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पाठ्यक्रम विकास केन्द्र
सानोठिमी, भक्तपुर
(मान्यता, समकेतता तथा मूल्याङ्कन शाखा)

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विषय : पाठ्यसामग्री स्वीकृति सम्बन्धमा ।

श्री नोभा पब्लिकेसन प्रा.लि.
काठमाडौं ।

प्रस्तुत विषयमा त्यस प्रकाशनबाट मूल्याङ्कन र स्वीकृतिका लागि तोकिएको अवधिभित्र पेस हुन आएका तपसिलबमोजिमका पाठ्यसामग्री आवश्यक निर्णयार्थ पाठ्यसामग्री व्यवस्थापन तथा मूल्याङ्कन समितिमा पेस हुँदा विद्यालय शिक्षाको राष्ट्रिय पाठ्यक्रम प्रारूप २०७६, आधारभूत शिक्षा (कक्षा ४-५) पाठ्यक्रम २०७८, पाठ्यसामग्री विकाससम्बन्धी विद्यमान प्रावधान, ऐन, कानुन, निर्देशिका, कार्यविधि, प्रकाशन शैलीका प्रावधान, पाठ्यक्रम विकास केन्द्रले विभिन्न समयमा जारी गरेका र पाठ्यसामग्री सुधार/परिमार्जन/पुनर्लेखनका लागि दिइएका सुझाव र निर्देशनको परिपालना गरी स्वीकृति दिन सिफारिस भएअनुसार यस कार्यालयको मिति २०७८।१२।१४ गतेको निर्णयानुसार तपसिलमा उल्लिखित निर्देशनको पूर्ण परिपालना गरी शैक्षिक वर्ष २०७९, २०८० र २०८१ गरी तीन शैक्षिक वर्षका लागि गुणस्तरीय एवम् त्रुटिरहित पाठ्यसामग्री विकास गरी प्रकाशन गर्न स्वीकृति प्रदान गरिएको छ । विद्यमान संवैधानिक व्यवस्था, ऐन, कानुन, निर्देशिका, कार्यविधि, पाठ्यक्रम विकास केन्द्रले विभिन्न समयमा जारी गरेका निर्देशनलगायतका प्रावधानहरूको पूर्ण परिपालना नगरी गुणस्तरहीन पाठ्यसामग्रीको विकास, प्रकाशन र बिक्री वितरण गरेको पाइएमा, पाठ्यक्रम परिवर्तन भएमा वा यस केन्द्रबाट अन्य निर्णय भएमा यो स्वीकृति जुनसुकै बेला रद्द हुने छ ।

सारा पाण्डे तिवारी
पाठ्यक्रम अधिकृत

तपसिल

(क)पाठ्यसामग्रीको नाम

१	Science and Technology	आधारभूत तह/ कक्षा ४

(ख) निर्देशन

१.पाठ्यसामग्री विकाससम्बन्धी विद्यमान प्रावधान तथा पाठ्यसामग्री सुधार र परिमार्जनका लागि यस अघि दिइएका निर्देशनको पूर्ण परिपालना गर्ने ।

२.पाठ्यक्रमको मूल मर्म र भावनाअनुरूप पाठ्यक्रमका सम्पूर्ण पक्ष एवम् विषयवस्तु समावेश गरी पाठ्यसामग्रीलाई गुणस्तरीय बनाउने ।

३.आवरण पृष्ठको अघिल्लो (Front) भागको बायाँ (Verso) पृष्ठमा नेपालको आधिकारिक नक्सा र आवरण पृष्ठको पछिल्लो (Back) भागको दायाँ (Recto) पृष्ठमा कोभिड १९ सङ्क्रमण रोकथामसम्बन्धी सूचना यस केन्द्रको वेबसाइटबाट डाउनलोड गरी समावेश गर्ने । विषयवस्तुको प्रकृति र आवश्यकताका आधारमा पाठ्यसामग्री भित्रका विषयवस्तु र पाठमा समावेश गरिने तथ्यांक तथा नक्सा आधिकारिक र प्रामाणिक हुनुपर्ने ।

४.स्वीकृति पत्र स्क्यान गरी पाठ्यसामग्रीको शीर्षक पृष्ठभन्दा पछि दायाँ (Recto) पृष्ठमा समावेश गर्ने । पाठ्यसामग्रीको प्रत्येक पृष्ठको पुच्छर (Footer) मा पाठ्यक्रम विकास केन्द्रबाट स्वीकृत भन्ने व्यहोरा उल्लेख गरी प्रकाशन गरेका पाठ्यसामग्रीका तीन प्रति यस केन्द्रमा पेस गरेपछि मात्र बिक्री वितरण गर्ने । शिक्षा, विज्ञान तथा प्रविधि मन्त्रालयको निर्णयअनुसारको मूल्य कायम गर्ने तथा मूल्य र मुद्रण प्रतिको सङ्ख्या सर्वाधिकार पृष्ठमा अनिवार्यरूपमा राख्नुपर्ने । प्रतिलिपि अधिकार (Copy right) को सम्बन्धमा लेखक र प्रकाशक स्वयम् जिम्मेवार हुने ।

५.राष्ट्र, राष्ट्रिय एकता, सार्वभौमिकता, भौगोलिक अखण्डता, स्वाधीनता, राष्ट्रिय हित, पहिचान, सम्मान र समृद्धिमा आँच आउने तथा विभिन्न जातजाति, भाषा, धर्म, संस्कृति, सामाजिक सहिष्णुता, सद्भाव, सांस्कृतिक मूल्यमान्यता, रहनसहन आदिमा प्रतिकूल प्रभाव पार्ने कुनै पनि विषयवस्तु, उदाहरण, चित्र, अभ्यास, सिकाइ क्रियाकलाप समावेश नगर्ने ।

६.जातजाति, भाषा, धर्म, संस्कृति, वर्ण, क्षेत्र, लैङ्गिकता, अपाङ्गता, पेसा, व्यवसाय, सामाजिक सांस्कृतिक अवस्थाका आधारमा भावनात्मक रूपमा चोट पुऱ्याउने, आक्षेप लाग्ने, होच्याउने र विभेदीकरण गर्ने किसिमका विषयवस्तु, उदाहरण, चित्र, अभ्यास, सिकाइ क्रियाकलाप समावेश नगर्ने ।

७.पाठ्यसामग्रीमा समावेश गरिएका चित्र, नक्सा, चिह्न, सङ्केत आदि शुद्ध, स्पष्ट र बोधगम्य हुनुपर्ने ।

८.विद्यार्थीलाई थप भार पर्ने गरी पाठ्यक्रममा समावेश नगरिएका विषयवस्तु, अभ्यास तथा सिकाइ क्रियाकलाप पाठ्यसामग्रीमा समावेश नगर्ने।

९.पाठ्यक्रम एवम् दिइएका सुझाव र निर्देशनबमोजिम पूर्णरूप दिइएको त्रुटिरहित गुणस्तरीय पाठ्यसामग्री मात्र प्रकाशन र बिक्री वितरण गर्ने ।

पुनश्च : यो स्वीकृति शैक्षिक वर्ष २०७९, २०८० र २०८१ का लागि प्रदान गरिएकाले सोहीबमोजिम प्रकाशन, बिक्री वितरण र प्रयोग गर्नु गराउनहुन सम्बन्धित सरोकारवाला सबैमा अनुरोध छ ।

Approved by Government of Nepal, Ministry of Education, Science and Technology, Curriculum Development Centre (CDC), Sanothimi Bhaktapur

Modern Concept Science AND TECHNOLOGY 4

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PREFACE

Modern Concept Science and Technology for grade 4 is written to meet the objectives of the curriculum of class 4 science and technology developed by CDC (Curriculum Development Center), Sanothimi, Bhaktapur. This edition of our textbook meets the criteria of basic knowledge in science and technology for students who study in class 4. It will help students to achieve the goals of life by gaining of knowledge,skills and values in Science and technology.

Logical placing of key points and well organized matter are given high priority throughout the textbook. Appropriate pictures, matter in simplified language and organization of the content with new features are our high expectation values about popularity of this textbook among the readers.

Features of Modern Concept Science and Technology

A notable concern of many teachers is to follow a well-organized textbook with step by step learningsin a continuous flow. The organization of this textbook is logically designed to make the book's information more accessible.

1. Top of the first page of each unit consists of syllabus issued by CDC (Curriculum Development Center), Sanothimi, Bhaktapur for class 4.
2. Learning outcomes of each unit are given just below the syllabus issued by CDC to focus the teaching learning goals.
3. The most important idea of writing terms and terminologies on the first page of each unit is devoted to screen out the main content to be covered.
4. Highlighted definitions, catchy memory tips and bubble box on pages inside of a chapter for a quick look on important points to be remembered are provided in the first page of each unit.
5. Activities and solved numerical problems are given in each unit of the same page with corresponding to the topic to develop the scientific skill in the readers.
6. Sample questions of Knowledge, Understanding, Application, and Higher Ability with their answer are given at the end of each unit under the title answer writing skill to get idea to solve the questions given in the four steps exercise.
7. This text book focuses primarily on all three level questions to test students' skill under the title four steps exercise.

With these all features in a well-organized content, the central focus of this book is to encourage students and make the text user-friendly for all. The answer writing skill and four levels grid based exercise will help teachers to set test papers for assessments. Students' interest will be peaked when they will find the screen out terms and terminologies, the appropriate pictures and key points throughout the textbook. We hope that this book will help teaching in learner-centered way.

We wish to express our sincere gratitude to Mr. Megh Raj Poudel, Managing director of Nova Publication Pvt. Ltd. for publishing this book. Similarly, thanks are due to Mr. Deepak Bahadur Bista, Ashim (Indra) Rijal, Deepak Banjade, Dilip Belbase, Srijan Pasachhe and Srijan Adhikari for their valuable help during the preparation and content editing of the book. Likewise, thanks are due to Mr. Jagadish Pokhrel for his praiseworthy language editing.

Finally, we owe full responsibility of misprints and other technical errors, if any, found in this textbook in spite of our best effort to make this book error-free. Constructive criticism and suggestions for improvement of this book will be highly appreciated.

Authors

Kathmandu, Nepal

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UNIT

1 SCIENTIFIC LEARNING

ESTIMATED TEACHING PERIODS	TH	PR
	5	1

Introduction

We have always wondered how an aeroplane floats in air or why is it dark at night. It is because we are curious. It is a natural process to be curious about the different events that happens in our surroundings. It is the first step of scientific learning.

Sir Isaac Newton was curious about the falling of an apple. He wondered why it was not floating. He thought about it and learnt that the earth's gravity pulled things down.

Sir Isaac Newton

Sir Isaac Newton under the apple tree

Activity

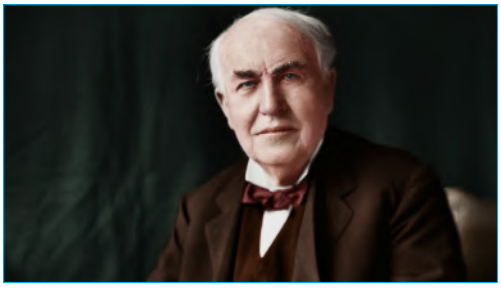
Take a few balloons and fill them with air. Give them to your teacher. Let your teacher pierce them for you. Does it burst or not? What happens if you paste cello tape in that balloon and your teacher pierce it through cello tape? Observe.

James watt saw that boiling water can move the lid of the kettle. Later he invented the steam engine.

steam engine

steam engine is based on working ability of boiling water

Thomas Alba Edison invented the electric bulb.



Thomas Alba Edison

electric bulb was invented by Edison

Memory Tips

Darwin observed various plants, animals and fossils for many years. He analysed the information he gathered from his observation and predicted that modern living beings were modified forms of ancient living things.

When people are curious about something, they observe it. They collect information by asking questions. They make predictions and experiment with it and arrive at some conclusion. Finally, they make a theory. Such a way of learning is called the scientific learning.

The continuous process of learning that includes observation, collecting information, analysing data, making a prediction, conducting an experiment and drawing the conclusion is called the scientific learning.

UNIT
1.1 Scientific Learning Process

Terms and terminologies

1. Scientific learning: The continuous process of learning that includes observation, collecting information, analysing data, making a prediction, conducting an experiment and drawing the conclusion is called scientific learning.
2. Scientific learning process: The transferable skills such as observation, measurement, comparison, analysing, conducting experiments etc. are called scientific learning processes.
3. Scientific experiment: The set of controlled activities performed to verify the predictions made during scientific learning is called a scientific experiment.

Introduction

Scientific learning always starts with observation. Observation helps to find new information on a topic. We use our sense organs to observe the object. We use eyes to see, ears to listen, nose to smell, skin to feel and tongue to taste. Such information is analysed. Predictions are made. Experiments are done and finally, a conclusion is drawn.

Transferable skills such as observation, measurement, comparison, analysing, conducting experiments etc. are used in the scientific learning process.

Memory Tips

Graham Bell invented the first telephone.

Activity

Visit a nearby vegetable garden. Collect a few leaves from different vegetable plants. Observe the leaves and fill in the table given below.

Name of vegetable you plucked a leaf from	Colour of the leaf	The shape of the leaf	Does it smell or not?	Is it edible or not?

During this experiment, we will observe the leaves. We will then ask elders about the vegetable leaves. We will collect the information, analyze it and learn about the leaves. This method of learning is called scientific learning.

Fact with Reason

Why is observation important?

Observation is important because it helps to collect new information about the topic. It is the first skill of the scientific learning process.

EXPERIMENT

The set of controlled activities performed to verify the predictions made during scientific learning is called a scientific experiment. Scientific learning is incomplete without an experiment. It can be performed in the science lab, at home, or outdoors.

We should have the following habits while performing a scientific experiment:

i. Observe very carefully and write a note if any information is found.

ii. Be very careful while using the tools, apparatus and chemicals.

iii. We should keep our laboratory, tools and apparatus clean.

iv. Put all the apparatus in their respective places after the experiment.

Activity

Sweet food contains sugar. Sugar is energy giving food. Let's experiment to see which food is energy giving food. Collect five different types of food we eat in our daily life. Observe them and fill the table below.

Sample food	What is it made of?	What is the taste of the food?	Is it energy giving food?

Memory Tips

An object that sinks in water has more density than the water.

Fact with Reason

Why is asking questions important?

Asking questions is very important because it helps to find answers to our curiosity. It can be used to make predictions.

Precautions during experimenting

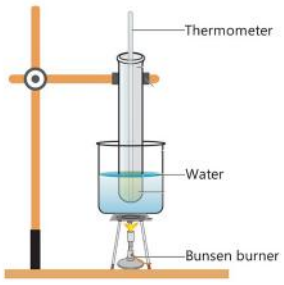
Scientific experiments may be quite dangerous sometimes. Therefore, we must perform scientific experiments very carefully.

There are some sets of instructions which must be considered in the laboratory. They are:

i. We should follow the instructions of the teacher.
ii. We should never play in the science laboratory
iii. We should never eat or drink anything in the laboratory.
iv. Use glass apparatus carefully.
v. Do not play with the fire.
vi. Use gloves while using chemicals.

Activity

Observe an experiment where water is being boiled to know its boiling point and think about the precautions you should follow.



GLOSSARY

Rainbow : *colourful arc seen in the sky*
Edible : *that can be eaten*
Precaution : *an activity to prevent an accident*

Answer writing skill

1. What do you mean by scientific learning?

The continuous process of learning that includes observation, collecting information, analysing data, making a prediction, conducting an experiment and drawing the conclusion is called scientific learning.

2. Which part of our body help us during observation?

Our sense organs help us during observation. We use our eyes to see, ears to listen, nose to smell, skin to feel and tongue to taste things.

3. Scientific learning is important. Give reason.

Scientific learning is important because it helps to understand events properly. It helps to invent new technology and make our life easier.

4. Write any three things which we should do while experimenting in the lab.

Some of the important things that we should do while experimenting in the lab are:

i. Observe very carefully and note down new information.

ii. Follow the teacher's directions.

iii. Keep the apparatus in their respective places after the experiment ends.

5. Let's suppose you are in a science lab and you got your finger burnt in the burner. What should you do? Why did you get burnt? Did you follow the directions of the teacher? What should you have done to avoid this accident?

If I am in the science lab and I got my finger burnt, I should inform my friends and teacher immediately. I should put my finger in cold water. Later I can use cold cream.

I got burnt because I was careless.

I should have followed the directions of the teacher. I should have never touched the burners. I should have used the tools properly. I should not have randomly touched the apparatus in the science lab.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

information	experiment	observation	answers	gravity

a. Sir Isaac Newton discovered ……

b. Asking questions is very important because it helps to find ……to our questions.

c. Scientific learning always starts with……

d. Scientific learning is incomplete without an ……

e. The conclusion is drawn after analysing …… and experimenting.

2. Write true for the correct and false for the incorrect statement.

a. Observation, analysis, research and invention are practised by humans since ancient times.

b. We should not play or rush in the science lab.

c. Scientific experiments are always safe.

d. Observation helps us to collect necessary information about a topic.

e. We should not note down new information.

3. Choose the best answer from the given alternatives.

a. Which one of the given substances floats on water?

Oil	Iron	Stone	Soil

b. Who invented the radio?

James	Darwin	Edison	Marconi

c. Who researched the origin of the species?

Darwin	James	Marconi	Edison

d. Which one of the following is scientific learning process skill?

Observation	Analysis	Asking question	All of them

e. Which one dissolves in water?

Soil	Stone	Iron	Sugar

4. Match the following.

James watt	helps in invention
Experiments and experience	observation
Thomas Alba Edison	steam engine
Sir Isaac newton	light bulb
First skill of scientific learning	gravity

Step 2

5. Answer the following questions in one word.

a. Which sense organ is used to see?
b. What is the term used for observation, asking questions, research and experiment to learn?
c. What is the term used for transferable skills such as observation, measurement, comparison, analysing, conducting experiments etc.?
d. What is incomplete without a scientific experiment to verify it?
e. What helps us to find answers to our questions about the topic?

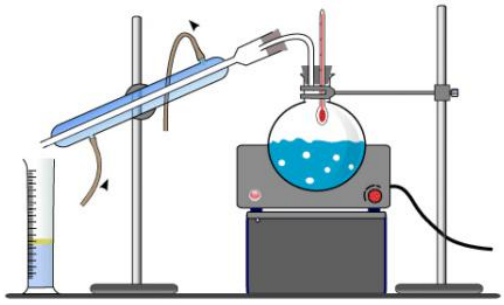
6. Write any two differences between.

a. Observation and experiment

7. Give reason.

a. We should observe the topic of interest very carefully.
b. Scientific learning is important for us.
c. We should not play in the science lab.
d. We should do scientific experiments.

8. Study the given diagram and answer the following questions.



i. What place is shown in the diagram?

ii. What is being done in the diagram shown above?

iii. What precautions should we adopt if we were there?

Step 3

9. Answer the following questions.

a. What do you mean by scientific learning?

b. Define the scientific learning process.

c. What do you mean by observation?

d. Define scientific experiments.

e. Write the importance of scientific experiments.

f. List the precaution which we should adopt while doing the scientific experiments.

g. Is it wise to eat our lunch in the science lab? Explain with reason.

h. Let's suppose we have chocolate. How can we verify if it is energy giving food or not?

i. What should we do if we dropped and broke a glass test tube in the chemistry lab?

j. List the activities that we should do while performing experiments in the science lab.

10. Project work.

There are lots of great scientists out there. Who is your favourite one? Collect any five pieces of information about your favourite scientist and read them in the class.

UNIT
1.2 Measurement

Terms and terminologies

1. Measurement: The process of comparison of an unknown quantity with a known standard quantity of the same kind is called measurement.
2. Unit: Unit is the standard reference form of a physical quantity.
3. Schematic diagram: The representation of an object using simple lines instead of the real picture is called a schematic diagram.

Introduction

We have always wondered how high is the sky or how deep is the ocean. We can know exact value of such quantities by measuring them. Measurement is a process where we collect information for the scientific learning process.

Activity

Stand in an attention position. Let your friend measure your height. Tell your height to your parents.

In this experiment, your height was an unknown quantity but the meter scale was a known quantity.

If you compare an unknown quantity with a known standard quantity of the same kind then the you can take the measurement.

Memory Tips

Take a weighing machine from your science lab. Stand on the weighing machine and observe the scale.
In this experiment, your weight is an unknown quantity. The weighing machine is a known quantity.

weighing machines

pan balance

spring balance

fig: few tools that are used for measurement

Measurement is an effort to know the exact amount of a physical quantity. The process of comparing an unknown physical quantity with a known and standard quantity of the same kind is called measurement. We measure almost everything in our daily life. Measurement is necessary for scientific research, engineering, business and trade.

taking measurement of cloth

Activity

Take a ruler and measure the length, breadth and height of your science book. Calculate the volume of your science book.

Volume = length × breadth × height. Which unit is used here?

Memory Tips

One kilogram mass is equal to the mass of 1 litre of pure water.

Importance of measurement

If our parents give us a pair of shoes but they are not fit, will we be happy? Of course not! Using materials without measurement may cause problems. Therefore, we must measure the physical quantity and use it in a proper amount.

Fact with Reason

Why is measurement important?

Measurement is important because it helps in business, trade and scientific research.

Measurement is very important because:

i. It helps in business and trade.

ii. It is useful in scientific research.

iii. It is useful to know the exact amount while making food or medicine.

figure of 1 kilogram and 5 kilograms weigh.

Unit of measurement

If we visit a grocery with our parent to buy sugar, the shopkeeper will ask us if how many kilograms of sugar we need. The mass of the sugar is measured during the trade. A kilogram is a unit of mass. Mass is measured by pan balance or digital balance. If we buy 2 kilograms of sugar it is 2 times heavier than 1-kilogram mass.

If we go for buying milk, then we measure it with the help of a measuring cylinder. This is because the volume of the milk is measured in litres during the trade. The litre is a unit of the volume of liquid. The volume of all liquids is measured by a measuring cylinder. If we buy 5 litres of milk its volume is 5 times of one litre volume.

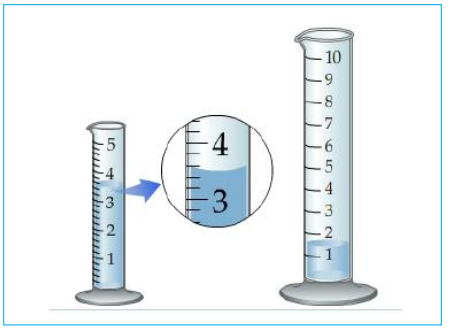


Fig: measuring cylinder

Fact with Reason

Why is the unit necessary?

The unit is necessary because it helps to compare and understand measurement easily.

Activity

Visit a local store with your guardian when they are going for shopping in the grocery. Discuss with your guardian or shopkeeper and try to know what units are used to measure the things you have bought.

When a physical quantity is measured, it is expressed using a number and a unit. The unit makes measurement easier. Thus, the unit is the standard reference form of a physical quantity.

Time is measured in seconds, minutes and hours. Length is measured in meters, centimetres and feet. Volume is measured in cubic meters and litres. Mass is measured in kilograms, grams and pounds. Area is measured in square meters, square feet and square centimetres.

quartz clock

pendulum clock

atomic clock

hourglass

Fig: some devices to measure time

Activity

Discuss with your parents or grandparents and learn the following things.

What local unit is used to measure rice and wheat?

What are the local units for measuring length?

Memory Tips

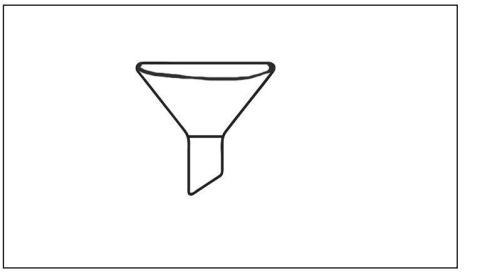
The standard unit of time is second, mass is kilogram and length is metre.

Measurement makes our daily life easier and faster. When we borrow or lend food, grains and cereals it is wise to measure. *Mana, pathi, haat, bitta, pau, dharni* etc. are commonly used to measure physical quantities in villages.

Schematic diagrams

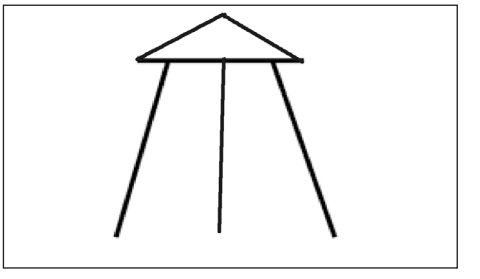
The Science laboratory contains lots of instruments. There are thousands of apparatus and devices. It would be very difficult and less meaningful to draw them during the study. Therefore, schematic diagrams are used to represent laboratory apparatus and devices. Schematic diagrams are very simple. Lines are used for representing the main part of the apparatus. The representation of an object using simple lines instead of the real picture is called a schematic diagram.

funnel

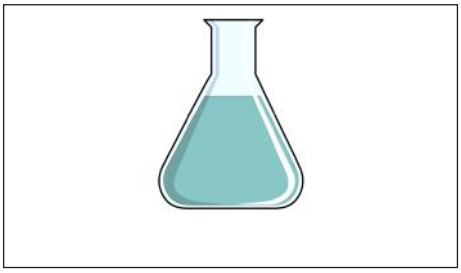


schematic diagram of funnel

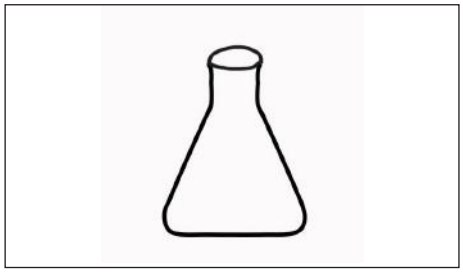
tripod stand



schematic diagram of tripod stand

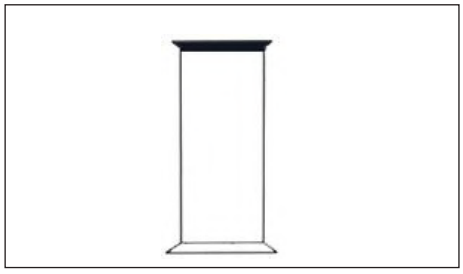


conical flask



schematic diagram of conical flask

gas jar



schematic diagram of gas jar

Properties of schematic diagrams

i. It is very simple and easy to understand.

ii. It contains main features of the object only.

iii. It is easy to draw and understand.

Fact with Reason

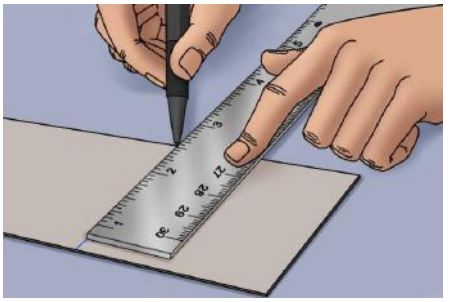
Why are schematic diagrams used in science textbooks?

Schematic diagrams are used in science textbooks because they are easy to draw and easy to understand.

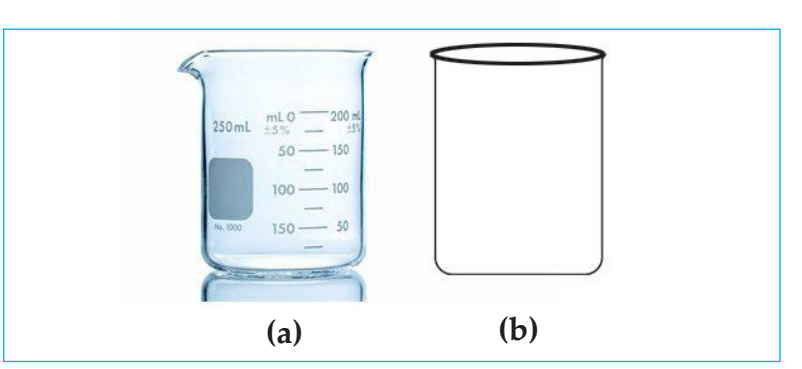
Rules for drawing schematic diagrams

i. A sharp pencil should be used.

ii. Draw a single line using the ruler.



iii. The picture must be two dimensional. Do not close the picture at the top.



iv. We cannot colour or shade the image.

v. Use a straight line for labelling.

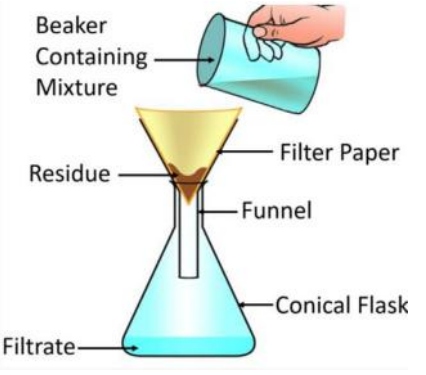


Fig: A labelled diagram of filtration

vi. The size of the different parts of the figure should be proportional.

Activity

Visit your science laboratory and draw the schematic diagram of any five apparatuses.

GLOSSARY

Physical quantity	:	*a substance that can be measured*
Volume	:	*space occupied by a body*
Mass	:	*the amount of matter present in a body*

Answer writing skill

1. Define measurement.

The process of comparison of an unknown physical quantity with a known and standard quantity of the same kind is called measurement.

2. What is a kilogram mass used for?

Kilogram mass is used to measure the mass of the substance.

3. List the rules of drawing schematic diagrams.

The rules of drawing schematic images are:

i. Use sharp pencils and rulers to draw lines.
ii. Do not colour or shade.
iii. Never close the top of the picture.

4. Why should we not colour or shade schematic diagrams?

We should never colour or shade schematic diagrams because they may block some important parts of the image.

5. How can we know our height? Explain.

If we want to know our height, we should find a measuring tape. We should stand in the attention position near the wall.

We should put a mark on the wall with a pencil. Then we have to stretch the measuring tape from the floor to the mark and observe the scale. Then we will know our height.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

measurement	schematic diagrams	volume	mass	comparison

a. We collect information for the scientific learning process by the skill called .....

b. The process of …… of an unknown quantity with a known quantity is called measurement.

c. The kilogram is a unit of ……

d. Measuring cylinder measures ……. of the liquid.

e. A very simple diagram is called …….

2. Write true for the correct and false for the incorrect statement.

a. The length of a foot was a valid unit of length.

b. Unit is the standard reference form of a physical quantity.

c. Happiness and sadness cannot be measured.

d. We should use colour pencils to draw schematic diagrams.

e. We should use appropriate colours in schematic diagrams.

3. Choose the best answer from the given alternatives.

a. What is the unit of mass?

