Chapter 4

Presentation, Analysis and Interpretation of Data

4.0.0 Introduction

This chapter discusses the findings based on the stated methodology of this research. Once the study has been conducted, the next step involves the recording of results which should be such that it conveys the results of the whole study in sufficient details. This arrangement is done so as to enable each reader to comprehend the data and to determine the conclusion. Data collected by the administration of tools is raw in nature. These data needs to be analyzed and interpreted for drawing sound conclusions. Organization of data includes edition, classification and tabulation of the information. Thus, the purpose of analysis is to summarize the completed observation in such a manner that they yield answer to the researcher for the broader meaning of these answers by linking them to other available knowledge. Thus in brief, analysis of data refers to the study of the organized material in order to discover inherent facts; further the data are studied from various angles for accessing the new facts.

This chapter presents data analysis and interpretation. The unintelligible mass of data is given in some significant and understandable form and then thoroughly analyzed. Analysis is hardly complete without interpretation coming into play and therefore, all the figures and tables are explained in the context of the theory on which the study was based. So finally, the research work is carried out to appease a query and to march ahead on the road of progress and development. Results of the research, thus constitute the final step, through which answer to the inquisitions are sought. The analysis and interpretation is done on the basis of research design given in previous chapter. Presentation of data and its analysis is as follows:

4.1 Content analysis of VIII class science book

4.2 Development of LAP for selected concepts

4.3 Effectiveness of LAP with reference to students’ achievement

4.4 Effectiveness of LAP with reference to students’ opinion
4.1 Content analysis of VIII class science book

Hypothesis 1. Concept could be identified for Upper Primary level Science content

In the present study, researcher attempted to analyze the content of General Science at Upper Primary level. The overall intent of the study is to analyze the content of General Science at Upper primary level and develop the self-learning activity package for students. For this purpose, the General Science text book of class 8th published by “National Council for Educational Research and Training” is selected for the study. A detailed content analysis of the text book of General Science at Upper Primary level is done and concepts are identified in each chapter of the book. There are eighteen chapters in General Science book of class 8th. Each chapter is analyzed to identify the concepts. Approximately total 339 concepts are identified in all eighteen chapters. After identifying the concept from all chapters the researcher selected randomly (almost 5%) concepts for the preparation of Learning Activity Package. So, it can be concluded that concepts could be identified for Upper Primary level science content.

4.2 Development of LAP for selected concepts

4.2.1 The LAP could be developed for learning of science concepts

Sub-hypothesis 4.2.1. Objectives could be determined in LAP for learning of science concepts.

Presentation of objectives for concept learning

The researcher formulates the objectives for each concept. The objectives are based on knowledge, understanding, application and skill. Each concept has its own specific objectives. All these objectives are determined for learning of concepts. These objectives are given below for selected concepts.
<table>
<thead>
<tr>
<th>Concept 1 Agriculture practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge:</td>
</tr>
<tr>
<td>➢ Student will be able to recall the meaning of Agriculture methods.</td>
</tr>
<tr>
<td>➢ Students will be able to recognize the various forms of Agriculture methods.</td>
</tr>
<tr>
<td>➢ Students will be able to recognize the difference between tradition and modern techniques of Agriculture methods.</td>
</tr>
<tr>
<td>Understanding</td>
</tr>
<tr>
<td>➢ Students will be able to give the example of various techniques of Agriculture methods.</td>
</tr>
<tr>
<td>➢ Students will be able to explain the process of Agriculture methods.</td>
</tr>
<tr>
<td>➢ Students will be able to describe the difference between tradition and modern techniques of Agriculture methods.</td>
</tr>
<tr>
<td>➢ Students will be able to explain the benefits of modern techniques of Agriculture methods.</td>
</tr>
<tr>
<td>Application</td>
</tr>
<tr>
<td>➢ Students will be able to describe the various techniques of Agriculture methods in daily life.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Concept 2 Micro organisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge:</td>
</tr>
<tr>
<td>➢ Students will be able to recall the meaning of micro-organism.</td>
</tr>
<tr>
<td>➢ Students will be able to recognize the various types of micro-organisms.</td>
</tr>
<tr>
<td>➢ Students will be able to recognize the structure of micro-organisms.</td>
</tr>
<tr>
<td>Understanding</td>
</tr>
<tr>
<td>➢ Students will be able to explain the definition of micro-organism.</td>
</tr>
<tr>
<td>➢ Students will be able to gives the examples of different types of micro-organisms.</td>
</tr>
<tr>
<td>➢ Students will be able to describe the types of micro-organisms.</td>
</tr>
<tr>
<td>➢ Students will be able to differentiate between the beneficial and harmful micro-organisms.</td>
</tr>
<tr>
<td>Application</td>
</tr>
<tr>
<td>➢ Students will be able to describe the importance of beneficial micro-organisms in daily life.</td>
</tr>
<tr>
<td>Skill</td>
</tr>
<tr>
<td>➢ Students will be able to draw the clean and well label diagram of beneficial and harmful micro-organisms.</td>
</tr>
</tbody>
</table>
Concept 3. Fibers

Knowledge:

- Students will be able to recall the meaning of fibers.
- Students will be able to recognize the various types of fibers.
- Students will be able to recognize the composition of different types of fibers.

Understanding

- Students will be able to explain the meaning of fibers.
- Students will be able to give the examples of different types of fibers.
- Students will be able to differentiate between the natural and artificial fibers.
- Students will be able to explain the use of fibers.

Application

- Students will be able to describe the use of fibers in daily life.

Skill

- Students will be able to prepare the list of the natural and artificial fibers.

Concept 4 Materials

Knowledge:

- Students will be able to recall the meaning of material.
- Students will be able to recognise the various types of materials.
- Students will be able to recognise the properties of materials.

Understanding

- Students will be able to explain the meaning of material.
- Students will be able to give the examples of different types of materials.
- Students will be able to differentiate the metallic and non-metallic material.
- Students will be able to give the examples of metallic and non-metallic materials.
- Students will be able to explain the properties of materials.

Application

- Students will be able to understand the importance of materials in daily life.

Skill

- Students will be able to prepare the table of metallic and non-metallic materials.
Concept 5 Fuel

Knowledge:

- Students will be able to recall the meaning of Fuel.
- Students will be able to recognise the products of Fuel.
- Students will be able to recognise the use of Fuel.

Understanding

- Students will be able to explain the formation of Fuel.
- Students will be able to describe the different types of Fuels.
- Students will be able to give the examples of products of Fuels.

Application

- Students will be able to describe the importance of Fuel in daily life.

Skill

- Students will be able to categorize different products of Fuel.

Concept 6 combustion

Knowledge:

- Students will be able to recall the meaning combustion.
- Students will be able to recognize the various types of combustions.
- Students will be able to recognize the structure of flame.

Understanding

- Students will be able to explain the meaning of combustion.
- Students will be able to give the examples of different types of combustions.
- Students will be able to describe the types of combustions.
- Students will be able to explain the structure of flame.
- Students will be able to explain the use of combustion.

Application

- Students will be able to describe the importance of combustion in daily life.

Skill

- Students will be able to draw the clean and well label diagram of flame.
Concept 7 Conservation

Knowledge:
- Students will be able to recall the meaning of conservation.
- Students will be able to recall the meaning of deforestation.
- Students will be able to recognize the meaning of red data book.

Understanding
- Students will be able to explain the meaning of conservation.
- Student will be able to describe the reasons of deforestation.
- Students will be able to explain the process of recycling of paper.

Application
- Students will be able to describe the importance of conservation in daily life.
- Students will be able to describe the benefits of recycling of paper.

Concept 8 Cell

Knowledge:
- Students will be able to recall the meaning of cell.
- Students will be able to recognize the various types of cells.
- Students will be able to recognize the structure of cell.

Understanding
- Students will be able to explain the various types of cells.
- Student will be able to give the examples of different types of cells.
- Students will be able to describe the structure of cell.
- Students will be able to differentiate between the plant cell and animal cell.
- Students will able to explain the functions of cell.

Application
- Students will be able to describe the importance of cell in living organisms.

Skill
- Students will be able to draw a clean and well labelled diagram of cell.
Concept 9 Reproduction

Knowledge:
- Students will be able to recall the meaning of reproduction.
- Students will be able to recognize the various types of reproduction.
- Students will be able to recognize the reproductive organs.
- Students will be able to recall the types of reproduction.

Understanding
- Students will be able to describe the various types of reproduction.
- Students will be able to explain the process of reproduction.
- Students will be able to differentiate the various types of reproduction.

Application
- Students will be able to describe the importance of reproduction in living organism.

Skill
- Students will be able to draw the clean and well labeled diagram of reproductive organs.

Concept 10 Adolescence

Knowledge:
- Students will recall the meaning of adolescence.
- Students will recognize the changes during adolescence period.
- Students will recognize the role of hormones.
- Students will recall the characteristic of reproductive health.

Understanding
- Students will be able to explain the changes during the adolescence.
- Students will be able to describe the role of hormones in reproduction.
- Students will explain the process of sex determination.
- Students will be able to explain the characteristics of reproductive health.

Application
- Students will be able to describe the importance of reproductive organs in human beings.

Skill
- Students will be able to draw a clean and well labeled diagram of sex determination.
Concept 11 Force

Knowledge:

- Students will be able to recall the meaning of force.
- Students will be able to recognize the conditions of force.
- Students will be able to recognize the types of force.

Understanding

- Students will be able to explain the effects of force.
- Students will be able to give the examples of different types of force.
- Students will be able to describe various types of force.
- Students will be able to differentiate various types of forces.

Application

- Students will be able to describe the importance of force in daily life.

Concept 12 Friction

Knowledge:

- Students will be able to recall the definition of friction.
- Students will be able to recognize the effecting factors of friction.
- Students will be able to recall the work of friction.

Understanding

- Students will be able to explain the friction.
- Students will be able to give the examples of different type of friction.
- Students will be able to describe the types of friction.
- Students will be able to differentiate the advantages and disadvantages of friction.

Application

- Students will be able to describe the importance of friction in daily life.

Skill
Concept 13 Sound

Knowledge:
- Students will be able to recognize the reasons of sound.
- Students will be able to recall the components of sound.
- Students will be able to recognize the types of sound.

Understanding
- Students will be able to give the reasons of sound.
- Students will be able to explain the components of sound.
- Students will be able to describe the types of sound.
- Students will be able to explain the reasons of sound pollution.

Application
- Students will be able to describe the importance of sound in daily life.

Concept 14 Electricity

Knowledge:
- Students will be able to recall the characteristics of electricity.
- Students will be able to recognize the effect of electricity.

Understanding
- Students will be able to explain the characteristic of electricity.
- Students will be able to give the examples of electricity.
- Students will be able to describe the effects of electricity.

Skill
- Students will be skilled in the use of electrical appliances.
Concept 15 Earthquake

Knowledge:

- Students will be able to recall the meaning of earthquake.
- Students will be able to recall the reasons of earthquakes.
- Students will be able to recognize the safety from earthquake.

Understanding

- Students will be able to explain the meaning of earthquake.
- Students will be able to give the reasons of earthquake.
- Students will be able to describe the process of earthquake.
- Students will be able to explain the safety methods for earthquake.

Application

- Students will be able to apply safety methods for earthquake in daily life.

Concept 16 Light

Knowledge:

- Student will be able to recall the meaning of light.
- Students will be able to recognize the characteristics of light.

Understanding

- Students will be able to explain the characteristics of light.
- Student will be able to explain the law of reflection.
- Students will be able to describe the formation of figure.

Application

- Students will be able to describe the importance of light in daily life.
Concept 17 Solar System

Knowledge:
- Students will be able to recall the meaning of solar system.
- Students will be able to recognize the composition of solar system.
- Students will be able to recognize the meaning of artificial satellite.

Understanding
- Students will be able to explain the composition of solar system.
- Students will be able to give the examples of solar system.
- Students will be able to explain the importance of solar system.
- Students will be able to describe the artificial satellite.

Application
- Students will be able to describe the importance of solar energy in daily life.

Concept 18 Pollution

Knowledge:
- Students will be able to recall the meaning of pollution.
- Students will be able to recognize the various types of pollution.
- Students will be able to recognize the causes of pollution.

