makes it readable with naked eye from 2 meters enabling students sitting at the back to read it clearly.
6) Ensure that all students can see the whole screen. Larger the screen used better is the projection showing the details.
7) While teaching progressive disclosure of the slides should be used. The transparency is totally covered with paper. You reveal the portion being discussed in class progressively as the classroom teaching proceeds. This helps the learners in concentrating on the topic being discussed and keeps alive the curiosity about the next point to be discussed.
8) You should face the class while explaining a concept with help of OHP slide. The presentation speed should be controlled.
9) Use pointer to focus on point being discussed.
10) Switch off projector when not needed.

5.8.2 Slides

A slide is a film transparency contained in a frame or mount. When pictures, diagrams, specimens, etc are to be shown to students, they can be mounted on slides and projected on screen by the use of slide projectors or viewer. Slides are a versatile medium. They are easy to arrange and rearrange to meet a variety of instructional needs. There are several ways of preparing slides. Diagrams, pictures, graphs, and illustrations can be drawn on a glass slide using ink or by enclosing them between two glass slides (of 120 mm) and binding them together. A micro-specimen can be projected by mounting it on a slide (e.g. blood). These are usually projected, using an epidiascope. An epidiascope is also used to project opaque objects like a page book or a small three-dimensional specimen. Slides

of 35 mm can be prepared by photographing objects, pictures, events, landscapes, etc. and by getting a dia-positive mode. An over exposed scrap film negative can be used to make/ethnic a needle on it. Another way of improving it is to project photographic negatives, which is much cheaper in comparison to a dia-positive. Now-a-days, it is possible to use a computer to design and produce photographic slides.

The slides have to be projected in a dark room. Since it is a visual medium, back-ground commentary on the content of the slides may be necessary. The teacher can make the commentary while showing the slides or it can be pre-recorded and played on the tape recorder along with the projection. But this has to be synchronized, i.e. the commentary and the visuals should match one another. A machine called synchronizer can be attached to the automatic slide projector. By adjusting speed of the commentary, the commentary and visuals can be synchronized.

5.8.3 Filmstrips

A filmstrip is a length of 35 mm film containing a series of still pictures intended for projection in sequence on at a time (Gerlach and Ely, 1980). Just like slides, filmstrips can be prepared for pictures, diagrams, graph, etc. But unlike slides, there is sequential movement of filmstrips on a screen. Filmstrips are projected with the help of a filmstrip projector. Filmstrips can be hooked to a tape-recorder to provide the commentary. The teacher can teach a lesson very affectively by way of stopping and moving different frames in a filmstrip. The teacher can prepare filmstrips by shooting appropriate frames in the film of a camera, and then sequencing them according to the lesson or theme he wants to deal with