Metre	Second	Kilogram	Cubic meter

b. Which one is the non-physical quantity?

Mass	Volume	Time	Sadness

c. What is the unit of length?

Meter	Second	Kilogram	Cubic meter

d. What is measured by an hourglass?

Length	Mass	Volume	Time

e. Which one is not the feature of the schematic diagram?

Simple	Clear	Shaded	All of them

4. Match the following.

5 kg mass	time
Mass	simple and clear
Physical quantity	5 times of one kilogram mass
Schematic drawing	can be measured
Atomic clock	pound

Step 2

5. Answer the following questions in one word.

a. Which device measures mass?
b. Write a name of the device that measures time?
c. Which tool is used to measure volume of water?
d. Which tool measures length?
e. Which tool is used to measure volume of rice, wheat and maize in villages?

6. Write any two differences between.

a. Real diagram and schematic diagram.
b. Measurement of solid mass and measurement of liquid mass.

7. Give reason.

a. Measurement is necessary.
b. We should never colour a schematic diagram.
c. A schematic diagram is used to represent laboratory apparatus.

8. Study the given diagram and answer the following questions.

i. Which laboratory tool is shown in the diagram?

ii. Draw its schematic diagram.

Step 3

9. Answer the following questions.

a. What is measurement?

b. Write the importance of measurement.

c. Define unit.

d. What is a schematic diagram?

e. What does it mean by 5 m length?

f. What are the rules for drawing a schematic diagram?

g. Draw the schematic diagram of the beaker.

h. Our country is already using *mana, pathi, dharni* etc. for measurement but nowadays people are using units such as Kilogram, litre, metre etc. Discuss the reason.

10. Project work.

Make a list of measuring tools present in your house. What are they used for? Discuss with your guardians.

UNIT

2 INFORMATION AND COMMUNICATION TECHNOLOGY

ESTIMATED TEACHING PERIODS	TH	PR
	5	1

Introduction

Since, ancient time humans have been using various tools to make their work easier and faster. Starting with stone axe humans have now made very complex machines such as rockets, computers, aeroplanes, etc. Technology makes work easier and faster. The technologies that are being used by local people since ancient times are called local technologies. The water mill is the oldest local technology that helps to grind grains which are now replaced by electric flour mill. Modern technology is very complex. It is created by modifying the local technology. Modern technology is widely used in agriculture, communication, education, transportation, industries and hospitals.

windmill

water mill

train

supercomputer

fig: some old and modern technologies

Activity

Visit your town or village with your parents and list the names of different local and modern technologies you see.

Memory Tips

The stone axe was the first human technology.

UNIT
2.1 Means of Communication

Terms and terminologies

1. Local technology: The technologies that are being used by local people since ancient times are called local technologies.
2. Information: Information is a set of facts about someone or something.
3. Means of communication: The technology that allows us to share information is called means of communication.
4. Communication: The process in which we exchange information between two or more people is called communication.
5. One-way communication: The communication in which information is relayed by the source but we cannot reply is called one-way communication.
6. Two-way communication: The communication method in which we can receive as well as send information among each other right away is called two-way communication.

Introduction

In ancient times people had to send the message from one place to another to send information. Animals such as pigeons and eagles were also used to send letters. The post office was started in Nepal in 1878 A.D. The most popular form of communication in the world, telephone was invented by Graham Bell. The first radio was invented by Marconi.


letter

post office


old telephone


telegraph


radio

fig: means of communication

Activity

Browse the internet or discuss with your parents and make a list of means of communication used in your country in the past.

Fact with Reason

Why is modern technology popular?

Modern technology is popular because it makes our work easier and faster.

Nowadays modern technology is used in information and communication technology too. Computers, smartphones and the internet have made communication easier. We can easily receive or send information to other people in any corner of the world. Various software, social media and internet service providers are helping to make communication easier.


laptop


desktop


internet signal towers


facebook


viber

fig: modern means of communication

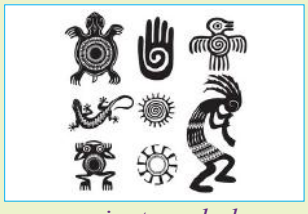
Information

We use a book to study. We use the telephone to talk with relatives. We read a newspaper or watch television for news. Messenger, viber and other social media applications help us to share information. Information is a set of facts about someone or something.

Memory Tips

Emojis are also used to communicate. People used symbols and pictures to communicate in ancient times.


emojis


ancient symbols

Information is important because:

i. Information about work helps us to plan.

ii. Information about food helps us to make a balanced diet.

iii. Information stored in our brain allows us to feel, taste, smell, hear and see.

iv. It allows us to talk to our friends and understand them.

Activity

How would you communicate with your relatives or friends who live far away from you? Think about it.

Communication

Letters, newspapers, messenger, telephone, television etc. are means of communication. They help to exchange information. The technology that allows us to share information is called means of communication. We use sound, pictures, letters, signals and body language to share our feelings with other people. The process in which we exchange information between two people is called communication.

Importance of communication

i. It helps us to tell our friends and family about our feelings.

ii. We can watch different movies, songs and other programs on television.

iii. Trade will be easier.

Memory Tips

The oldest known form of communication is cave painting.

old cave paintings

Fact with Reason

Why is communication important?

Communication is important because it helps us and our friends understand each other easily and quickly.

Means of communication

Communication may be one-way or two-way. Books, newspapers, radio and television help in one-way communication. These means give us information but we cannot reply through them. The communication in which information is relayed by the source but we cannot reply is called one-way communication.

listening to the radio

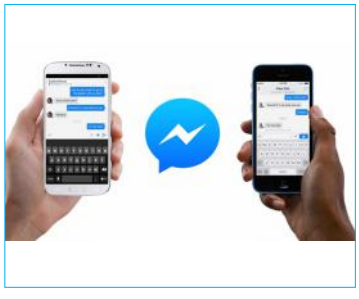
watching television

reading books

fig: means of one-way communication

Telephone, Messenger, Viber etc. allow two-way communication. Two or more people can exchange information at the same time with each other. The communication method in which we can receive as well as send information among each other right away is called two-way communication.

making a phone call



using messenger

snap chat

fig: means of two-way communciation

Activity

How does your family receive information? What are the uses of smartphones?

Communication makes our daily life easier in many ways:

i. It will be easier to buy groceries from the store.

ii. We can know about weather from television.

iii. We can stay in touch with relatives who are far away.

iv. We can call our elders during an emergency.

GLOSSARY

Internet service provider : *company that sells internet service*

Answer writing skill

1. Write the use of the telephone?

The telephone is used to transfer our voice to another person.

2. What is information?

Information is a fact about someone or something.

3. Give an example of means of two way communication.

Smartphone is a means of two way communication.

4. Let's suppose you are lost in the city. What should you do?

If I am lost in the city, I should try to communicate with others properly. I must remember the full name and phone number of my parents. I should find police officers or a woman with a child. I should ask them to make a phone call to my parents.

5. Is communication the key for better life? Clarify.

Communication is very important for better life. It makes our life easier by following ways:

i. It helps us to tell our friends and family about our feelings.

ii. We can watch different movies, songs and other programs on television.

iii. Trade and teaching-learning activities will be easier.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

graham Bell	communication	means of communication	one-way communication	information

a. The most popular form of communication in the world telephone was invented by ……

b. Computers, smartphones and the internet has made ……. easier.

c. The fact about someone or something is called…….

d. The technology that allows us to share information is called……

e. The communication in which information is relayed by the source but we cannot reply is called……

2. Write true for the correct and false for the incorrect statement.

a. Communication helps us to understand other people.

b. The telephone is a means of two-way communication.

c. Information stored in our brain allows us to feel, taste, smell, hear and see.

d. The post office is used to transfer letters.

e. Television is a means of two-way communication.

3. Choose the best answer from the given alternatives.

a. Which one is the means of communication?

Letter	Bus	Watermill	Spoon

b. Which one is modern technology?

Watermill	*Dhiki*	*Kol*	Electric flour mill

c. What are the modern means of communication'?

Letter	Pigeon	Book	Smartphone

d. What are the means of one-way communication?

Book	Smartphone	Messenger	Telephone

e. What are the means of two-way communication?

Letter	Radio	Telephone	Television

4. Match the following.

Set of fact	one-way communication
Mobile phone	act of exchanging information
Radio	local technology
Dhiki	two-way communication
Communication	information

Step 2

5. Answer the following questions in one word.

a. What is the term used for meaningful facts about something?

b. What is the term for the exchange of information between two people?

c. When was the post office started in Nepal?

d. What type of means of communication is the newspaper?

e. What type of means of communication is Messenger application?

6. Write any two differences between.

a. One-way communication and two-way communication

b. Letter and email

7. Give reason.

a. It is important to learn to dial phone numbers on a smartphone.

b. Radio and television are called means of one-way communication.

c. The telephone is called a means of two-way communication.

d. Communication is necessary.

8. Study the given diagram and answer the following questions.

(a)

(b)

(c)

(d)

i. What are shown in the diagram?

ii. Which one of them is a means of two-way communication?

iii. Write the use of the means of communication shown in figure 'a'.

Step 3

9. Answer the following questions.

a. Define information.

b. Write the importance of information.

c. What is communication. Write its importance.

d. What do you mean by one-way communication? Give two examples.

e. Define two-way communication. Give two examples.

f. Internet, smartphones, computers etc. are modern means of communication. Justify.

g. Do you think information and technology has made our life easier? If yes, how? Discuss in a group.

10. Project work.

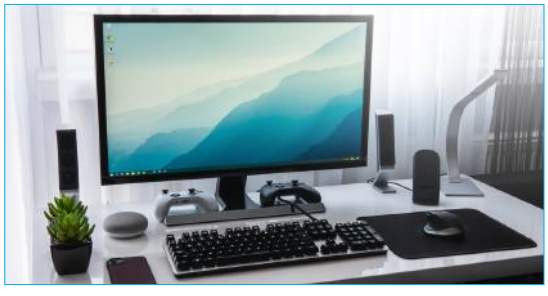
Collect ten pieces of current information from all over the world. You may use any means of communication. Read them aloud in the class.

UNIT
2.2 Introduction to Computer

Terms and terminologies

1. Information: A set of facts about someone or something is called information.
2. Computer: The device that can work with the information is called a computer.
3. Data: Information in the computer is called data.
4. Input device: The devices that send information into the computer are called input devices.
5. Output device: The devices which receive the data from the system unit are called output devices.
6. Keyboard: A keyboard is an input device that has keys for typing.
7. Mouse: A mouse is a hand-held input device.
8. System unit: The hardware which can process the information sent from the input device is called the system unit.
9. Monitor: A monitor is an output device that displays information in visual form.
10. Storage device: Hardware that can store processed information is called a storage device.

Introduction



desktop computer

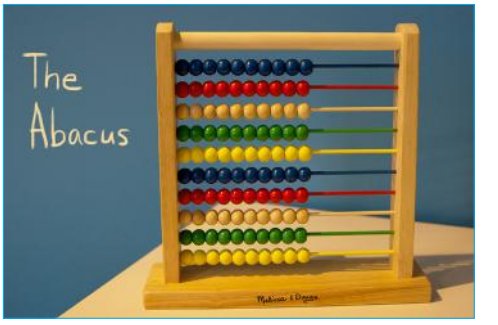
A set of facts about someone or something is called information. Information may be in the form of letters, words, pictures, sounds and symbols. This kind of information can be stored in a device such as a pen drive, compact disk, floppy disk etc. There are a few devices such as a calculator, digital camera, smartphone,

laptop and desktop which can store and process that information. The device that can work with information is called a computer. A computer can work with a very large amount of data. Information in the computer is called data.

Memory Tips

Charles Babbage is the father of the computer.

Importance of computer



abacus

The abacus is the oldest computer. It is a device that helps us to do simple calculations just as a calculator would do it. Modern computers are amazing. People use computers for listening to music, watching movies and playing games. It is also used in offices to keep different records. Factories also use computers to control machines. Writing email, shopping, banking etc. can be done easily on the computer. When more than one computer is linked together it forms the internet. A computer is a smart machine. It provides information from all over the world. It is a very important and popular means of communication.

The computer is widely used for the following works:

i. Keeping records in the office
ii. Writing documents, email and filling forms.
iii. Banking
iv. Online shopping, booking tickets
v. Communication


people using computer in the office


students in the computer lab

Fact with Reason

Why is the computer called a multipurpose machine?

The computer is called a multipurpose machine because it can do many tasks.

Activity

Draw a diagram of a desktop personal computer and label its keyboard, mouse, monitor and CPU.

Parts of the computer

We already know that a computer takes information, processes it and outputs the data. The computer may be as simple as a calculator or it may be a very advanced supercomputer. Some of the common parts of the computer are the monitor, central processing unit, mouse and keyboard. Broadly, Computer parts are divided into input and output devices. Mouse, keyboard, joysticks, controllers, web camera and light pen are some input devices. These parts send information to the system unit. The devices that send information to the computer are called input devices. System units process the data. The processed data can be displayed on the monitor or played through the speakers. It can be stored on a hard disk, a Compact discs or in a pen drive. We can also print out images and words from the printer as well. The devices which receive the data from the system unit are called output devices.

Memory Tips

The first computer weighed more than 27,000 kilograms.

Keyboard

A keyboard is an input device that has keys for typing. It is usually a flat rectangular board. Some keys have letters in them. Some of them have numbers or symbols.

keyboard

Fact with Reason

Why is a keyboard called an input device?

A keyboard is called an input device because we can press keys in it and send information to the computer.

Mouse

A mouse is a hand-held input device. It helps us to select an icon on the monitor. It is seen as a triangular pointer on the monitor. Keep it on a mouse pad and move it gently. Doing this will move the pointer on the monitor. There are at least two buttons on the mouse. The button on the right helps in the right-click and the button on the left helps in the left-click. Use the index finger for the left click and the middle finger for the right click. We can use the mouse to draw pictures, select icons and play games. It is a very useful input device.

mouse

Memory Tips

The first computer mouse was made of wood.

Activity

Learn to use a mouse and a keyboard.

System unit

The hardware which can process the information sent from the input device is called the system unit. It is also called the Central Processing Unit (CPU). The CPU is also called the brain of the computer.

processor

motherboard

microprocessor

Fact with Reason

Why is a computer called a smart machine?

A computer is called a smart machine because it can do many works such as calculating, typing, playing games, watching movies etc.

Monitor

All of the information processed and stored in the CPU can be displayed on the monitor. Icons are seen on the monitor. A monitor is an output device that displays information in visual form. If we are playing games and watching movies, it is seen on the monitor.

monitor

Storage device

People store files, photos, songs and movies in a pen drive. Compact disks (CDs) are widely used to store movies and software. These

hardware devices can store data in them. Hardware that can store the processed information is called a storage device. A storage device known as a hard disk is found in the CPU.


hard disk


floppy disk


CD

pen drive

fig: storage devices

Activity

Find a compact disk. Observe it.

Security and cleaning of the computer:

The computer is amazing. It is fun to have one. If it is damaged it is expensive and hard to repair. So, we should use it with care.

Some of the good ways to use a computer are listed below:

i. It should be connected to the safe power circuit.

ii. Uninterruptable Power Supply (UPS) should be connected.

iii. Do not turn off computers directly. Use the shut down option.

iv. Do not eat or drink near your computer.

v. Do not hit the monitor, CPU, mouse and keyboard.


stand and stretch after using computer for an hour


computer reading glasses [focus on glass]

Memory Tips

We blink less while using mobiles and computers. So, our eyes become dry.

Fact with Reason

Why should we be careful while using a pen drive?

We should be very careful while using a pen drive to prevent the transfer of viruses to the computer.

Cleaning of the computer

We must keep our computers neat and clean. If there is lots of dust inside the CPU, it cannot work properly.

Following points should be considered while cleaning a computer.

i. We should shut down the computer while cleaning it.

ii. Do not use water to clean it.

iii. Use soft cloth to clean the mouse, keyboard and monitor.

iv. Use an air blower to remove the dust from the CPU.

Activity

Clean your computer with the help of your guardian. Make sure you do not get an electric shock.

Computer and human health

The computer is a multipurpose electronic device. Using the computer for a long time is harmful to us. It may cause headaches and back pain.

The following activities help to reduce these harmful effects.

i. We should keep our back straight.

ii. Adjust the brightness of the monitor.

iii. Do not use the computer for a very long time.

iv. Stand up from the chair every one hour and stretch our arms and legs.

GLOSSARY

Input device **:** *a device that enters information into the computer*

Answer writing skill

1. Define an input device with an example.

The device that sends information into the computer is called an input device.

Example: keyboard

2. Write the names of two buttons of the mouse.

Left-click button and right-click button are two buttons of the mouse.

3. Write any two differences between an input device and the output device.

Two differences between input devices and output devices are listed below:

Sn	Input device	Sn	Output device
1	The device that sends information into the computer is called an input device.	1	The device which receives information from the system unit is called an output device.

2	It cannot receive information from the system unit. Example: keyboard	2	It cannot send information to the system unit. Example: mouse

4. Observe the inside of CPU. It might have lots of dust in it. Is it good for computer? Should we keep it clean? Support your answer.

Most of the times CPU will collect dust over time. It is not good for computer. It lowers down the performance of computer. We should keep our computer clean so that it runs smoothly.

5. Scientists use computers for research. Can computers be used differently? Discuss.

Computers can be used in multiple ways. It is widely used in researches. However it can be used differently in other fields. For example it can be used:

i. to keep records in the office.

ii. for banking, shopping etc.

iii. for communication, gaming, entertainment etc.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

input	output	brain	processes	two

a. There are …… main parts of the computer.

b. The system unit is called…….of the computer.

c. System unit …….the information.

d. The monitor is a ……device.

e. The joystick is a ……device.

2. Write true for the correct and false for the incorrect statement.

a. The computer is an information processing device.

b. The keyboard is an output device.

c. You can eat your lunch near the computer.

d. The computer must be kept clean.

e. A hard disk is an input device.

3. Choose the best answer from the given alternatives.

a. Which one is not the part of a computer?

Mouse	Keyboard	Monitor	Pen drive

b. Who is called the father of the computer?

Charles Babbage	Marconi	Gehendra Samsher	Newton

c. Which one of the following is not a storage device?

Hard disk	Floppy disk	Compact disk	Monitor

d. Which is an input device?

Mouse	Monitor	CPU	Hard disk

e. What should we not do near the computer?

Eat lunch	Drink water	Pull wires	All of them

4. Match the following.

Computer	process information
Light pen	mouse
Hand-held device	typing device
Keyboard	input device
System unit	smart machine

Step 2

5. Answer the following questions in one word.

a. What is the name of the device that processes a large amount of information?

b. Which device lets us type?

c. Which device lets us select icons on the monitor?

d. Give an example of a storage device.

e. Give an example of an audio output device.

6. Write any two differences between.

a. Mouse and monitor

b. Hard disk and keyboard

7. Give reason.

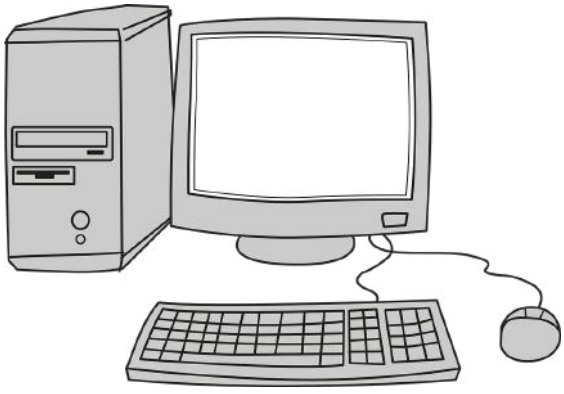
a. A mouse is called an input device

b. A computer is called a smart machine.

c. The CPU must have a hard disk.

d. We should not pull wires of the CPU.

8. Copy the given diagram and label any two input devices.



Step 3

9. Answer the following questions.

a. Define a computer.

b. Write any three uses of a computer.

c. Enlist the uses of the hard disk.

d. How can we keep our computer clean? Write any three methods.

e. Computers are delicate electronic devices. Mishandling can destroy it. Mention the right ways of using a computer.

f. Do you think sitting posture is important while using PC? Does it affect our health? Discuss the importance of right posture while using a computer.

10. Project work.

Reassemble the parts of a computer under the guidance of your teacher or parents. Make sure you do not get an electric shock. Electric shock can kill.

UNIT
2.3

Paint Software

Terms and terminologies

1. Paint software: The software which allows us to draw pictures and images is called paint software.
2. Tux paint: Tux Paint is a free child-friendly paint software.
3. Paint tool: The brush-like tool of tux paint that helps us to draw logos is called a paint tool.
4. Text tool: The tool that allows us to insert text in the canvas is called the text tool.
5. Lines tool: The tool that is used to draw lines of various thicknesses is called the lines tool.
6. Shapes tool: The tool that inserts different shapes in the canvas is called the shapes tool.
7. Label tool: The tool that allows us to write text in the box is called the label tool.
8. Magic tool: The tool that can be used to give various graphic effects to the images is called the magic tool.
9. Eraser tool: The tool that helps to remove any part of the image is called the eraser tool.
10. Typing software: The software which helps us to learn to type is called typing software.
11. Typeshala: Typeshala is a popular typing software.

Painting software


fig: digital paintings

People usually draw images on paper. Images can be drawn on the computer too. It might be a little bit difficult to learn to draw pictures on the computer but once we learn it we can create very beautiful pictures. There is amazing paint software that can be used to draw images. MS Paint and Tux Paint are popular ones. The software which allows us to draw pictures and images is called paint software.

Activity

Download and install Tux Paint on your computer or smartphone.

Memory Tips

Images created using paint software are digital paintings.

Fact with Reason

Why should we use paint software than drawing on paper?

We should use paint software than drawing on paper because it saves paper, pencil and colour.

Features of Tux Paint

Tux Paint is a free child friendly paint software. It has various tools on the right and a brush on the left of the canvas that help us to draw the images.

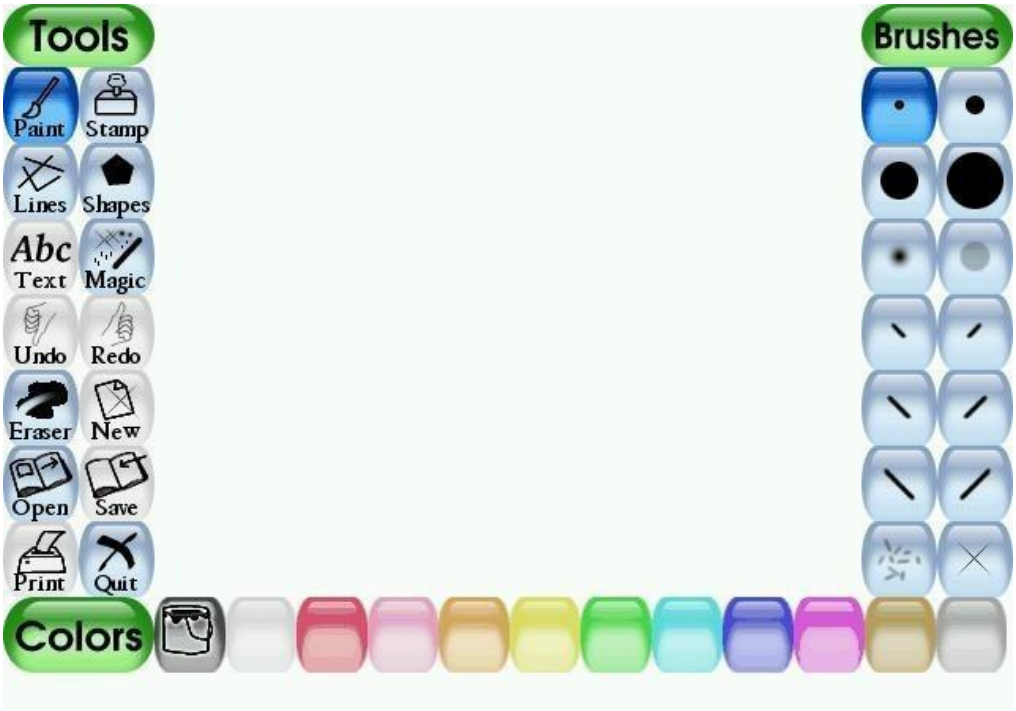


Fig: homepage of Tux Paint

Introduction of tools

i. **Paint tool:** The Paint tool looks like a brush. It is used to draw logos and clip arts.

ii. **Lines tool:** The Lines tool is used to draw lines of various thickness.

iii. **Shapes tool:** Different shapes can be selected with the Shape tool.

iv. **Text tool:** The Text tool allows us to insert text in the canvas.

v. **Label tool:** The Label tool allows us to write text in the canvas.

vi. **Magic tool:** The Magic tool can be used to give various graphic effects to the images.

vi. **Eraser tool:** The Eraser tool helps to remove any part of the image.

vii. **Save tool:** The Save tool is used to save and store the image on the hard disk.

Fact with Reason

Why is paint software replacing traditional painting?

Painting software is replacing traditional painting because it has lots of amazing tools. Tools make drawing easier.

Activity

Let's draw a straight line on the canvas in Tux Paint.

Step 1: Select the paint tool.

Step 2: Select the brush

Step 3: Select the colour

Step 4: Left click on the canvas.

Step 5: Hold the left click and move the mouse. A line will be drawn.

Step 6: Release left click to stop drawing.

Memory Tips

The oldest painting in the world so far is of cattle.

Application of rubber stamp tools

The stamp tool is used to insert the pictures that are already available in Tux Paint.

You can use the stamp tool by following steps:

i. Select stamp tool.

ii. Select the picture.

iii. Left-click in the canvas.

Activity

Insert any five pictures on the canvas using the stamp tool.

Tux Paint has a lot of pictures available which can be inserted on the canvas and coloured. The following steps help you to insert a picture and colour it.

Step 1: Select the new tool tab.

Step 2: Select the picture.

Step 3: Double click the open icon.

Step 4: Select the magic tool.

Step 5: Select fill.

Step 6: Select the colour

Step 7: Left-click the part of the picture where you want to fill colour

Activity

Use paint software to create a beautiful picture as you like. Fill in the colour. Use the save tool to store the file. Show it to your friends and family.

Typing software

How fast can we type on the computer? Various software is developed which helps to learn to type. The software which helps

us to learn to type is called typing software. Some of the popular software are typeshala, typing trainer etc. Typing software helps us to memorize the position of alphabets and symbols. It increases our typing speed. Some typing software has games in them. It makes typing more interesting.

fig: typeshala

Fact with Reason

Why is typing software important?

Typing software is important because it helps to increase our speed.

Memory Tips

The typewriter was invented in 1868.

Activity

Download and install typeshala on your computer.

Practice typing. It may be difficult in the beginning but it will be easier as you keep practising.

GLOSSARY

Digital painting : *images created in paint software*

Answer writing skill

1. What is used to create images on the computer?

Paint software is used to create images in the paint software.

2. Which software allows you to practice typing on the computer?

Typing software allows us to practice typing on the computer.

3. Write the function of shape tool.

The Shape tool allows us to insert different shapes into the canvas.

4. Why is typing software developed?

Typing software is developed to improve typing speed.

5. Digital painting is popular nowadays. It is created using paint software. Can we use paint software for other tasks? Discuss.

Beside drawing digital paintings we can use paint software for other purposes such as.

i. to create a logo.

ii. to resize images.

iii. to colour images.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

typeshala	paint software	label tool	tux paint	magic tool

a. Images can be drawn in ……

b. We can write text in the box by using .....

c. Various graphic effects are given to the images by ……

d. One of the most popular typing software is .....

e. A lot of pictures which can be inserted and coloured on the canvas are available in ……

2. Write true for the correct and false for the incorrect statement.

a. Tux Paint is a typing software.

b. Magic tool helps to colour ready-made pictures.

c. Rubber Stamp tool inserts photographic images on the canvas.

d. Typing Tutor is a typing software.

e. Digital images can be saved on a hard disk.

3. Choose the best answer from the given alternatives.

a. Which is paint software?

Typing tutor	*Typeshala*	Tux paint	None

b. What does the save tool do?

Save the image	Draw the line	Fill colour	Erase

c. What does the lines tool do?

Select the thickness of the lines	Make dotted line	Make solid line	All of them

d. Which one is typing software?

Typeshala	Microsoft paint	Tux paint	None

e. Which tool helps to draw colourful lines?

Paint tool	Line tool	Magic tool	Text tool

4. Match the following.

Draw logo	insert ready-made shapes
Typeshala	paint tool
Magic tool	Improve typing speed
Tux paint	Fill colour in a ready-made picture
Shape tool	Paint software

Step 2

5. Answer the following questions in one word.

a. What kind of software allows us to draw images?

b. Which tool helps to remove unwanted lines from canvas?

c. Which tool helps to insert photographic images on canvas?

d. Give an example of typing software.

e. What kind of software helps to increase typing speed?

6. Write any two differences between.

a. Paint software and typing software

b. Digital images and traditional images

7. Give reason.

a. Popularity of digital painting is growing.

b. People practice typing on typing software.

8. Study the given diagram and answer the following questions.

i. Which software is shown in the diagram?

ii. Which tool is being used to fill colour in the diagram?

Step 3

9. Answer the following questions.

a. Define paint software. Give an example.

b. Write uses of paint software.

c. What is a paint tool used for?

d. What is typing software? Give an example.

e. Is typing software useful for us? Discuss its advantages.

10. Project work.

Draw a picture of the sun in a paint software. Write any two fun facts about the sun on the canvas.

UNIT
2.4

Internet

Terms and terminologies

1. Internet: The Internet is the network where computers all over the world are connected for communication.
2. Search engine: The software that helps to search data on the internet is called a search engine.
3. Web browser: The software for accessing the World Wide Web (WWW) is called a web browser.
4. Omni bar: The Omni bar is part of a web browser where we can type the topic we are going to search.
5. Supercomputer: A computer with a very high processing capacity is called a supercomputer.

Introduction

Internet

We have viewed amazing cartoons, movies and songs on YouTube. We are familiar with Zoom and Google Meet which helped us to take online classes. Why are we able to access those kinds of information from our computer and mobile? It is because of the internet. Internet is the network where computers all over the world are connected for communication. It is a means of communication in the modern world. If we have access to the internet we can easily send or receive information from every part of the earth.

Memory Tips

Vint Cerf is called the father of the internet.

Fact with Reason

Why can we search for information about any topic at any time on the internet?

We can search for information about any topic at any time on the internet because those information are stored in a supercomputer.

Activity

Use the internet to search for five fun facts about the internet.