Understanding
- Students will be able to explain the types of pollution.
- Students will be able to describe the effects of pollution.
- Students will be able to describe the treatment of pollution.

Application
- Students will be able to describe the effect of pollution in daily life.

Skill
- Students will be skilled to prevent the effect of pollution.
Sub-hypothesis 4.2.2 Learning activities can be developed in LAP for learning of science concepts.

The researcher developed different learning activities for learning of related concepts. These learning activities include videos, ppt., animation, audio and picture presentation. The presentation of activities is simple and in feasible language with effective images, clear sound, clear pronunciations and good correlation between content and activities. Each concept has own specific objectives. The nature of activities depends on the objectives for selected concepts. These learning activities have different ways of learning according to individual differences. The learning activities which are prepared by the researcher are given below concept wise in table.

Table 4.1 Shows learning activities for LAP

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Concept</th>
<th>Learning Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Agricultural Practices</td>
<td>ppt., Picture presentation, text, Video</td>
</tr>
<tr>
<td>2.</td>
<td>Micro organism</td>
<td>ppt., Picture presentation, text, Video</td>
</tr>
<tr>
<td>3.</td>
<td>Fiber</td>
<td>ppt., Picture presentation, text</td>
</tr>
<tr>
<td>4.</td>
<td>Materials</td>
<td>ppt., Picture presentation, text, Video</td>
</tr>
<tr>
<td>5.</td>
<td>Fuel</td>
<td>ppt., Picture presentation, text, Video</td>
</tr>
<tr>
<td>6.</td>
<td>Combustion</td>
<td>ppt., Picture presentation, text</td>
</tr>
<tr>
<td>7.</td>
<td>Conservation</td>
<td>ppt., Picture presentation, text</td>
</tr>
<tr>
<td>8.</td>
<td>Cell</td>
<td>ppt., Picture presentation, text, Video</td>
</tr>
<tr>
<td>9.</td>
<td>Reproduction</td>
<td>ppt., Picture presentation, text, Video</td>
</tr>
<tr>
<td>10.</td>
<td>Adolescence</td>
<td>ppt., Picture presentation, text, Video</td>
</tr>
<tr>
<td>11.</td>
<td>Force</td>
<td>ppt., Picture presentation, text</td>
</tr>
<tr>
<td>12.</td>
<td>Friction</td>
<td>ppt., Picture presentation, text</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Learning activities have been shown in table (4.2) for each selected concept. For concept no. 1, 2, 4, 5, 9, 10, 13, 14, 16, 17 activities are in the form of ppt+ picture presentation+text+video. For concept no. 3, 6, 7, 11, 12, 15, 18 activities are in the form ppt+ picture presentation+text. For all concepts learning activities in LAP are presented in CD and there are 3 concepts for which learning activities are presented here.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>13.</td>
<td>Sound</td>
<td>ppt., Picture presentation, text, Video</td>
</tr>
<tr>
<td>14.</td>
<td>Electricity</td>
<td>ppt., Picture presentation, text, Video</td>
</tr>
<tr>
<td>15.</td>
<td>Earthquake</td>
<td>ppt., Picture presentation, text.</td>
</tr>
<tr>
<td>16.</td>
<td>Light</td>
<td>ppt., Picture presentation, text, Video</td>
</tr>
<tr>
<td>17.</td>
<td>Solar system</td>
<td>ppt., Picture presentation, text, Video</td>
</tr>
<tr>
<td>18.</td>
<td>Pollution</td>
<td>ppt., Picture presentation, text.</td>
</tr>
</tbody>
</table>

**Concept no. 2 (Micro Organism)**
TYPES OF MICROORGANISMS

There are four types of microorganisms. They have different shapes. The details are given in this video.

LIVING PLACE OF MICROORGANISMS

Microorganisms can survive under all types of environment, ranging from ice cold climate to hot springs and deserts to marshy lands. They are also found inside the bodies of animals including humans. Some microorganisms grow on other organisms while others exist freely. Microorganisms like amoeba can live alone, while fungi and bacteria may live in colonies.

FRIENDLY MICROORGANISM

In Food
- Bacteria grow in milk to make it ‘go off’.
- This type of bacterial growth is used to make milk into yoghurt.
- Cheese is another product that is made from milk.

PREPARATION OF MILK PRODUCTS

- Lactobacillus Bacteria promote formation of milk products like curd, cheese.
- This bacteria multiplies in milk to form curd.

MAKING OF BAKERY PRODUCTS

- Making of bakery products like bread, cakes.
- Yeast produces rapidly and produces carbon dioxide respiration.

YEAST IS A TYPE OF FUNGUS AND CARRIES OUT RESPIRATION. THE RESPIRATION OF THIS MICROBE CAN BE USED IN DIFFERENT WAYS IN BAKING BREAD AND IN BREWING.

- The aerobic respiration of yeast is used to make bread rise.
- Yeast uses the sugar in bread dough to carry out aerobic respiration:

**glucose + oxygen → carbon dioxide + water + energy**

THE ANAEROBIC RESPIRATION OF YEAST IS USED TO MAKE BEER AND WINE.

In this case, the yeast respires without oxygen and produces alcohol (ethanol). This process is known as fermentation.

Yeast converts the sugar into alcohol by anaerobic respiration:

**glucose → carbon dioxide + ethanol + energy**

COMMERCIAL USE OF MICROORGANISMS

- Microorganisms are used commercially for the production of wine, alcohol and acetic acid.
- Yeast is grown on natural sugars present in grains like barley, wheat.
- Yeast converts the sugar in to alcohol by the process of fermentation.
AGRICULTURAL USE

- Some bacteria and blue green algae are able to fix nitrogen from the atmosphere to enrich soil with nitrogen and increase its fertility. These microbes are commonly called biological nitrogen fixing.

CLEANING THE ENVIRONMENT

- The plant waste has been converted into manure by the action of microbes. The nutrients released in the process could be used by the plants again.
- Microorganisms can be used to degrade the harmful and smelly substances and thereby clean up the environment.

HARMFUL MICROORGANISMS

- Some of the microorganisms cause diseases in human beings, plants and animals. Such disease-causing microorganisms are called pathogens.
- Some microorganisms spoil food, clothing and leather.

PATHOGEN IN HUMAN BEING

- Pathogens enter our body through the air we breathe, the water we drink or the food we eat. They can also get transmitted by direct contact with an infected person or carried through an animal. Microbial diseases that can spread from an infected person to a healthy person through air, water, food or physical contact are called communicable diseases. Examples of such diseases include cholera, common cold, chicken pox and tuberculosis.

WAYS BY WHICH YOU GET A PATHOGEN

- Indirect Contact
  Foods and water may be contaminated
- Direct Contact

DISEASE CAUSED BY MICROORGANISMS:

- The disease caused by microbes and their severity depend on the type of microbes.

  - influenzalflu
  - measles
  - chicken pox
  - tuberculosis
  - small pox
  - tetanus
  - polio
  - cholera
  - rabies
  - typhoid

  - fungamia
  - athlete’s foot
  - Onchocerciasis (causes discoloured eye balls)

3. Transmission by animals

An animal can carry a microbe from one place to another, e.g., a mosquito which spreads the malaria parasite.

4. Transmission by contact

Many microbes can be exchanged from one person to another by direct or indirect contact:
- direct contact by hand
- indirect contact, e.g., by walking on a wet floor already contaminated by someone else who has athlete’s foot
- sexual contact

The spreading of microbes and disease is known as transmission.

1. Transmission by air

A cough or a sneeze can release millions of microbes into the air which can then infect somebody else.

2. Transmission by water

Dirty water can transmit many diseases, e.g., cholera, which can be transmitted by drinking.
How can I avoid pathogens?

- Wash your hands often so you won’t transfer bacteria to your mouth or food.
  - Warm water with soap for 20 seconds, rub hard between fingers and nails.

<table>
<thead>
<tr>
<th>Human Disease</th>
<th>Pathogen Type</th>
<th>Mode of Transmission</th>
<th>Preventive Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuberculosis</td>
<td>Bacteria</td>
<td>Air</td>
<td>Keep the patient in complete isolation. Keep the personal belongings of the patient away from those of the others.</td>
</tr>
<tr>
<td>Measles</td>
<td>Virus</td>
<td>Air</td>
<td>Maintain personal hygiene and good sanitary habits.</td>
</tr>
<tr>
<td>Chicken Pox</td>
<td>Virus</td>
<td>Air/Water</td>
<td>Causes properly cooked food and boiled drinking water. Vaccination.</td>
</tr>
<tr>
<td>Polio</td>
<td>Virus</td>
<td>Water/water</td>
<td>Drink boiled drinking water. Vaccination.</td>
</tr>
<tr>
<td>Cholera</td>
<td>Bacteria</td>
<td>Water/water</td>
<td>Use mosquito nets and repellents.</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>Virus</td>
<td>Water</td>
<td>Use mosquito nets and repellents.</td>
</tr>
<tr>
<td>Malaria</td>
<td>Protozoa</td>
<td>Mosquito</td>
<td>Use mosquito nets and repellents.</td>
</tr>
</tbody>
</table>

DISEASE—CAUSING MICROORGANISMS IN PLANTS

- Several microorganisms cause diseases in plants like wheat, rice, potato, sugarcane, orange, apple and others.
- The diseases reduce the yield of crops.
- Citrus canker is caused by Bacteria through air.

DISEASE—CAUSING MICROORGANISMS IN ANIMALS

Some Microorganism also cause diseases in animals. For example, anthrax is a dangerous human and cattle disease caused by a bacterium. Foot and mouth disease of cattle is caused by virus.

FOOD PRESERVATION

- Method of Food Preservation
- Chemical method
- Preservation of common salts
- Preservation by sugar
- Preservation by soil and vinegar
- Heat and cold treatments
- Storage and packing.

FOOD POISONING

- Food poisoning could be due to the consumption of food spoiled by some microorganisms. Microorganisms that grow on our food sometimes produce toxic substances.
**Chemical Method**

Salts and edible oils are the common chemicals generally used to check the growth of microorganisms. Therefore, they are called preservatives. We add salt or acid preservatives to pickles to prevent the attack of microbes. Sodium benzoate and sodium metabisulphite are common preservatives. These are also used in the jams and squashes to check their spoilage.

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**Preservation by Common Salt**

- Preservation by Common Salt
  - Common salt has been used to preserve meat and fish for ages. Meat and fish are covered with dry salt to check the growth of bacteria. Salting is also used to preserve amla, raw mangoes, tamarind.

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**Preservation by Sugar**

- Jams, jellies and squashes are preserved sugar. Sugar reduces the moisture content which inhibits the growth of bacteria which spoil food.

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**Preservation by Oil and Vinegar**

- Use of oil and vinegar prevents spoilage of pickles because bacteria cannot live in such an environment. Vegetables, fruits, fish and meat are often preserved by this method.

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**Heat and Cold Treatments**

- Boiling kills many microorganisms. Low temperature inhibits the growth of microbes.
- Pasteurized milk can be consumed without boiling as it is free from harmful microbes. The milk is heated to about 70°C for 15 to 30 seconds and then suddenly chilled and stored. By doing so, it prevents the growth of microbes.
- This process was discovered by Louis Pasteur. It is called pasteurization.

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**Storage and Packing**

- dry fruits and even vegetables are sold in sealed air tight.
- packets to prevent the attack of microbes.
Concept no. 7 (Animal and Plant Conservation)

CONSERVATION OF PLANTS AND ANIMALS.

Our first prime minister Jawarlal Nehru said "LIFE WOULD BE VERY DULL AND COLOURLESS IF WE DID NOT HAVE THESE MAGNIFICENT PLANTS, ANIMALS AND BIRDS TO LOOK AND PLAY WITH."

1) Deforestation :-
   - The clearing of forests and using the land for other purposes is called deforestation.
   - The causes for deforestation are :-
     - i) Procuring land for cultivation.
     - ii) Building houses and factories.
     - iii) Using wood as fuel or making furniture etc.
   - The natural causes of deforestation are forest fires and draught.