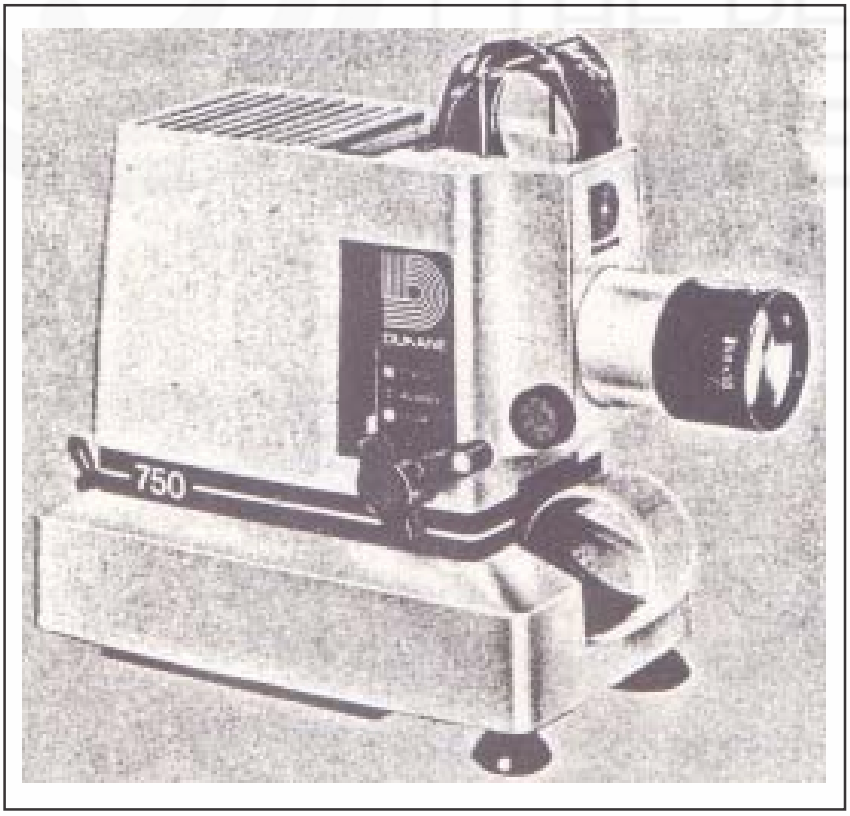


Fig. 5.16: Filmstrips projector

Check Your Progress

Notes: a) Write your answers in the space provided.

b) Compare your answers with the one given at the end of the unit.

8) Fill in the Blanks

A) OHP transparencies are made up of .....

B) OHP slides should be made in ..... position.

C) OHP helps teachers to .....while showing the visuals.

D) While using OHP progressive ..... of transparency should be done.

E) If you have to show derivation of a theorem which type of slides, you will use .....

5.9 PREPARATION OF LOW COST TEACHING LEARNING MATERIALS FROM AVAILABLE LOCAL RESOURCES

You want to use Teaching Learning Resources to teach your class. What will you do? You will go and buy it. Oh! The model and chart you want are very costly. The school has not enough budgetary provision for costly teaching learning resources. What should you do then? You also realize that you can easily design and prepare the chart with little cost.

You are right. You can easily make many teaching learning resources with the help of locally available materials. The waste materials like used wrapping papers, cardboards, etc.can be used to prepare teaching learning resources. You will be able to design and develop teaching learning resources at low cost using waste materials. Also the locally available materials can be used which will not be costly and you will be able to use teaching learning resources in your classroom teaching without financial burden. It will also give you an opportunity to involve your students in creating teaching learning resources. Let us discuss how to make teaching learning material using local resources with some examples.

A) **Making a Neighborhood Map-**You want to teach children about their neighborhood and want to use map for teaching. How to get a map of the neighborhood? It will not be available in shop. You can make map of the neighborhood with the help of help of students and community. You can request children, their parents or your neighbors to help in developing neighborhood map.

Steps –

1) Procure a large sheet of paper and coloured papers to draw the map.

2) Sit in-group and identify important and most frequented places in the neighborhood.

3) Make a list of places. Also, select pictures and symbols to represent those places like…  for house,  for doctor, etc.

4) Start from your school. Make it in the middle so that you can map the surrounding neighborhood. Indicate the roads and important places in vicinity.

5) Then you can move around in Maps and make the important places and the roads connecting.

6) You will get a neighborhood map to teach your learners.

7) The map will help you in teaching Neighborhood to children in your class. It will generate their interest as it reflects the learner's own lives. Thus, you are able to use Map at a very low cost.

8) Maps can be used for community's natural resources; level of education; out of schoolchildren, etc.

8) Flannel Board

Flannel boards can be used in classrooms in variety of situations. Advantage of using a Flannel board is that it provides flexibility of using material to teach students.

Steps in making the flannel Board:

- A plywood board of desired dimension should be obtained.
- Cloth like Velvet, Wool blanket or any other hard textured cloth can be used. The cloth needs to be stretched and fixed on the board with the help of nails.
- Flannel boards are used to display pictures, messages. You can add, move the pictures easily on flannel board.
- For pictures to stick on flannel board a small piece of sand paper or two-way tape should be used on the back of the pictures.