Web browser

We can use any internet browser such as Google Chrome to search for information. The software for accessing the World Wide Web (WWW) is called web browser. Web browsers such as Google Chrome, Firefox, Microsoft Edge are popular web browsers. We can use Facebook to chat, audio call and video call our friends. Gmail can be used to send files, pictures and videos from one computer to another.

Memory Tips

The first web browser was invented in 1990.

Fact with Reason

Why is a web browser needed on a computer?

The web browser is needed on a computer because it is easy to use the internet through it.

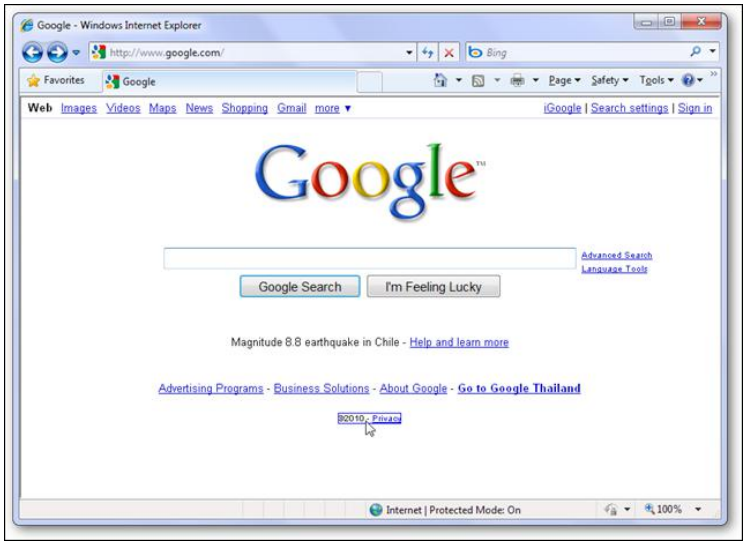
The Internet can be used to learn about culture, geography, literature, technology, organism etc. from all over the world. All of this information is stored in supercomputers somewhere on earth.

Search engine

How can we search for information and data from the internet?

The software that helps to search data in the internet is called search engine. Searching for information from the internet is an easy task. We need an access to the internet. The following steps will help us to learn to search.

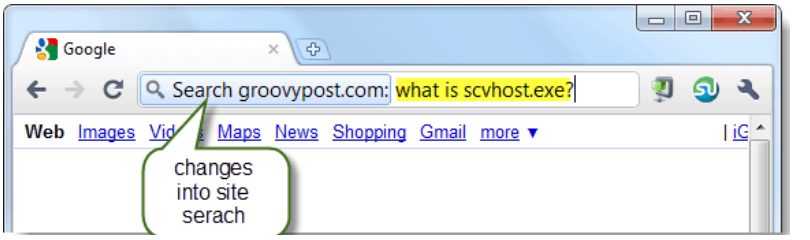
Step 1 : Double click the icon of any web browser.



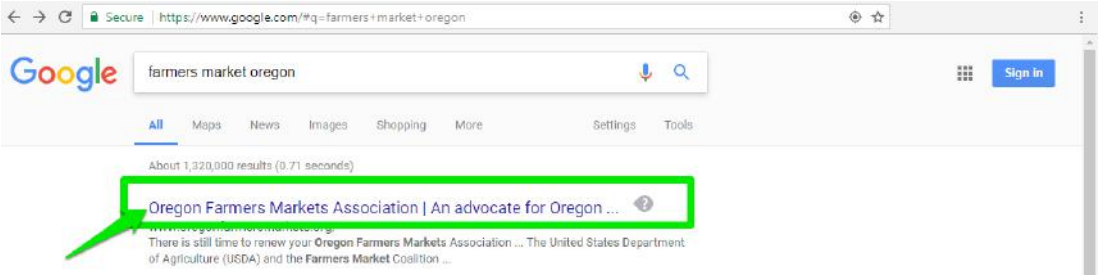
Step 2 : Left click in the Omni bar of the browser. The Omni bar is part of a web browser where we can type the topic we are going to search.

Step 3 : Type the topic of your search and press enter.

Topic are typed in omni bar.



Step 4 : We can select All option, Image option, Video options or News option below the Omni bar. If we select an image then images related to our search will be shown on the web page.



Memory Tips

There are at least 63,000 searches per second on Google Search.

Activity

Search 10 interesting facts about Nepal on a web browser.

GLOSSARY

Supercomputer : a computer with a very high processing capacity

Web browser : an application to access information

Answer writing skill

1. What is the internet?

The network of many computers that helps in communication is called the internet.

2. Give an example of the web browser.

Google Chrome and Firefox are popular web browsers.

3. Who invented the internet?

Vint Cerf invented the internet.

4. Why is search engine important?

Search engine is important because we can search for information about any topic at any time on the internet.

5. The Internet has a very important role in information and communication technology. Justify.

Internet connects computers from all over the world. The Internet can be used to access information about any topic with help of a web browser. We can use it to read emails, articles, books online. Internet is necessary to use applications such as Gmail, messenger, zoom etc. It can be used for audio calls and video calls also. Therefore, the internet has a very important role in information and communication technology.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

omni bar	information	supercomputers	network	web browser

a. Internet is a ……. of many computers from all over the world.

b. Google Chrome is a …….

c. We type at ……of a web browser.

d. The Internet makes it easy to search for …….

e. Information is stored in ……

2. Write true for the correct and false for the incorrect statement.

a. Firefox is a web browser.

b. Internet is a network of many computers.

c. The Omni bar is present on the web browser.

d. Internet does not help in the study.

e. The Internet cannot be used for communication.

3. Choose the best answer from the given alternatives.

a. What can be done by the internet?

Communication	Download software	YouTube	All

b. What is the internet?

Network of computer	Power of computer	Language of computer	None

c. Which one is not a web browser?

Firefox	Google chrome	Microsoft edge	Tux paint

d. Where should we type the topic to be searched?

View bar	Taskbar	Toolbar	Omni bar

e. Which one is a web browser?

Internet explorer	Safari	Chromium	All of them

4. Match the following.

Network of the computer	used to access information on the internet
Omni bar	father of internet
Google chrome	internet
Vint Cerf	web browser
Web browser	place to type topic of research

Step 2

5. Answer the following questions in one word.

a. What is a network of computers from all over the world called?

b. What allows us to search for information on the internet?

c. Where do we type the topic of search in the web browser?

d. Can we search for images of the topic only?

e. Give an example of a web browser.

6. Write a difference between communication with the help of the internet and communication via the post office.

7. Give reason.

a. Vint Cerf is called the father of the internet.

b. It is important to install internet at our house.

c. We should install a web browser on the computer.

8. Study the given diagram and answer the following questions.

i. What is shown in the diagram?

ii. Write its advantage.

Step 3

9. Answer the following questions.

a. What is the internet?

b. Define web browser.

c. What do you mean by Omni bar?

d. How do we search for information on the internet?

e. Write the importance of the internet in communication.

f. Online classes were only options for studying during corona pandemic. How did the internet help us in learning and studying during pandemic? Explain.

10. Project work.

Search information about supercomputers on the internet and tell in class.

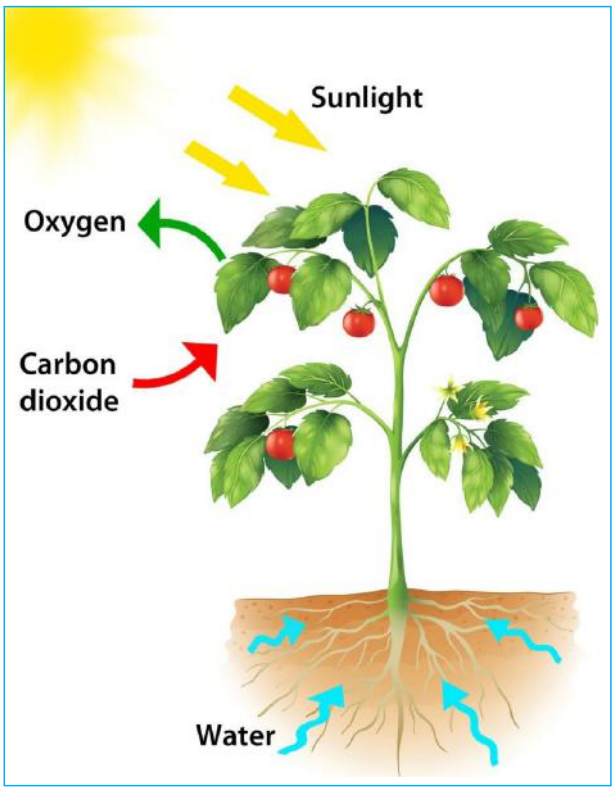
UNIT

3 ORGANISMS AND ENVIRONMENT

ESTIMATED TEACHING PERIODS	TH	PR
	5	1

Introduction

Plants and animals are very important parts of the environment. Leaves of plants contain chlorophyll. Chlorophyll absorbs sunlight. The roots of plant absorb water and minerals from the soil. Leaves absorb carbon dioxide from the air. Plants use water, carbon dioxide and sunlight to make food and oxygen. The process in which a plant uses carbon dioxide, water and sunlight to produce food is called photosynthesis.



Photosynthesis is a source of food

Organisms obtain food, air, water and shelter from the environment. Animals help plants to disperse the seeds. Earthworms make the soil fertile. There is a very important relationship between organisms and the environment.

UNIT
3.1 Organisms and environment

Terms and terminologies

1. Photosynthesis: The process in which a green plant uses carbon dioxide, water and sunlight to produce food is called photosynthesis.
2. Environment: The group of living things and non-living things found around us is called our environment.
3. Air: Air is a mixture of various gases.
4. Wind: The moving air is called wind.
5. Water: Water is a liquid that covers 70% surface area of the earth.
6. Humus: Humus is black decaying parts of dead plants or animals.
7. Solar energy: Heat and light energy that comes from the sun is called solar energy.

Introduction

We live in the environment. There are living things and non-living things around us. Plants, humans, birds, insects, fish, snakes etc. are common living things around us. Air, water, land and sunlight are non-living things around us. The animals and plants found in one place may be different from another place. The group of living things and non-living things found around us is called our environment.

Activity

Observe the given picture and make a list of living things and non-living things seen in it.

Memory Tips

The oldest tree still alive on the earth is 5000 years old.

Fact with Reason

Why can't human beings survive without plants?

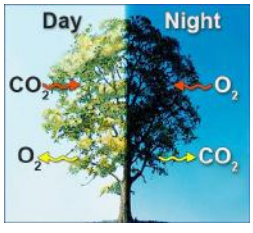
Human beings cannot survive without plants because the plants are the source of food and oxygen in the environment.

Cows, goats and rabbits are plant-eating animals. Animals depend upon plants or other animals for food. Human beings receive milk, meat, egg and wool from animals. The plant gives us oxygen, timber, herbs and fodder. Some of the important materials that affect animals and plants are air, water, soil and solar energy.

Air

Air is a mixture of different gases. It is very important for living things. Plants and animals need air to breathe. Living things inhale oxygen and exhale carbon dioxide while breathing. Carbon dioxide is used by the plants during the daytime for photosynthesis.

Moving air is called wind. Wind helps in the pollination of flowers. It also helps in the dispersal of seeds. However, the storm is dangerous. It destroys crops as well as may kill people.



oxygen from plant

dispersal of seed by air

a tree broken during storm

fig: effects of air

Water

Water is liquid that covers 70% surface area of the earth. Plants and animals need water to live. Plants absorb water from the soil. Without water, the plant cannot make their own food. Animals drink water from rivers and ponds. We need to drink enough water every day to be healthy. Fish, whales, octopuses etc. live in water. We can use water for bathing, cleaning and washing clothes.


semi-aquatic animals


bathing


washing cloth


aquatic plants

fig: uses of water

Memory Tips

Only 3% of the world's water is drinkable.

Soil

Soil is a very important natural resource. We live on soil. Earthworms, rats, rabbits etc. live in the soil. Plants also grow in the soil. The plant absorbs water and minerals from the soil. A soil that contains humus is good for plants. Humus is black decaying parts of dead plants or animals. Bacteria help in decaying. Earthworm lives in the soil. It makes the soil fertile.

Fact with Reason

Why should we not use chemical fertilizer?

We should not use chemical fertilizer because it kills earthworms and makes soil infertile.

earthworm lives in the soil

rabbit lives in borrow in the soil

humus makes soil fertile

Activity

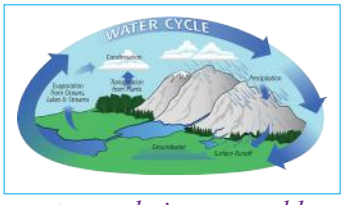
Collect soil from two different places. Put it in separate bottles and mix water. Stir the water. Which one has more amount of humus? Which one is good for agriculture? Discuss in a group.

Solar energy

Heat and light energy that comes from the sun is called solar energy. Sunlight makes the day bright. It helps plants in photosynthesis. We can use solar panels to produce electricity from sunlight. The heat from sunlight keeps us warm. It also helps in the germination of seeds. Solar energy evaporates water from the surface of the earth. Vapour changes into clouds in the sky and brings rain.

sunlight helps in photosynthesis

solar panel produces electricity from sunlight



water cycle is powered by solar energy

Memory Tips

Solar energy is a renewable source of energy. It does not finish.

Activity

Sow a seed in a pot and keep it in a dark room for a week. Observe the leaf of the plant. Is it dark green or light green? Is the plant well developed or not? Discuss with your teacher.

Relationship among plants, animals and non-living things:

All living things live in the environment. They depend upon each other for their survival.

Some of the important relationships between living things are listed below:

i. Plants depend upon the environment for water, minerals and carbon dioxide. Plants help to prevent floods, soil erosion and landslide.

ii. The plant gives oxygen and food to animals. Animals help in pollination.

iii. The honey bee helps in pollination. Human beings get honey and wax from bees. It is believed that if honey bee goes extinct, rate of pollination will decrease and plants cannot produce food. Human beings will also go extinct due to the shortage of food.

iv. Forests give shelter for many wild animals. Wild animals help in the dispersal of seeds.

plants preventing soil erosion

animals grazing

dispersal of seed by animal

GLOSSARY

Chlorophyll : *green pigments at present in the leaf of the plant*

Pollination : *Transfer of pollen grains from the male part of a flower to the female part*

Answer writing skill

1. What is an environment?

The group of living things and non-living things found around us is called our environment.

2. Mention the materials needed for photosynthesis.

The plant needs carbon dioxide, water and sunlight for photosynthesis.

3. The earthworm is very important for plants. Explain.

Earthworms live in soil. Earthworm's stool makes the soil fertile. Earthworm helps soil to absorb enough water and air. Plants can grow well in these lands. Hence, the earthworm is very important for plants.

4. Villages are turning into semi-urban areas. Vegetations are lost every year. Water resources are drying. Enlist the consequences if water sources dry completely in our village.

If water sources dry completely in our village, there will be lots of problems. Such as:

i. We cannot get water to drink.

ii. Wild animals will be thirsty.

iii. Plants will die.

iv. It will be very hot.

5. Humans hunt wild animals for certain resources. Varieties of animals are domesticated too. Why are animals hunted or domesticated?

Animals are either hunted or domesticated because of the following reasons:

i. Animals give us meat, milk, eggs and fur.

ii. Cat kills rats and dogs keep us safe.

iii. Animals help us to do work. For example, donkey carry bricks, ox plough fields, etc.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

water	pollination	gases	photosynthesis	fertile

a. Butterfly helps in ……of a flower.

b. Earthworm makes soil……

c. Plants make food by the process called……

d. Air is a mixture of ……

e. We must drink enough…… every day.

2. Write true for the correct and false for the incorrect statement.

a. Air helps to transfer pollen grains of the flower.

b. Animals cannot live inside water.

c. Earthworm lives in water.

d. There is no relation between plants and animals.

e. We get food, cloth and shelter from the environment.

3. Choose the best answer from the given alternatives.

a. What does a plant need for photosynthesis?

Air	Water	Sunlight	All of them

b. What can do photosynthesis?

Insect	Water	Plant	Dog

c. Which gas is necessary for plants for photosynthesis?

Oxygen	Nitrogen	Carbon dioxide	All of them

d. What does the earthworm do?

Make soil fertile	Make soil infertile	Make soil hard	Does nothing

e. What are the factors that affect plants and animals?

Air	Water	Sunlight	All of them

4. Match the following.

Environment	black fertile matter
Air	helps in decaying
Honey bee	everything around us
Bacteria	honey and wax
Humus	mixture of gases

Step 2

5. Answer the following questions in one word.

a. Which living organism produces food and oxygen for us?

b. What is moving air called?

c. Which gas is exhaled while breathing?

d. Which organisms help to decay dead plants and change them into the humus?

e. Which gas is inhaled by plants for respiration?

6. Write any two differences between.

a. Plants and animals

b. Air and water

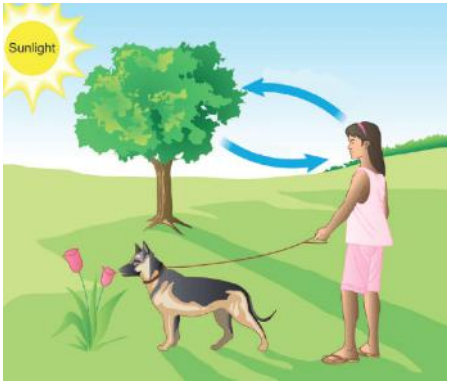
7. Give reason.

a. There can be no life without air.

b. The plants are the most important part of the ecosystem.

c. Humans will go extinct if all the honey bees die.

8. Study the given diagram and answer the following questions.



i. Which process is occurring in the plant?

ii. Which gas is produced by the plant during this process?

iii. What is the advantage of this process?

Step 3

9. Answer the following questions.

a. Define environment.

b. List the non-living factors that affect living things.

c. Write the importance of air.

d. What are the major uses of water in the environment?

e. Write a short note on the soil.

f. Do plants depend upon environment? Discuss.

10. Project work.

When a wet cloth is spread in sunlight, it becomes dry. Where does the water go? What happens to that water? Will it come back? What is the water cycle? Discuss with your teacher and make a report.

UNIT
3.2

The interrelationship between organisms and the environment

Keyterms and terminologies

1. Natural resources: The useful things that we obtain from the environment are called natural resources.
2. Deforestation: The act of cutting a wide area of trees is called deforestation.
3. Afforestation: The act of planting many trees is called afforestation.
4. Environment pollution: Environment pollution means decrease in the quality of air, water and soil.

Introduction

We live in the environment. Air, water, minerals, soil, herbs and animals are natural resources. The useful things that we obtain from the environment are called natural resources. These resources are limited in nature. The human population is increasing very fast. As a result, various kinds of environmental problems are happening around us.

Harmful effects of population growth on the environment are:

i. Increase in the temperature of the earth
ii. Change in weather and climate
iii. Deforestation
iv. Soil erosion and landslide
v. Drying of water resources
vi. Environment pollution

more land is used for agriculture

herbs are collected excessively

tress are cut for timber

Fig: Harmful effects of population growth on environment

Memory Tips

The world has already lost 80% of its forest.

Fact with Reason

Why is overpopulation a problem?

Overpopulation is a problem because it overuses natural resources.

Activity

What happens to wild animals when the forest is cut? Discuss in a group. List any three effects.

Harmful effect of population growth in the forest

Food, cloth and shelter are basic needs of human beings. We obtain these things from the environment. Since the human population is too large, we need more food, more cloth and many houses. Forest is cut down to make lands for agriculture and for making houses. The act of cutting a wide area of trees is called deforestation.

Some harmful effects of population growth in the forest are:

i. Medicinal plants will be illegally collected.
ii. Timber plants will be illegally cut down
iii. Wild animals will be hunted down.
iv. People will burn the forest.
v. Fodder, firewood and grass will be overused.

Memory Tips

We lose forest equal to one standard football field in every one second.

deforestation

forest fire

poaching

some harmful effects of population growth on forest

Environmental pollution and its causes

Environment pollution means decreases in the quality of air, water and soil. The plant is the most important part of the environment. It absorbs carbon dioxide and gives oxygen. Deforestation decreases the number of trees. As a result, there will be more carbon dioxide and less oxygen in the air. Air will be polluted. The surrounding area will be hotter. Weather and climate will start to change slowly. Plants hold soil and prevent soil erosion. Loss of trees makes soil weak. Soil erosion and landslide will occur.

roots of the plants hold soil

Loss of trees causes landslide

Forest keeps the surroundings cooler. It brings rainfall. Land with trees stores water in it. Deforestation decreases the forest. The land will become dry. There will be less rainfall and water sources will dry.

There is always water around forest

without vegetation land will become dry

People will burn forests so that they can cut woods, grow grass or plant crops later.

Fact with Reason

Why is it cooler around the forest?

It is cooler around the forest because plants absorb carbon dioxide. Carbon dioxide gas makes the environment hotter.

Activity

Observe your village or city. What is the condition of the land, air, water, soil and forest? Is it a healthy environment or not? Discuss with your friends.

Due to population growth more houses and roads are made in agricultural land. Industries and factories are made. There are more vehicles and machines in the city. It produces a large amount of waste material. Smoke and dust mix in the air. It causes air pollution. Plastic, glass, metals, garbage, etc. are thrown in the soil. It causes land pollution. Sewage is mixed in water. It causes water pollution.


urban industrial area


sewage mixing in river


dumping site


smoke mixing in air

fig: causes of pollution

Some harmful effects of pollution are:

i. Aquatic animals and plants will become sick and die.
ii. Humans and animals will be sick.
iii. Plants will be small and weak.

Memory Tips

There is an island of garbage in the Pacific Ocean which is 12 times bigger than Nepal.

Fact with Reason

Why does deforestation cause scarcity of water?

Deforestation causes scarcity of water because the loss of trees decreases rainfall. Surface water changes into vapour faster. Water sources will dry.

Activity

Collect biodegradable waste from your kitchen every day. Put it in a pit in your garden. When the pit is full, cover it with mud. It will change into compost manure after a few months. Use this to grow the vegetables or flowers in the flower vase.

Environment conservation

Population growth, deforestation and pollution have destroyed the environment. Wild animals, plants and human beings are suffering. Water sources are drying. Floods and landslides kill people every year. Therefore, we must protect the environment.

We can do the following things to protect our environment:

i. Reduce, reuse and recycle waste materials.

reduce, reuse and recycle

ii. Control population growth.

iii. Do afforestation. The act of planting many trees is called afforestation.

Afforestation

iv. Collect biodegradable waste such as wasted food, peels of the vegetables, grass etc. Bury them in a pit for few months. Earthworms and bacterial will change it into compost fertilizer. Compost fertilizer is very good for plants.

Biodegradable waste

compost

Fig: composting

v. Reduce use of plastic, coal and petrol.

Activity

Buy a seedling of a tree from a nursery and plant it on a barren land on your birthday every year.

GLOSSARY

Population	:	*total number of people living in an area*
Weather	:	*cloudy day, rainy day, sunny day, windy day etc.*
Afforestation	:	*the act of planting trees*

Answer writing skill

1. What is deforestation?

The act of cutting a wide area of trees is called deforestation.

2. How does population growth harm the environment?

Population growth harms the environment in the following ways:

i. Forest is cut down to make more land for growing crops and making houses.

ii. More people use more petrol and diesel, which produce smoke.

iii. Cities and industries produce lots of waste material.

3. The number of wild animals is decreasing day by day. Why?

The number of wild animals is decreasing day by day because:

i. Forest is cut. So, they lose their place to live.

ii. The water is dirty. Drinking dirty water makes them sick.

iii. Human beings are killing wild animals.

4. Obviously smoke from factories pollutes air. But deforestation is also a leading cause of air pollution. Relate deforestation with air pollution.

We know that plants take carbon dioxide and throw oxygen during photosynthesis. When plants are cut down, the amount of carbon dioxide will increase in the air and oxygen will decrease. It will be difficult to breathe. Air becomes hotter. This is how deforestation causes air pollution.

5. We live in the environment. We must actively involve in the activities that conserves the environment. Provide some suggestions that can aid to keep environment healthy.

As a young children growing in this environment we suggest following ideas to keep our environment healthy:

i. Request seniors not to cut trees.

ii. Ask guardians to plant more trees on a barren land.

iii. Request guardians to reduce the use of petrol and diesel.

iv. Never throw waste material in the river, roads, forest etc.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

forest	carbon dioxide	deforestation	air	environment

a. Population growth is harmful to……

b. Plants reduce …… from the air.

c. Smoke from vehicles pollutes ……

d. Water resources will dry because of …….

e. Wild animals live in …….

2. Write true for the correct and false for the incorrect statement.

a. Deforestation is good for the environment.

b. Population growth is not harmful to the environment.

c. Urbanization and industrialization increase waste material.

d. When the forest is cut down, the surroundings will be cooler.

e. Solar energy is the cause of the water cycle.

3. Choose the best answer from the given alternatives.

a. What are the effects of population growth on the environment?

Deforestation	Air pollution	Water pollution	All of them

b. What is the effect of deforestation on wild animals?

Loss of home	Sufficient land	Enough water	Healthy life

c. What happens to the water resources when trees are cut?

More water	New springs	River dries	All of them

d. What is the main cause of air pollution?

Population growth	Vehicle	Forest fire	All of them

e. What is the cause of water pollution?

Smoke	Sewage	Both	None

4. Match the following.

Deforestation	compost manure
Air pollution	sewage
Land pollution	loss of trees
Water pollution	smoke
Vegetable parts	garbage

Step 2

5. Answer the following questions in one word.

a. What is the process in which a large area of forest is lost?
b. What is the term for a decrease in the quality of air?
c. What is the term for a decrease in the quality of water?
d. What is the term for a decrease in the quality of land?
e. What is the act of planting trees called?

6. Write any two differences between:

a. Air pollution and water pollution
b. Deforestation and afforestation

7. Give reason.

a. Water resources dry when trees are cut.
b. The surrounding village become hotter after deforestation.
c. Population growth is harmful to the environment.
d. Population growth causes deforestation.

8. Study the given diagram and answer the following questions.

i. Which activity is shown in the picture?

ii. What happens to the water resources in that place now?

iii. What happens to the wild animals now?

iv. Why are humans doing this?

Step 3

9. Answer the following questions.

a. Define deforestation.

b. What are the harmful effects of deforestation on the environment?

c. Mention the harmful effects of deforestation on wildlife.

d. Discuss the harmful effects of population growth on the environment.

e. What are the causes of deforestation?

f. How does deforestation lead to air pollution?

g. Industries and cities pollute water. Prove the statement.

h. Degradable waste such as vegetable leaves, waste food, leaves etc. can be used to make compost. How can it be made changed into compost manure? Discuss.

10. Project work.

How does population growth cause scarcity of drinking water? Discuss in group and make a report.

UNIT

4 CLASSIFICATION OF LIVING THINGS

ESTIMATED TEACHING PERIODS: TH 5 | PR 1

Introduction

There are different types of living things on the earth. It will be very difficult to learn about them all individually. So, scientists have made groups of living things. These groups will make the study of living things easier and simpler. Living things having similar characteristics are kept in the same group. Living things having different characteristics are kept in different groups. The process in which living things are divided into groups and subgroups according to their similarities and differences is called the classification of living things.

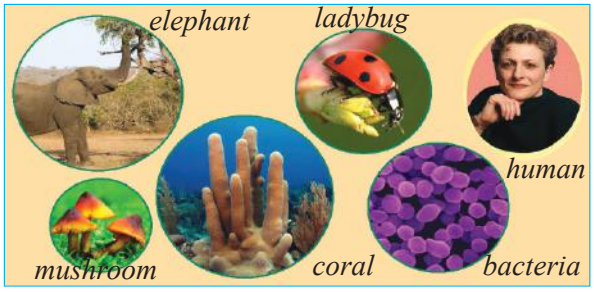


Fig. various organisms

Memory Tips

Ants never sleep. They rest about 8 minutes per every 12 hours.

Fact with Reason

Why is it possible to live on earth?

It is possible to live on earth because there is air, water, land and suitable temperature.

Living things are broadly divided into two groups. They are plants and animals.

UNIT
4.1

Animals around us

Keyterms and terminologies

1. Classification of living things: The process in which living things are divided into groups and subgroups according to their similarities and differences is called the classification of living things.
2. Animals: The living things which have sense organs and can move from one place to another are called animals.
3. Invertebrates: The animals which do not have a backbone in their body are called invertebrates.
4. Vertebrates: The animals which have a backbone in their body are called vertebrates.
5. Oviparous animals: The animals that lay eggs to produce babies are called oviparous animals.
6. Viviparous animals: The animals that give birth directly are called viviparous animals.
7. Aquatic animals: The animals that live in water are called aquatic animals.
8. Terrestrial animals: The animals that live on land are called terrestrial animals.

Introduction

There are many animals around us. They may have different shapes, sizes and colours. All of them have sense organs. They can usually move from one place to another. The living things which have sense organs and can move from one place to another are called animals. Animals include four-legged animals, birds, insects, fishes, frogs and many others. Animals are divided into different groups according to their characters.

Fig : different types of animals

Activity

Visit a zoo with your guardian and write the name of different plants and animals you see.

We have bones in our bodies. Do all animals have bones in their body? No! Some of the animals such as earthworms do not have bones in their body. Based on the absence or presence of bones, animals are divided into invertebrates and vertebrates.

Memory Tips

A snail can sleep three years at a time.

Activity

Different species of animals are found in different places. Visit your local area. Write names of any 10 species of animals you see.

Invertebrates

Butterflies, ants, mosquitoes and snails do not have a backbone in their body. Their body is made of flesh only. These are invertebrates. The animals which do not have a backbone in their body are called invertebrates.