Consequences of Deforestation

(i) The decrease in carbon dioxide assimilation in the earth
(ii) Increase in the level of carbon dioxide in the atmosphere leading to the drying up of the earth
(iii) Decrease in the level of wind, soil, and rain
(iv) Disturbances in the balance of nature
(v) Decrease in the area leading to the decrease
(vi) Soil erosion and soil erosion leading to desertification
(vii) Decrease in the water-holding capacity of soil leading to floods

*The increase in temperature on the earth disturbs the water cycle and may reduce rainfall. This could cause droughts.

Fewer trees would mean that less carbon dioxide will be used up resulting in its increased amount in the atmosphere. This will lead to global warming as carbon dioxide traps the heat rays reflected by the earth.
Conservation

- By these irresponsible actions and natural calamities, many trees and plant animals became extinct.
- To prevent this, efforts to protect our flora and fauna all over the world and in particular in our country, the government has taken many measures.
- Like developing the protected areas, which provide natural habitat for endangered species, national parks, sanctuaries, and biosphere reserves are some protected areas.
- In these areas, plantation, cultivation, grazing, logging, hunting, and poaching are prohibited. Endemic species are those species of plants and animals which are found exclusively in a particular area like protected area. They are not naturally found anywhere else.

Biodiversity and Protected Areas

Biosphere is that part of the earth on which various organisms exist or which supports life. Biological diversity is the variety and variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems.

- Sanctuary: Areas where animals are protected from any disturbance to them and their habitat.
- National Park: A wild life where they will not merely use the habitats and natural resources.
- Biosphere Reserve: A large area in which natural habitat for conservation, recreation, and amenity activities and the traditional life of the local farming area.

Flora and fauna

i) Flora are the plants found in a particular area.
ii) Fauna are the animals found in a particular area.

Eg.: The flora of Sal, teak, wild mango, jamun, silver ferns etc.
- The fauna of wild dog, chital, wolf, leopard, blue bull, barking deer etc.

Endemic Species

Endemic species are those species of plants and animals found only in a particular area and not found anywhere else.

Negative Factors that have caused fearful depletion of flora and fauna

Extinct Species

These are species which are not found after searches of known or likely areas where they may occur. A species may be extinct from a local area, region, country, continent or the entire earth.

Examples of such species are the Asiatic cheetah, pink head duck.
**ENDANGERED SPECIES**
These are species which are in danger of extinction. The survival of such species is difficult if the negative factors that have led to a decline in their population continue to operate. The examples of such species are black buck, crocodile, Indian wild ass, Indian rhino, lion tailed macaque, sangat (brow antler deer), etc.

**National Park**:
National parks are areas reserved for wildlife where they can freely use the habitats and natural resources. Eg:- Satpura National Park is the first Reserve Forest in India.

**National symbols of India**
- National animal: Tiger (*Panthera Tigris*)
- National Heritage animal of India: Elephant
- National aquatic animal: Ganges River Dolphin
- National bird: Peacock
- National flower: Lotus
- National tree: Banyan

**Gir National Park**
The Gir Forest National Park and Wildlife Sanctuary established in 1965, with a total area of 1612 km² in Rajput. It is the sole home of the Asiatic Lions and is considered to be one of the most important protected areas in Asia due to its supported species. The count of 2,375 distinct fauna species of Gir includes about 38 species of mammals, around 500 species of birds and around 37 species of reptiles.

**Wildlife Sanctuary**
Wildlife sanctuaries are areas where animals are protected from any disturbance to them or their habitat. The killing or capturing of animals in wildlife sanctuary is strictly prohibited.

**Project Tiger**
The project aims to establish a viable tiger population in the fragmented habitats of India. The project area of tiger endangered specie consists of 10 tiger reserves in India and the tiger population is currently about 2222.

**Corbett National Park**
- Location: Uttarakhand.
- India’s one of the first and well-known national parks for tigers.
- The park had a large area, which is divided, into five zones.
- First zone, Jhimuk, is open to public all around the year and other zones are closed during monsoon.
- The elephant safaris inside the park are exciting and gives a close and safe trip inside the dense forest.
- The Dhikala zone is best spots to enjoy wildlife.
Kaziranga National Park

- Kaziranga National Park is located in the Golaghat and Nagaon districts of the state of Assam, India.
- A World Heritage Site, the 4320km² park hosts two-thirds of the world's Great One-Horned Rhinos.
- Kaziranga is recognized as an Important Bird Area by BirdLife International for conservation of avifaunal species.

Ecosystem:

Ecosystem consists of all the plants, animals and microorganisms living in an area along with the non-living components like climate, water, soil etc.

Ranthambore National Park

- Location: Rajasthan.
- It is located at the junction between the Aravali Hill ranges and the Vindhyan plateau.
- It's scenic surrounding guide you through the forest and 10th century fort amidst the cliffs.
- It serves as a rich heritage of various plants and animals.
- It has a huge number of tigers.
- A good time to visit Ranthambore National Park is in November and May when the nature of the dry deciduous forests makes sightings common.

Migration

Many birds fly to far away areas every year during a particular time because of climatic changes. They fly for laying eggs as the weather in their natural habitat becomes very cold and inhospitable. Birds who cover long distances to reach another land are known as migratory birds.

Red Data Book is the source book which keeps a record of all the endangered animals and plants. Different Red Data Books have plants, animals and other species.

Recycling of paper:

Reduction, Reuse, Recycle

About seventeen full grown trees are required to produce one tonne of paper. Paper can be recycled about five to seven times for use. We should save, reuse and recycle paper to save energy, water and chemicals used to

Reforestation

Reforestation is the restocking of destroyed forests by planting new trees. We should plant at least as many trees as we cut. If we have already caused a lot of damage to our forests, if we have to regain our green wealth, reforestation is the only option.

Please Conserve Forest

Save tree, save life.
Concept no. 11 (Force)

**FORCE – PUSH OR PULL**

Actions like picking, opening, shutting, kicking, lifting, lifting, pushing, pulling are often used to describe everyday tasks. Each of these actions usually results in some kind of change in the motion of an object. This change is caused by Force, Force is a push or pull. The strength of force is measured in Newton.

**A force can be measured with a Newton spring balance.**
The SI unit for measuring force is the Newton (symbol N).

**Exploring Forces**

- Forces applied on an object in the same direction add to one another.
- The net force acting on it is the difference between the two forces.
- The strength of a force is expressed by its magnitude.
- More than one force may act on an object. The effect of the object due to the net force acting on it.

**Effect of Force**

1. A Force can Change the State of Motion
   - The state of motion of an object is described by its speed and the direction of motion.
   - The state of rest is considered to be the state of zero speed. An object may be at rest or in motion; both are states of motion.
A Force can Change the State of Motion

- A force applied on an object may change its speed. If the force applied on the object is in the direction of its motion, the speed of the object increases.
- If the force is applied in the direction opposite to the direction of motion, then it results in a decrease in the speed of the object.

FORCE CAN CHANGE THE SHAPE OF AN OBJECT

- Force on an object may change its shape. Such as
  - may make an object move from rest.
  - may change the speed of an object if it is moving.
  - may change the direction of motion of an object.
  - may bring about a change in the shape of an object.
  - may cause some or all of these effects.

There are two main types of forces:

- contact forces
- non-contact forces.

TYPES OF FORCES

- Contact forces
- Non-contact forces

MUSCULAR FORCE

- The force resulting due to the action of muscles is known as the muscular force.
- Animals also make use of muscular force to carry out their physical activities and other tasks. Animals like bullocks, horses, donkeys and camels are used to perform various tasks for us. In performing these tasks they use muscular force.
**Frictional force**
- It is an important force which only acts when two objects are touching and are applying force to one another.
- It is a force that slows down moving objects and brings them to rest.
- It always acts in a direction opposite to the direction of the force applied to the object.
- Walking is possible only on a frictional surface.
- Water also applies a frictional force to the objects moving in it.
- Frictional force does not depend on the area of the rubbing surfaces.

**Friction force**
- A force that opposes the motion of an object.
- It’s a contact force. Occur when an object in motion rubs against a surface. The contact reduces the speed of the object and releases heat. The friction depend on the force pushing the surface together and the roughness of the surface.

**Non-contact Forces**
They all exert their force **without having to touch** the object
- Magnetic forces
- Electrostatic forces
- Gravitational forces

**Magnetic Force**
A magnet can also exert a non-contact force on objects made of iron, steel, cobalt or nickel. Either pole of the magnet exerts a **pulling force** on these magnetic materials.

**The strength** of the force increases as the magnet and the magnetic material lose are brought closer together.
**Electrostatic Force**

If certain electrical insulator materials are rubbed an electrostatic charges (positive charge and negative charge) develop on them. **Similar charges repel each other** while opposite charges attract each other.

---

**ELECTROSTATIC FORCE**

- The force exerted by a charged body on another charged or uncharged body is known as electrostatic force.
- This force comes into play even when the bodies are not in contact.
- The electrostatic force, therefore, is another example of a non-contact force.

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**Gravity**

**The Apple & the Moon**

- **Isaac Newton** realized that the motion of a falling apple and the motion of the Moon were both actually the same motion, caused by the same force - the gravitational force.
- **Gravity** is a force that pulls objects toward each other.

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**Gravitational Force**

The gravitational force between the Sun and all the planets in the Solar System holds the planets in their orbits.

The gravitational force between an object on the Earth and the Earth itself pulls the object down towards the centre of the Earth and is called the **weight** of the object.

---

**GRAVITY FORCE**

- Objects or things fall towards the earth because it pulls them. This force is called the force of gravity, or just gravity. This is an attractive force.
- The force of gravity acts on all objects. The force of gravity acts on all of us all the time without our being aware of it. Water begins to flow towards the ground as soon as we open a tap. Water in rivers flows downward due to the force of gravity.
Concept no. 13 (Sound)

Sound
Sound is a mechanical wave that is an oscillation of pressure transmitted through a solid, liquid, or gas, composed of frequencies within the range of hearing.

WHAT IS SOUND
Sound plays an important role in our life. It helps us to communicate with one another. We hear a variety of sounds in our surroundings.

Sound is Produced by a Vibrating Body
- The to and fro or back and forth motion of an object is termed as vibration.
- When a tightly stretched band is plucked, it vibrates and produces sound. When it stops vibrating, it does not produce any sound.

Human also produce the Sound
- In humans, the sound is produced by the voice box or the larynx. Put your fingers on the throat and find a hard bump that seems to move when you swallow. This part of the body is known as the voice box. It is at the upper end of the windpipe.
- Two vocal cords, are stretched across the voice box or larynx in such a way that it leaves a narrow slit between them for the passage of air.
Human also produce the Sound

- Muscles attached to the vocal cords can make the cords tight or loose.
- When the vocal cords are tight and thin, the type or quality of voice is different from that when they are loose and thick.
- The vocal cords in men are about 20mm long. In women these are about 5mm shorter. Children have very short vocal cords. This is the reason why the voices of men, women and children are different.

Propogation of sound VIEDO

- Sound needs a medium to travel. Sound can not travel through vacuum. Wave are transmitted to one place to another place by the vibration of particles to medium. You can study the propogation of sound in this video.

We hear Sound through Our Ears

- The shape of the outer part of the ear is like a funnel. When sound enters in it, it travels down a canal at the end of which a thin membrane is stretched tightly. It is called the eardrum.
- The eardrum is like a stretched rubber sheet. Sound vibrations make the eardrum vibrate.

We hear Sound through Our Ears

- The eardrum sends vibrations to the inner ear. From there, the signal goes to the brain. That is how we hear.
- We must NEVER put a sharp, pointed or hard thing into our ear. It can damage the eardrum. The damaged eardrum can impair hearing.

B. HUMAN HEARING

- The to and fro motion of an object is known as vibration.
- Loudness of sound is proportional to the square of the amplitude of the vibration producing the sound.
- For example, if the amplitude becomes twice, the loudness increases by a factor of 4.

AMPLITUDE OF A VIBRATION

- The number of oscillations per second is called the frequency of oscillations. Frequency is expressed in hertz. Its symbol is Hz. Frequency of 1 Hz is one oscillation per second.
- The frequency of oscillations determines the shrillness or pitch of a sound. If the frequency of vibration is higher we say that the sound is shrill and has a higher pitch.
- If the frequency of vibration is lower, we say that the sound has a lower pitch.