A) Low cost Experimental Aids

i) Expansion of Gases- A simple experiment to show this can be made from a fused bulb, a balloon, a candle and a match stick.

Steps-

- Remove inner content of fused bulb. Ensure that no sharp edges are left.
- Fix a balloon on the open end of the bulb
- Heat the bulb.
- The gases expand and thus the balloon will blow up.

ii) Expansion of Liquid can also be demonstrated. You will need additionally, to earlier experiment of gases, a cork and an empty ball point refill .

Steps-

- Empty fused bulb.
- Fix an empty ball point refill inside the cork.
- Fill the bulb with colored water as expansion will be more visible in coloured water.
- Fix the cork on the bulb.
- Heat the bulb.
- You will see the water over flowing through the refill. This shows that gases expand on heating.

iii) Use of Cardboards- Cardboards may be effectively in teaching concepts in Math. Shapes, sizes, addition, subtraction, multiplication, fraction, etc, can be taught using cardboards.

iv) Use of Match Sticks – Match sticks may also be used for teaching children geometrical shapes. Two sticks may be joined by a bicycle valve tube or any other narrow tube material.

The above examples are suggestive list of low and no cost teaching and learning materials. You can try to make a large number of teaching learning resources at home at no or very little cost. You only have to let your imagination run free and you will realize that you have a basket full of teaching learning resources to choose and use.

Check Your Progress

Notes: a) Write your answers in the space provided.

b) Compare your answers with the one given at the end of the unit.

9) Why should we make teaching learning resources at low or no cost?

.....

.....

.....

.....

.....

.....

.....

5.10 SHIFT FROM NON-DIGITAL TO DIGITAL TEACHING-LEARNING RESOURCES

We have discussed various non-digital teaching-learning resources which are used by classroom teachers in most of our schools. Although non-digital teaching-learning resources like textbook, pictures, charts, models, etc. are still being used by our classroom teachers, with the advent of digital devices or tools, many of these non-digital teaching-learning resources can be presented to students

during classroom teaching with the help of digital devices. For example, charts and diagrams can be prepared with the help of MS PowerPoint. Now-a-days, many schools are equipped with LCD Projector instead of Over Head Projector (OHP). Now, audio and video programmes can be developed by a teacher or a student with a smart mobile. Pictures and models can be developed with the help of a computer. Therefore, there is now a gradual shift from use of non-digital teaching-learning resources to digital teaching-learning resources. We will discuss in details about digital teaching-learning resources in the next Unit.

5.11 LET US SUM UP

Teaching learning resources are designed and developed towards achieving the learning objectives. Teaching learning resources are, therefore, tools, which are used by teachers to help learners to learn concept with ease and efficiency. The role of teaching learning resources in the classroom is to make learning real, practical and fun for children. Teachers use teaching learning resources to illustrate or reinforce a skill, fact or idea. Teaching learning resources also help in bringing novelty and freshness in classroom teaching as they relieve learners from anxiety, fear and boredom. They help to provide a range of learning experiences to learners from direct to indirect. Teaching learning resources are used to enhance the learning of students in classrooms. A teacher uses them to make teaching learning effective. They also help learners achieve the learning outcomes after classroom teaching and learning. Some reasons to use teaching learning resources in classroom are:

- Motivate Learners.
- Longer Retention of Information.
- Wholistic on Integrated Learning
- Organizing Classroom Teaching
- Facilitate change in Attitude.
- Application of theoretical knowledge into practical applications.
- Making learning fun in the classroom.
- Facilitate the concept formation and attainment among children.

Therefore, use of teaching learning resources in classroom teaching is an essential aspect about which you should focus your attention while designing and developing your lesson.