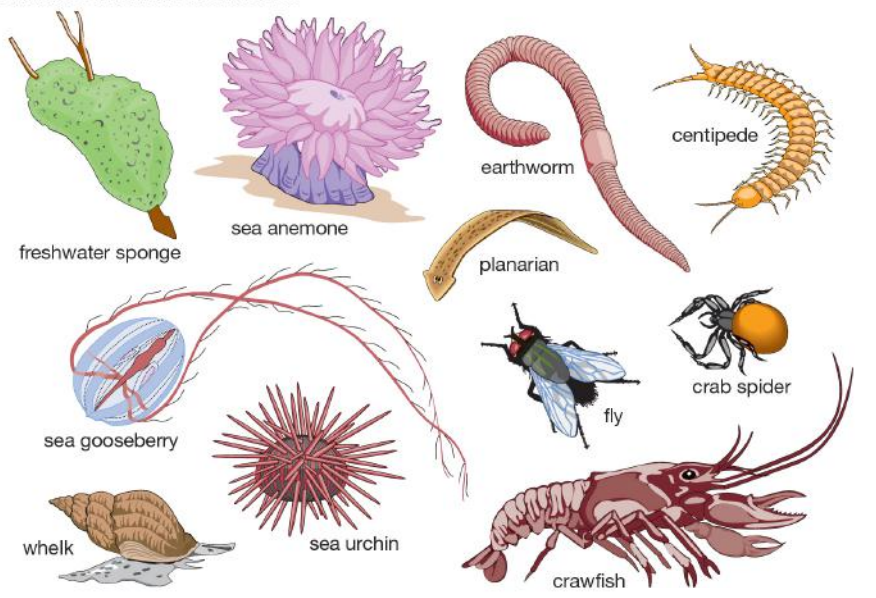


Fig: different types of invertebrates

Some special features of invertebrates

i. They do not have a backbone in their body.
ii. They may be unicellular or multicellular.
iii. Most of the invertebrates are small in size.
iv. They have less developed organs and system.
v. They do not have red blood cells.
vi. Most of them have a soft body.

Honey bee, jellyfish, starfish, octopus, earthworm, leech, etc. are some invertebrates.

Memory Tips

One species of jellyfish is immortal. It never dies.

Fact with Reason

Why is an earthworm called an invertebrate?

An earthworm is called an invertebrate because it does not have a backbone in its body.

Activity

Observe and copy the given diagram. Write any three special features of this animal.

Vertebrates

Cows, goats and dogs have a backbone in their body. Their body has flesh around the bones. They are vertebrates. The animals which have a backbone in their body are called vertebrates.

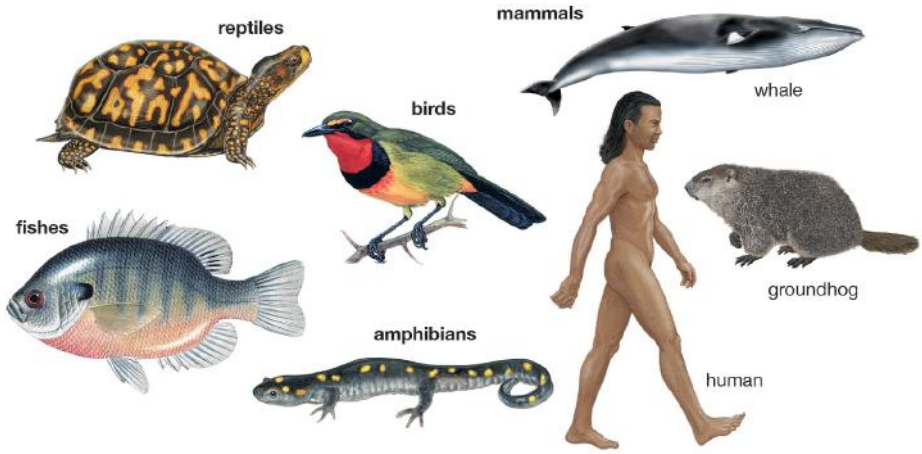


Fig: different types of vertebrates

Some special features of vertebrates

i. They have a backbone in their body.
ii. They have a complex nervous system.
iii. These animals are strong and rigid.
iv. They may be cold-blooded or warm blooded.
v. They have red blood cells.
iv. Most of the vertebrates have a tail.

Human beings, whales, monkeys, horses, elephants and mice are some vertebrates.

Memory Tips

The polar bear looks white because of its white fur but its skin is black.

Fact with Reason

Why human beings are called vertebrates?

Human beings are called vertebrates because they have a backbone in their body.

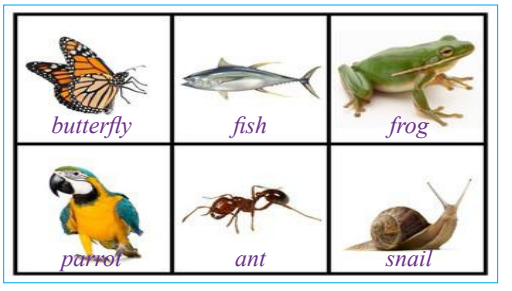
Activity

Make a list of a few vertebrates and invertebrates that are found nearby your home.

Reproduction is the process of giving birth to a new baby. Humans give birth to a baby directly but hens lay eggs. Based on the way of reproduction animals are divided into oviparous and viviparous.

Oviparous

Hens lay eggs. Hens sit on eggs to keep them warm. Chicken will be hatched from eggs after few days. The animals that lay eggs to produce babies are called oviparous animals. Frogs, butterflies, pigeons and ants are some oviparous animals.



oviparous animals

hen hatching chickens

Fish and frogs lay eggs in water. Eggs will hatch into new babies in water. Crocodiles and tortoises lay eggs in the sand. Snakes lay eggs in holes. Butterflies lay eggs on a leaf.

silkworm lay eggs on mulberry leaves

eggs of fish in water

baby tortoise hatching in the sand

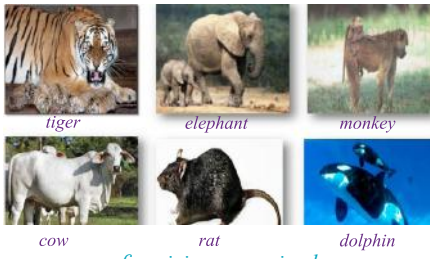
Fact with Reason

Why is a duck called an oviparous animal?

A duck is called an oviparous animal because it lays eggs to hatch ducklings.

Viviparous animals

Cows and goats give birth directly. They do not lay eggs. The animals that give birth directly are called viviparous animals. Human beings, monkeys, horses and buffaloes are viviparous animals.



tiger *elephant* *monkey* *cow* *rat* *dolphin*

fig: viviparous animals

Kangaroos give birth to undeveloped babies and keep them in their pouch for many months.

kangaroo with a child in the pouch

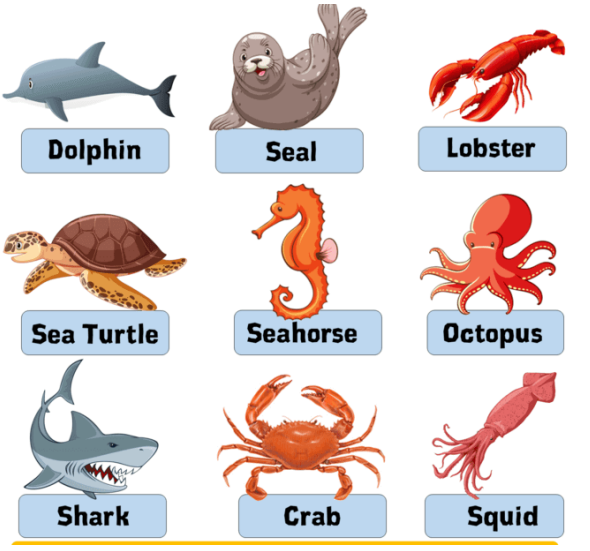
Activity

Collect pictures of oviparous and viviparous animals. Draw two separate boxes and paste the pictures separately.

Animals live in different places. The natural home of the animal is called habitat. Based on habitat animals are divided into aquatic animals and terrestrial animals.

Aquatic animals

Fish, whales, dolphins and octopuses live in water. They cannot live outside the water. The animals that live in water are called aquatic animals. Starfish, seahorses and jellyfish are found in the ocean. Trout fish, Labeo etc. are found in freshwater. Ducks, frogs, crocodiles and turtles can live in both water and land.



Aquatic animals

Sharks, squid, crabs and hydra are some aquatic animals.

Some special features of aquatic animals:

i. Fish use gills to breathe in water.

ii. Fish have waterproof scales on their body.

iii. Fins help fish and whales to swim.

iv. Ducks and frogs have webbed feet which help them to swim.

Memory Tips

Dolphins sleep with one eye open.

Fact with Reason

Why do fish have scales?

Aquatic animals are covered with scales because it makes them waterproof. It prevents decaying. Scales protect fish from injury.

Activity

Do you have an aquarium? Observe a fish very carefully and write any three characteristics you find.

Terrestrial animals

Cows, goats and elephants live on land. They cannot survive inside the water. The animals that live on land are called terrestrial animals. Birds, bees and butterflies spend most of their time in the air. Monkey and squirrels live mostly on trees. Lions, foxes, horses and wild buffaloes live in large grasslands. Snakes, mouse and rabbits live in holes. Camels and scorpions live in the desert. Polar bears, yaks and snow leopards are found in cold places. Bats live in the cave.

hare

tiger

zebra

cow

fox

goat

elephant

man

some terrestrial animal

Leopards, dogs, cats, anacondas and deer are some terrestrial animals.

Memory Tips

Leopard and tigers can climb trees.

Fact with Reason

Why cannot we breathe underwater?

We cannot breathe underwater because humans breathe by lungs. Lungs cannot take oxygen from water.

Some special features of terrestrial animals:

i. They live on land.

i. They breathe with the help of their lungs.

ii. They use legs or wings to travel.

iii. They have hair, feather or fur in their body.

GLOSSARY

Scientists **:** *people who are experts in a certain part of science*

Backbone **:** *a long group of bones from head to tail*

Answer writing skill

1. Write the name of any two vertebrates.

Cow and goat are two vertebrates.

2. Which organs help frog to breathe underwater?

The frog uses moist skin to breathe under the water.

3. Hen cover its egg for few weeks. Give reason.

A hen covers its eggs for a few weeks to keep them warm. It will hatch the eggs.

4. Observe a fish and an earthworm. What kind of differences do you find?

After observing fish and earthworms I found that:

Fish	Earthworm
It is a vertebrate.	It is an invertebrate.
It lives in water.	It lives under the soil.
It breathes by gills.	It breathes by the skin.
It has a head, body, fins and tails.	I do not see the head.

5. Write the names of animals with the following characters.

i. It lays eggs, crawls on the ground and is poisonous.

Ans: Snake

ii. Has wings, lays eggs, warm blood.

Ans: Hen

iii. Moist skin, soft body, seawater and no bones.

Ans: Octopus

iv. Lives in the desert, has thick skin, and a flat foot.

Ans: Camel

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

seawater	terrestrial	oviparous	travel	backbone

a. Animals can usually ……. from one place to another.

b. The hen is an…… animal.

c. Butterfly does not have ……

d. Tiger is a ……animal.

e. Whales live in ……

2. Write true for the correct and false for the incorrect statement.

a. Animals have sense organs.

b. Octopus lives in holes in the moist land.

c. Frogs can live on both land and water.

d. Cow lays eggs to hatch calf.

e. Foxes and lions live in the jungle.

3. Choose the best answer from the given alternatives.

a. Which is an invertebrate?

Snake	Earthworm	Human	Cow

b. Which is a viviparous animal?

Fish	Frog	Crocodile	Dog

c. Which one is an aquatic animal?

Horse	Dog	Cat	Seahorse

d. What helps fish to breathe underwater?

Gills	Lungs	Siphon	Spiracles

e. What helps the dog to move from one place to another?

Fins	Wings	Legs	Cilia

4. Match the following.

Oviparous	direct birth
Viviparous	lay eggs
Aquatic animals	invertebrates
Polar beer	gills
Earthworm	cold place

Step 2

5. Answer the following questions in one word.

a. What is the name of solid hard parts found inside the body of vertebrates?
b. Where do the snakes lay eggs?
c. What covers the body of fish?
d. Which animal can breathe both on land and in water?
e. Write the name of the animal that has gills and fins.

6. Write any two differences between.

a. Vertebrates and invertebrates
b. Oviparous and viviparous
c. Aquatic animal and terrestrial animal
d. Fish and crocodile

7. Give reason.

a. Fish can breathe under the water.
b. Human beings can stand but snails cannot.
c. Fish have scales.
d. Snakes lay eggs in holes and cover them.

8. Study the given diagram and answer the following questions.

i. Is it a terrestrial or aquatic animal?
ii. Is it oviparous or viviparous?
iii. Is it vertebrate or invertebrate?

Step 3

9. Answer the following questions.

a. What do you mean by invertebrates? Write its characteristics.
b. Define vertebrates. Enlist its characteristics.
c. Write any two methods of giving birth.

d. Define oviparous organisms with any four example.

e. What are viviparous animals? Give four examples.

f. Fish and hippopotamus both live in water. What is the difference between their ways of living?

g. Write the names of the animals with the following characters.

- Has gills, fins and aquatic
- Has backbone and viviparous
- Has backbone, four-legged and viviparous
- Lives in the desert, has thick skin, and a flat foot.

10. Project work.

Write the names of animals that you see in your village or town. Observe them and tick the box.

Name of the animal	Vertebrate	Invertebrate	Aquatic	Terrestrial	Oviparous	Viviparous
Cow	✓			✓		✓

UNIT
4.2

Plant around us

Key terms and terminologies

1. Plants: The living things which have chlorophyll and are fixed in the soil are called plants.
2. Flowering plants: The plant which bears flowers and produces seeds is called a flowering plant.
3. Non-flowering plants: The plants which do not bear flowers and do not produce seeds are called non-flowering plants.
4. Herbs: Small plants with fleshy stems are called herbs.
5. Shrubs: The medium-sized bushy plants are called shrubs.
6. Trees: The very big and tall plants with woody stems are called trees.
7. Aquatic plants: The plants that live and grow in water are called aquatic plants.
8. Terrestrial plants: The plants that grow on land are called terrestrial plants.
9. Root system: The part of the plants that grows under the soil is called the root system.
10. Shoot system: The part of the plant that grows above the soil is called the shoot system.
11. Flower: The flower is a colourful reproductive part of the plant.

Introduction

different species of plants

There are many plants around us. They are found in various shapes and sizes. They do not have developed sense organs. They cannot move from one place to another. The living things which have chlorophyll and are fixed in the soil are called plants. Plants include algae, herbs, shrubs, trees, climbers, creepers and many others.

lotus

pine

spirogyra

fig: plants around us

Plants are divided into different groups according to their characters.

Classification of plants based on absence or presence of flower

An apple tree bears flowers and seeds. A fern plant neither has flowers nor seeds. Based on the presence or absence of seeds, plants are divided into flowering and non-flowering plants.

Flowering plants

Rose, mango and potato plants and grass bear flower. They produce seeds. The plant which bears flowers and produces seeds is called a flowering plant. Apple tree, maize plant, lotus and banyan tree are some flowering plants.

lotus plant

hibiscus plant

banyan tree

fig: flowering plants

Non-flowering

Mushrooms, fern and algae do not have a flower. They do not produce seeds. The plants which do not bear flowers and do not

produce seeds are called non-flowering plants. Yeast, moss and horsetail are some non-flowering plants.

fern

mushroom

spirogyra

fig: non-flowering plants

Memory Tips

Flowering plants are called phanerogams and non-flowering plants are called cryptogams.

A banyan tree is very big and tall. Grasses are small in size. Based on the size, plants are divided into herbs, shrubs and trees.

Herbs

Paddy plants, mustard plants and grass are very small in size. They have a soft and fleshy stem. Small plants with fleshy stems are called herbs. Cauliflower, cabbage, wheat and potato plant are herbs. Most of the herbs are food crops and medicinal plants.

Features of herbs

i. They have a fleshy stem.
ii. They are soft and weak.
iii. They are a seasonal plants.
iv. They are small in size.

wheat

mint

cauliflower

cabbage

Fact with Reason

Why grass is called an herb?

The grass is called an herb because it is a small plant with a soft, weak and fleshy stem.

Activity

Visit a botanical garden and make a list of herbs, shrubs and trees.

Shrubs

Rose, lemon and pomegranate are medium-sized plants. They are found as a bush. The medium-sized bushy plants are called shrubs. Shrubs are used in making a hedge. It is also used for decoration in the garden. Marigold, jasmine and hibiscus are some shrubs.

Features of shrubs

i. They are usually tall and bushy.

ii. They have many woody branches.

iii. They live for more than one year.

iv. They are medium-sized plant.

rose

lemon

pomegranate

Memory Tips

Bamboo is the fastest growing woody plant.

Fact with Reason

Why are shrubs bushy?

Shrubs are bushy because these plants have lots of branches.

Trees

Peepal, banyan, pine and uttis are very big and tall plants. They have very long roots. Their stem is woody and large. The very big and tall plants with woody stems are called a tree. It gives us timber and fodder.

sal

pine

salla

Fact with Reason

Why trees are called perennial plants?

Trees are called perennial plants because they live for many years.

Features of trees

i. They have a large woody stem.

ii. Stem has nodes. Branches start from nodes.

iii. They are tall and strong.

iv. They are a perennial plants.

Memory Tips

Hyperion is the tallest tree on earth.

Plants can grow in water as well as on land. According to the habitat, plants are divided into two groups: aquatic plants and terrestrial plants.

Aquatic plants

Lotus, water lily and algae are found in water. These plants cannot live properly on land. The plants that live and grow in water are called aquatic plants. Algae and hydrilla live completely inside the water. Waterlily floats on water. Lotus also floats on water but its roots are fixed in the soil. Water hyacinth, duckweed, and water cabbage are some aquatic plants.

lotus

water lily

hydrilla

Features of aquatic plants:

i. Their stem and roots are very weak and soft.
ii. Their body is covered with waterproof wax.
iii. Air sac is found in the stem and roots. It helps the plant to float.
iv. Lotus has a large leaf. It helps the plant to float.
v. The underwater plant has very small leaves.

Fact with Reason

Why is the stem of aquatic plants covered with wax?

The stem of an aquatic plant is covered with wax to make it waterproof. It prevents decaying. It also prevents the blocking of stomata.

Activity

Find an aquatic plant and observe its appearance. Fill in the table given below.

Part of the plant	Character
Stem	
Leaf	
Root	

Terrestrial plant

The banana plant, cauliflower, cucumber and watermelon grow on land. The plants that grow on land are called terrestrial plants. The pumpkin plant is a creeper. It crawls on the ground. Grapevine is a climber. It climbs up. Pine trees are found in the mountain region. Cactus grows in the desert. Banyan tree grows in hot and moist lands. Cycas, mustard plants, guava and avocado are some terrestrial plants.

banyan tree

banana plant

potato plant

Features of terrestrial plants

i. They have developed roots and stems.

ii. Desert plants have thick fleshy and green stems.

iii. Creepers and climbers have tendrils.

iv. Leaves have fewer stomata than aquatic plants.

Memory Tips

Leaves of the cactus are modified into thorns. It helps to reduce the loss of water.

Fact with Reason

Why do terrestrial plants have more developed roots than aquatic plants?

Terrestrial plants have developed roots than aquatic plants because it is comparatively difficult to find water on land.

Activity

Ask your parents to find an aquatic plant for you. Observe its stem and leaves and compare them with a plant growing in your garden. Which one has developed stem and root?

Parts of the plant

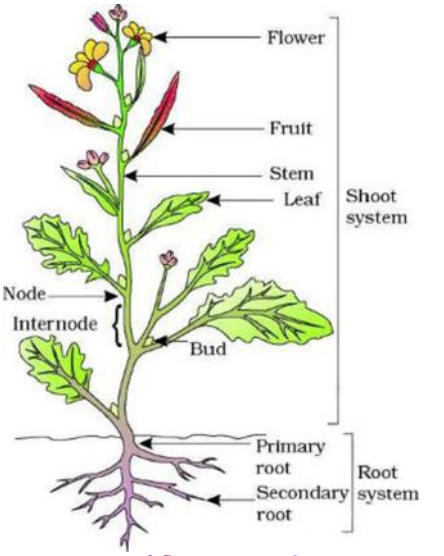
A plant has many parts. Leaf, stem, branch, flower, fruit and tendrils are common parts of a plant. Broadly a plant body is divided into two parts. They are the root system and shoot system.

Root system:

The part of the plants that grows under the soil is called the root system. It absorbs water and minerals for the plant.

Shoot system:

The part of the plant that grows above the soil is called the shoot system. Green leaves prepare food for the plant. Stem supply water and minerals to the leaves from the roots. The flower is a colourful reproductive part of the plant. It bears fruits and seeds. Seeds will produce new plants. Trees have branches on them. Branches arise from nodes.



parts of flowering plant

Memory Tips

There are two types of roots: taproot and fibrous root.

Fact with Reason

Why are plants green in colour?

Plants are green in colour because of chlorophyll present in the leaf.

Activity

Find a mustard plant. Paste it in a chart paper. Label its part.

GLOSSARY

Climbers: plants with a weak stem that use tendril to climb on other trees

Creepers: plants with a weak stem that crawl in the ground

Hedge: a boundary made of bush

Answer writing skill

1. **What is a plant?**

   The living thing which has chlorophyll and cannot move from one place to another place is called a plant.

2. **What do you mean by root system?**

   The part of the plants that grows under the soil is called the root system.

3. **Rose is called a shrub. Give reason.**

   Rose is called a shrub because it is a bushy plant. It has a woody stem.

4. Write a short note on the shoot system.

The part of the plant that grows above the soil is called the shoot system. Green leaves prepare food for the plant. The stem carries the entire plant. Flowers produce fruit. Trees have branches on them.

5. Observe an aquatic plant and a terrestrial plant. Find the differences you see.

When we observed a lotus and a mustard plant, we found that aquatic plants and terrestrial plants have the following differences:

Parts	Lotus is an aquatic plant	The mustard plant is a terrestrial plant
Leaf	Broad	Small leaf
Stem	Soft and spongy	Hard
Root	Poorly developed	Well developed
Flower	Large pink flower	Small yellow flower

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

colourful	climber	woody	shrub	aquatic

a. Lotus is an ……. plant.

b. A bushy plant is called…….

c. Trees have tall and ……. stem.

d. Cucumber is a ……

e. The flower is a ……. part of the plant.

2. Write true for the correct and false for the incorrect statement.

a. Aquatic plants have air sacs in their stem.

b. Herbs live for many years.

c. The root system grows under the soil.

d. All types of fruits are edible.

e. Cactus have short and poorly developed roots.

3. Choose the best answer from the given alternatives.

a. Which one is a herb?

Paddy	Rose	Hibiscus	Ashoka

b. Which one has a woody stem?

Banana plant	Lotus plant	Paddy	Rose

c. What produces fruit?

Stem	Root	Leaf	Flower

d. Which is an aquatic plant?

Hydrilla	Water lily	Spirogyra	All of them

e. Which one is a terrestrial plant?

Cactus	Spirogyra	Hydrilla	None

4. Match the following.

Wheat	tree
Hibiscus	changes into a fruit
Waterlily	shrub
Ovary of the flowers	herb
Banyan	floating aquatic plant

Step 2

5. Answer the following questions in one word.

a. What type of plant is smallest in size?

b. How long does a herb live?

c. Which type of plant has a woody stem?

d. What type of plant has a weak, soft and fleshy stem?

e. What type of plant is hydrilla?

6. Write any two differences between.

a. Aquatic plant and terrestrial plant

b. Herbs and trees

c. Lotus and jasmine

d. Root system and shoot system

7. Give reason.

a. Lotus has soft and weak roots.

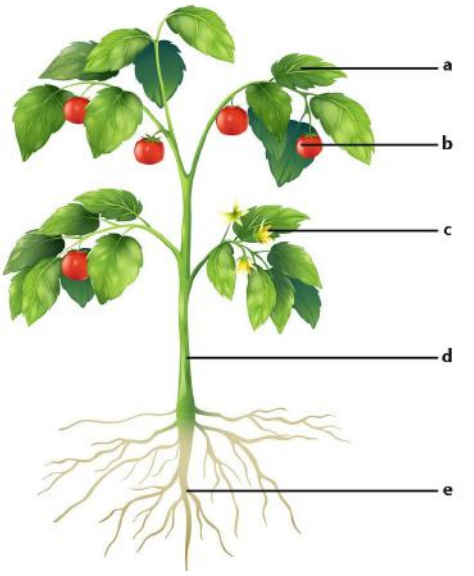
b. Cactus has developed roots.

c. The stem of the lotus is covered by wax.

d. A mushroom is called a non-flowering plant.

e. Cauliflower is a herb.

8. Study the given diagram and answer the following questions.



i. Is it a terrestrial plant or an aquatic plant?

ii. Is it an herb, shrub or tree? Discuss in the group. Access information from the internet to confirm your answer.

iii. Name the colourful part of this plant.

iv. What is the work of the green and flat parts of the plant?

Step 3

9. Answer the following questions.

a. What are plants? Give examples.

b. Define the plants that grow in water. Give any two examples.

c. Write the characteristics of aquatic plants.

d. What is a terrestrial plant? Give any two examples.

e. Write the characteristics of terrestrial plants.

f. What are shrubs? Give three examples.

g. Is a banana plant a herb, shrub or a tree? Write your opinions.

10. Project work.

Draw the diagram of a plant and label all of the major parts in it.

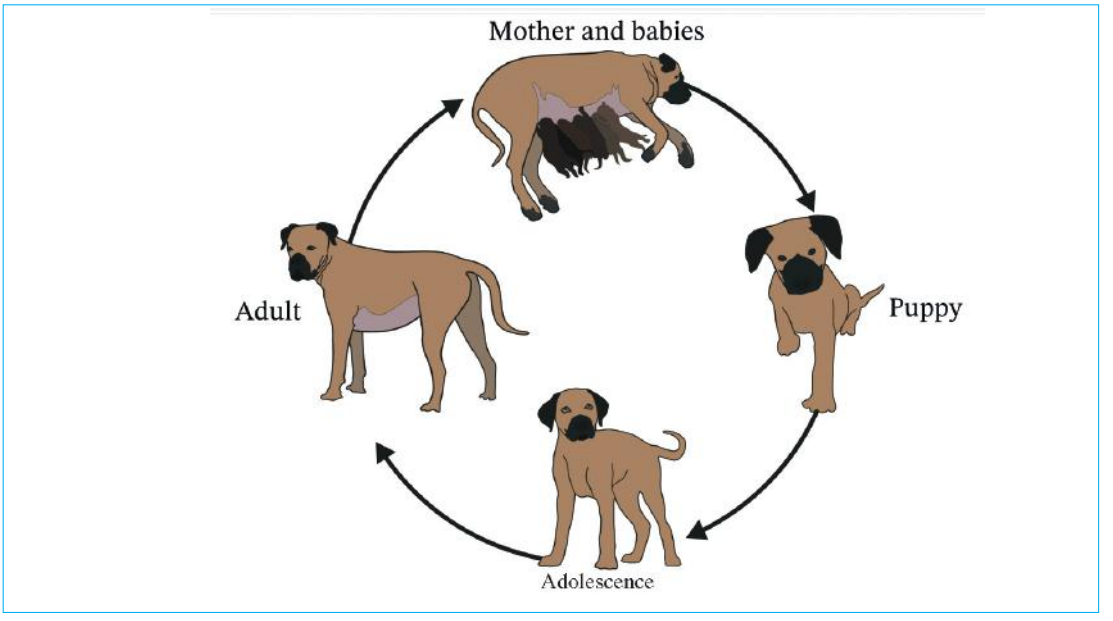
UNIT

5 LIFE PROCESS

ESTIMATED TEACHING PERIODS	TH	PR
	5	1

Introduction

Dogs are amazing pet animals. Some dogs are little puppies. Some are adults and some of them are old ones. These are various stages of the lifecycle of the dog. The process in which a new living thing is born, grows into an adult, produces new offspring, grows old and dies is called the lifecycle.

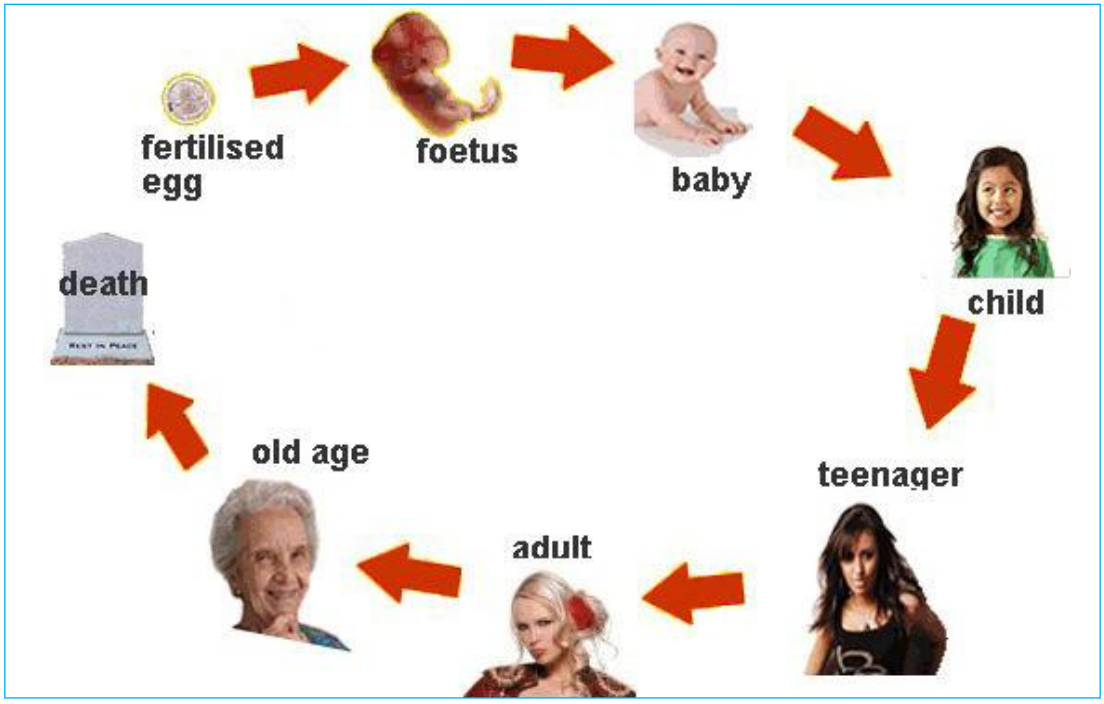


lifecycle of dog

Memory Tips

A fish just hatched from an egg is called fry.

We were also born as infants. We are now children. After few years we will be adults. Then we will grow into old people. Someday we will die. This is our lifecycle.



lifecycle of human beings

Fact with Reason

Why do living things reproduce?

Living things reproduce because it helps to continue lives on the earth.