FREQUENCY OF VIBRATION

- A drum vibrates with a low frequency. Therefore, it a low-pitched sound. On the other hand, a whistle has a high frequency and therefore, produces a sound of higher pitch.
**Frequency, Wavelength, Pitch And Frequency Spectrum**

- The frequency is the number of waves per unit time that pass a fixed location.
- Wavelength is the distance over which the wave's shape repeats.
- The sensation of a frequency is commonly referred to as the pitch of a sound.

- A source of light can have many colors mixed together and in different amounts (intensities). A rainbow, or prism, sends the different frequencies in different directions, making them individually visible at different angles. A graph of the intensity plotted against the frequency (showing the amount of each color) is the frequency spectrum of the light.

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**Loudness and Pitch**

- Loudness of sound is proportional to the square of the amplitude of the vibration producing the sound.
- For example, if the amplitude becomes twice, the loudness increases by a factor of 4. The loudness is expressed in a unit called decibel (dB).

---

**Audible and Inaudible Sound**

- The fact is that sounds of frequencies less than about 20 vibrations per second (20 Hz) cannot be detected by the human ear. Such sounds are called inaudible.
- On the higher side, sounds of frequencies higher than about 20,000 vibrations per second (20 kHz) are almost not audible to the human ear.
- Thus, for human ear, the range of audible frequencies is roughly from 20 to 20,000 Hz.

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**FREQUENCY OF SOUND**

- **Jet plane**
- **Train whistle**
- **Fire alarm**
- **Airplane take-off (at distance 50 m)**
- **Dog barking**

**Sound Pollution**

*By Susanna & Terrenz*

- Domestic noise (TV, Mahjong)
- Busy Road
- Road Maintenance
- Construction Site

Please choose the sources of noise to see their impact on us.

- **160 dB**
- **140 dB**
- **120 dB**
- **100 dB**
- **80 dB**
- **60 dB**
- **40 dB**
- **20 dB**
- **0 dB**

---

**Noise and Music**

- Such unpleasant sounds are called noise.
- On the other hand you enjoy sounds from musical instruments. Musical sound is one which is pleasing to the ear. Sound produced by a harmonium is a musical sound. The sound of a clarinet also has musical sound.

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**Noise Pollution**

- Presence of unwanted gases and particles in air is called air pollution.
- Presence of excessive or unwanted sounds in the environment is called sound pollution.
- Television and transistor radio at high volumes, some kitchen appliances, desert areas, air conditioners, etc. contribute to noise pollution.
Concept no. 15 (Natural Disasters)

Natural Disasters

Are we prepared?

Types of Natural Disasters
- Lightning
- Volcanic eruption
- Earthquake
- Cyclone or Hurricane
- Flood
- Drought
- Forest fire or Bushfire

NATURAL DISASTERS

- Natural disasters are changes which are so great they may cause damage to the shape of the land or to the lives of people and other living things.
- Great changes happen deep inside the Earth and on its surface. The changes on the outer part of the Earth happen because of different kinds of weather.

Thunder Storms
- Every Thunderstorm produces lightning.
- There is wet thunder and dry thunder, the difference being whether or not rain is produced.
- Warm humid conditions favor thunderstorms.
- Only 10% of thunderstorms are classified as severe.
- Your chance of being struck by lightning is 1 in 600,000.

HOW CAN THE NOISE POLLUTION CONTROL

- Silencing device must be installed in aircraft engines, transport vehicles, industrial machines, and home appliances.
- The noisy operations must be conducted away from any residential area.
- Noise-producing industries should be set up away from such areas.
- Use of automobile horns should be minimized. TV and music systems should be run at low volumes.
- Trees must be planted along the roads and around buildings to cut down on the sounds reaching the resident, thus reducing the harmful effects of noise pollution.
PRODUCTION OF LIGHTING

- Charging by Rubbing
  - When a plastic refill is rubbed with polythene, it acquires a small electric charge. Similarly, when a plastic comb is rubbed with dry hair, it acquires a small charge. These objects are called charged objects.
  - In the process of charging the refill and the plastic comb, polythene and hair also get charged.
  - Such as – rubbing between Riffle and polythene, Rubber and woolen.

POSITIVE CHARGE

- When the two objects have different charges and attract to each other, this attraction produce the Positive Charge.
- Such as - a glass rod when it is rubbed with silk as positive.
- a charged balloon attracted a charged refill.

NEGATIVE CHARGE

- When the two objects have same repel charges and repels each other, this attraction produce the negative Charge.
- A charged balloon repelled a charged balloon.
- A charged refill repelled a charged refill.

TRANSFER OF CHARGES

- How to know object is charged or not - Electroscope
  - The aluminum foil strips receive the same charge from the charged refill through the paper clip (remember that metals are good conductors of electricity).
  - The strips carrying similar charges repel each other and they wide open. Such a device can be used to test whether an object is carrying charge or not. This device is known as electroscope.
  - Thus the electrical charge can be transferred from a charged object to another through a metal conductor.

EARTHING

- Touch the end of the paper clip gently with hand and you will find a charge in the foil strips. They come back to their neutral state. Repeat changing of foil strips and touching the paper clip.
- Every time you will find that the foil strips collapse as soon as you touch the paperclip with hand, the foil strips are discharged.
- The process of transferring of charge from a charged object to the earth is called earthing.
How to produce Electrical Discharge

The development of a thunderstorm, the air currents move upward while the water droplets move downward. These vigorous movements cause separation of charges. By a process, not yet completely understood, the positive charges collect near the upper edges of the clouds and the negative charges accumulate near the lower edges. There is accumulation of positive charges near the ground also. When the magnitude of the accumulated charges becomes very large, the air which is normally a poor conductor of electricity, is no longer able to resist their flow. Negative and positive charges meet, producing streaks of bright light and sound. We see streaks as lightning. The process is called an electric discharge.

Lightning Safety

1. Finding a safe place
   - A house or a building is a safe place. If you are traveling by car or by bus, you are safe inside with windows and doors of the vehicle shut.

Inside the house

- Lightning can strike telephone cords, electrical wires and metal pipes. During a thunderstorm contact with these should be avoided. It is safer to use mobile phones and cordless phones. However, it is not wise to call up a person who is receiving your phone through a wired phone.
- Bathing should be avoided during thunderstorms to avoid contact with running water.
- Electrical appliances like computers, TVs, etc., should be unplugged as electrical lights can remain on. They can also be damaged.

Lightning Conductors

- Lightning Conductors is a device used to protect buildings from the effect of lightning. A metallic rod taller than the building is installed in the walls of the building during its construction. One end of the rod is kept out in the air and the other is buried deep in the ground. The rod provides easy route for the transfer of electric charge to the ground.
- The metal columns used during construction, electrical wires and water pipes in the buildings also protect the structure. But do not touch the metal during a thunderstorm.

What is an Earthquake?

- An earthquake is a sudden shaking or trembling of the earth occurring under the earth's crust. Earthquakes can be felt in such small areas as well as in large regions.
- There is evidence of past destruction which can be damaging to humans or animals. The earthquake is the outward shaking of the earth's crust.

How Earthquakes Impact the Environment

- collapsing buildings
- property damage
- mud slides
- fires
- floods
- tsunamis
- loss of power
**What Causes an Earthquake**
- Tremors are caused by the movement of rocks inside the earth’s crust. The blocks of rock move past each other due to friction.
- Where the blocks move past each other, the friction builds up to a certain point and creates stress. When this stress becomes too great, the rocks break and the energy is released, causing the earthquake.

**Seismic or Fault Zones**
- Earthquakes are caused by the movement of large blocks of rock, or faults, within the earth’s crust. These faults are zones where stresses build up to a certain point and then release energy in the form of seismic waves.
- When the stress is released, it can be felt as an earthquake. The strength of an earthquake is measured using the Richter scale.

**How to Measure Earthquake**
- The power of an earthquake is expressed in terms of a magnitude on a scale called Richter scale.

**Protection against Earthquakes**
- People living in seismic zones, where the earthquakes are more likely to occur, have to be specially prepared. First of all, the buildings in these zones should be designed so that they can withstand major tremors. Modern building technology can make it possible.
- It is advisable to make the structure simple so that it is ‘Quake Safe’.

**Protection against Earthquakes**
- Consult qualified architects and structural engineers.
- In highly seismic areas, the use of mud or timber is better than the heavy construction material. Keep roofs as light as possible. In case the structure fails, the damage will not be heavy.
- It is better if the cupboards and shelves are fixed to the walls, so that they do not fall easily.
- Be careful where you hang wall clocks, photo-frames, water heaters etc., so that in the event of an earthquake, they do not fall on people.
- Since some buildings may catch fire due to an earthquake, it is necessary that all buildings, especially tall buildings, have fire fighting equipment in working order.
Protection against Earthquakes

- In the event that an earthquake does strike, take the following steps to protect yourself:
  
  1. If you are at home:
     - Take shelter under a table and stay there till shaking stops.
     - Stay away from tall and heavy objects that may fall on you.
     - If you are in bed, do not get up. Protect your head with a pillow.

  2. If you are outdoors:
     - Find a clear spot, away from buildings, trees and overhead power lines. Drop to the ground.
     - If you are in a car or a bus, do not come out. Ask the driver to drive slowly to a clear spot. Do not come out till the tremors stop.

Concept no. 18 (Pollution)

**Definition:**

Pollution

The introduction into the environment, by people, of substances or energy liable to cause harm to living creatures or ecological systems.

**Pollution:**

How did pollution begin?

- More sophisticated lifestyles
- Growing needs of people.
- Accelerated rates of human and economic activities.

**Pollution:**

Air
Noise
Water

**Air Pollution**
WHAT IS AIR POLLUTION?
MODERNIZATION AND PROGRESS HAVE LED TO AIR POLLUTION. MORE AND MORE POLLUTION OVER THE YEARS, PROVING THAT AIR POLLUTION IS THE PROBLEM. THIS OCCURS IN THE DAYS WHERE MODERN INDUSTRIES ARE AMONG THOSE THAT EMIT A GREAT DEAL OF POLLUTANTS INTO THE AIR. THERMAL POWER PLANTS, CEMENT, STEEL, REFINERIES, PETRO-CHEMICALS, AND MINES.

SOURCES OF OUTSIDE AIR POLLUTION
- Combustion of gasoline and other hydrocarbon fuels in cars, trucks, and airplanes
- Burning of fossil fuels (oil, coal, and dinosaur bones)
- Insecticides, Herbicides
- Everyday radioactive fallouts
- Dust from fertilizers
- Mining operations, Livestock feedlots

SOURCES OF INDOOR POLLUTION
- Efficient insulation
- Bacteria
- Molds and mildews
- Viruses
- animal dander and cat saliva
- plants
- house dust
- Alites
- Cockroaches
- pollen

AROUND 30-40% OF CASES OF ASTHMA AND 20-30% OF ALL RESPIRATORY DISEASES MAY BE LINKED TO AIR POLLUTION

EFFECTS ON THE ENVIRONMENT
- Acid rain
- Ozone depletion
- Global warming
- In human population-respiratory problems, allergies, strengthens lugs, and a risk for cancer

ACID RAIN
- contains high levels of sulfuric or nitric acids
- contaminates drinking water and vegetation
- damage aquatic life
- erodes buildings
- alters the chemical equilibrium of some soils
GLOBAL WARMING

- There is excess of CO2 in the air, it acts as a pollutant..........
- CO2 is continuously being released because of human activities. On the other hand, area under forests is decreasing. Plants utilise CO2 from the atmosphere for photosynthesis, thereby decreasing the amount of CO2 in the air. Deforestation leads to an increase in the amount of CO2 in the air because the number of trees which consume CO2 is reduced. Human activities, thus, contribute to the accumulation of CO2 in the atmosphere.
- CO2 traps heat and does not allow it to escape into space. As a result, the average temperature of the earth’s atmosphere is gradually increasing. This is called global warming.

GREEN HOUSE EFFECT

- A part of the radiation that falls on the earth is absorbed by it and a part is reflected back into space.
- A part of the reflected radiation is trapped by the atmosphere. The trapped radiation further warms the earth. If you have seen a greenhouse in a nursery or elsewhere, recall that the sun’s heat is allowed to get in but is not allowed to go out. The trapped heat warms the greenhouse.
- The trapping of radiations by the earth’s atmosphere is similar. That is why it is called the greenhouse effect. Without this process, life would not have been possible on the earth. But now it threatens life. CO2 is one of the gases responsible for this effect.