Non digital teaching learning resources, as the name suggests, means those teaching learning resources which are developed by a teacher or any other individual, not with the help of digital technology. Prior to the availability of digital mediums like computer, Mobile, Internet, etc. a teacher used to take the help of teaching-learning aids developed by him/her in his/her teaching activities. There are a variety of non-digital teaching learning resources to choose from depending on the context, level of learner and availability.

You can easily make teaching learning resources with the help of locally available materials. The waste materials like used wrapping papers, cardboards, etc. can be used to prepare teaching learning resources. This way you will be able to design and develop teaching learning resources at low or almost no cost. Also

the locally available materials can be used which will not be costly and you will be able to use and teaching learning resources in your classroom teaching and share them with others without financial burden.

5.12 SUGGESTED READINGS AND REFERENCES

- http://www2.education.ualberta.ca/staff/olenka.Bilash/best%20of%20bilash/Images/dalescone2.gif
- Lal, H. (2011). *Manual of Low Cost Technological Aids*. Faridabad: Sai Publications.
- Kumar, k L (1996). *Educational Technology*. New Delhi: New Age International.
- http://en.wikipedia.org/wiki/Open_educational_resources
- IGNOU (2000) Unit 5: *Instructional Media and Materials-1*, ES-361: Educational Technology: State of the Art. New Delhi: IGNOU.
- IGNOU (2013) Unit 8: *Teaching-learing Materials* of BES-002: Teaching, Learning and Assessment, New Delhi: IGNOU
- http://www.egyankosh.ac.in/bitstream/123456789/33122/1/Unit10.pdf
- http://www.egyankosh.ac.in/bitstream/123456789/33123/1/Unit11.pdf
- http://www.ischool.zm/media/ptddl_m1_wholemodule.pdf
- http://www.sil.org/lingualinks/literacy/referencematerials/glossaryofliteracyterms/whatisateachingaid.htm
- http://georgeyonge.net/sites/georgeyonge.net/files/Lesontwerp_Ch5.pdf
- http://www2.unescobkk.org/elib/publications/nonformal/M5.pdf

5.13 ANSWERS TO CHECK YOUR PROGRESS.

1) Teacher can make the class interesting by using teaching learning resources. They motivate learners and make learning fun. Teaching learning resources help in longer retention of information and facilitate change in attitude. They further facilitate the concept formation and attainment among children.

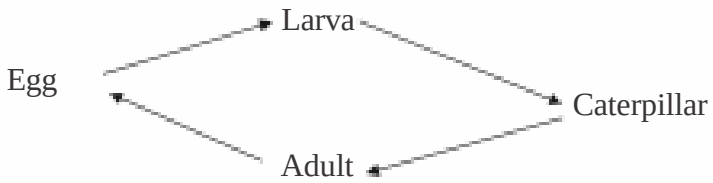
2) a) Self-instructional Materials
   b) Textbook
   c) Workbook and Copybook
   d) Newspapers and Magazine
   e) Simulation and Case Report

3) Map is a scaled down representation of real earth's surface on paper whereas chart is diagrammatic representation of any system, process or any other thing.

4) Various types of charts are
   - Physical Maps, which show climate, soil, forest areas, resources, rainfall, etc.
   - Political Map which show political divisions of countries and places.

- Economic Maps are those maps showing the crop distribution, land use, transport, etc.
- Social Maps, show demographic distribution, in country. The literary rate, language, tribes etc. are shown on maps for easy comprehension.
- Historical Maps show boundaries, of the empires, routes taken by travelers, places of war, treaties, etc.

5) Process chart of a butterfly



6) A) d.

7) The two types of models are Stationary or non-working Model and working model.

8) a) Acetate sheets
   b) Landscape
   c) talk
   d) disclosure.
   e) Continuous roll.

9) Teaching learning resources can be easily made from low cost from used or locally available resources. On one hand it helps in motivating and orienting learners towards local resources. It also helps in saving environment because resources are not wasted but recycled for good cause.