UNIT
5.1

Animal life

Key terms and terminologies

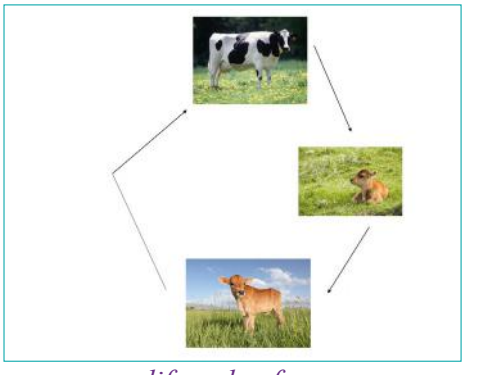
1. Lifecycle: The process in which a new living thing is born, grows into an adult, produces new offspring, grows old and dies is called the lifecycle.
2. Tadpoles: The caterpillar of frogs are called tadpoles.
3. Larva: A larva is a long cylindrical hungry stage of the lifecycle of an insect.
4. Caterpillar: The larva of the butterfly is called a caterpillar.
5. Cocoon: A cocoon is an oval box made from glue and thread.
6. Pupa: The pupa is an immature stage between larva and adult butterfly.

Introduction

All the animals have their unique lifecycle. The lifecycle of one animal may be different from another. The lifecycle of viviparous animals has the following stages: birth, childhood, adulthood and oldage. When an animal is born it will grow into a child. Later it grows into an adult. The adult organism will reproduce, grow and die. Thus, the lifecycle of an animal is completed.

The lifecycle of a cow

The cow is a viviparous animal. It gives birth directly. The baby of the cow is called a calf. The calf will grow into an adult cow after a year. It will give birth to another calf. Then it will grow old and die. Thus, a cow completes its lifecycle.



lifecycle of cow

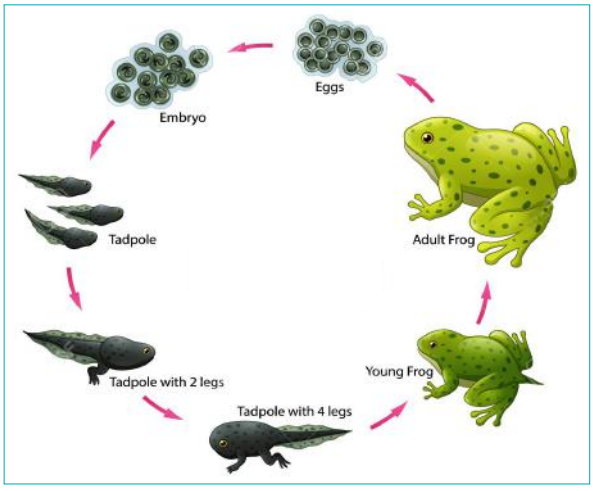
Activity

Write the names of any five animals and their baby that are found in your community.

Animal	Baby

The lifecycle of a frog

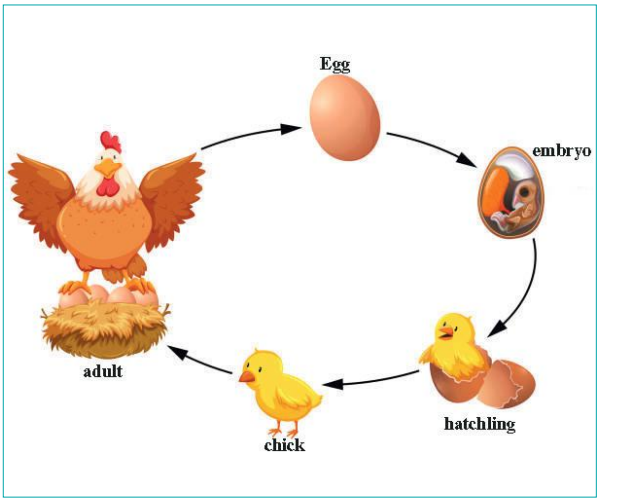
The lifecycle of a frog is different from the cow. A frog is an oviparous animal. It does not give direct birth to its babies. Eggs, tadpoles, young frogs and adult frogs are four stages of the lifecycle of the frog. Frogs lay many eggs in the pond. Eggs will hatch into tadpoles. Tadpoles are baby frogs but they look like baby fish. A tadpole has gills to breathe underwater. Later it grows legs. After few days, it changes into a frog. It lives on land. When it becomes a fully grown frog, it will then lay its egg in water. It will grow old and die. In this way the lifecycle of a frog is completed.



lifecycle of the frog

The lifecycle of a hen

The hen also lays eggs. Unlike frogs, it has developed eggs. Eggs, chick and adult hens are three stages of the lifecycle of a hen. Mother hen sits upon the eggs to keep them warm. After 3 weeks eggs will hatch into chicken. The chicken will grow into adult hens after few months and lay eggs. Mother hen grows old and dies. Thus, a hen completes its lifecycle.



lifecycle of hen

Memory Tips

Frogs do not need to drink water. They absorb it from their skin.

Fact with Reason

Why does a hen cover its eggs?

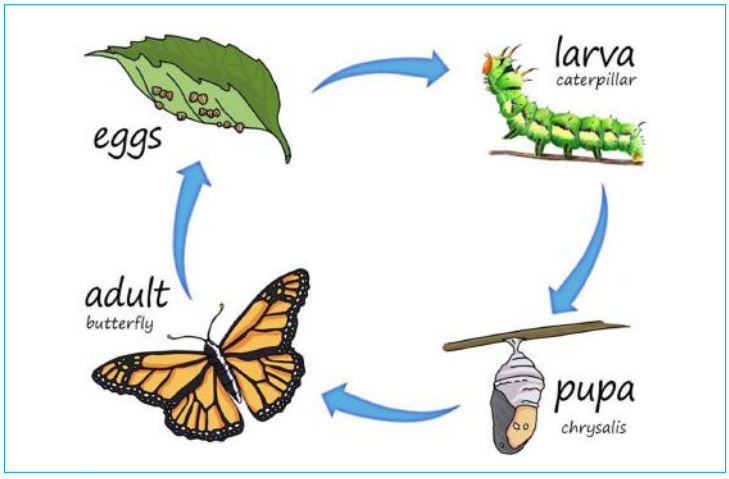
A hen covers its eggs because they want to hatch eggs by keeping them warm.

Activity

Visit a nearby pond with your guardian! Never go alone. Can you see a tadpole? How is it different from fish?

The lifecycle of a butterfly

A butterfly is an insect. It is an invertebrate. It completes its lifecycle in 4 stages. They are egg, larva, pupa and adult. A butterfly completes its lifecycle in about 2 months.



lifecycle of the butterfly

Egg

Eggs of butterflies are tiny and round. The female butterfly lays many eggs on the leaf of a plant. Eggs will hatch into larvae in about 3 to 4 days.

Larva

A larva of a butterfly hatches from an egg. A larva is a long cylindrical hungry stage of lifecycle of insect. It is called a caterpillar. It is long and cylindrical. It moves from one place to another to find food. It eats a lot of leaves. It grows very fast and keeps changing its skin. It stays as a larva for 2 weeks.

Fact with Reason

Why does a larva change the skin?

A larva changes its skin to remove its smaller old skin.

Activity

Wear gloves. Find a caterpillar. Keep it in a closed bottle. Make few holes in the bottle cap. Feed it leaves. Observe for 2 weeks. What will you find? Make a report.

Pupa

When the larva stops eating, it will change into a pupa. The pupa is immature stage between larva and adult butterfly. Pupa sits inside the cocoon. A cocoon is an oval box made from glue and thread. The pupa does not eat. It does not move either. It will slowly change into a butterfly within two weeks.

Adult

When the pupa changes into a butterfly, it breaks the cocoon. It comes out and dries its wings. Then it will fly. It feeds upon the nectar of the flower. The adult butterfly lives for 2 to 5 weeks.

This is how the lifecycle of the butterfly completes.

Memory Tips

Butterflies taste through their feet.

GLOSSARY

Reproduction: *the process in which new babies are produced*
Life process: *activities such as respiration, growth etc.*
Caterpillar: *The larva of butterfly*

Answer writing skill

1. Define life process.

The activities that a living thing does to survive are called life processes.

Example: respiration, sense, reproduction, nutrition, etc.

2. Write the name of the larva of frog.

The larva of the frog is called a tadpole.

3. Why do tadpoles have gills?

Tadpoles have gills to breathe underwater.

4. Differentiate between larva and pupa of an insect.

The differences between larva and pupa of the insect are:

SN	Larva of insect	SN	Pupa of insect
1	The larva of an insect eats a lot.	1	The pupa of an insect does not eat at all.
2	The larva can travel from one place to another.	2	The pupa of an insect cannot travel at all.

5. Write a short note on the larva of a butterfly.

Larva of a butterfly hatches from an egg. It is called a caterpillar. It is long. It moves from one place to another to find food. It eats a lot of leaves. It grows very fast and keeps changing its skin. It stays as a larva for 2 weeks.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

lifecycle	insect	frog	eggs	calf

a. The process in which a new living thing is born, grows into an adult, produces new offspring, grows old and dies is called the …….

b. The baby of the cow is called a …….

c. Egg, tadpole, young frog and adult frog are four stages of the lifecycle of the…….

d. A butterfly is an…….

e. Mother hen sits upon the …….to keep them warm and hatch.

2. Write true for the correct and false for the incorrect statement.

a. The lifecycle of one animal may be different from another.

b. Tadpoles are baby frogs but they look like fish.

c. Larva of a butterfly is called a caterpillar.

d. The cow is a viviparous animal.

e. The hen also lays eggs.

3. Choose the best answer from the given alternatives.

a. What is hatched from a frog's egg?

Chick	Caterpillar	Tadpole	Calf

b. What is hatched from a hen's egg?

Fry	Tadpole	Caterpillar	Chick

c. What is the larva of a butterfly called?

Caterpillar	Tadpole	Chick	Fry

d. What are the stages in the lifecycle of a butterfly?

Eggs	Larva and pupa	Adult	All of them

e. How long does it take to hatch a chicken egg?

2 weeks	3 to 4 days	3 weeks	9 months

4. Match the following.

Frog	calf
Fish	chicken
Hen	butterfly
Cow	fry
Caterpillar	tadpole

Step 2

5. Answer the following questions in one word.

a. What is the process in which a living thing is born, grows, reproduces and dies?

b. Where do frogs lay their eggs?

c. Where does the butterfly lay eggs?

d. What is the process in which a baby animal comes out of the egg?

e. How long does the larva stage of a butterfly last?

6. Write any two differences between.

a. Egg stage of the butterfly and adult butterfly

b. Larva of a butterfly and pupa of a butterfly

7. Give reason.

a. Living things reproduce.

b. Tadpoles have gills.

c. Hen cover its egg for few weeks.

8. Study the given diagram and answer the following questions.

i. Which stage of the lifecycle of the butterfly is shown in the diagram?

ii. Does it eat?

iii. What happens in this stage?

Step 3

9. Answer the following questions.

a. What do you mean by a life process?

b. What is reproduction?

c. Describe the lifecycle of the frog with a diagram.

d. Represent the lifecycle of a hen in a diagram.

e. Draw a suitable diagram of the lifecycle of the butterfly and explain it in detail.

f. A larva starts to eat as soon as it hatches. It eats leaves for many days. Lets make some hypothesis on why does it eat a lot.

10. Project work.

Birth, growth, adulthood, reproduction and death are stages of the lifecycle of animals. Should all animals live through those stages or not? Discuss in the group.

UNIT
5.2

Plant life

Keyterms and terminologies

1. Germination: The process in which a seed changes into the seedling is called germination.
2. Vegetative reproduction: The process in which a new plant grows from stem, leaf and root is called vegetative reproduction.
3. Herbarium: Herbarium is a systematically arranged collection of dried plants.

Introduction

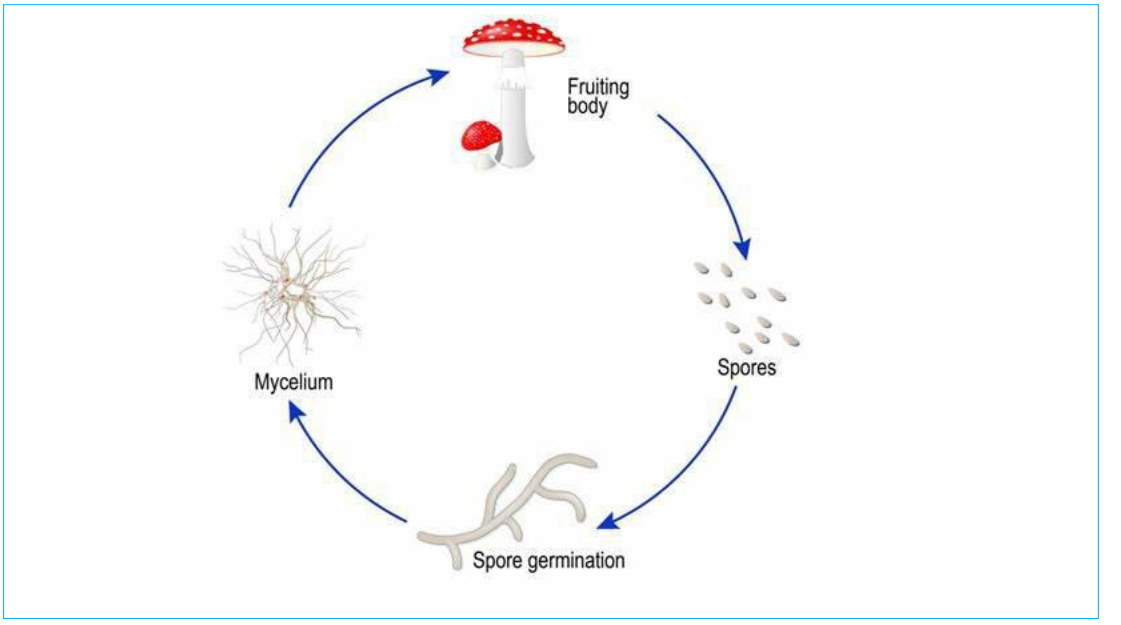
The lifecycle of the plant is quite different from the animal. Plants reproduce through seeds or spores. Mostly, non-flowering plants reproduce by spores.

a non-flowering plant reproduces through spore

a flowering plant reproduces through seeds

Lifecycle of mushroom

Mushroom is a non-flowering plant. It has spores. Spores are round in shape. When these spores fall into the ground and absorb water, they will change into new mycelium. Mycelium will produce a new fruiting body. It will produce the spore. Thus, the lifecycle of the mushroom continues.



lifecycle of mushroom

Lifecycle of the flowering plant

Flowering plants reproduce by seeds. The lifecycle of flowering plants has four stages. They are germination, pollination, fertilization and dispersal of seeds.

Germination

Farmers plant seeds in their fields. Seeds have a baby plant inside them. Under suitable conditions of the baby plant changes into the root. Plumule changes into leaf. Then the baby plant will change into a seedling. The process in which a seed changes into the seedling is called germination.

germination

A suitable amount of air, water and temperature is necessary for germination.

Memory Tips

Heat energy from sunlight is necessary for germination.

Activity

Plant some seeds in a pot and observe germination.

Fact with Reason

Why does a seed stored in a closed bottle not germinate?

A seed stored in a closed bottle does not germinate because it does not get air and water.

When a plant matures, it bears flowers. Insects help in pollination.

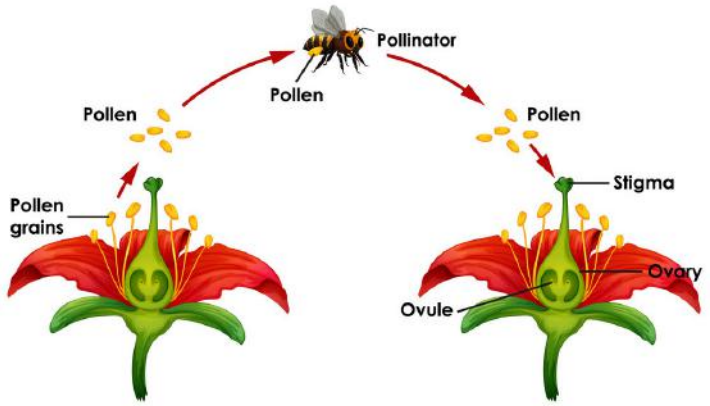


Fig. Pollination

Memory Tips

The honey bee is one of the pollinators.

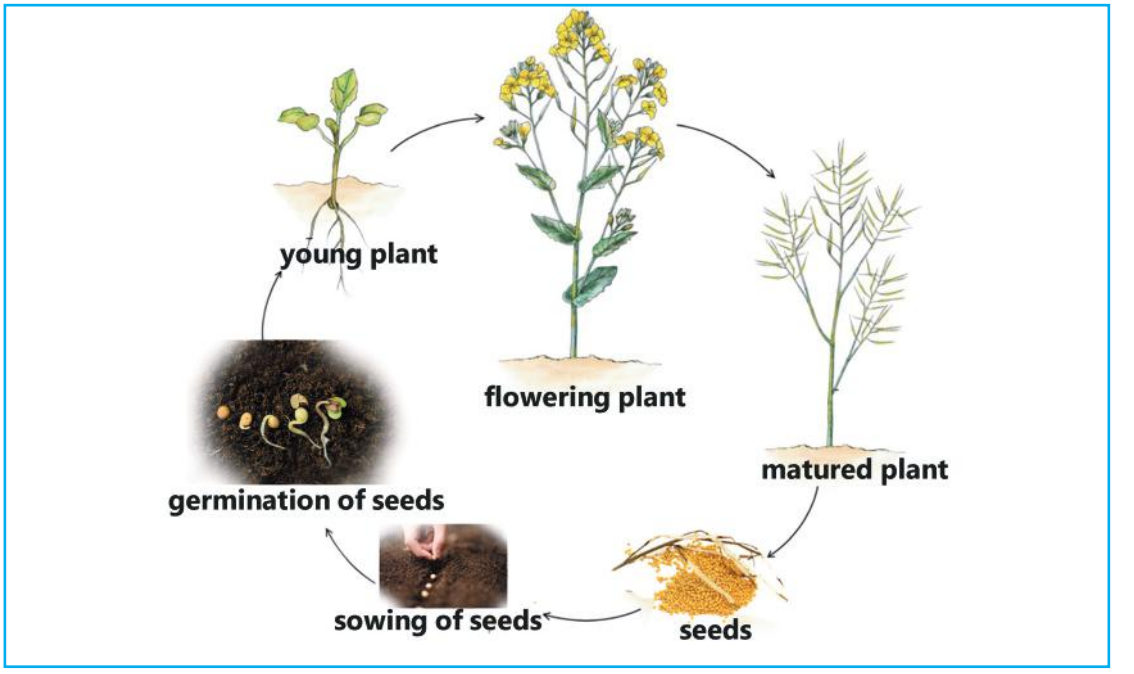
Fertilization will occur. The flower will change into fruit. The fruit has seeds in them.

Dispersal of seeds

Air, insects, birds, animals and plants help in the dispersal of seeds from one place to another. Under suitable conditions, seeds change into seedlings.

The lifecycle of a mustard plant

The mustard plant is a flowering plant. When a seed of a mustard plant gets enough water, air and heat, it will change into a seedling. Seedling is a new plant that has grown from the seed. Seedling absorbs water and mineral from the soil. It will grow into a bigger plant. It will bear flowers. Flowers will produce fruits and seeds. Seeds can produce new plants again. This is how the lifecycle of a mustard plant is complete.



lifecycle of a mustard plant

Memory Tips

The mustard plant gives us mustard oil. Its leaf is used as a vegetable.

Activity

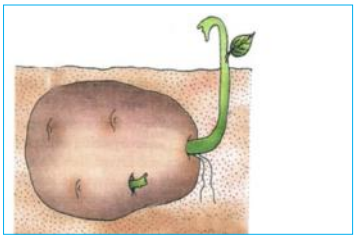
Visit a nearby garden and write the names of plants that reproduce by seed and that reproduce by spores.

Vegetative propagation

We usually don't find seeds in the banana. It does not have a developed seed. Potato and sugarcane also do not have developed seeds. Therefore, these plants do not continue their lifecycle through seed. They use other methods such as vegetative propagation. The process in which new plant grows from stem, leaf and root is called vegetative reproduction.

banana does not have good seeds

sugarcane plants reproduce from stem



germination of potato plant

Fact with Reason

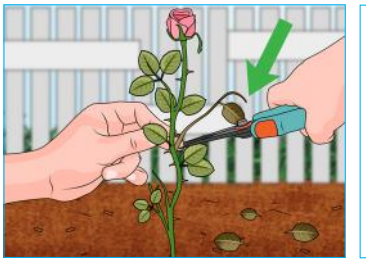
Why does a banana plant not grow from a seed?

A banana plant does not grow from a seed because it does not have a well-developed and viable seeds.

There is a plant called begonia. It produces new plants from its leaf. Sweet potato grows a new plant from its root. Sugarcane is a flowering plant but it does not have developed seeds. Farmers cut the stem of sugarcane into many pieces. They plant pieces into the

soil for few days. Each stem will grow roots and leaves. They will change into new plants. We can grow new rose plants in a similar way.

reproduction of sugarcane by cutting



reproduction of rose by stem

reproduction in begonia through leaves

Memory Tips

The pine tree is a flowering plant but it does not have a true flower.

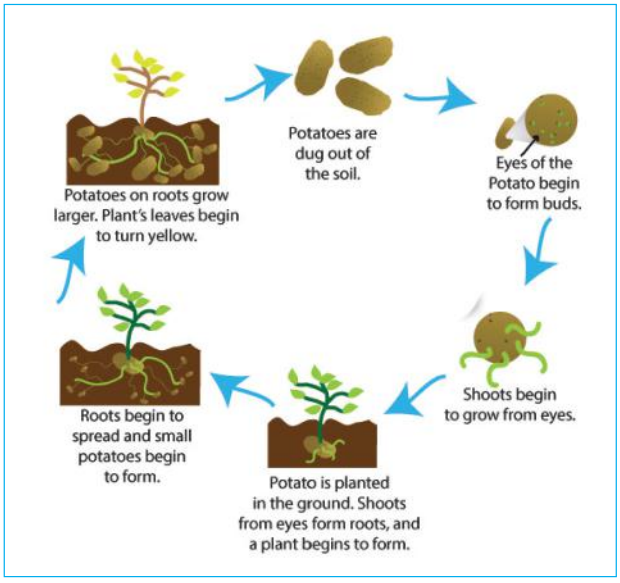
Activity

Do all plants reproduce through seed? Find the plants that usually reproduce from other parts.

Part of the plant for reproduction	Example
Stem	
Leaf	
Root	
Spore	

The lifecycle of potato

Potato is a vegetable. It is a very popular food. It is a flowering plant. It has fruit and underdeveloped seeds. Seeds of potatoes cannot germinate into seedlings. Potato used as a vegetable is a stem. Farmers collect good potatoes and store them. These potatoes have buds. Under suitable conditions, buds will grow into new plants. These new plants are planted in the field. They will change into fine potato plants. They will bear flowers and fruits. The potatoes will grow under the soil.



lifecycle of a potato plant

Memory Tips

Potato gives us vitamin C and vitamin B6.

Herbarium

The herbarium is a systematically arranged collection of dried plants. It may be the whole plant or a part of the plant. It is used for research.

Activity

Collect mustard plants of the different stages of their lifecycle. Keep them inside old books for a week. Then paste them into a chart paper. Label properly and share with your friends.

Fact with Reason

Why are the seeds of potatoes not used to grow new plants?

Potato seeds are not used to grow new plants because they do not grow healthy plants.

Seasonal and perennial plants

Herbs are seasonal plants. Their lifecycle completes within a single season. Cauliflower, radish, paddy and wheat are some herbs. When we plant them, they germinate into seedlings. These seedlings grow into plants, bear fruits and seeds. Then within a few months they die.

radish seed *seedling* *adult radish* *dead radish*

fig: lifecycle of a herb (example: radish)

Shrubs and trees are perennial plants. They complete their lifecycle in more than two years. For example, uttis, chilaune, khayer, sal, dhupi, etc.

dhupi tree

peepal tree

ashoka tree

GLOSSARY

Perennial: plants that live for many years

Pollination: transfer of pollen grains

Fertilization: formation of the baby plant

Answer writing skill

1. Which structure helps flowering plant to reproduce.

The seeds help flowering plants to reproduce.

2. Define embryo.

An embryo is a baby plant found inside the seed.

3. How does a seed change into a seedling?

A seed changes into a seedling when it gets a suitable amount of air, water and heat. Radical changes into the root. Plumule changes into the leaf.

4. Why is a flower important?

A flower is important because it helps in the formation of seeds.

5. Potato plant does not have good quality of seed. How do farmers grow potato plants on the farm?

Potato plants do not have a good quality of seeds. Therefore, farmers use tuber of the potato. A tuber of potato will produce bud. Bud will grow into a new plant. It is planted in fields. After a few months, it will produce flowers and fruits. Potato tuber grows under the soil.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

leaf	germination	plants	round	root

a. Seed or spore helps ..... to reproduce.

b. The spores are …… in shape.

c. Radical of the baby plant change into …….

d. Plumule of the baby plant changes into……

e. The process in which a seed changes into the seedling is called…….

2. Write true for the correct and false for the incorrect statement.

a. The flower produces fruit.

b. After fertilization flower changes into fruit.

c. Insect help in the transfer of seeds from one place to another one.

d. Potato and sugarcane have developed seeds.

e. Sweet potato grows a new plant from its seed.

3. Choose the best answer from the given alternatives.

a. Which plant reproduces through spore?

Mustard	Sugarcane	Potato	Mushroom

b. What is the process in which a seed change into a seedling?

Germination	Reproduction	Fertilization	Pollination

c. Which plant does not have good quality seed?

Paddy	Tomato	Apple	Potato

d. Which part of the plant changes into fruit?

Stem	Leaf	Root	Flower

e. What part of the baby plant changes into roots?

Plumule	Seed coat	Radical	Cotyledon

4. Match the following.

Mushroom	seedling
Germination	collection of dried plants
Flower	reproduces through leaf
Begonia	changes into fruit
Herbarium	spore

Step 2

5. Answer the following questions in one word.

a. What helps in the reproduction of non-flowering plants?

b. What helps in the reproduction of flowering plants?

c. What is the process of a seedling growing out of a seed?

d. What part of the plant contains a seed?

e. What part of the plant changes into fruit?

6. Write any two differences between.

a. The lifecycle of a flowering plant and lifecycle of a non-flowering plant

b. Reproduction of a potato plant and reproduction of a mustard plant

7. Give reason.

a. Flower is very important for the plant.

b. A potato doesn't reproduce through seeds.

c. Scientist make herbarium of the plants.

8. Study the given diagram and answer the following questions.

i. Which process is shown in the diagram?

ii. Define the process shown in the diagram.

iii. What changes into seedling?

Step 3

9. Answer the following questions.

a. Describe the lifecycle of mushrooms in short.

b. Write a short note on the lifecycle of the mustard plant.

c. Explain the lifecycle of the potato plant.

d. Sugarcane is grown from a stem. Discuss the reasons.

e. How would you make a herbarium?

10. Project work.

Draw the diagram to represent the lifecycle of the mustard plant and label its stages.

UNIT

6 MATTER

ESTIMATED TEACHING PERIODS	TH	PR
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Introduction

Sun, moon, cloud, air, soil and water are natural things. Bags, clothes, vehicles and desks are man-made things. These are made using natural things. All these things are made up of molecules. These objects have mass and occupy space. The substances which have mass and occupy space are called matter.

natural things

man-made things

Sunlight, shade, shadow and sound are also present around us. These things do not have mass. They do not occupy space. Therefore, they are not called matter.

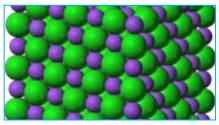
States of matter

Matter is made up of molecules. Rock is a solid matter. It is hard. Its molecules are closely packed. The form of matter in which molecules are closely packed is called solid. Book, brick, wood , pen, pencil, whiteboard, etc. are solid matter. They have a fixed shape, size and volume.

book

brick

ice



solid molecules

fig: solids

Water is a liquid matter. Its molecules are loosely packed than those of rock. The form of matter in which molecules can flow easily is called liquid. Water, oil and milk are common forms of liquid. They do not have a fixed shape but they have a fixed volume.


water


oil


milk

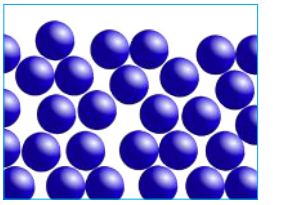

liquid molecules

fig: liquids

We need air to breathe. Air is also matter. Its molecules are very far away from each other. The form of matter in which molecules are very loosely packed is called gas. It does not have a fixed shape and volume.


water vapour

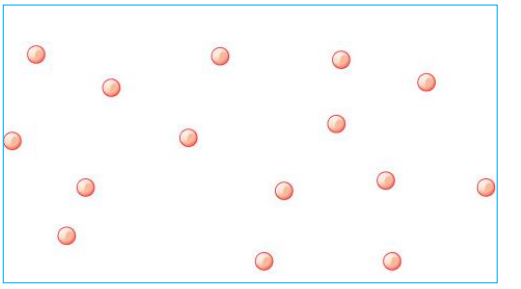

gas molecules

fig: gases

Memory Tips

Water is made of two gases. They are hydrogen and oxygen.

UNIT
6.1 Water

Key terms and terminologies

1. Matter: The substances which have mass and occupy space is called matter.
2. Solid: The form of matter in which molecules are closely packed is called solid.
3. Liquid: The form of matter in which molecules can flow easily is called liquid.
4. Gas: The form of matter in which molecules are very loosely packed is called gas.
5. Water vapour: Water vapour is a gaseous form of water.
6. Vaporization: The process in which water changes into vapour on heating is called vaporization.
7. Condensation: The process in which vapour changes into water on cooling is called condensation.
8. Freezing: The process in which water changes into ice or snow on cooling is called freezing.
9. Melting: The process in which snow changes into the water on heating is called melting.
10. Source of water: The place where water is found is called the source of water.
11. Rainwater harvesting: The process of collecting rainwater in a tank is called rainwater harvesting.
12. Water cycle: The process in which water travels from earth to the sky as vapour and comes back to the earth as rainfall is called the water cycle.
13. Water turbine: The rotary machine that changes the energy of flowing water into work is called a water turbine.
14. Watermill: The local technology that changes the energy of flowing water to grind grains is called a water mill.
15. Hydroelectricity: The electricity which is produced by flowing water is called hydroelectricity.
16. Water pollution: The decrease in the quality and quantity of the water due to the mixing of harmful materials is called water pollution.

Introduction

evaporation

Water is a natural resource. It is found in rivers, lakes and ponds. It also rains from the sky on a rainy day. Snow in the mountains is also a form of water. It is found in all three states of matter. Snow is the solid states of water. Ice, hailstone, frost and snow are also solid states of water. We can see water vapour rising from hot coffee. When water is heated it changes into vapour. Water vapour is a gaseous form of water.