CONTROL OF AIR POLLUTION

What is noise pollution?

Any unwanted sound that generates the environmental noise pollution.

In general noise pollution is related to any noise irritating to one’s ear which comes from an external source.

SOCIETY

Industries
- Legislation
- guidelines for siting of industries
- emission standards for industries
- development of pollution prevention technologies

Vehicular pollution
- stringent emission norms
- cleaner fuel quality

Noise Pollution

“Noise pollution or environmental noise is displeasing human-, animal- or machine-created sound that disrupts the activity or balance of human or animal life.”

“The term "noise pollution" has been recently used to signify the hazard of sounds which are consequence of modern day development, leading to health hazards of different type.”

Sources of noise pollution

- Street traffic
- Rail roads
- Airplanes
- Constructions
- Consumer products
ROAD TRAFFIC NOISE

Air Craft NOISE
Now-a-days, the problem of low flying military aircraft has added a new dimension to community annoyance, as the nation seeks to improve its nap-of-the-earth aircraft operations over national parks, and other areas previously unaffected by aircraft noise has claimed national attention over recent years.

Noise in building

Apartment dwellers are often annoyed by noise in their homes, especially when the building is not well designed and constructed. In this case, internal building noise from plumbing, boilers, generators, air conditioners, and fans, can be audible and annoying.

Effects of noise pollution

- There are about 25000 hair cells in our ear which create wave in our ear, responding to different levels of frequencies.
- With increasing levels of sound the cells get destroyed decreasing our ability to hear the high frequency sound.

PROSPECTS OF NOISE POLLUTION

Noise pollution makes man more irritable. The effect of noise pollution is multifaceted & inter related. The effects of Noise Pollution on Human Being, Animal and property are as follows:

- Hearing Impairment
- It Decreases the Efficiency of A Man
- Lack of concentration
- Abortion is caused
- Pupil Dilation
- Mental Illness
- It Causes Heart Attack
- Digestive problems
- Temporary or permanent Deafness
- Aggressive Behavior
- Effect on Vegetation Poor Quality of Crops
- Effect on Animal
- Effect on Property
- Sleep interference
- Speech interference
**Water Pollution**

- Whenever harmful substances such as sewage, toxic chemicals, etc., get mixed with water, the water becomes polluted. The substances that pollute water are called water pollutants.

**Major Sources of Water Pollution**

- The three major sources of water pollution are human wastes, industrial wastes, and chemical runoff.

**Sewage in Rural Areas**

- Wastes from cattle, pigs, and chickens can also be a problem in rural areas.
- Animal wastes can run off from pastures and barnyards, and pass disease-causing bacteria and other kinds of pollution into bodies of water.

**Industrial Wastes**

- Chemicals, smoke, and heated water are three types of pollutants produced by factories, mines, and other industries.

**Chemicals**

- Another problem is pollution caused by nonpoint sources.
- In the past, many industries stored toxic wastes in barrels or other containers buried underground.
- Over the years, however, many of these containers rusted or broke.
- The chemicals leaked out, polluting both the soil and the groundwater.

**Barrels of nuclear waste found in an abandoned German salt mine**

**Waste**

- Sewage in cities
  - During heavy rains or floods, sanitary sewers sometimes overflow and can pollute the surface water.
  - If this happens, people are often told to boil water for drinking and cooking after a flood.
  - The boiling kills many disease-causing organisms.

**101**
Smoke and Exhaust
- When coal, oil, and gasoline are burned, the gases sulfur dioxide and nitrogen oxide are released into the atmosphere.
- The sulfur and nitrogen react with water, forming sulfuric and nitric acids.
- The result is acid rain.

Heat Pollution
- Much of the water in factories is used to cool machinery or metal objects.
- The warm water alone can act as a pollutant.
- Many water organisms can live in only a narrow range of temperatures.
- Wastewater released by factories into a nearby river or pond raises the temperature of the water, sometimes enough to harm the living things there.

Chemical Runoff
- Farmers spread or spray fertilizers, chemicals on their fields to produce better crops.
- When rain falls on the fields, it washes some of the chemicals away as runoff.
- Water used for irrigation also creates runoff.
- The fertilizers in the runoff are a nonpoint source of pollution.

Examples of runoff

Runoff from farms
- With the addition of fertilizers running off into ponds and lakes, the process of eutrophication speeds up.
- Runoff and irrigation water carry away pollutants from farm fields such as pesticides and fertilizers.

Runoff from farms

Prevention
- Many industries have found that recycling techniques that conserve water also reduce pollution.
  - For example, factories cool the water used to cool machinery and reuse it instead of releasing it into a river.
  - Another example is when farmers collect and reuse the runoff water from their pasture as water for irrigation.
  - Farmers can also plant fields of grasses that filter out pollutants before the water reaches a river or pond.
Sub-hypothesis 4.2.3 Evaluation activities can be developed in LAP for evaluation of science concept.

The researcher developed the evaluation activities related to the concept. Evaluation is an inspirable component of the teaching-learning process. It is the process which is carried out during or after the instructional program to ensure that learning is proceeding in the desirable direction. It is ensured whether the objectives of teaching learning process are being achieved or not. These evaluation activities are formulated according to individual difference, knowledge, intelligence and educational background of learners. These evaluation activities include puzzles, multiple choice questions, one word questions, matching type questions, figure labeling, figure identification, fill in the blanks, true/false and one line questions. These activities are related to cognitive, problem-solving ability, reasoning and skill based.

Table 4.2 shows evaluation activities for LAP

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<thead>
<tr>
<th>S. No.</th>
<th>Concept</th>
<th>Evaluation Activity</th>
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<tbody>
<tr>
<td>1.</td>
<td>Agricultural Practices</td>
<td>Multiple choice questions, flow charts, one word questions, fill in the blanks, true false questions, matching, identification of figures, puzzles, labeling of diagrams.</td>
</tr>
<tr>
<td>2.</td>
<td>Micro organism</td>
<td>Matching, multiple choice questions, one word questions, diagrams drawing, making list, fill in the blanks, identification of figures, true false questions, one line questions.</td>
</tr>
<tr>
<td>3.</td>
<td>Fiber</td>
<td>Matching, multiple choice questions, one word questions, diagrams drawing, making list, fill in the blanks, identification of figures, true false questions, one line questions.</td>
</tr>
<tr>
<td>4.</td>
<td>Materials</td>
<td>Matching, multiple choice questions, one word questions, identification of objects,</td>
</tr>
<tr>
<td>5.</td>
<td>Fuel</td>
<td>Matching, multiple choice questions, one word questions, diagrams drawing, making list, fill in the blanks, identification of figures, true false questions, one line questions.</td>
</tr>
<tr>
<td>6.</td>
<td>Combustion</td>
<td>Matching, multiple choice questions, one word questions, diagrams drawing, making list, fill in the blanks, identification of figures, true false questions, one line questions, puzzles.</td>
</tr>
<tr>
<td>7.</td>
<td>Conservation</td>
<td>Matching, multiple choice questions, one word questions, diagrams drawing, making list, fill in the blanks, identification of figures, true false questions, one line questions and puzzles.</td>
</tr>
<tr>
<td>8.</td>
<td>Cell</td>
<td>Matching, multiple choice questions, one word questions, diagrams drawing, making list, fill in the blanks, identification of figures, true false questions, one line questions, labeling diagram and identification of differences in objects.</td>
</tr>
<tr>
<td>9.</td>
<td>Reproduction</td>
<td>Matching, multiple choice questions, one word questions, making list, fill in the blanks, identification of figures, true false questions, one line questions and labeling diagram.</td>
</tr>
<tr>
<td>10.</td>
<td>Adolescence</td>
<td>Matching, multiple choice questions, one word questions, making list, fill in the blanks, identification of figures, true false questions, one line questions, labeling diagram.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>one line questions, labeling diagram and identification of differences in objects.</td>
<td>11. Force</td>
<td>Matching, multiple choice questions, making list, fill in the blanks, identification of figures, true false questions, one line questions, labeling diagram, and identification of differences in objects.</td>
</tr>
<tr>
<td></td>
<td>12. Friction</td>
<td>Matching, multiple choice questions, one word questions, making list, fill in the blanks, identification of figures, true false questions, one line questions.</td>
</tr>
<tr>
<td></td>
<td>13. Sound</td>
<td>Matching, multiple choice questions, making list, fill in the blanks, identification of figures, true false questions, one line questions and identification of differences in objects.</td>
</tr>
<tr>
<td></td>
<td>14. Electricity</td>
<td>Matching, multiple choice questions, making list, fill in the blanks, identification of figures, true false questions, one line questions, labeling diagram, figure explanation, puzzles and identification of differences in objects.</td>
</tr>
<tr>
<td></td>
<td>15. Earthquake</td>
<td>Matching, multiple choice questions, making list, fill in the blanks, identification of figures, true false questions, one line questions, labeling diagram, and identification of differences in objects.</td>
</tr>
<tr>
<td></td>
<td>16. Light</td>
<td>Matching, multiple choice questions, making list, fill in the blanks, identification of figures, true false questions, one line questions, labeling diagram, puzzles and identification of differences in objects.</td>
</tr>
</tbody>
</table>
17. Solar system          Matching, multiple choice questions, making list, fill in the blanks, identification of figures, true false questions, one line questions, labeling diagram, and identification of differences in objects.

18. Pollution            Matching, multiple choice questions, making list, fill in the blanks, identification of figures, true false questions, one line questions, labeling diagram, writing full form of subjects and identification of differences in objects.

4.3.0 Effectiveness of LAP with reference to students’ achievement

4.3 There is significant difference between the achievement scores of pre-test and post-test.

Testing of main hypothesis has been done through eighteen sub hypotheses.

Sub-hypothesis 4.3.1 There is significant difference between the achievement scores of pre-test and post-test for the concept - Agriculture Practices.

Null hypothesis 4.3.1 There is no significant difference between the mean scores of pre and post achievement test for the concept - Agricultural Practices.

Table 4.3.1.1 shows difference between the mean score of pre and post-test for concept Agricultural Practices

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>34</td>
<td>12.26</td>
<td>3.86</td>
<td></td>
<td></td>
<td>Significant</td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>14.20</td>
<td>2.85</td>
<td>33</td>
<td>7.05</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.3.1.1 shows that t-value is 7.05 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 12.26 and the mean score of the
post-test is 14.20. It indicates achievement in respect to pre-test score which is significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores of pre and post achievements test for the concept – Agriculture Practices” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.2** There is significant difference between the achievement scores of pre-test and post-test for concept – Micro Organism.

**Null hypothesis 4.3.2** There is no significant the concept difference between the mean scores of pre and post-test for the concept – Micro Organisms.

Table 4.3.1.2 shows difference between the mean score of pre and post-test for concept **Micro Organisms**

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>34</td>
<td>10.10</td>
<td>3.66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post test</td>
<td>34</td>
<td>11.42</td>
<td>3.12</td>
<td>33</td>
<td>7.37</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.3.1.2 shows the t value is 7.37 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 10.10 and the mean score of the post-test is 11.42. It indicates that the achievement in respect to pre-test score which is significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores of pre-test and post-test for the concept – Micro Organism” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.3** There is significant difference between the achievement scores of pre-test and post-test for the concept – Fiber.
**Null- Hypothesis 4.3.3** There is no significant difference between the mean scores of pre and post-test for the concept Fiber.

Table 4.3.1.3 shows difference between the mean score of pre and post-test for the concept Fiber

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>34</td>
<td>12.26</td>
<td>3.75</td>
<td>33</td>
<td>5.70</td>
<td>Significant</td>
</tr>
<tr>
<td>Post test</td>
<td>34</td>
<td>14.11</td>
<td>2.21</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3.1.3 shows the t value is 5.70 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 12.26 and the mean score of the post-test is 14.11. It indicates achievement in respect to pre-test score which is significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores of pre and post tests for the concept - Fiber” is rejected and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.4** There is significant difference between the achievement scores of pre-test and post-test for the concept - Material.

**Null hypothesis 4.3.4** There is no significant post-test difference between the mean scores of pre and post-test test for the concept - Material.

Table 4.3.1.4 shows difference between the mean score of pre and post-test for the concept Materials

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>34</td>
<td>10.97</td>
<td>2.62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>12.88</td>
<td>1.94</td>
<td>33</td>
<td>4.34</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.3.1.4 shows the t value is 4.34 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 10.97 and the mean score of the
post-test is 12.88. It indicates achievement in respect to pre-test score which significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores of pre and post-test for the concept - Materials” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.5** There is significant difference between the achievement scores of pre-test and post-test-test for the concept- Fuel.

**Null hypothesis 4.3.5** There is no significance different between the mean scores of pre and post-test test for the concept - Fuel.

Table 4.3.1.5 shows difference between the mean score of pre and post-test for the concept Fuel

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>34</td>
<td>9.35</td>
<td>2.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>13.29</td>
<td>1.84</td>
<td>33</td>
<td>9.95</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.3.1.5 shows that the t-value is 9.95 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre achievement test is 9.35 and the mean score of the post-test is 13.29. It indicates achievement in respect to pre-test score which significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores of pre and post-test for the concept - fuel” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.6** There is significant difference between the achievement scores of pre-test and post-test for the concept - Combustion.

**Null hypothesis 4.3.6** There is no significant difference between the mean scores of pre and post-test for the concept - Combustion.
Table 4.3.1.6 shows difference between the mean score of pre and post-test for the concept **Combustion**

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>34</td>
<td>9.73</td>
<td>2.13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>14.64</td>
<td>2.51</td>
<td>33</td>
<td>9.89</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.3.1.6 shows the t value is 9.89 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre achievement test is 9.73 and the mean score of the post-test is 14.64. It indicates achievement in respect to pre-test score which significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores pre and post-test for the concept - combustion” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.7** There is significant difference between the achievement scores of pre-test and post-test for the concept- Conservation.

**Null hypothesis 4.3.7** There is no significant difference between the mean scores of pre and post-test for the concept- Conservation.

Table 4.3.1.7 shows difference between the mean score of pre and post-test for the concept **Conservation**

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>34</td>
<td>10.47</td>
<td>2.32</td>
<td></td>
<td>7.60</td>
<td>Significant</td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>13.73</td>
<td>2.85</td>
<td>33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3.1.7 shows the t value is 7.60 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 10.47 and the mean score of the
post-test test is 13.73. It indicates achievement in respect to pre-test score which significantly differs from the post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores pre and post-test for the concept - Conservation” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.8** There is significant difference between the achievement scores of pre-test and post-test for the concept - Cell.

**Null hypothesis 4.3.8** There is no significant difference between the mean scores of pre and post-test for the concept - Cell.

Table 4.3.1.8 shows difference between the mean score of pre and post-test for the concept Cell

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>34</td>
<td>8.85</td>
<td>2.59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>12.41</td>
<td>2.92</td>
<td>33</td>
<td>7.65</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.3.1.8 shows that value is 7.65 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 8.85 and the mean score of post-test that is 12.41. It indicates achievement in respect to pre-test score significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores of pre and post-test tests for the concept - Cell” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.9** There is significant difference between the achievement scores of pre-test and post-test for the concept - Reproduction.

**Null hypothesis 4.1.9** There is no significant difference between the mean scores of pre and post-test for the concept - Reproduction.
Table 4.3.1.9 shows difference between the mean score of pre and post-test for the concept **Reproduction**

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>34</td>
<td>11.02</td>
<td>3.60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>13.67</td>
<td>2.90</td>
<td>33</td>
<td>6.40</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.3.1.9 shows the t value is 6.40 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 11.02 and mean score of post-test is 13.67. It indicates achievement in respect to pre-test score which significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores pre and post-test for the concept - Reproduction” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.10** There is significant difference between the achievement scores of pre-test and post-test for the concept - Adolescence.

**Null hypothesis 4.1.10** There is no significant difference between the mean scores of pre and post-test for the concept- Adolescence.

Table 4.3.1.10 shows difference between the mean score of pre and post-test for the concept **Adolescence**.

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>34</td>
<td>8.85</td>
<td>2.51</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>13.97</td>
<td>2.69</td>
<td>33</td>
<td>12.13</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.3.1.10 shows the t value is 12.13 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 8.85 and mean score of post-
test is 13.97. It indicates achievement in respect to pre-test score which significantly differs from that of the post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores pre and post tests for the concept- Adolescence” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.11** There is significant difference between the achievement scores of pre-test and post-test for the concept- Force.

**Null hypothesis 4.1.11** There is no significant difference between the mean scores of pre and post-test for the concept- Force.

Table 4.3.1.11 shows difference between the mean scores of pre and post-test for the concept **Force**

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>34</td>
<td>10.73</td>
<td>1.95</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post test</td>
<td>34</td>
<td>15.02</td>
<td>2.34</td>
<td>33</td>
<td>10.19</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.3.11 shows the t value is 10.19 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 10.73 and the mean score of the post-test is 15.02. It indicates achievement in respect to pre-test score which is significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores of pre and post tests for the concept- force” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.12** There is significant difference between the achievement scores of pre-test and post-test for the concept- Friction.

**Null hypothesis 4.1.12** There is no significant difference between the mean scores of pre and post-test for the concept- Friction.
Table 4.3.1.12 shows difference between the mean score of pre and post-test for the concept **Friction**

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>34</td>
<td>9.61</td>
<td>2.25</td>
<td>33</td>
<td>7.94</td>
<td>Significant</td>
</tr>
<tr>
<td>Post test</td>
<td>34</td>
<td>12.17</td>
<td>2.36</td>
<td>33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3.1.12 shows the t value is 7.94 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 9.61 and the mean score of the post-test is 12.17. It indicates achievement in respect to pre-test score which is significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores of pre and post tests for the concept - Friction” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.13** There is significant difference between the achievement scores of pre-test and post-test for the concept- Sound.

**Null hypothesis 4.1.13** There is no significant difference between the mean scores of pre and post-test for the concept- Sound.

Table 4.3.1.13 shows difference between the mean score of pre and post-test for the concept- **Sound**

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>34</td>
<td>9.14</td>
<td>7.64</td>
<td>33</td>
<td>7.05</td>
<td>Significant</td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>12.73</td>
<td>3.29</td>
<td>33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.3.1.13 shows the t value is 7.05 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 9.14 and the mean score of the
post-test is 12.73. It indicates achievement in respect to pre-test score which is significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores of pre and post tests for the concept - Sound” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.14** There is significant difference between the achievement scores of pre-test and post-test for the concept - Electricity.

**Null hypothesis 4.1.14** There is no significance difference between the mean scores of pre and post-test for the concept - Electricity.

Table 4.3.1.14 shows difference between the mean score of pre and post-test for the concept **Electricity**

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>34</td>
<td>10.97</td>
<td>2.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>13.88</td>
<td>1.80</td>
<td>33</td>
<td>9.44</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.3.14 shows the t value is 9.44 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre achievement test is 10.97 and the mean score of the post-test is 13.88. It indicates in respect to pre-test score which is significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores of pre and post tests for the concept - Electricity” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.15** There is significant difference between the achievement scores of pre-test and post-test for the concept - Earthquake

**Null hypothesis 4.1.15** There is no significant difference between the mean scores of pre and post-test for the concept - Earthquake.
Table 4.3.1.15 shows difference between the mean score of pre and post-test for the concept **Earthquake**

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>34</td>
<td>11.5</td>
<td>2.57</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>13.44</td>
<td>2.13</td>
<td>33</td>
<td>4.79</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.3.1.15 shows the t value is 4.79 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 11.5 and the mean score of the post-test is 13.44. It indicates achievement in respect to pre-test score which is significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores of pre and post tests for the concept - Earthquake” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.16** There is significant difference between the achievement scores of pre-test and post-test for the concept - Light.

**Null hypothesis 4.1.16** There is no significant difference between the mean scores of pre and post-test for the concept - Light.

Table 4.3.1.16 shows difference between the mean score of pre and post-test for the concept **Light**

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>34</td>
<td>10.38</td>
<td>2.47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>13.47</td>
<td>2.13</td>
<td>33</td>
<td>7.33</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.3.1.16 shows the t value is 7.33 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 10.38 and the mean score of the
post-test is 13.47. It indicates achievement in respect to pre-test score which is significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores of pre and post tests for the concept- Light” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.17** There is significant difference between the achievement scores of pre-test and post-test for the concept- Solar system.

**Null hypothesis 4.1.17** There is no significant difference between the mean scores of pre and post-test for the concept- Solar system.

Table 4.3.1.17 shows difference between the mean score of pre and post-test for the concept **Solar system**

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>34</td>
<td>11.35</td>
<td>3.05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>14.52</td>
<td>2.23</td>
<td>33</td>
<td>6.15</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.3.1.17 shows the t value is 6.15 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 11.35 and the mean score of the post-test is 14.52. It indicates achievement in respect to pre-test score which is significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores of pre and post tests for the concept - Solar system” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

**Sub-hypothesis 4.3.18** There is significant difference between the achievement scores of pre-test and post-test for the concept- Pollution.

**Null hypothesis 4.1.18** There is no significant difference between the mean scores of pre and post-test for the concept- Pollution.
Table 4.3.1.18 shows difference between the mean score of pre and post-test for the concept **Pollution**

<table>
<thead>
<tr>
<th>Scores</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Df</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>34</td>
<td>12.11</td>
<td>2.57</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>34</td>
<td>14.88</td>
<td>2.23</td>
<td>33</td>
<td>8.66</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 4.3.1.18 shows the t value for achievement is 8.66 which is significant at 0.05 level, with degree of freedom 33. The mean score of pre-test is 12.11 and the mean score of the post-test is 14.88. It indicates achievement in respect to pre-test score which is significantly differs from that of post-test scores.

In this context the null hypothesis that “there is no significant difference between mean scores pre and post tests for the concept - Pollution” is not accepted and the research hypothesis is accepted. This implies that achievement is significantly affected by Learning Activity Package.

On the basis of above results researcher concludes that the hypothesis “there is significant difference between the achievement scores of the pre-test and the post-test” is accepted. According to this result it can be concluded that LAP is effective in terms of students’ achievement.

**4.4 Effectiveness of LAP with reference to students’ opinion**

4.4 There is difference in student’s opinion towards LAP.

After applying LAP the researcher tried to find out the students’ response towards this package. For this purpose the researcher prepared an opinion scale. The opinion scale for students’ opinion about LAP included five dimensions related to objective fulfillment of concept, content presentation, visual presentation for content, relevance of learning activity package for learning and evaluation activity. Each dimension of opinion scale had eight statements. This opinion scale consisted of forty items and measured at 5 point rating scale - strongly agree, agree, neutral, disagree and
strongly disagree. Researcher used this opinion scale to know students’ response to each item. The response related to the first dimension - Objective fulfillment of concept given by student is shown table in given below

**Sub-hypothesis 4.4.1 There is difference in students’ opinion towards LAP with reference to objective fulfillment of concept.**

Table 4.4.1 Students’ opinion towards objective fulfillment of concept by LAP in percentage

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>47%</td>
<td>29%</td>
<td>15%</td>
<td>9%</td>
<td>0%</td>
</tr>
<tr>
<td>2.</td>
<td>29%</td>
<td>44%</td>
<td>15%</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>3.</td>
<td>24%</td>
<td>44%</td>
<td>14%</td>
<td>15%</td>
<td>3%</td>
</tr>
<tr>
<td>4.</td>
<td>35%</td>
<td>32%</td>
<td>21%</td>
<td>9%</td>
<td>3%</td>
</tr>
<tr>
<td>5.</td>
<td>32%</td>
<td>35%</td>
<td>18%</td>
<td>6%</td>
<td>9%</td>
</tr>
<tr>
<td>6.</td>
<td>26%</td>
<td>38%</td>
<td>21%</td>
<td>6%</td>
<td>9%</td>
</tr>
<tr>
<td>7.</td>
<td>23%</td>
<td>50%</td>
<td>15%</td>
<td>9%</td>
<td>3%</td>
</tr>
<tr>
<td>8.</td>
<td>38%</td>
<td>32%</td>
<td>12%</td>
<td>15%</td>
<td>3%</td>
</tr>
</tbody>
</table>

From table 4.4.1, it can observed that in reference to statement no. 1 (the slides help me to understand the concept) 47% students strongly agree that slides help to understand the concepts. On the other hand 29% of them agree with it and 15% of them are neutral about it. On the opposite side 9% students disagree that slides helped to understand the concept. Therefore it can be concluded that maximum of them (47%) students strongly agree that slides help for understanding the concept and minimum (9%) students disagree that slides help to understand the concept. It is shown in graph No. 4.1.
In table 4.4.1, it can be observed that in reference to statement no. 2 (animation based content helps to understand the concept) 29% of students strongly agree that animation based content helps to understand the concept. On the other side 44% students of them just agree with it and 15% of them are neutral about it. On the opposite side 6% students disagree that animation based content helps to understand the concept and 6% of them strongly disagree with it. Thus it can be concluded that maximum (44%) students agree that animation based content helped to understand the concept and minimum (6%) of them strongly disagree that animation based content helps to understand the concept. It is shown in graph No. 4.2.