Activity

Get some ice cubes and press them. What happens to the ice cubes? Will they melt into water? Observe.

Change in states of water

Heat is a form of energy. This energy can change the state of matter. If you heat water in a pot, vapour will rise. The process in which water changes into vapour on heating is called vaporization. When vapours cool down, they will change back into the water. The process in which vapour changes into the water on cooling is called condensation. Rainfall is an example of condensation.

vapourization

condensation on glass

When it is very cold, water changes into snow. The process in which water changes into ice or snow on cooling is called freezing. During the winter season, snow falls in certain places. Does snow stay there forever? No, it does not. It will melt into water. The process in which snow changes into water on heating is called melting.

freezing

melting

Activity

Take some ice cubes in a glass and put them on the table. Observe after a few minutes. You can see some water droplets formed on the outer wall of the glass. It means air contains water vapour.

Fact with Reason

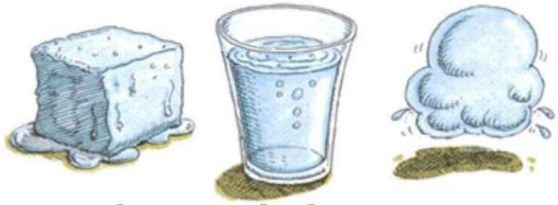
Why is there frost on the leaf on winter mornings?

There is frost on the leaf on winter mornings because water vapour present in the air freezes into frost due to coldness.

Properties of water

Properties of water are listed below:

i. Water is found in all three states of matter.



Solid **Liquid** **Gas**

ii. Water can dissolve other matters.

sugar solution

salt solution

mushroom soup

iii. Water does not have a fixed shape and size. It takes the shape of the container.

iv. Water has a fixed volume.

v. Water does not have smell, colour or taste. Mixing of other materials gives taste, smell and colour to the water.

vi. Water flows from a higher place to a lower place.

Memory Tips

97% of the world's water is salty.

Sources of water

Water is found in lakes, ponds, wells, sea, ocen, river, etc. The place where water is found is called the source of water. Water found in springs and rivers has minerals in them. It is good for drinking. Seawater is very salty. We cannot drink it. Water sources are broadly divided into two groups. They are surface water and underground water. Pond, lakes, rivers, snow-caps, rainfall and springs are the sources of surface water. River water keeps flowing. Water in a pond and lakes do not flow.

rainfall

pond

fewa lake

river

fig: surface water

Fact with Reason

Why does not the pond water flow?

Pond water does not flow because it has the same level of water everywhere.

A large amount of water goes inside the soil. It is stored deep under the surface. We can dig wells, springs and tube wells to extract that water. These are underground sources of water.

well

water spring

aquifers

fig: underground water

Activity

Make a list of different water sources found in your community.

Fact with Reason

Why should we plant trees near water sources?

We should plant trees near water sources because it prevents the drying of water sources.

Uses of water

Water is a very useful natural resource. It is useful for every living thing. Some uses of water are:

i. Plants absorb water from the soil for photosynthesis.

ii. Animals drink water to be healthy.

iii. We also drink water to be fit and healthy.

iv. Water is used for bathing, washing clothes, brushing teeth and cleaning the house.

v. Water is used for producing hydroelectricity.

vi. Water runs a water mill.

animal drinks water

bathing

brushing

washing

fig: uses of water

Memory Tips

70% of the human brain consist of water.

Conservation of water sources

Life is impossible without water. We get water from water sources. Water sources are drying up nowadays because of deforestation. If all the water sources dry up, plants and animals will die. Therefore, we must conserve water sources.

Some ways of conserving water sources are:

i. Do not cut trees.

ii. Do not throw waste material in the river and pond.

iii. Plant more trees near water sources.

We can save water by following methods:

i. Keep the tap closed when brushing.

ii. Use a wet towel to wash your face.

iii. Use the rainwater harvesting method.

close tap while brushing

use wet towel to wash face

use wet cloth to wash vehicles

fig: ways of saving water

Activity

How can we save water? Practice ways of saving water for one week.

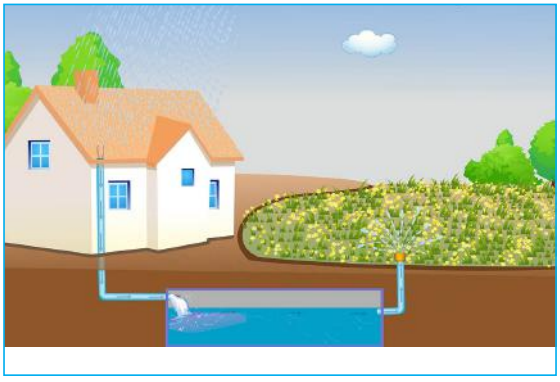
Fact with Reason

Why should we use a wet towel to wash our face?

We should use a wet towel to wash our face because it helps to save water.

Rainwater harvesting

We can put some pipes on the roof of the house. Rainwater that falls on the roof passes through the pipe. It is collected in a water tank. The process of collecting rainwater in the tank is called rainwater harvesting. This water can be used for gardening, washing clothes and washing vehicles.



rainwater harvesting

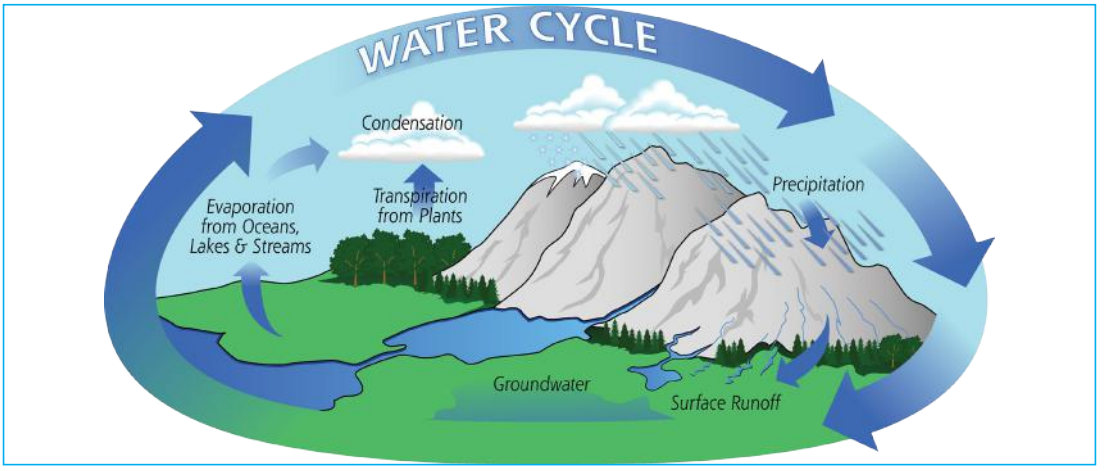
Activity

Make a very small model to represent rainwater harvesting.

Water cycle

Clouds bring rain. There is more rainfall in the summer season. Where does the rain come from? Rainfall is a part of the water cycle.

The process in which water travels from earth to sky as vapour and comes back to earth as rainfall is called the water cycle.



water cycle

Surface water changes into water vapour because of the different kinds of heat energy. This water vapour rises in the sky. It changes into tiny water drops on cooling in the sky. Water drops now come together and change into a cloud. The wind brings dark clouds in the sky of our area. When one cloud collides with another, it starts to rain. Rainwater flows into the river and pond. Some of the rainwater is absorbed into the soil.

Memory Tips

The water cycle is powered by the sun.

Fact with Reason

Why do clouds bring rain?

Clouds bring rain because they are made up of billions of tiny water droplets.

Water turbine

A water turbine is an old technology. It uses the energy of moving water to run the blades of the turbine. Then the turbine rotates other

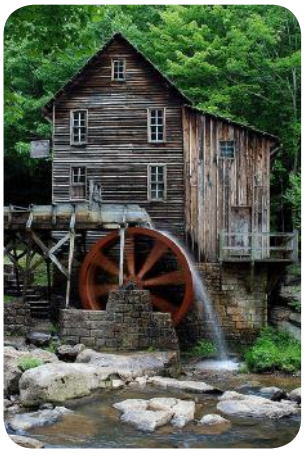
machines connected to it. The rotary machine that changes energy of flowing water into work is called water turbine. It can be used to run machines like water mills, sawmills, etc. It can also be used to generate hydroelectricity.

Watermill

The water mill is the oldest local technology. It uses a water turbine. It is used to grind grains in villages. The local technology that changes energy of flowing water to grind grains is called water mill.

How does water mill work?

i. First of all, water is collected in a dam.
ii. Water flows through the pipe and falls into the turbine.
iii. The energy of the falling water rotates the turbine.
iv. The turbine is connected to the huge stone disc.
v. There are two stone discs. The stone disc at the top rotates to grind the flour.



water mill

Hydroelectricity

Water turbines can be used to produce hydroelectricity. This technology is similar to the watermill. A large amount of water is collected in the dam. The dam is made by blocking rivers. Water flows down the pipe and falls into the turbine. The energy of the falling water rotates the turbine. The turbine rotates the generator. Then the electricity is produced. The electricity which is produced

by flowing water is called hydroelectricity. It is used to light bulbs, run televisions, air cooler, electric iron, electric kettle, fans etc.

technology of hydroelectricity

Memory Tips

Hydroelectricity is a renewable source of energy.

Water pollution

Collect water from five different sources and observe. Which one is the cleanest? Does it have a smell? Water can dissolve many things. So, water collects lots of materials. Sometimes harmful substances mix in water. Mixing of harmful material makes water unhealthy to drink. This decreases the quality of water. Aquatic animals will become sick and die. The decrease in the quality and quantity of water due to the mixing of harmful materials is called water pollution.

water pollution

Causes of water pollution

Water pollution is caused by following activities:

i. Throwing of waste material in rivers and water sources.
ii. Heavy rainfall
iii. Sewage from cities and industries

Memory Tips

Around 70% of industrial waste is dumped in the river.

Activity

Public awareness is important to reduce water pollution. Draw a picture to show that we should not mix waste material and sewage in the river. Paste it in the class.

Fact with Reason

Why should we not mix sewage in the river?

We should not mix sewage in the river because it pollutes water. It kills fish, spread germs and makes us sick.

Conservation of water resources

We must keep water sources clean.

The following ways help to keep water sources clean:

i. Do not throw waste material in the river and pond.

ii. Do not mix sewage in the river.

iii. Do not bathe, wash clothes or wash buffaloes in the river.

GLOSSARY

Volume: space occupied by the body

Rainfall: falling of water drops from the sky

Answer writing skill

1. What is the matter?

The substances which have mass and occupy space are called matter.

2. What powers the watermill?

The energy of the flowing water (hydropower) powers the watermill.

3. Why is the hydroelectric best source of energy for Nepal?

Hydroelectricity is the best source of energy for Nepal because Nepal has lots of fast-flowing rivers.

4. Our wet clothes dry when kept in the sunshine. Give reason.

Our wet clothes dry when kept in the sunshine because heat energy from the sun changes water into vapour. Vapour flies away from the clothes.

5. How does the rainfall occur in the lands? Explain.

The water from rivers, land, ocean and pond changes into vapour on a sunny day. The vapour rises in the sky. The vapour cools down and condenses into tiny water droplets. Billions of tiny water droplets make a cloud. The wind brings clouds upon land. When the cloud is heavy it rains.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

molecules	gas	vaporization	matter	solid

a. The substances which have mass and occupy space are called……

b. The matter is made up of…….

c. The matter with a fixed shape, size and volume is called .....

d. The form of matter in which molecules are very loose is called …….

e. The process in which water changes into vapour on heating is called…….

2. Write true for the correct and false for the incorrect statement.

a. The process in which water changes into ice or snow on cooling is called melting.

b. Water can dissolve everything.

c. A place with a large amount of underground water is called a desert.

d. Plants absorb water from the soil for photosynthesis.

e. If all the water sources dry up, plants and animals will die.

3. Choose the best answer from the given alternatives.

a. What should we do while brushing our teeth?

Close tap	Keep tap open	None	Break the tap

b. What is the best way to conserve water?

Cut trees	Plant trees	Do nothing	Throw waste

c. What powers the water cycle?

Moonlight	Electricity	Solar energy	All of them

d. What is the form of energy produced with the help of flowing water?

Bio-energy	Wind energy	Geo energy	Hydroelectricity

e. What is the decrease in the quality and quantity of water called?

Air pollution	Water pollution	Land pollution	Sound pollution

4. Match the following.

Mass and volume	solid form of water
Melting	matter
Ice	changing from solid to liquid
Watershed	drying of water resources
Deforestation	a land with lots of water resources

Step 2

5. Answer the following questions in one word.

a. What is the process in which vapour changes into liquid?

b. Write the name of an underground source of water.

c. What is the form of matter which has compactly arranged molecules?

d. What is the form of matter which has very loosely arranged molecules?

e. What is the process in which water travels from land to the sky and comes back?

6. Write any two differences between.

a. Evaporation and condensation

b. Freezing and melting

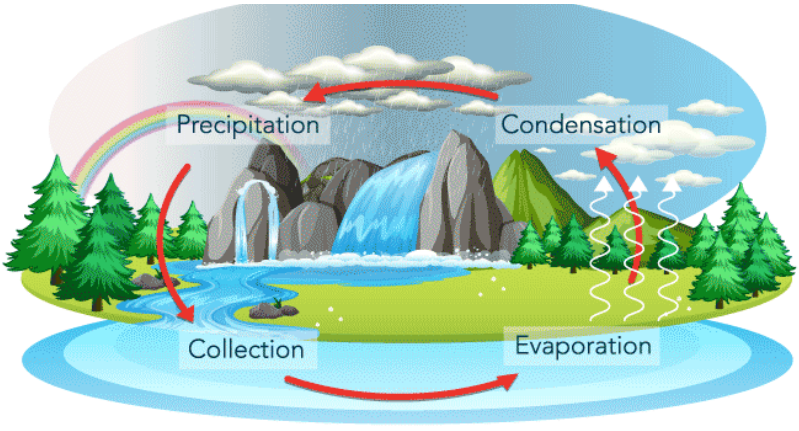
7. Give reason.

a. The water cycle is a very important natural process.

b. The water feel tasty even though it does not have taste.

c. We should practice rainwater harvesting techniques.

8. Study the given diagram and answer the following questions.



i. What natural process is shown in the diagram? Define it.

ii. What powers this process?

iii. What is the advantage of this process for farmers?

Step 3

9. Answer the following questions.

a. What is matter? Mention three forms of matter.

b. If you boil water for a long time, there will be less water left in the pot. What might be the reason? Explain.

c. What do you mean by source of water? Give examples.

d. List the uses of water.

e. Define water mill and hydroelectricity.

f. What do you mean by water pollution?

g. Write any two causes, two effects and two preventive measures of water pollution.

h. Water is scarce in city areas. How can rainwater harvesting process help to solve scarcity of water? How does it work? Describe.

10. Project work.

How can water change its state of matter? Show it with the help of a flow chart.

UNIT
6.2 Air

Keyterms and terminologies

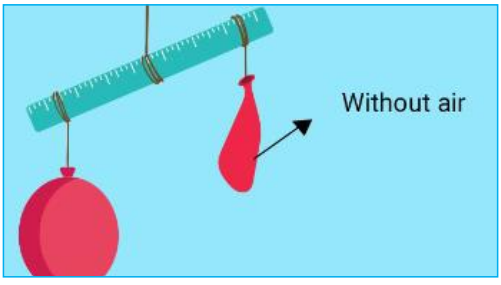
1. Air: The mixture of gases is called air.
2. Breeze: Gently moving wind is called breeze.
3. Air pollution: The decrease in the quality of air due to the mixing of smoke, dust and germs is called air pollution.

Introduction

Air is a very important natural resource. It is found all around the earth. It is a gaseous form of matter. Air is mainly made up of nitrogen, oxygen, water vapour and carbon dioxide. The mixture of gases is called air. Air is a non-living factor of the environment.

Properties of air

We cannot see air. It does not have colour. We can smell the sweet scent of perfume in the air. But air itself does not have scent or taste. Air is matter so it has mass and volume. An air-filled football is heavier than a flat one. A cylinder of LPG is heavier when it is full.



Air has mass

Memory Tips

The weight of air creates atmospheric pressure.

Activity

Take a glass of water and cover it with a postcard. Press the card with the palm of one hand. Hold the glass with another hand. Turn it upside down quickly and gently remove the hand from the postcard. Try it until the water does not fall from the glass. Why does water not fall from the glass? Discuss with your teacher.

Fact with Reason

Why do we see bubbles when an air-filled balloon is released inside the water?

We see bubbles when an air-filled balloon is released inside the water because air escaping from the balloon occupies that space.

Air does not have a fixed shape. If it is filled in a bottle, it becomes like a bottle. If it is filled in a cup, it looks like a cup. It takes the shape of the container. A kilogram of air can fit in a tiny bottle. Same air can also fill an entire room as well because it does not have a fixed volume. It can expand to fill the container. All living things need oxygen gas to live. Have you ever wondered how fish survive? Of course! Their gills help them to breathe in water. Water dissolves oxygen from the air. Gills take that oxygen from water. Do you like balloons? We like to fill hydrogen gas in the balloon and see it float. A balloon becomes bigger when air is filled in it. It means air has volume. It can push the balloon from inside and make it big. That property of air is called air pressure.

Some of the common properties of air are listed below

i. It is colourless, odourless and tasteless.
ii. It has mass and occupies volume.
iii. It does not have a fixed shape, size and volume.
iv. It slightly dissolves in water.
v. It exerts pressure.

Activity

Take a football and measure its mass in digital balance. Then release its air and measure the mass again. Does the mass increase or decrease? What does it prove? Discuss in a group.

Uses of air

Air is useful for plants and animals. We cannot live without air. Oxygen gas is necessary for respiration. Plants, animals and human beings take in oxygen gas and throw out carbon dioxide gas while breathing. Gently moving wind is called breeze. Breeze carry away pollen grains. Fuzzy seeds fly away from plants. Plants absorb carbon dioxide for photosynthesis from the air. Air contains nitrogen gas. Nitrogen gas changes into fertilizer in the rainy season. It makes the soil fertile. Human beings use air to fill footballs, and tubes of cycles and buses. The wind rotates the turbine to produce electricity. It also helps in the sailing of the boat.

Memory Tips

There is no air in outer space.

Fact with Reason

Why is wind called an agent of dispersal of seed?

The wind is called an agent of dispersal of seed because it flies away fuzzy seeds from one place to another.

Uses of air are listed below

i. It helps in the pollination.
ii. It helps in the dispersal of seeds.
iii. It gives oxygen to plants for photosynthesis.

iv. It gives oxygen to living things for respiration.

v. It runs a windmill, sails a boat and helps to remove the husk from wheat.

vi. It can be used to fill tubes of football, bicycle, bus, truck, etc.

filling air in bicycle tube

wind farms

wind turbine

Air pollution

We must breathe fresh air to be healthy. Air in the forest is very good for health. The quality of city air is decreasing daily. It contains smoke, dust and germs. It is hotter. The decrease in the quality of air due to the mixing of smoke, dust and germs is called air pollution.

Effects of air pollution

It is very harmful to human beings. It causes lung diseases. Smoke will burn our eyes. We will suffer from skin allergies and heart diseases. Germs will spread. The plant cannot do photosynthesis due to smoke and dust. The plant will be unhealthy.

Memory Tips

There are five layers of air around the earth.

Some major effects of air pollution are listed below

i. It causes lung, eyes and heart diseases to human beings.

ii. It disturbs the growth of the plant.

iii. It spreads diseases such as trachoma and diphtheria.
iv. People will suffer from asthma.

Activity

Visit your community with your guardian. Make a list of different things or activities that pollutes the air.

Causes of air pollution

Let's compare the quality of air of the village area with the city area. It is found that air in village areas has more amount of oxygen and less amounts of harmful gases. What is the reason behind this? The city area has more population than the village. People use cooking gas to make food. The city has a greater number of vehicles and factories. The city produces more amount of smoke and dust. Therefore, the quality of air decreases in the city.

Memory Tips

According to WHO, almost 7 million people die from air pollution every year.

Fact with Reason

Why does the village have fresh air?

The village has fresh air because it has a greater number of trees and fewer factories.

Some major causes of air pollution are listed below

i. Forest fires and volcanoes.
ii. Smoke from vehicles and industries.
iii. Dust from the construction of roads, buildings etc.
iv. Smoke from the chimney.
v. Smoke from burning of cooking gas, kerosene, petrol and diesel.

Prevention of air pollution

The village area has good air because it has fewer people and more forest.

We can reduce air pollution by following methods

i. Plant more trees. Stop deforestation.
ii. Reduce use of petrol and kerosene. Use electricity instead of these.
iii. Use solar panels.
iv. Make industries and cities far away from human settlement.

GLOSSARY

LPG: cooking gas
Fertile: can grow crops well

Answer writing skill

1. What is air?

The mixture of gases is called air.

2. Which gas is necessary for respiration?

Oxygen gas is necessary for respiration.

3. What is the difference in the quality of air between a village and a city?

The difference in the quality of air between the village and the city is:

SN	Air in the village	SN	Air in the city
1	It has more amount of oxygen gas.	1	It has less amount of oxygen gas.
2	It has less amount of dust and smoke.	2	It has more amount of dust and smoke.

4. Why should we stop deforestation?

We should stop deforestation because:

i. It leads to the drying of the water sources.

ii. Oxygen decreases in the air.

5. Observe the given diagram and answer the following questions?

i. What is polluted by this activity?

Air is polluted by this activity.

ii. What is used as fuel in this vehicle?

Petroleum is used as fuel in this vehicle.

iii. What should we use to replace this fuel?

We should use electricity to replace this fuel.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

smell	heavier	respiration	breeze	air

a. The gaseous form of matter is .....

b. Air does not have ……

c. An air-filled football is……. than the flat one.

d. Oxygen gas is necessary for …….

e. Gently moving wind is called…….

2. Write true for the correct and false for the incorrect statement.

a. The wind rotates the turbine to produce electricity.

b. There is no air in outer space.

c. We must breathe fresh air to be healthy.

d. The village produces more amount of smoke and dust.

e. Cities have good air because they have fewer people and more area of forest.

3. Choose the best answer from the given alternatives.

a. What is the property of air?

Has mass	Has smell	Has shape	Has taste

b. What is a gently moving wind called?

Air	Atmosphere	Breeze	Storm

c. Which gas is necessary for respiration?

Nitrogen	Hydrogen	Oxygen	Carbon dioxide

d. What is the air used for?

Respiration	Filling tubes	Pollination	All of them

e. Which gas is necessary for plants for photosynthesis?

Nitrogen	Hydrogen	Oxygen	Carbon dioxide

4. Match the following.

Mixture of gases	absorb oxygen from water
Weight of air	air
Gills	exert pressure
Oxygen	make soil fertile
Nitrogen	respiration

Step 2

5. Answer the following questions in one word.

a. What is the mixture of gases called?

b. What is the pressure exerted by the weight of air called?

c. What causes lung diseases in human beings?

d. Which gas helps in respiration?

e. Which gas helps in photosynthesis?

6. Write any two differences between.

a. Air in the city and air in the village

7. Give reason.

a. Cities have polluted air.

b. We should reduce the use of petroleum.

c. We should stop deforestation and start planting trees.

d. A balloon expand when air is filled.

8. Study the given diagram and answer the following questions.

i. What is being mixed into the air?

ii. Is it good to make such factories near human settlements?

iii. What kinds of health problems are seen in human beings living nearby?

Step 3

9. Answer the following questions.

a. Define air. Write its properties.

b. List the uses of air.

c. Why is air important for plants?

d. What is air pollution?

e. Enlist the causes of air pollution.

f. Describe harmful effects of air pollution on human health.

g. Air pollution is the leading cause of the death of people. It must be prevented to save lives. Suggest few preventive measures to reduce air pollution.

10. Project work.

What is the condition of air quality in your community? What can you do to improve the quality of air in your community? Discuss in the group.

UNIT
6.3

Rock

Keyterms and terminologies

1. Rock: The rock is a natural solids, hard substance made up of minerals.
2. Boulder: A boulder is a very large rock.
3. Soft rock: The rock which has a very low density is called soft rock.
4. Hard rock: The rock which has a very high density is called hard rock.
5. Soapstone: Soapstone is a soft rock made of talc and other minerals.
6. Weathering: The process in which a rock changes into fine powder naturally is called weathering of rock.
7. Soil: The soil is a mixture of weathered rock and humus.

Introduction

Rock is a matter. It has mass and volume. It is made up of minerals. It is found everywhere on the earth. The rock is a natural solid, hard substance made up of minerals. Rock and soil make the land.

Memory Tips

Geology is the study of rock.

Fact with Reason

Why do we study rock?

We study rock because it is a very useful natural resource.

Properties of rock

Rock come in various shapes, sizes and colours. Pebbles are small rocks. Boulder is a large rock. Limonite is a red rock. Sapphire is a blue rock. Diamond is the hardest rock. Shale is a rock that contains plant parts. Emeralds are green and shiny.

diamond is hard

sandstone is soft

emeralds are green and shiny

fig: each rock has its own unique properties

Fact with Reason

Why do scientists study rocks with fossils?

Scientists study rock with fossils because it helps to understand the history of the earth.

Some of the physical properties of rock are listed below

i. Rock may be small or big, short or long and thick or thin.

ii. It may be round, cube, cuboid, flat or irregular in shape.

iii. It may be green, blue, white, yellow or red.

iv. It may be soft or hard.

Activity

Collect different types of rocks from the surroundings. Ask your guardians to break it by hammer. Observe it and fill in the table below:

Sample rock	Colour	Hard or soft	Fossils present or absent	Shiny or dull	Can be scratched by a nail or not
A					
B					
C					
D					
E					

Types of the rock

Rock can be formed in many ways. Volcano brings hot molten rock to the surface. Molten rock cools down and changes into very hard rock. The rock which has a very high density is called hard rock. Plants cannot grow in these types of rock. Granite and basalt are hard rock. Shale is soft rock. It is formed when soil, sand and minerals are compressed at the bottom of the lake, river and ocean. It contains plant and animal parts as well. The nature of the rock will change slowly due to weather and climate. The rock which has a very low density is called soft rock. Soapstone is a soft rock. It can be scratched by nails. These kinds of rocks are found in the hilly region. Plants grow easily in these hills.

hard rock: granite

soft rock: soapstone

Memory Tips

Pumice is rock made from cooling magma. It can float in water.

Fact with Reason

Why can plants not grow on hard rock?

Plants cannot grow in hard rock because roots cannot dig in the hard rock.

Weathering of a rock

Rock dies! It means it breaks into powder. Rock expands on heating and contracts on cooling. Continuous contraction and expansion

for thousands of years crack the rock. Rainfall, wind, storm, snowfall and other weather activities will erode rock. As a result, the rock will change into fine powder. The process in which rock changes into fine powder naturally is called weathering of rock. A weathered rock will change into soil over time. The soil is a mixture of weathered rock and humus.

weathering of a rock

A rock eaten away by water

A rock eroded by wind

fig: weathering of a rock

Memory Tips

Water eats away rock slowly over hundreds of years.

Fact with Reason

Why is soil called weathered rock?

Soil is called weathered rock because it is formed when rock is broken down into tiny pieces over millions of years.

Importance of a rock

Rock is a very useful natural resource. Some of the uses of rock are listed below.

i. Rock is used in making walls, buildings and paving roads.

making walls

stone-paved road

making buildings

ii. Colourful and shiny rocks are used to make jewellery.

iii. Soft rocks are used for making statues, idols and flower vases.

iv. Sand, pebbles and gravel are used for construction.

v. Some rocks have plant and animal parts within them. It is used to learn about the history of the earth.

fossils are found in sedimentary rocks

vi. Metals such as gold, silver, aluminium, copper are obtained from the rocks called ores.

Haematite is an iron ore

Argentite is a silver ore

Activity

Find a soft yellow mudstone with the help of your parents. Make it flat and carve the first letter of your name in it.

GLOSSARY

Minerals: a useful substance found in the earth

Answer writing skill

1. What is rock?

Rock is a natural solid, hard substance made up of minerals.

2. Why do plants grow easily in hills that has soft rock?

Plants grow easily on hills that have soft rock because roots can easily penetrate through soft rock.

3. How is soil formed?

Soil is formed when rock breaks down into a fine powder. Rainfall, river, wind and heat from the sun breaks the rock into fine powder. Plants can break rocks too.

4. List three properties of rock.

The properties of rock are listed below:

i. Rock may be soft or hard.

ii. It may be shiny or dull.

iii. It comes in different colours.

5. Do some rocks have plant parts in them? What are the advantages of such rocks?

Yes, some rocks have plant parts trapped in them. Some of them have animal parts too. It is used to study the history of the earth.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

pebbles	scientists	volcano	rock	soft rock

a. We can find ..... everywhere on the earth.

b. The small rocks are .....

c. The rocks with fossils are studied by ..... because it helps to understand the history of the earth.

d. The hot molten mass comes to the surface from .....

e. Shale is a .....

2. Write true for the correct and false for the incorrect statement.

a. Soapstone is a hard rock.

b. A weathered rock will change into soil over time.

c. Rock is used in making walls, paving roads, making buildings etc.

d. Diamond is a soft rock.

e. Limonite is a red rock.

3. Choose the best answer from the given alternatives.

a. What is a rock made up of?

Minerals	Water	Air	None

b. Which one is hard rock?

Chalk	Soapstone	Shale	Sandstone

c. Which one is a soft rock?

Granite	Soapstone	Diamond	Sandstone

d. What are the properties of rock?

Shiny or dull	Various colour	Made of minerals	All of them

e. What causes weathering of rock?

Rainfall	Heat	Wind	All of them

4. Match the following.

Diamond	used as a jewel
Emerald	breaking of rock into dust
Weathering	mudstone
Soft rock	study of earth and rocks in it
Geology	hardest rock

Step 2

5. Answer the following questions in one word.

a. What is a solid substance made of minerals called?

b. Write the name of the hardest rock.

c. What type of rock is good for plants to grow on hills?

d. Which rock contains remains of old plants?

e. What is formed after the weathering of the rock?

6. Write any two differences between.

a. Soft rock and hard rock

7. Give reason.

a. Plants cannot grow in hills made of hard rock.

b. The soil is called weathered rock.

c. Sandstone is round in shape.

d. Different rocks have different colours.

8. Study the given diagram and answer the following questions.

i. What is that person doing in the diagram?

ii. For what other purpose that kind of rock can be used?