On the basis of above table 4.1.1, it has been found that in reference to statement no. 3 (I could understand the concept through the video) 24% students strongly agree with understanding the concept through video. On the other side
44% students agree with it and 15% of them are neutral about it. On the other hand 15% of them disagree with the statement and only 3% of students strongly disagree with it. So it can be said that maximum (44%) students agree minimum (3%) of them strongly disagree with the statement. It is shown in graph No. 4.3.

From table 4.1.1, it has been found that in reference to statement no. 4 (I could differentiate two concepts with the help of slides) 35% of students strongly agree while 32% of them agree with it and 21% of them are neutral about it. On the other side 9% of students disagree with it and 3% of them strongly disagree with it. Thus it can be concluded that maximum (35%) students strongly agree and only 3% students strongly disagree with it. It is shown in graph No. 4.4.

From table 4.1.1, it has been found that in reference to statement no. 5 (The content presentation through video enhances the level of explanation) 32% students
strongly agree with statement. On the opposite side 35% of them agree and 18% of them are neutral about it. On the other hand 6% of students disagree with the statement and 9% of them strongly disagree about it. Thus it can be concluded that maximum (35%) students agree with the statement and none of them strongly disagree about it. It is shown in graph No. 4.5.

From table 4.1.1, it can be seen that in reference to statement no. 6 (The use of two or more devices helped to enhance understanding of concepts) 26% of students strongly agree with the statement. On the opposite side 38% of students agree with it and 21% of them are neutral about it. On the other hand 6% students disagree with the statement and 9% of them strongly disagree with it. So it can be concluded that maximum (38%) students agree with the statement and minimum (6%) disagree with it. It is shown in graph No. 4.6.
From table 4.1.1, again it can be seen that with reference to statement no. 7 (The content based clips helps to describe the difficult concept) 23% of students strongly agree with the statement. On the other hand 50% of students agree and 15% of them are neutral about it. On the opposite side 9% of students disagree and 3% of them strongly disagree. Thus it can be concluded that maximum (50%) of students agree and minimum (3%) of them strongly disagree with it. It is shown in graph No. 4.7

![Graph 4.7](image)

Opinion towards statement 7: The content based clips helps to describe the difficult concept

From table 4.1.1 it can be seen that in reference to statement no. 8 (The video helps me for better understanding of concept in daily life activities) 38% of students strongly agree with the statement. On the other hand 32% of them agree and 12% of them are neutral about it. On the opposite side 15% of students disagree and 3% of them strongly disagree with it. So it can be concluded that maximum (38%) of students strongly agree and minimum (3%) of them strongly disagree about it. It is shown in graph No. 4.8.

![Graph 4.8](image)

Opinion towards statement 8: The video helps for better understanding of concept in daily life activities
On the basis of students’ opinion towards LAP, the researcher concludes that students have different opinions towards LAP with reference to objective fulfillment of concept.

**Sub-hypothesis 4.4.2** There is a difference in students’ opinion towards LAP with reference to content presentation.

Table 4.1.2 Students’ opinion towards content presentation by LAP in percentage

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.</td>
<td>47%</td>
<td>26%</td>
<td>17%</td>
<td>8%</td>
<td>3%</td>
</tr>
<tr>
<td>10.</td>
<td>44%</td>
<td>26%</td>
<td>15%</td>
<td>12%</td>
<td>3%</td>
</tr>
<tr>
<td>11.</td>
<td>38%</td>
<td>29%</td>
<td>24%</td>
<td>9%</td>
<td>0%</td>
</tr>
<tr>
<td>12.</td>
<td>26%</td>
<td>34%</td>
<td>20%</td>
<td>11%</td>
<td>9%</td>
</tr>
<tr>
<td>13.</td>
<td>23%</td>
<td>44%</td>
<td>21%</td>
<td>9%</td>
<td>3%</td>
</tr>
<tr>
<td>14.</td>
<td>29%</td>
<td>41%</td>
<td>9%</td>
<td>12%</td>
<td>9%</td>
</tr>
<tr>
<td>15.</td>
<td>26%</td>
<td>35%</td>
<td>26%</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>16.</td>
<td>18%</td>
<td>44%</td>
<td>20%</td>
<td>12%</td>
<td>6%</td>
</tr>
</tbody>
</table>

From the above table 4.1.2 it has been found that in reference of statement no. 9 (The clips related to content are more interesting) 47% of students strongly agree with statement. On the other side 26% of students agree and 17% of them are neutral about it. On the opposite side 9% of students disagree with the statement and 3% of them strongly disagree with it. Therefore, it can be concluded that maximum (47%) of students strongly agree and minimum (3%) of them strongly disagree with it.
It is shown in graph No. 4.9

From table 4.1.2, it has been found that in reference to statement no. 10 (The content related figures are clear, appropriate and near to clarity) 44% of students strongly agree with the statement. On the opposite side 26% of students agree and 15% of them are neutral about it. On the other side 12% of students disagree and 3% of them strongly disagree with it. So it can be concluded that maximum (44%) of students strongly agree and minimum (3%) of them strongly disagree with it. It is shown in graph No. 4.10.

From table 4.1.2, it has been found that in reference to statement no. 11 (The slide helps me to remember the content) 38% of students strongly agree. On the other
hand 29% of students agree and 23% of them are neutral about it. On the opposite side 9% of students disagree. So from the above table, researcher concludes that maximum (38%) of students strongly agree and minimum (9%) of them disagree with it. It is shown in graph No. 4.11.

![Graph no 4.11](image)

From table 4.1.2, it has been found that in reference to statement no. 12 (The content related video helps me to clarify the process) 26% of students strongly agree. On the opposite side 35% of students agree and 21% of them are neutral about it. On the other hand 12% of students disagree and 9% of them strongly disagree about it. On the basis of table 4.1.2, researcher concludes that maximum (35%) of student agree and minimum (9%) of them strongly disagree. It is shown in graph No. 4.12.

![Graph no 4.12](image)

From table 4.1.2, it has been found that in reference to statement no. 13 (The images used for content presentation are relevant) 23% of students strongly agree. On the other hand 44% of students agree and 21% of them are neutral about it. On the
opposite side 12% of students disagree and 3% of them strongly disagree. Thus it can be concluded that maximum (44%) of students agree and minimum (3%) of them strongly disagree with it. It is shown in graph No. 4.13.

From table 4.1.2, it has been found that in reference to statement no. 14 (It is easy to understand the content through content based video) 29% of students strongly agree. On the other side 41% of students agree and 9% of them are neutral about it. On the opposite side 12% of students disagree and 9% of them strongly disagree with it. On the basis of table 4.1.2 it can be concluded that maximum (41%) of students agree and minimum (9%) of them strongly disagree with the statement. It is shown in graph No. 4.14.

From table 4.1.2, it has been found that in reference to statement no. 15 (The animation based content promotes stable learning for long time) 26% of students
strongly agree with the statement. On the opposite side 35% of students agree and 26% of them are neutral about it. On the other hand 6% of students disagree with the statement and 6% of them strongly disagree. On the basis of table 4.1.2 it can be concluded that maximum (35%) of students agree minimum (6%) of them strongly disagree. It is shown in graph No. 4.15.

From table 4.1.2, it has been found that in reference to statement no. 16 (The video based content helps to define the specific concept) 18% of students strongly agree with the statement. On the opposite side 44% of students agree and 21% of them are neutral about it. On the other side 12% of students disagree with the statement and 6% of them strongly disagree. On the basis of above table, it can be concluded that maximum (44%) of students agree and minimum (6%) of them strongly disagree. It is shown in graph No. 4.16.
On the basis of student’s opinion towards LAP, it can be concluded that students have different opinions towards LAP with reference to content presentation.

**Sub hypothesis-4.4.3** There is a difference in students’ opinion towards LAP with reference to visual presentation for content.

Table 4.4.3 Student’s opinion towards visual presentation for content by LAP in percentage

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>23%</td>
<td>35%</td>
<td>24%</td>
<td>15%</td>
<td>3%</td>
</tr>
<tr>
<td>18</td>
<td>41%</td>
<td>23%</td>
<td>21%</td>
<td>9%</td>
<td>6%</td>
</tr>
<tr>
<td>19</td>
<td>33%</td>
<td>33%</td>
<td>21%</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>20</td>
<td>26%</td>
<td>53%</td>
<td>9%</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>21</td>
<td>44%</td>
<td>38%</td>
<td>9%</td>
<td>3%</td>
<td>6%</td>
</tr>
<tr>
<td>22</td>
<td>29%</td>
<td>35%</td>
<td>24%</td>
<td>9%</td>
<td>3%</td>
</tr>
<tr>
<td>23</td>
<td>32%</td>
<td>35%</td>
<td>23%</td>
<td>9%</td>
<td>3%</td>
</tr>
<tr>
<td>24</td>
<td>26%</td>
<td>44%</td>
<td>12%</td>
<td>15%</td>
<td>3%</td>
</tr>
</tbody>
</table>

From the above table 4.1.3, it has been found that in reference to statement no. 17 (The labeling of figures/diagrams which are clear to read) 23.5% of students strongly agree with the statement. On the other hand 35% students agree and 23% of them are neutral about it. On the opposite side 15% of students disagree and 3% of them strongly disagree. On the basis of above table, it can be concluded that maximum (35%) of students agree and minimum (3%) of them strongly disagree. It is shown in graph No. 4.17.
From table 4.1.3, it has been found that in reference of statement no. 18 (The images which are used for concept explanation are relevant) 41% of students strongly agree with the statement. On the opposite side 23.5% students agree and 21% of them are neutral about it. On the other hand 9% of students disagree and 6% of them strongly disagree about it. On the basis of above table, it can be concluded that maximum (41%) of students strongly agree and 6% of them strongly disagree with it. It is shown in graph No. 4.18.

From table 4.1.3, it has been found that in reference to statement no. 19 (The images used for content presentation are effective and clear) 33% of students strongly agree with the statement. On the other hand 33% students agree and 20% of them are neutral about it. On the opposite side 8% of students disagree and 6% of them strongly disagree about it. On the basis of above table, it can be concluded that...
maximum (33%) of students strongly agree minimum (6%) of them strongly disagree about it. It is shown in graph No. 4.19.

![Pie Chart: Opinion towards statement 19: The image used for content presentation are effective and clear](Graph no 4.19)

From table 4.1.3, it has been found that in reference to statement no. 20 (The size of text on slide is easily readable) 26% of students strongly agree. On the other hand 53% students agree and 9% of them are neutral about it. On the opposite side 6% of students disagree and 6% of them strongly disagree about it. On the basis of above table, it can be concluded that maximum (53%) of students agree with the size of text on slides is easily readable and minimum (6%) of them strongly disagree. It is shown in graph No. 4.20.

![Pie Chart: Opinion towards statement 20: The size of text on slide is easily readable](Graph no 4.20)

From table 4.1.3, it has been found that in reference to statement no. 21 (The colour combination of texts and images are effective) 44% of students strongly agree.
On the opposite side 38% students agree and 9% of them are neutral about it. On the other hand 3% of students disagree and 6% of them strongly disagree. On the basis of above table, it can be concluded that maximum (44%) of students strongly agree and 6% of them strongly disagree with it. It is shown in graph No. 4.21.

From table 4.1.3, it has been found that in reference to statement no. 22 (The links between the slides of content presentation are appropriate) 29% of students strongly agree with the statement. On the other hand 35% students agree and 23% of them are neutral about it. On the opposite side 9% of students disagree and 3% of them strongly disagree. On the basis of above table, it can be concluded that maximum (35%) of students agree and minimum (3%) of them strongly disagree. It is shown in graph No. 4.22.
From table 4.1.3, it has been found in reference of statement no. 23 (The explanations about images according to content are relevant) 31% of students strongly agree. On the other hand 34% students agree and 23% of them are neutral about it. On the opposite side 9% of students disagree and 3% of them strongly disagree about it. On the basis of table 4.1.3, it can be concluded that maximum (34%) of students agree and minimum (3%) of them strongly disagree with it. It is shown in graph No. 4.23.

![Graph No 4.23](image)

From table 4.1.3, it has been found that in reference to statement no. 24 (The texts and images of slides are easily visible) 26% of students strongly agree with the statement. On the other hand 44% students agree and 11% of them are neutral about it. On the opposite side 15% of students disagree and 3% of them strongly disagree about it. On the basis of above table, it can be concluded that maximum (44%) of students agree and minimum (3%) of them strongly disagree about it. It is shown in graph No. 4.24.

![Graph No 4.24](image)
On the basis of students’ opinion towards LAP, the researcher concludes that students have different opinions towards LAP with reference to visual presentation for concept.

Sub hypothesis-4.4.4 There is a difference in students’ opinion towards LAP with reference to relevance of LAP for learning.

Table 4.4.4 Students’ opinion towards relevance of Learning Activity Package for learning in percentage

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.</td>
<td>44%</td>
<td>26%</td>
<td>9%</td>
<td>12%</td>
<td>9%</td>
</tr>
<tr>
<td>26.</td>
<td>47%</td>
<td>26%</td>
<td>15%</td>
<td>9%</td>
<td>3%</td>
</tr>
<tr>
<td>27.</td>
<td>44%</td>
<td>20%</td>
<td>18%</td>
<td>12%</td>
<td>6%</td>
</tr>
<tr>
<td>28.</td>
<td>26%</td>
<td>38%</td>
<td>18%</td>
<td>18%</td>
<td>0%</td>
</tr>
<tr>
<td>29.</td>
<td>47%</td>
<td>20%</td>
<td>21%</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>30.</td>
<td>38%</td>
<td>38%</td>
<td>15%</td>
<td>9%</td>
<td>0%</td>
</tr>
<tr>
<td>31.</td>
<td>44%</td>
<td>35%</td>
<td>9%</td>
<td>12%</td>
<td>0%</td>
</tr>
<tr>
<td>32.</td>
<td>32%</td>
<td>35%</td>
<td>21%</td>
<td>12%</td>
<td>0%</td>
</tr>
</tbody>
</table>

From the above table 4.1.4 it has been found that in reference to statement no. 25 (I prefer learning from video clips more than books) 44% of students strongly agree with the statement. On the other side 26% of students agree and 9% of them are neutral about it. On the opposite side 12% of students disagree with the statement and 9% of them strongly disagree about it. Thus it can be concluded that maximum (44%) of students strongly agree and minimum (9%) of them strongly disagree with it. It is shown in graph No. 4.25.
From table 4.1.4, it has been found that in reference to statement no. 26 (I prefer video based presentation with voice explanation) 47% of students strongly agree with the statement. On the opposite side 26% of students agree and 14% of them are neutral about it. On the other side 9% of students disagree and 3% of them strongly disagree about it. So it can be concluded that maximum (47%) of students strongly agree and minimum (3%) of them strongly disagree with it. It is shown in graph No. 4.26.

From table 4.1.4, it has been found that in reference to statement no. 27 (Learning through videos and slides is more enjoyable than printed materials) 44% of students strongly agree with the statement. On the other hand 21% of students agree and 18% of them are neutral about it. On the opposite side 12% of students disagree and 9% of them strongly disagree about it. So it can be concluded that maximum (44%) of students strongly agree and minimum (9%) of them strongly disagree with it. It is shown in graph No. 4.26.
and 6% of them strongly disagree about it. So from the table 4.1.4, it can be concluded that maximum (44%) of students strongly agree and minimum (6%) of them strongly disagree. It is shown in graph No. 4.27.

From table 4.2.4, it has been found that in reference to statement no. 28 (The slides have complete and adequate explanation of content presentation) 26% of students strongly agree with the statement. On the opposite side 38% of students agree and 18% of them are neutral about it. On the other hand 18% of students disagree. On the basis of table 4.1.4, it can be concluded that maximum (35%) of students agree with the statement and none of them strongly disagree. It is shown in graph No. 4.28.

From table 4.1.4, it has been found that in reference to statement no. 29 (I like videos than diagrams) 47% of students strongly agree. On the other hand 21% of
students agree and 21% of them are neutral about it. On the opposite side 6% of students disagree and 6% of them strongly disagree with it. On the basis of above table, it can be concluded that maximum (47%) of students strongly agree and minimum (6%) of them strongly disagree with it. It is shown in graph No. 4.29.

From table 4.1.4, it has been found that in reference to statement no. 30 (I prefer the slides for self-study) 38% of students strongly agree and prefer the slides for self-study. On the other side 38% of students agree and 15% of them are neutral about it. On the opposite side 9% of students disagree. On the basis of above table, it can be concluded that maximum (38%) of students strongly agree and none of them strongly disagree. It is shown in graph No. 4.30.

From table 4.1.4, it has been found in reference to statement no. 31 (The presentations are attractive) 44% of students strongly agree with the attractiveness of
presentations. On the opposite side 35% of students agree and 9% of them are neutral about it. On the other hand 12% of students disagree with the statement. On the basis of above table, it can be concluded that maximum (44%) of students strongly agree with the attractiveness of presentation and none of them strongly disagree about it. It is shown in graph No. 4.31.

From table 4.1.4, it is clear in reference to statement no. 32 (The presentation motivated me for self-study) 32% of students strongly agree with the statement. On the opposite side 35% of students agree and 21% of them are neutral about it. On the other side 21% of students disagree. On the basis of above table, it can be concluded that maximum (35%) of students agree and none of them strongly disagree about it. It is shown in graph No. 4.32.
On the basis of students’ opinion towards LAP, the researcher concludes that students have different opinions towards LAP with reference to relevance of LAP for learning.

Sub hypothesis-4.4.5 There is a difference in students’ opinion towards LAP with reference to evaluation activities by LAP.

Table 4.4.5 Students’ opinion towards evaluation activity by LAP in percentage

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>33.</td>
<td>35%</td>
<td>35%</td>
<td>21%</td>
<td>3%</td>
<td>6%</td>
</tr>
<tr>
<td>34.</td>
<td>41%</td>
<td>32%</td>
<td>6%</td>
<td>18%</td>
<td>3%</td>
</tr>
<tr>
<td>35.</td>
<td>47%</td>
<td>23%</td>
<td>24%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>36.</td>
<td>29%</td>
<td>32%</td>
<td>21%</td>
<td>15%</td>
<td>3%</td>
</tr>
<tr>
<td>37.</td>
<td>32%</td>
<td>23%</td>
<td>24%</td>
<td>12%</td>
<td>9%</td>
</tr>
<tr>
<td>38.</td>
<td>41%</td>
<td>23%</td>
<td>15%</td>
<td>15%</td>
<td>6%</td>
</tr>
<tr>
<td>39.</td>
<td>15%</td>
<td>47%</td>
<td>15%</td>
<td>17%</td>
<td>6%</td>
</tr>
<tr>
<td>40.</td>
<td>24%</td>
<td>29%</td>
<td>26%</td>
<td>6%</td>
<td>15%</td>
</tr>
</tbody>
</table>

From table 4.1.5, it has been found that in reference to statement no. 33 (The evaluation activities are related to the content) 35% of students strongly agree with the statement. On the other side 35% of students agree and 21% of them are neutral about it. On the opposite side 3% of students disagree and 6% of them strongly disagree with it. Therefore, it can be concluded that maximum (35%) of students strongly agree and minimum (3%) of them strongly disagree. It is shown in graph No. 4.33.
From table 4.1.5, it has been found that in reference to statement no. 3 (The evaluation activity included variety of questions) 41% of students strongly agree with the statement. On the opposite side 32% of students agree and 6% of them are neutral about it. On the other side 18% of students disagree and 3% of them strongly disagree about it. So it can be concluded that maximum (41%) of students strongly agree and minimum (3%) of them strongly disagree about it. It is shown in graph No. 4.34.

From table 4.1.5, it has been found that in reference to statement no. 35 (The evaluation activities are interesting) that 47% of students strongly agree with the statement. On the other hand 23% of students agree and 23% of them are neutral about it. On the opposite side 3% of students disagree with the evaluation activities are interesting and 3% of them strongly disagree. Thus it can be concluded that
maximum (47%) of students strongly agree and minimum (3%) of them strongly disagree. It is shown in graph No. 4.35.

![Graph no 4.35](image)

From table 4.2.5, it has been found that in reference to statement no. 36 (The puzzles included in evaluation activities are interesting) 29% of students strongly agree with the statement. On the opposite side 32% of students agree and 21% of them are neutral about it. On the other hand 15% of students disagree with the statement and 3% of them strongly disagree. On the basis of table 4.2.5, it can be concluded that maximum (32%) of students agree with the statement and minimum (3%) of them strongly disagree. It is shown in graph No. 4.36.

![Graph no 4.36](image)

From table 4.1.5, it has been found that in reference to statement no. 37 (The evaluation activity contains various items of difficulty level) 32% of students strongly
agree with the statement. On the other hand 23% of students agree and 23% of them are neutral about it. On the opposite side 12% of students disagree and 9% of them strongly disagree with it. On the basis of table 4.1.5, it can be concluded that maximum (32%) of students strongly agree and minimum (9%) of them strongly disagree. It is shown in graph No. 4.37.

![Graph no 4.37](image)

From table 4.1.5, it has been found that in reference to statement no. 38 (The evaluation activities help me to improve my learning related mistakes) 41% of students strongly agree with the statement. On the other side 23% of students agree and 15% of them are neutral about it. On the opposite side 15% of students disagree with the statement and 6% of them strongly disagree with it. On the basis of table 4.1.5, it can be concluded that maximum (41%) of students strongly agree with the evaluation activities which help them to improve their learning related mistakes and minimum (6%) of them strongly disagree. It is shown in graph No. 4.38.

![Graph no 4.38](image)
From table 4.1.5, it has been found that in reference to statement no. 39 (The evaluation activities cover up all the content) 15% of students strongly agree. On the opposite side 47% of students agree and 15% of them are neutral about it. On the other hand 18% of students disagree and 6% of them strongly disagree with it. On the basis of table 4.1.5, it can be concluded that maximum (47%) of students agree with evaluation activities which cover up all the content and minimum (6%) of them strongly disagree. It is shown in graph No. 4.39.

From table 4.1.5, it has been found that in reference to statement no. 40 (Readiness to face the problems in solving the puzzles of evaluation activity) 23% of students strongly agree. On the opposite side 29% of students agree and 27% of them are neutral about it. On the other side 6% of students disagree and 15% of them strongly disagree about it. On the basis of above table, it can be concluded that maximum (29%) of students agree and minimum (6%) of them disagree. It is shown in graph No. 4.40.
On the basis of student’s opinion towards LAP, the researcher concludes that students have different opinions towards LAP with reference to evaluation activities for LAP.

On the basis of Students’ Opinion Scale most of the students like LAP for learning. Students like all learning activities mentioned in LAP. Some students strongly agree with LAP for content learning. It may be due to creativity and animated presentation of LAP. Only few students disagree with LAP, the reason behind this may be due to their English language problem and understanding problem. The students who strongly disagree with LAP may be due to their less interest in Science subject. On the basis of Students’ Opinion Scale responses, researcher concludes that LAP is a sufficient and effective self-learning material for Science learning, it is very helpful in enhancing the level of learning and Achievement of students.