Step 3

9. Answer the following questions.

a. What is a rock? Write any three properties of the rock.

b. Give three examples each of soft rock and hard rock?

c. What are the uses of the rock?

d. Define weathering.

e. What is soil? How is it formed?

f. Diamond and ruby are just rocks but used as ornaments. Discuss the reasons.

10. Project work.

Visit your village or town with your guardian. Make a list of things made by using rocks.

UNIT

7

ENERGY

ESTIMATED TEACHING PERIODS	TH	PR
	5	1

Introduction

A magnet can pull metal. It can lock the doors of the fridge. Electricity can do the work as well. It can run fans, flour mills and computers. Moving water can run the water turbine. A flood moves way faster than a river. It has more energy. It can carry away the soil. The ability to do work is called energy. We cannot do any work without energy.

magnet pulling metal

electricity running machines

flood has energy to carry away things

hydroelectricity

fig: various objects have ability to do work

UNIT
7.1 Introduction to energy

Keyterms and terminologies

1. Energy: The ability to do work are called energy.
2. Source of energy: The substances that give energy is called the sources of energy.
3. Heat energy: The form of energy that gives the sensation of warmth is called heat energy.
4. Light energy: The form of energy that helps us to see is called light energy.
5. Sound energy: The form of energy that gives the sensation of hearing is called sound energy.
6. Electrical energy: The form of energy produced by the flow of electrons is called electrical energy.
7. Magnetic energy: The form of energy present in a magnet is called magnetic energy.
8. Chemical energy: The form of energy stored in chemical substances is called chemical energy.

Introduction

Life is hard without energy. We need energy to do any kind of work. We need light to see. Plants need sunlight for photosynthesis. Heat energy from the sun keeps the earth warm. Solar energy runs the water cycle. Wind energy runs a windmill. A motorcycle cannot move without petrol. Petrol and diesel are the sources of energy for vehicles. A computer cannot run without electricity. We eat food to get energy. We use this energy to walk, work, speak, think and run. If we are hungry, we feel weak.

Firewood is chief fuel in villages

windmill produces electricity

food is source of energy for us

fig: few sources of energy

Memory Tips

Object in motion has kinetic energy.

Fact with Reason

Why does a plant need sunlight?

The plant needs sunlight because it provides energy for photosynthesis.

Activity

Even though you do not do any physical activity, you get hungry after few hours. You will grow weaker. What may be the reason? Discuss with your teacher.

Sources of energy

People burn firewood to cook food. The sun gives us heat and light energy. Winds help boats to sail. Food is the source of energy for living things. The substances that give energy is called the source of energy. Flowing rivers, wind, sun, firewood and coal are natural sources of energy. Briquette, battery and hydroelectricity are artificial sources of energy. Walking, writing, speaking and sweeping uses a lesser amount of energy. Running, carrying loads,

climbing mountains and digging fields uses a greater amount of energy. We need to eat, rest and sleep to regain energy. Trucks, buses, cranes and crusher machines can do a huge amount of work. They need a large amount of energy. However, bicycles, motorcycles and tempos need less amount of energy than the truck.


sail boat sails into the wind


briquette


battery


electricity

Fig: few sources of energy

Activity

List some sources of energy used in your community.

Fact with Reason

Why should athletes eat more food?

Athletes should eat more food because their body needs more energy while playing physical games.

Types of energy

There are various types of energy. Heat energy, light energy, sound energy, electrical energy, magnetic energy, chemical energy, etc. They are discussed below.

Heat energy

Sunlight keeps us warm. Fire is used to cook food. We use electric heaters in winter to warm our room. Wet clothes dry when it is spread in sunlight. The form of energy that gives the sensation of warmth is called heat energy.

sun

burning woods

electric heater

fig: few sources of heat energy

Memory Tips

Heat energy can change the state of the matter.

Activity

What sources of heat energy are used in the city and in villages to cook food? Discuss with your guardian.

Light energy

Sunlight helps plants in photosynthesis. It helps us to see. It can be used to produce electricity with the help of solar panels. The form of energy that helps us to see is called light energy. The sun is the ultimate source of light energy on the earth. Both the sun and fireflies are natural sources of light. Torchlight, electric bulbs and candles are artificial sources of light.

solar panel

fireflies

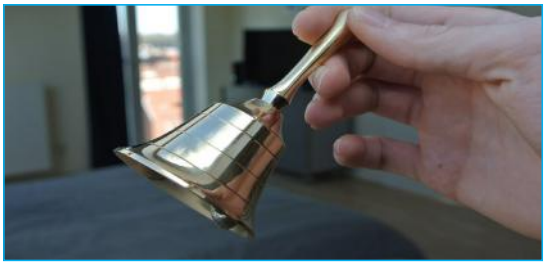
torch light

candle

fig: few sources of light energy

Sound energy

It is pleasant to listen to songs. Our friends can hear our sounds. Sound helps to communicate. It is used to request for help. The form of energy that gives the sensation of hearing is called sound energy. Loudspeakers, horns and bells are some sources of sound.



bell

horns

fig: few sources of sound energy

Fact with Reason

Why is the sun called the ultimate source of energy?

The sun is called the ultimate source of energy because it is the source of every other type of energy present on earth.

Electrical energy

Computers and mobiles run on electricity. Trolleybuses and electric trains consume electricity to work. It can be used for light bulbs and run electric heaters as well. The form of energy produced by the flow of electrons is called electrical energy. Lightning is a natural source of electricity. Generators and batteries are artificial sources of electricity.

generator

dynamo

fig: few sources of electricity

Magnetic energy

The doors of the fridge are locked by a magnet. Electric bells operate with help of the magnet. The magnetic compass shows the direction. The form of energy present in a magnet is called magnetic energy. Earth is a natural source of magnetic energy. A bar magnet is an artificial source of magnetic energy.

magnet pulls steel

Memory Tips

Food is a form of chemical energy.

Chemical energy

Chemical energy from food gives us the energy to live. Coal and petrol have chemical energy. It is used to run vehicles. The chemical energy of the battery produces electricity. The form of energy stored in chemical substances is called chemical energy. Food, medicine, firewood, petrol etc. are the source of chemical energy.

solar panel

medicine

firewood

petrol

fig: few sources of chemical energy

Fact with Reason

Why do we need to eat food?

We need to eat food to obtain energy for walking, working, speaking and studying.

GLOSSARY

Athletes: *people who take part in physical exercises and sports*

Answer writing skill

1. Define energy.

The ability to do work is called energy.

2. Which form of energy is present in a dry cell?

Chemical energy is present in a dry cell.

3. Why do we feel hungrier after physical work?

We feel hungrier after physical work because it uses energy.

4. Enlist uses of sound energy.

The uses of sound energy are listed below:

i. It helps us to communicate.

ii. Vehicles use horns.

iii. Siren is used by ambulance.

5. The sun is called the ultimate source of energy on the earth. Prove the statement.

The sun is called the ultimate source of energy on the earth because of the following reasons:

i. It gives us a very large amount of heat and light energy.

ii. It helps plants to make food which is source of energy for plants and animals.

iii. It runs the water cycle and creates the wind.

EXERCISE

Three Steps Exercise

Step 1

1. Fill in the blanks with an appropriate word.

heat	energy	sun	sound	chemical

a. We need ……to do work.

b. The ultimate source of energy is the …….

c. The energy that helps in hearing is termed …….. energy.

d. Food is a type of …… energy.

e. The form of energy that gives the sensation of warmth is termed ……. energy.

2. Write true for the correct and false for the incorrect statement.

a. Sunlight helps in photosynthesis.

b. Firewood is a natural source of energy.

c. Briquette is a natural source of energy.

d. Cow dung can be used as fuel.

e. An adult person needs more food than children.

3. Choose the best answer from the given alternatives.

a. What form of energy helps us to see?

Light	Heat	Electricity	Eye

b. What form of energy is present in food?

Light energy	Heat energy	Sound energy	Chemical energy

c. Which one is a natural source of energy?

Bulb	Briquette	Torch light	Firewood

d. Which one is an artificial source of energy?

Coal	Firewood	Briquette	Kerosene

e. What is mostly used to cook food in rural areas?

Electricity	Firewood	Kerosene	Briquette

4. Match the following.

Fan	uses petroleum
Torchlight	is called sound
Truck	ultimate source of energy
The sun	uses battery
Sense of hearing	runs by electricity

Step 2

5. Answer the following questions in one word.

a. What type of energy is present in rice?

b. What is used as fuel in the vehicle?

c. Give one example of a natural source of energy.

d. Which energy is produced by vibrating bodies?

e. Write a name of any one source of light.

6. Write any two differences between.

a. Heat and light

b. Chemical energy and sound energy

c. Electrical energy and magnetic energy

7. Give reason.

a. We feel tired after work.

b. The truck needs more fuel than the car.

c. Athletes need to eat more food.

d. The sun is called the ultimate source of energy.

8. Study the given diagram and answer the following questions.

i. What is shown in the diagram?

ii. Is it a natural source of energy or an artificial source of energy?

iii. What types of energy are obtained from this?

Step 3

9. Answer the following questions.

a. Define energy. List its types.

b. Discuss the importance of energy.

c. What do you mean by source of energy? Give examples.

d. Give three examples each of natural and artificial source of energy.

e. Write any four uses of light energy.

f. What is sound energy used for?

g. Firewood is used as source of heat in rural areas. How does it produce heat?

10. Project work.

Make a list of sources of energy present in your community.

UNIT
7.2

Electricity

Keyterms and terminologies

1. Electrical energy: The form of energy produced due to the flow of electrons is called electrical energy.
2. Source of electricity: The substance that produces electricity is called the source of electricity.
3. Electric cell: A device that produces electricity from the chemical is called an electric cell.
4. Battery: A group of cells is called a battery.
5. Solar panel: The device that changes solar energy into electricity is called a solar panel.
6. Generator: The device that produces electricity by the rotation of the turbine is called a generator.
7. Hydroelectricity: The electricity produced from the generator with the help of flowing water is called hydroelectricity.
8. Dynamo: The device that produces electricity by the rotation of the magnet is called a dynamo.

Introduction

An atom is the building block of matter. Atoms have electrons in them. When electrons flow in the conductor, electricity is produced. The form of energy produced due to the flow of electrons is called electrical energy.

Sources of electrical energy

The battery produces electricity. It runs torchlight. The mobile phone runs on electricity present in its battery. The generator produces electricity with the help of flowing water. The substances that produce electricity are called sources of electricity.

Generators, dynamos and batteries are artificial sources of electricity. Lightening during heavy rainfall is a natural source of electricity.

lightning

dry cell

generator

fig: some sources of electricity

Fact with Reason

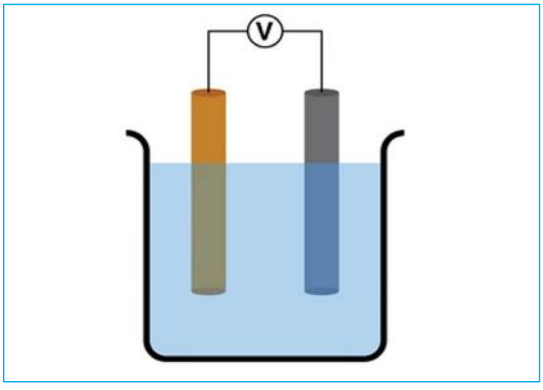
Why should we be very careful while using electric devices?

We should be very careful while using electric devices because we may suffer electric shock through them.

Battery

Chemical energy from the battery changes into electricity. A device that produces electricity from chemical is called an electric cell. A group of cells is called a battery. Radios, torchlight, T.V remote etc. run on dry cells. Similarly, laptops, mobile phones and electric cars have a rechargeable battery in them.

dry cell



simple cell

Memory Tips

The first battery was created by Alessandro Volta.

Fact with Reason

Why is a battery used widely in electrical devices?

The battery is used widely in electrical devices because it is portable and safe.

Activity

Find a dry cell and observe its structure. Observe the structure of a battery in your science laboratory.

Solar panel

Solar panel changes sunlight into electricity. Electricity is stored in the battery. The device that changes solar energy into electricity is called solar panel.

solar geyser

solar panel

Generator

The generator is a modern technology. It contains a turbine. Running water, wind, diesel, petrol, etc. can rotate the turbine. Whenever the turbine is rotated electricity is produced. It produces a large amount of electricity. The device that produces electricity by the rotation of the turbine is called a generator.

Memory Tips

Generators have powerful electric magnets in them.

Fact with Reason

Which source of electricity is best in Nepal and why?

Hydroelectricity is the best source of energy in Nepal because Nepal has lots of fast-flowing rivers.

Wind turbine

A wind turbine is used to produce electricity in a windy place. It is in use in Manang and Mustang of Nepal. The electricity produced from the generator with the help of flowing water is called hydroelectricity. It is produced in hydropower stations. Electric wires are used to supply electricity from hydropower stations to our homes.

Activity

How is electricity produced? Make a model to represent the process.

Wind energy

Hydroelectricity

Dynamo

Dynamo is similar to the generator. It produces a lesser amount of electricity. Its turbine

dynamo

is rotated by the wheel of the bicycle. The device that produces electricity by the rotation of the magnet is called a dynamo.

Memory Tips

Electricity travels as fast as light.

Activity

Find an electric motor. Fix a circular disc in its turbine. Install LED light in it. Rotate the disc as fast as possible. Does the LED bulb glow? Try rotating disc in opposite direction too. Think about what's happening in this experiment.

Uses of electricity

Coal, firewood and petrol produce smoke. Smoke pollutes the air. We must use electricity to save the environment. Electricity does not produce smoke. It runs a fan that keeps us cool in summer. We can store food in the refrigerator. The rice cooker changes electricity into heat. It is used to cook rice. Iron changes electricity into heat. We use it to iron clothes. The light bulb uses electricity to produce light. The flour mill, trolley bus and electric car get energy from electricity.

Fact with Reason

Why should we use electricity instead of coal?

We should use electricity instead of coal because it does not pollute air. Coal pollutes air.

Some uses of electricity are listed below:

i. To run means of communication such as radios, T.Vs, mobiles and computers.

radio

T.V

mobile

computer

ii. To run machines such as flour mills, blenders, fans and fridges.

flour mill

blender

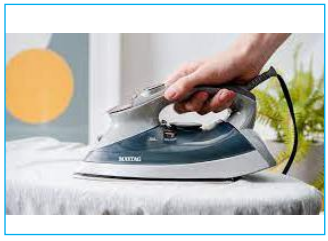
fan

fridge

iii. To run light bulbs, doorbells and irons.

light bulb

doorbell



iron

iv. To run vehicles such as trolleybuses and electric cars.

trolleybus

electric car

Memory Tips

ECG machine uses electricity to detect heart problems.

Activity

Electricity is used in our daily life. What is electricity used for in your house? Make a list and submit it to your teacher.

GLOSSARY

Dry cell: an electric cell used in remotes

Answer writing skill

1. What is electrical energy?

The form of energy produced due to the flow of electrons is called electrical energy.

2. Write the name of the device that changes chemical energy into electrical energy.

A battery is a device that changes chemical energy into electrical energy.

3. Electricity is better than petroleum. Give reason.

Electricity is better than petroleum because:

i. Electricity can run electronic devices but petroleum cannot.

ii. Electricity does not pollute the environment but petroleum does.

4. Differentiate between dynamo and generator.

The differences between dynamo and generator are:

SN	Dynamo	SN	Generator
1	Dynamo produces less amount of electricity.	1	The generator produces a greater amount of electricity.
2	It is small.	2	It is big.

5. How does a bulb glow when bicycle having a dynamo moves?

Dynamo is connected to the wheel of the bicycle. Whenever a bicycle moves, it rotates the magnet of the dynamo. Whenever the magnet of dynamo rotates, electricity is produced. Induced current glows the bulb.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

sunlight	rechargeable	generator	battery	electrons

a. Electricity is the form of energy produced by the flow of ...

b. Smartphones have..... battery.

c. Solar panel changes .....into electricity.

d. Hydroelectricity is produced by .....

e. A group of cells is called .....

2. Write true for the correct and false for the incorrect statement.

a. Hydroelectricity is the main source of energy in Nepal.

b. The dry cell produces hydroelectricity.

c. Electric cars run on petroleum.

d. Dynamo is used in bicycles.

e. Solar panel produces smoke and pollutes the air.

3. Choose the best answer from the given alternatives.

a. Which one is a source of electricity?

Light bulb	Radio	Dry cell	Laptop

b. Which device consumes electricity?

Dry cell	Solar panel	Simple cell	Mobile

c. What produces hydroelectricity?

Generator	Dry cell	Torchlight	Watermill

d. Which one runs on battery?

Fan	Headlight of car	Electric car	Solar panel

e. Which device uses dry cell?

Torchlight	Computer	Solar panel	Heater

4. Match the following.

Generator	dry cell
Torch light	blows air
Fan	rechargeable battery
Laptop	light into electricity
Solar panel	hydroelectricity

Step 2

5. Answer the following questions in one word.

a. Which device changes electricity into heat?

b. Which device changes electricity into light?

c. Which device uses electricity to produce sound?

d. Which source of energy produces smoke?

e. What is a group of cells called?

6. Write any two differences between.

i. Battery and generator

ii. Solar panel and dynamo

7. Give reason.

a. We should use electricity instead of petroleum.

b. We should be very careful while using electricity.

c. Electricity is the best source of energy for Nepal.

8. Study the given diagram and answer the following questions.

i. What is the source of energy required for this device?

ii. Does it run on a dry cell?

iii. Does this source of energy pollute the environment?

Step 3

9. Answer the following questions.

a. Define electrical energy.

b. What do you mean by source of electricity?

c. What is a battery?

d. Define solar panels.

e. What is a generator? How does it produce hydroelectricity?

f. Computers are powered by electricity. Write three other uses of electricity.

10. Project work.

Write the name and draw the diagrams of any ten devices that use electricity.

UNIT
7.3

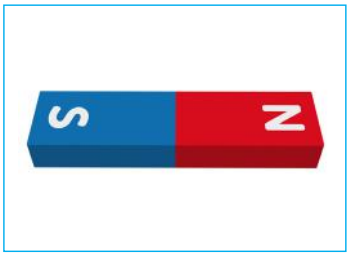
Magnetic and non-magnetic substances

Keyterms and terminologies

1. Magnet: An object that can create a magnetic field around it is called a magnet.
2. Magnetic field: The fixed region around the magnet from where it can attract magnetic substances is called a magnetic field.
3. Magnetic substances: The substances that are pulled by the magnet are called magnetic substances.
4. Non-magnetic substances: The substances that cannot be pulled by the magnet are called non-magnetic substances.
5. Magnetism: The properties of the magnet are called magnetism.
6. Loadstone: The black rock that can attract iron is called loadstone.
7. Natural magnets: The magnets that are formed naturally are called a natural magnets.
8. Artificial magnet: The magnet made in industries is called an artificial magnet.

Introduction

What is a magnet and how does it work? The magnet is an amazing object. It creates a magnetic field around it. It can pull an iron nail, within the magnetic field. The magnetic field cannot be seen by the human eyes. So, when an iron nail is pulled, it looks like magic. An object that can create a magnetic field around it is called a magnet. It can attract iron, nickel and cobalt towards it.



bar magnet

u-shaped magnet

circular magnet

fig: types of magnet

Memory Tips

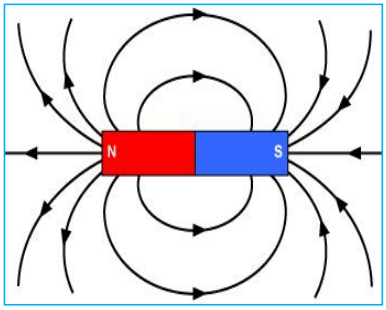
Earth itself is a huge magnet.

Discovery of magnet

loadstone

According to a Greek legend, a magnet was discovered by a shepherd called Megnes. He lived in a country called Magnesia. Megnes was grazing his sheep in the mountains. Suddenly he noticed that the iron of his stick and the nails of his shoes were pulled by black rock. That rock was called loadstone because it could attract iron. Loadstone is a natural magnet.

Magnetic field



magnetic field

The magnets that are formed naturally are called natural magnet. The bar magnet is artificial. A bar magnet is more powerful than a loadstone. The magnet made in industries is called an artificial magnet. A powerful magnet has a wide area of the magnetic field. It can pull a heavy iron nail from faraway. A weak magnet has a small area of the magnetic field. It cannot pull heavy iron nails from far away. Magnets are fun to play with. The fixed region around the magnet from where it can attract magnetic substances is called a magnetic field. A magnetic substance that is outside the magnetic field is not pulled by the magnet.

Memory Tips

Heating and breaking make a magnet weak.

Fact with Reason

Why is loadstone called a natural magnet?

The loadstone is called a natural magnet because it is a natural rock that can attract iron nails.

Activity

Make two or more groups in a class. Each group should bring a magnet and a safety pin. Put a safety pin far away from the magnet and see if it is pulled or not. Keep decreasing the distance between the magnet and the safety pin. Mark the place from where the pin is pulled. Measure the length between the magnet and pin and mark the point. Tell it to the class. Who got the most powerful magnet?

Magnetic substances and non-magnetic substances:

An iron nail, iron hammer and steel plate are pulled by a magnet. The substances that are pulled by the magnet are called magnetic substances. Iron, steel, nickel, and cobalt are a few magnetic substances.

fig: magnet attracts magnetic substances like iron, nickel, cobalt, etc.

A magnet cannot pull a plastic cup even if we put it on the magnet. The substances that cannot be pulled by the magnet are called non-magnetic substances. Wood, plastic, copper and rubber are a few non-magnetic substances.

non-magnetic substances

Memory Tips

Water is slightly pushed by the magnet.

Activity

Collect 10 small objects in a box. Check one by one if it is pulled by a magnet or not. Make a list of magnetic and non-magnetic substances found in your collection after the experiment.

Fact with Reason

Why does a magnet stick to a steel plate but not to a plastic plate?

A magnet sticks to a steel plate because it is a magnetic substance. A magnet does not stick to a plastic plate because it is a non-magnetic substance.

Magnetism

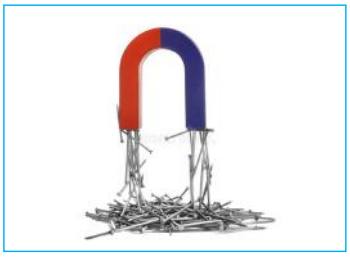
The properties of the magnet are called magnetism.

Some properties of the magnet are listed below:

i. It can pull magnetic substances toward it.

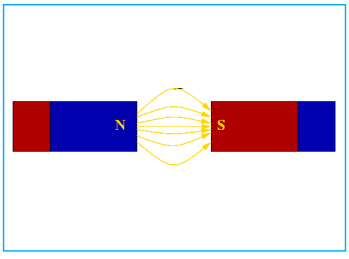
ii. It can show direction.

iii. It has poles in it.



magnet pulls iron nails

needle of compass rest in N-S direction



a magnet has north pole and south pole

fig: properties of magnet

Memory Tips

The middle part of the magnet cannot pull an iron nail.

Activity

Properly hold a magnetic compass. Take suggestions from your teacher. In which direction does your house lie? Tell your friends.

Fact with Reason

Why is a magnet used in a magnetic compass?

A magnet is used in a magnetic compass because it can show the direction.

Uses of magnet

Magnet is a very useful object. It is used in our everyday life.

Some of the uses of the magnet are listed below

i. It is used to lock the door of the fridge.
ii. It is used in a device called a compass.
iii. Fans, televisions and electric bells have a magnet in them.
iv. It is used to store needles, safety pins and iron nails.
v. It is used to separate iron nails and screws from grains.
vi. The magnet helps to identify metal rocks.

door locks of the fridge

Fan

electric bell

television

fig: Uses of magnet

Memory Tips

The North pole of one magnet pushes the north pole of another magnet.

Fact with Reason

Why are magnets used to lock the door of the fridge?

Magnets are used to lock the door of the fridge because of their ability to pull magnetic substances.

Activity

Take a magnet. Collect different types of objects present in your surrounding. Check whether these objects are attracted by the magnet or not.

Name of object	Response towards magnet

GLOSSARY

Loadstone: black rock that can attract iron

Magnetic compass: a device that shows the north side of the earth

Answer writing skill

1. **What is a magnet?**
   An object that can create a magnetic field around it is called a magnet.
2. **Define artificial magnet.**
   The magnet made by humans is called an artificial magnet.

3. Why a magnet cannot pull an iron nail from far away?

A magnet cannot pull an iron nail from far away because it can pull things present in its magnetic field only.

4. Enlist the properties of the magnet.

Some common properties of the magnet are listed below:

i. It can pull magnetic substances towards it.
ii. It can show direction.
iii. It has poles in it.

5. Describe the working mechanism of the magnetic compass.

A magnetic compass has a needle. The needle has a tiny bar magnet under it. A tiny bar magnet rest in North-South direction. It always shows north direction.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

magnetic	magnet	heating	non-magnetic	loadstone

a. The …… field cannot be seen by the human eye.
b. The natural magnet found in earth is called .....
c. A magnetic substance that is outside the magnetic field is not pulled by the……
d. The breaking and …….. makes a magnet weak.
e. The substances that cannot be pulled by the magnet are called……. substances.

2. Write true for the correct and false for the incorrect statement.

a. Wood, plastic, copper and rubber are magnetic substances.
b. The properties of the magnet are called magnetism.
c. Fans, blenders, and electric bells have magnets in them.

d. A weak magnet has a wide area of the magnetic field.

e. An iron nail and iron hammer are pulled by a magnet.

3. Choose the best answer from the given alternatives.

a. Which is a magnetic substance?

Plastic	Wood	Iron	Water

b. Which is a non-magnetic substance?

Iron	Wood	Nickel	Cobalt

c. Which poles are present in a magnet?

East and west	East and north	North and south	West and south

d. Which magnet is present in a compass?

Loadstone	Bar magnet	None	Both

e. What makes a magnet weak?

Hammering	Heating	Breaking	All of them

4. Match the following.

Magnetism	non-magnetic
Natural magnet	south pole
North pole attracts	shows direction
Magnetic compass	loadstone
Glass	property of a magnet

Step 2

5. Answer the following questions in one word.

a. What kind of magnet has a smaller magnetic field?

b. What kind of magnet has a wider magnetic field?

c. Which rock is called a natural magnet?

d. Give an example of a magnetic substance.

e. Which pole of a magnet is repelled by the north pole of another magnet?

6. Write any two differences between.

a. Artificial magnet and a natural magnet

b. Magnetic substance and non-magnetic substance

7. Give reason.

a. A magnet is used to separate metal from powdered rock.

b. A magnet is used to lock the door of the fridge.

c. A bar magnet is used in compass.

d. An iron nail is attracted by magnet but plastic cup is not.

8. Study the given diagram and answer the following questions.

i. What is shown in the diagram?

ii. Is nail a magnetic substance?

iii. Write the use of this object.

Step 3

9. Answer the following questions.

a. What is a magnet? What poles does a magnet have?

b. Define magnetism.

c. Write any three uses of a magnet.

d. What is a loadstone?

e. Define magnetic field.

f. What are magnetic substances? Give two examples.

g. Define non-magnetic substances with an example.

h. Artificial magnets are used in electronic devices rather than loadstone. Discuss the reasons.

10. Project work.

Bring a copper coin near the magnet. Is it pulled by the magnet? Try keeping a magnet over the coin? Does it attach with a magnet? What does it mean? Discuss in the group.

UNIT

8 EARTH AND SPACE

ESTIMATED TEACHING PERIODS	TH	PR
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Introduction

Earth is our home planet. The third planet from the sun where we live is called the earth. It revolves around the sun. We can live on earth because it has air, water and land on it. The earth has a land surface, air and water surface. Weather activities happen in the atmosphere. Oceans, lakes, rivers and springs are water bodies. We live on land. Earth has different types of plants and animals. The environment provides food, cloth and shelter for us. Storm, flood, earthquakes etc. are natural disasters. They are harmful to us. They destroy lives and properties.

earth and the space

weather activities

landscapes

Memory Tips

One million earth fit inside the sun.

UNIT
8.1

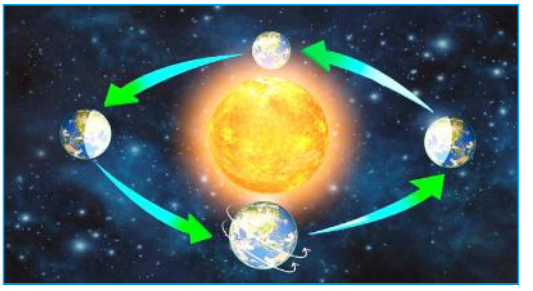
The Earth

Keyterms and terminologies

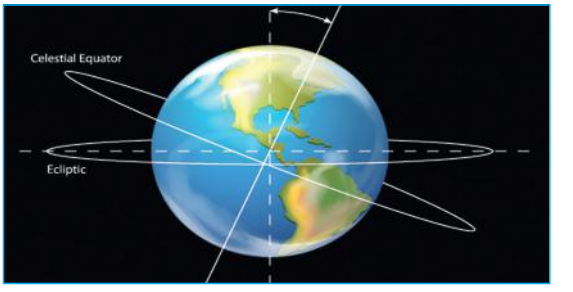
1. Earth: The third planet from the sun where we live is called the earth.
2. Plains: Plains are flatlands.
3. Hill: The raised land is called a hill.
4. Valley: The plain land surrounded by hills is called a valley.
5. Mountains: Highly raised land taller than hills are called mountains.
6. Plateau: A flatland at the top of a hill or mountain is called a plateau.
7. Globe: The globe is the spherical model of the earth.
8. Air: Air is a mixture of different gases.
9. Atmosphere: The layer of air around the earth is called the atmosphere.
10. Wind: The air in slow motion is called wind.
11. Monsoon: The wind that brings lots of rain is called the monsoon.

Introduction

The earth is the third planet from the sun. It revolves around the sun in 365 days. Earth rotates on its axis. Earth takes 24 hours to rotate once on its axis. The Axis of the earth is tilted. It is the cause of the change in seasons on the earth. Earth has one natural satellite called the moon.



revolution of the earth



rotation of earth in its axis

Memory Tips

Mercury, Venus, Earth and Mars are four planets in our solar system that have solid land in them.

Activity

Draw the diagram of the solar system. Also find the suitable diagram from the internet.

Earth is round in shape. It is flat at the north pole and the south pole. It is bulging at the equator. About 71% of the earth surface is covered by water. It has oceans, lakes, ponds and rivers. About 29% of the earth's surface is covered by land. The land is not same everywhere. There are plains, hills, valleys, plateaus and mountains. The fertility of the soil is different from place to place.

Fact with Reason

Why do different lands have different fertility?

The different lands have different fertility because:

i. They contain different amounts of minerals,
ii. Different types of soil and
iii. Different amounts of humus.

Plains

Plains are flatlands. They have fertile soil suitable for growing crops. Plains have lakes, rivers and underground water. Vast forests are also present in the plains. Terai is a plain land.

plain land

Fact with Reason

Why do crops grow well in plains and valleys?

Crops grow well in plains and valleys because they have fertile soil and enough water.

Hills

hills landscape

The raised land is called a hill. It is comparatively infertile than plain land. Nagarkot and Chandragiri are hills found in Nepal, just to name a few. The plain land surrounded by hills is called a valley. Soil is fertile in the valley. Kathmandu is a valley. Rivers, ponds and springs are found in hills and valleys.

Mountain

Highly raised land taller than a hill is called mountain. The land is dry and infertile on a mountain. Crops do not grow well in the mountain region of Nepal. Very few plants are found there. Snow, glacier lake, waterfall and rivers are water sources in the mountains. Mt. Annapurna and Mt. Kanchenjunga are some mountains of our country. Mt. Sagarmatha is the highest mountain on the surface of the earth. It is 8848 m tall. A flatland at the top of a hill or mountain is called a plateau. Plateaus are drier and less fertile than the plains. They have seasonal rivers, ponds and waterfalls.

mountain

plateau

Memory Tips

Earth is 4.5 billion years old.

Globe

A globe is used to show the landmass and water bodies present on the earth. The blue colour represents water bodies. The green colour represents low lands. The orange colour represents highlands. The globe is the spherical model of the earth.

globe

Activity

Make a model of the globe using paper.

Fact with Reason

Why is the globe slightly tilted?

Globe is slightly tilted to represent the tilting of the earth.

Atmosphere

atmosphere

There is air around the earth. Air is a mixture of different gases. Air contains oxygen gas. Oxygen is produced by plants. Nitrogen is the main part of the air. During the daytime water changes into vapour and mixes in the air. It cools down at night and changes into dew. Carbon dioxide from the volcano, forest fire and respiration mixes in the air. The layer of air around the earth is called the atmosphere. Air contains smoke, dust and germs too. Dirty air is harmful to health. The air in slow motion is called wind. It brings clouds. The wind that brings lots of rain is called monsoon. It makes the environment cooler.

Fact with Reason

Why is monsoon wind important?

The monsoon wind is important because it brings rain.

The advantages of the atmosphere are given below :

i. It produces wind energy.
ii. It gives oxygen to breathe.
iii. It blocks harmful rays of the sun.

Memory Tips

Atmosphere blocks meteors falling toward the earth.

Activity

Does the atmosphere contain water vapour and dust? How can you tell? Do you know how water vapour and dust mix in the air? Discuss in a group.

GLOSSARY

Axis: *imaginary line in which earth rotates*

Answer writing skill

1. Define hill.

A raised land is called a hill.

2. Why is it difficult to grow crops in the mountain region of Nepal?

It is difficult to grow crops in the mountains because the mountains have infertile and dry land.

3. Write the advantages of the atmosphere.

The advantages of the atmosphere are listed below:

i. It gives us oxygen to breathe.

ii. It gives carbon dioxide to the plant to make food.

ii. It brings us rain and protects from the harmful solar radiations.

4. Manang and Mustang are called the desert of Nepal. Discuss the reason.

Manang and Mustang are called the desert of Nepal because:

i. The land is dry.

ii. The land is infertile.

iii. It has very few water sources.

iv. Very few plants grow there.

5. Describe the landforms of Nepal.

Nepal is divided into the Terai region, hilly region and mountain region.

Terai region is plain. It has fertile land. Lakes, rivers and ponds are found here. It is covered with forests.

The Hilly region has raised lands and valleys. Land in valleys is fertile. Hills are less fertile than the Terai. It is covered with forests. We can find rivers, ponds and underground water in hilly region.

The Mountain region is taller than the hills. It is cold and dry. The land is infertile. Very few plants grow in the mountains. Snow, glacier, springs are some water sources found in the mountains.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

hill	atmosphere	deserts	water	globe

a. The spherical model of the earth is called ……

b. 71% of the earth's surface is covered with .....

c. The raised part of the land is called…….

d. The driest and infertile lands of earth are called .....

e. The layer of air around the earth is called……...

2. Write true for the correct and false for the incorrect statement.

a. Earth is flat.

b. A valley is a flat land surrounded by hills.

c. Water in the river does not flow.

d. Terai is an infertile land.

e. Air contains dust and germs.

3. Answer the following questions in one word.

a. What type of land is Terai?

b. What does air contain?

c. Which land does not have water resources?

d. How tall is Mount Sagarmatha?

e. What is the shape of the earth?

4. Match the following.

Layer of air around the earth	water body
Axis	atmosphere
Blue colour in globe	plain land
Mountain	imaginary line in which earth rotates
Terai	a highly raised land

Step 2

5. Answer the following questions in one word.

a. Which land is raised from the ground?

b. What are snow-capped raised lands called?

c. How much of the earth's surface is covered by land?

d. What type of land is most fertile?

e. What is a flat land surrounded by hills called?

6. Write any two differences between.

a. Hills and mountains

b. Hydrosphere and lithosphere

c. Valley and plateau.

7. Give reason.

a. Desert is infertile but the valley is fertile.

b. We are able to survive on the earth.

c. Terai have a vast green forest than the mountain region of Nepal.

d. It is difficult to grow crops in the mountain region.

8. Study the given diagram and answer the following questions.

i. What is shown in the diagram?

ii. What does the blue part indicate?

iii. What does the green colour represent?

Step 3

9. Answer the following questions

a. What is a hill?

b. Define a mountain.

c. What kind of lands are infertile?

d. What is a globe?

e. Enlist the advantages of the atmosphere.

f. Discuss types of landforms present in Nepal.

10. Project work.

Make a model of a globe to show various landforms and water bodies.

UNIT
8.2

Weather

Keyterms and terminologies

1. Weather: The hour-to-hour condition of the atmosphere of a place is called weather.
2. Sunny day: The weather with a lot of sunshine is called a sunny day.
3. Rainy day: The weather with rainfall is called a rainy day.
4. Windy day: The weather with wind is called windy day.
5. Snowy day: The weather with snowfall is called a snowy day.
6. Cloudy day: The weather with clouds all over the sky is called cloudy day.
7. Weather forecasting: The way of predicting things like clouds, rainfall, sunshine and wind speed is called weather forecasting.
8. Cloud: A cloud is a large collection of tiny droplets of water.
9. Stratus cloud: A stratus cloud is a cloud that covers the entire sky.
10. Nimbostratus: A rain-bearing stratus cloud is called nimbostratus.
11. Cumulus cloud: A cumulus cloud is a cloud that is white and puffy like cotton.
12. Cumulonimbus cloud: The rain-bearing cumulus cloud is called the cumulonimbus cloud.
13. Cirrus cloud: A cirrus cloud is a cloud that is found in a very high place from the earth.
14. Nimbus cloud: Nimbus is a cloud that brings rain.

Introduction

Sunshine, rain, storm, wind and clouds affect the weather. If the sky is clear, it will be a sunny day. A cloudy day brings rain. Storms make a day cold. Snowfall happens in the winter season. Days in autumn are warm and pleasant. Frost covers the land in winter. Such events happen in the atmosphere. These events do not occur

full day. They change within a few hours. It may be raining in the morning, sunny at noon and cloudy in the evening. The hour-to-hour condition of the atmosphere of a place is called weather. The weather in different places can be different. It may be raining heavily at our school but sunny day at our house. Weather is affected by sunlight, water vapour, cloud, wind and seasons.

Memory Tips

Sometimes it gets so cold that the entire river freezes.

Activity

Observe the weather activities of this month. Which season is it? What types of weather do you notice? What types of weather are found in other seasons?

Season	Common weather
Autumn	
Winter	
Spring	
Summer	

Fact with Reason

Why does weather keep changing?

Weather keeps changing mostly because of sunshine and wind.

Types of weather

There are five types of weather: sunny, cloudy, windy, snowy, and rainy.

Sunny day

The weather with a lot of sunshine is called a sunny day. The sky is clear. The day is warm. It may be a very hot day as well.

sunny day

people eating ice cream in a sunny day

Rainy day

The weather with rainfall is called a rainy day. We should use a raincoat and umbrella on rainy days.

rainy day

using an umbrella in the rain

Windy day

It is mostly windy in the spring season. The weather with wind is called windy day. Storms break trees and electric poles. We should be very careful because sometimes storms kill people.

storm breaks trees

storm breaking electric poles

Snowy day

Days are cold in winter. We should wear warm clothes on a cold day or we will catch cold. Drinking warm tea and soup keeps us warm. Snowfall makes days even colder. The weather with snowfall is called snowy day.

people wear warm clothes in a cold day

snowy day

Memory Tips

Cyclones that come from the sea can rain fish.

Activity

When there is snowfall in your area or when you visit somewhere to play with snow make a snowman. Click a photo and show it to your friends and family.

Cloudy day

If there are clouds in the sky, it is a cloudy day. It may be warm or cold according to the types of clouds. The weather with clouds all over the sky is called cloudy day.

Cloudy day

Fact with Reason

Why is it warm if the sky is full of low clouds?

It is warm if the sky is full of low clouds because it acts as a blanket. It traps heat.

Weather forecasting

weather forecasting

Can we tell what kind of day it will be today? Will it be cold or hot? Will it rain or not? Can we predict these things? Yes! These events can be predicted. Weather stations collect information about water vapour, sunshine, season, wind and temperature. Weather scientists will study that information and forecast weather. The way of predicting things like clouds, rainfall, sunshine and wind speed is called weather forecasting. Nowadays modern technology is used to forecast weather. Weather forecasting is broadcast through radio and television. You can find it in the newspaper too. Weather forecasting applications are easily available on smart phones and computers.

Importance of weather forecasting

i. It helps us to decide whether we should carry an umbrella or not.
ii. We can plan our events such as picnics according to the weather forecast.
iii. Farmers will know about rainfall.
iv. People can avoid natural disasters such as storms, lightning and heavy rainfall.

Memory Tips

Clouds are not weightless.

Activity

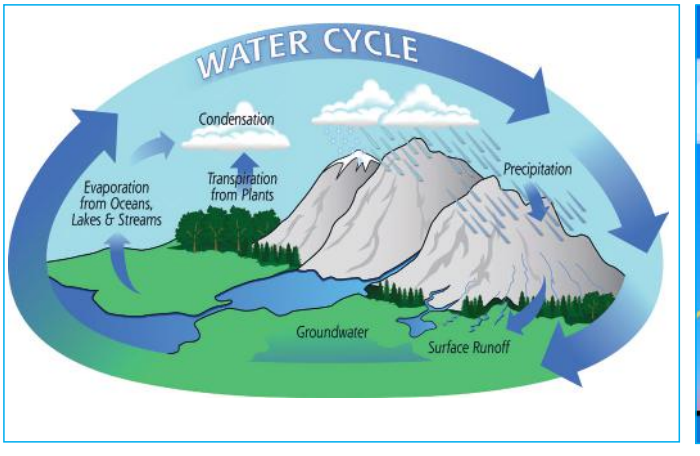
Collect information about tomorrow's weather from any source. Will it rain tomorrow? How will you prepare for tomorrow?

Clouds and weather

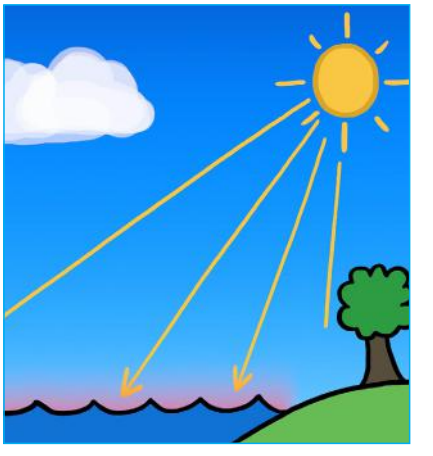
Clouds are easily seen in the sky. A cloud is a large collection of tiny droplets of water. It floats in the air. Solar heat changes water into the vapour. Vapour rises into the sky. When it is cold vapour will condense into tiny drops of water. When billions of these tiny drops of water come together, it forms a cloud. Clouds are usually white. When lots of clouds combine, it becomes dark and heavy. Dark and heavy clouds bring rain.

Types of cloud

There are many types of clouds. Some of the common types are stratus, cumulus, cirrus and nimbus.



water cycle



formation of cloud

Stratus cloud

A stratus cloud is a cloud that covers the entire sky. The day will be cloudy and warm. This cloud looks like a fog. When lots of stratus cloud is collected in a place, it becomes grey. It will start to snow or rain gently. The rain-bearing stratus cloud is called nimbostratus.

stratus cloud

nimbostratus

Cumulus cloud

A cumulus cloud is a cloud that is white and puffy like cotton. The day will be warm and sunny. Sometimes many cumulus clouds combine into a huge dark thunderstorm cloud. It brings heavy rain. The rain-bearing cumulus cloud is called the cumulonimbus cloud.

cumulus cloud

cumulonimbus

Memory Tips

Clouds are white because they reflect light from the sun. Clouds become dark when they stop reflecting light.

Activity

Look at the sky. Do you find a cloud? What type of cloud is it? Discuss in a group.

Cirrus cloud

A cirrus cloud is a cloud that is found in a very high place from the earth. The day will be warm and sunny but will change after few hours. They are made of ice.

cirrus cloud

Nimbus cloud

Nimbus is a cloud that brings rain. It is dark and rains heavily with thunderstorms. Stratus cloud and cumulus cloud will change into nimbus cloud.

Nimbus cloud brings heavy rainfall

Fact with Reason

Why is the nimbus cloud important?

Nimbus cloud is important because it brings water for agriculture.

GLOSSARY

Thunderstorm: lightning and loud sounds

Answer writing skill

1. Define weather.

The hour-to-hour condition of the atmosphere of a place is called weather.

2. What is the advantage of weather forecasting?

The advantage of weather forecasting is it helps us to plan our day.

3. What are the activities that people do on a sunny day?

People do various activities on a sunny day:

i. Wear light cotton clothes.

ii. Use fan and air conditioner.

iii. Eat cold drinks and ice cream.

4. Why should we be very careful on a cold day?

We should be very careful on a cold day because we might catch cold.

5. If we see cirrus clouds in the sky, what kind of weather should we expect?

Cirrus is very high clouds made of ice. If we see it in the sky we can expect fine weather for now but it will change after few hours.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

weather	nimbus	stratus	cloud	snowy

a. We should wear warm clothes on……. day.

b. The cloud that brings rain is called …….

c. The changing atmospheric condition is called .....

d. The cloud that spreads all over the sky is called .....

e. Billions of tiny droplets of water make the .....

2. Write true for the correct and false for the incorrect statement.

a. Cirrus clouds bring rainfall.

b. Stratus clouds in the sky suggest fair weather.

c. The Rainy day is warm and sunny.

d. We should be very careful on a stormy day.

e. Cloud is weightless.

3. Choose the best answer from the given alternatives.

a. Which clothing is better to wear on a warm day?

Cotton shirt	Woollen sweater	Jacket	Gloves

b. Which food is better to eat on a cold day?

Tea	Coffee	Soup	All of them

c. Which cloud does not bring rain?

Cirrus	Cumulus	Stratus	Nimbus

d. Which cloud is shown in the picture?

Cirrus	Nimbus	Cumulus	Stratus

e. What does not affect weather?

Wind	Cloud	Sunshine	Lightning

4. Match the following.

Nimbus	weather forecasting
Cumulus	cold day
Cirrus	rain and thunder
Snowy day	high clouds
Prediction of the weather	fair weather

Step 2

5. Answer the following questions in one word.

a. What is a warm and shiny day called?

b. What is the atmospheric condition of a particular place at a particular time called?

c. What is a rain-bearing stratus cloud called?

d. What is a rain-bearing cumulus cloud called?

e. In which weather, we should be very careful?

6. Write any two differences between.

a. Stratus cloud and cumulus cloud

b. Cirrus cloud and nimbus cloud

c. Sunny day and snowy day

7. Give reason.

a. We should wear warm clothes on a cold day.

b. The weather keeps changing.

c. A cloudy day is warm.

d. A cumulus cloud is white but nimbus is dark.

8. Study the given diagram and answer the following questions.

i. What type of cloud is shown in the diagram?

ii. What is it made up of?

iii. What kind of weather does it suggest?

Step 3

9. Answer the following questions.

a. Define weather. What factors affect weather?

b. What kind of activities do people do on a sunny day?

c. What kind of activities do people do on a snowy day?

d. Define clouds. How is it formed?

e. How do you go to school on a rainy day?

f. It rains a lot in summer. The clouds bring rains. How do clouds bring rain? Discuss.

10. Project work.

Make a model to show different types of clouds.

UNIT
8.3 Natural Disaster

Keyterms and terminologies

1. Natural disaster: The damage done by natural activities is called a natural disaster.
2. Flood: The overflow of water from the river is called a flood.
3. Landslide: The falling of a large area of soil and rock from a slope is called a landslide.
4. Storm: A very strong wind is called a storm.
5. Earthquake: The shaking of the land is called an earthquake.
6. Fire disaster: The damage done by rapidly burning huge fire is called a fire disaster.

Introduction

We live in the environment. There are various natural events in the environment. Rainfall, wind, flowing river etc. are natural activities. Sometimes these natural activities are harmful to us. Storm, heavy rainfall and lightning can destroy life and property. Drought, erosion and flood will harm crops. Earthquakes, volcanoes and tsunamis can kill thousands of people. The damage done by natural activities is called a natural disaster. Forest fires, tornadoes and sandstorms are some natural disasters.

Memory Tips

A tsunami is a flood that comes from the ocean. It starts because of the earthquake. It is violent.

sunshine

rainfall

wind

lightning

volcano

earthquake

fig: Some natural activities

Flood

Flood kills people every year. It usually occurs in the monsoon. If there is heavy rainfall for a few days, there will be more water in the river. Sometimes water overflows from the river into the fields and villages. The overflow of water from the river is called a flood.

flood disaster

Causes of the flood

i. Heavy rainfall in monsoon.
ii. Breaking of the dam of hydropower station.
iii. Bursting of lakes.
iv. City made of concrete that cannot absorb water.
v. Deforestation
vi. Melting of snow from the mountain

Fact with Reason

Why do concrete cities cause floods?

Concrete cities cause floods because they cannot absorb water into the soil. Water will directly flow into the river.

deforestation

Heavy rainfall

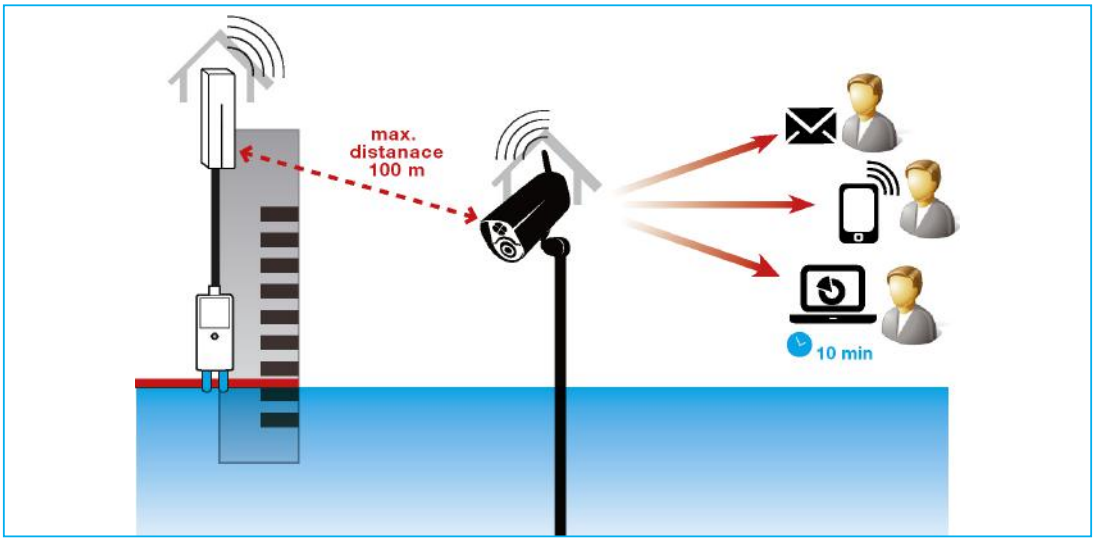
fig: causes of flood

Harmful effects of flood

i. Flood kills people.
ii. It kills domestic animals.
iii. It destroys crops.
iv. It carries away fertile soil.
v. It makes water dirty and spreads diseases.

Preventive measure of the flood

i. Planting trees in barren land and riverside reduces flood.
ii. Embankment on the riverside.
iii. Repair old dams of hydropower stations.
iv. Flood detectors can be used to inform people about the flood.
v. Satellite helps to observe floods and inform people in time. The government uses television and radio to inform people about the flood.



flood detection system

Memory Tips

Flood killed 64 people in Nepal in 2019. It kills people every year.

Activity

Use locally available materials and make a model of a flood detector.

Landslide

Landslide is common in the hilly region of Nepal. It occurs usually during the monsoon. Heavy rainfall makes landmass weak. The falling of a large area of soil and rock from a slope is called a landslide.

landslide destroying the village, blocking the road

Causes of landslide

i. Deforestation, heavy rainfall during the monsoon.
ii. No terrace farming on hills
iii. Construction of roads on weak hills

Effects of the landslide

i. It covers agricultural land and pollutes water.
ii. It kills people and blocks roads.
iii. It destroys houses.

Preventive measure of landslide:

i. Planting trees on barren land and gullies.
ii. Embankment on weak slopes.
iii. Terrace farming.

Fact with Reason

Why should we practice terrace farming?

We should practice terrace farming because it prevents landslides. It controls the speed of water. Water will be absorbed by the soil. It prevents soil erosion and landslide.

Memory Tips

243 people were killed by a landslide in 2020. People die every year from the landslide.

afforestation

terrace farming on hills

retaining walls

fig: preventive measures of landslides

Activity

What kind of structures or activities are used to prevent the landslide in your community? Try to make a model of that structure.

Wind and storm

Winds and storms destroy crops and houses every year in the Terai region of Nepal. A very strong wind is called a storm.

Causes of the storm

Unequal heating of air in a different part of the earth.

Effects of the storm

i. Destroys life and property.
ii. Destroys crops.
iii. Breaks trees and poles.

Safety measures from the storm

i. Make strong houses.
ii. Close doors and windows.
iii. Do not go outside in the storm.

Memory Tips

Storms killed 2 people in Terai in 2021.

Fact with Reason

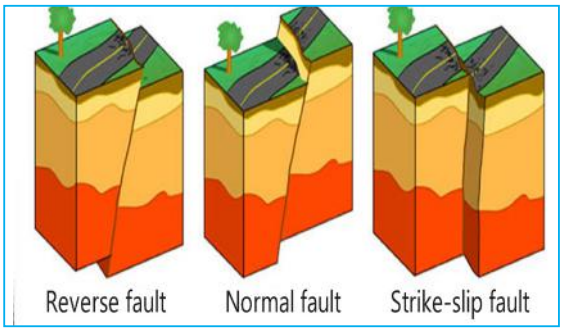
Why should we not go out in the storm?

We should not go out in the storm because it may injure or kill us.

Earthquake

Earth is not a single round rock. It is made up of few huge rocks called tectonic plates. Sometimes these tectonic plates slip at fault. The

vibrations will be passed into the lands and land will shake. The shaking of the land is called an earthquake. Earthquake is measured by seismograph. It records the shaking of the earth in a graph. The magnitude of the earthquake is expressed on the Richter scale. Some of the earthquakes are so weak that they cannot be felt. However, the earthquake of higher Richter scales is violent.



tectonic plates and fault

Harmful effects of an earthquake

i. It destroys our houses.
ii. It causes road accidents.
iii. It may start a landslide.
iv. It may break dams and cause floods.
v. It destroys historical buildings.
vi. Collapsing buildings and walls can kill people.


earthquake-ravaged cities


earthquake-ravaged villages

Safety measures against the earthquake

Earthquakes can be dangerous. We can minimize the effects of the earthquake by following ways:

Safety measures before the earthquake

i. Make earthquake-proof buildings.

ii. Keep an emergency survival kit in the room. It contains food and water for 3 days. It also contains a first aid box, whistle, flashlight and power bank.

iii. Remember the phone number of ambulances, fire brigades and police.

iv. Keep heavy furniture on the ground floor.

v. Do not keep glass pots on the top of the cupboard.

Fact with Reason

Why should we keep an emergency survival kit?

We should keep an emergency survival kit because it helps us to survive during a natural disaster.

Activity

Browse the internet and search for the information on the earthquake in 2072. What can we do to be safe from such disasters? Discuss in a group.

Safety measures during the earthquake

i. We should not panic.

ii. We should stop driving.

iii. If we are in a classroom we should hide under a strong iron table.

iv. We should protect our head at any cost.

v. We should be very careful because falling glasses, flower vase or wall can hit us.

vi. If we are in top floors of a very tall building, we should go to the roof.

hide under strong table during earthquake

stay in open ground during earthquake

Safety measures after the earthquake

i. Call for help and use first aid.

ii. Find an emergency survival kit.

iii. Go to a safe place.

Memory Tips

A magnitude 7.8 earthquake killed around 9000 people in 2015 in Nepal

Fire

Fire is a very dangerous disaster. We lose a vast amount of forest to fires every year. The damage done by rapidly burning huge fire is called a fire disaster. Fire can start anywhere. It may be at school, in our homes, on buses or in cinema halls.

house on fire

Some of the harmful effects of fire are listed below:

i. It destroys forests and kills people and wild animals.

ii. It burns our houses, schools and furniture.

iii. It produces smoke and pollutes air.

Fact with Reason

Why should we never play with burning candles?

We should never play with the burning candle because it may start a fire in the house.

Causes of fire

i. Volcanoes and lightning.
ii. Smoking in the bedroom.
iii. Electric short circuits.
iv. Using candles, gas stoves and match sticks carelessly.
v. Curious children playing with fire

Preventive measures against fire

i. Keep match sticks, lighter and kerosene far away from children.
ii. Use sources of fire properly.
iii. Do not smoke in bedrooms and forests.
iv. Use a smoke sensor in the room.
v. Put a fire extinguisher in the home.

Safety measures during the fire

i. Go outside of the house if possible.
ii. Dial 101 and call fire-fighters immediately.
iii. Call for an ambulance.
iv. Use water or sand to put out the fire.
v. If a person is on fire, wrap them with a blanket, use water etc.

Memory Tips

Continuous drought for three months started forest fires all over Nepal in 2021. The fire lasted for more than a month.

GLOSSARY

Sandstorm **:** *a very strong wind that brings clouds of sand*

Barren land: *dry land without plants*

Answer writing skill

1. What is a natural disaster?

The damage done by natural activities is called a natural disaster.

2. What is a fire disaster?

The damage done by rapidly burning huge fire is called a fire disaster.

3. Overgrazing causes a landslide. Explain.

Sheep, goats, cows and yak graze upon the grass. They uproot and eat plants. Their pointy hoof breaks the soil. As a result, a landslide occurs on the slope during heavy rainfall.

4. Differentiate between floods and landslides.

The differences between floods and landslides are:

SN	Flood	SN	Landslide
1	The overflow of water from the river is called a flood.	1	The falling of a large area of soil and rock from a slope is called a landslide.
2	Floods are common in the plains.	2	Landslides are common in the hills.

5. Floods and landslides are common in Nepal. Nepal government has launched various programs to control the disasters. As a member of community what can we do to

prevent floods and landslides from our side?

As a member of community we should do the following things to prevent floods and landslides:

i. Plant trees on barren hills.

ii. Plant trees on river banks.

iii. Do not throw plastic in drainage and river.

EXERCISE

Step 1

1. Fill in the blanks with an appropriate word.

road	shaking	wild animals	storm	flood

a. Overflow of the water from the river is called…….

b. A very strong wind is called …….

c. Landslide blocks……and disturbs transportation.

d. The ……of the land is called an earthquake.

e. Forest fire kills plants and……

2. Write true for the correct and false for the incorrect statement.

a. Rainfall is a natural disaster.

b. Heavy rainfall for few days may cause flooding.

c. If earthquakes start when you are on open ground, you should go inside the house and hide under a strong table.

d. When your house is on fire, you should open doors with tools.

e. You should dial 101 in case of fire disasters.

3. Choose the best answer from the given alternatives.

a. Which one is a regular natural event?

Flowing river	Earth quake	Flood	Lightning

b. Which one is a natural disaster?

Rainfall	Lightning	Wind	Landslide

c. What is a storm?

Air	Wind	Breeze	Very strong wind

d. What is present in an emergency survival kit?

First aid kits	Food and water	Flashlight and power bank	All of them

e. What is the contact number of fire-fighters in Nepal?

101	24	86400	100

4. Match the following.

Damage done by nature	earthquake
Overflow of water from river	natural disaster
Shaking of land	put out fire
Sandstorm	storm that brings sand
Fire-fighter	flood

Step 2

5. Answer the following questions in one word.

a. What is the term used for the falling of land from a slope?

b. What is the term used for the shaking of land?

c. What number should we dial in case of a fire disaster?

d. What disaster may occur if we play with fire?

e. Which device measures the magnitude of the earthquake?

6. Write any two differences between.

a. Flood and earthquake

b. Rain and storm

7. Give reason.

a. Nepal suffers a lot from the landslide.

b. We should grow plants on barren lands.

c. We should not go out in the storm.

d. We should practise terrace farming on hills.

e. The fire is called a good servant but a bad master.

8. Study the given diagram and answer the following questions.

i. Which natural disaster is shown in the diagram? Define it.

ii. What might have caused this disaster?

iii. What effects of the disaster are seen in the picture? Do you know any other effects of this disaster? Make a list.

iv. How can we prevent such disasters?

Step 3

9. Answer the following questions.

a. What is a natural disaster? Give an example.

b. How can the government help people to be safe from the flood?

c. Define landslide.

d. Write any two causes, two effects and two preventive measures of landslide.

e. What is a storm?

f. Define earthquake.

g. Earthquake destroys lots of infrastructures and kills people each year. Enlist the precaution to be safe from the earthquake.

h. Lets suppose an earthquake hit during the class. What should we do at that moment and after the earthquake passes away.

i. Write any two causes and preventive measures of fire.

10. Project work.

Work in a group to make an emergency survival kit.