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PARVEEN ARIF ALI

Teaching Guide

Revised Edition

Amazing Science

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Contents

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Introduction

Children want to know things. Early guidance and varied experiences do much to stimulate the development of their natural intelligence.

A teacher can play a very important role in arousing the interest of students by allowing them to discuss facts and ideas and helping them to draw conclusions from them as to why and how things happen.

The teacher can stimulate the thinking process of students by asking questions and by encouraging them to ask questions.

Experimental work enables students to test for themselves the facts that have been learnt by them, thereby making it easier for them to understand the implications of the background to their activities.

This course has been developed to provide information about the world around on which students can base their opinion, verify information, come to conclusions, and use the knowledge thus gained in their everyday life. It will help in maintaining the curiosity and enthusiasm of students who have just started studying science. Concepts developed at this stage will be of use in their studies at an advanced level later. It will help them to develop a better outlook on life.

About the Pupil's Book:

This science series, now completely revised, has been written especially for children at the primary level. It provides information at a child's level of understanding and has a direct appeal for children who need interesting and easy to read material. Keeping in view the interests, abilities, curiosities, and needs of children, it provides stimulating learning experiences and offers enjoyable educational motivation, thus serving as a building block for further learning.

The keyword in science is curiosity. The material in the series is designed to awaken in a child the same urge that motivates in a scientist the desire to know the answer to a question. There is a wide range of topics that will interest and motivate the child.

Teachers will recognize that this series deals with those broad areas about which most children frequently express curiosity; that it provides answers to many questions they ask, and offers new and exciting information in many fields. It aims to create an awareness, as well as stimulate an interest in science.

The language is simple and easy to read and within the range of the abilities of students of each grade. Together, the text and illustrations motivate children to discuss, question, and explore.

The contents have been selected and presented in such a way as to capture and hold the interest of the students. The objective is to simplify complex ideas and present them in an interesting way. Every effort has been made to keep the language simple.

When it is necessary to use a specialized word, it has been used. When it is not self-explanatory within the context, it has been defined. Clear and well-labelled illustrations have been included, which help to identify and clarify the topics dealt with.

Good pictures and diagrams arouse and develop interest. These make lasting impressions. They help to make the text clear. They also appeal to the child's imagination, while satisfying his curiosity and often provoke a favourable reaction.

Simple practicals—interesting and stimulating presentation of factual materials—offer every chance of successful learning experiences. Knowledge of problem-solving techniques so acquired can be applied in everyday life.

It is intended, through this series, to introduce children to many of the interesting and enjoyable things in science they can learn about and do for themselves. The series also intends to develop in them a quest for knowledge and an understanding of how science is shaping the world in which they live.

The role of the teacher:

It is up to the teacher to devise ways and means of reaching out to the students, so that they have a thorough knowledge of the subject without getting bored.

The teacher must use his/her own discretion in teaching a topic in a way that he/she feels appropriate depending on the intelligence level as well as the academic standard of the class.

To the teacher:

With your assurance and guidance the child can sharpen his/her skills. Encourage the child to share his/her experiences. Try to relate pictures to real things. Do not rush the reading. Allow time to respond to questions and to discuss pictures or particular passages. It will enhance learning opportunities and will enable the child to interpret and explain things in his/her own way.

Method of teaching:

The following method can be employed in order to make the lesson interesting as well as informative.

The basic steps in teaching any science subject are:

(i) locating the problem
(ii) finding a solution by observation and experimentation
(iii) evaluating the results
(iv) making a hypothesis and trying to explain it

Preparation by the teacher:

Be well-prepared before coming to the class.

(i) Read the text.
(ii) Prepare a chart if necessary.
(iii) Practise diagrams which have to be drawn on the board.
(iv) Collect all material relevant to the topic.
(v) Prepare short questions.
(vi) Prepare homework, tests, and assignments.
(vii) Prepare a practical demonstration.

The following may also be arranged from time to time.

(i) Field trips
(ii) Visits to the laboratory
(iii) A show of slides or films
(iv) Plan projects

The usual strategy which is easy as well as effective can be adopted:

(i) Before starting a lesson, make a quick assessment of the previous knowledge of the students by asking them questions pertaining to the topic. Relate them to everyday observation of their surroundings or from things that they have seen or read about in books, magazines, or newspapers.

(ii) Explain the lesson.
(iii) Write difficult words and scientific terms on the board.
(iv) Ask students to repeat them.
(v) Help students to read text.
(vi) Show materials, models, or charts.
(vii) Make diagrams on the board.
(viii) Perform an experiment if necessary.
(ix) Ask students to draw diagrams in their science manuals.
(x) Students should tackle objective questions independently.
(xi) Ask questions from the exercises.
(xii) Answers to questions to be written for homework
(xiii) The lesson should be concluded with a review of the ideas and concepts that have been developed or with the work that has been accomplished or discussed.

Conclusion:

The teacher can continue the learning process by not only encouraging and advising the students, but also by critically evaluating their work.

It is not necessary that the lesson begins with a reading of the textbook. The lesson can begin with an interesting incident or a piece of information that will hold the interest of the students and they will want to know more about the topic.

The topic should then be explained thoroughly and to check whether the students are following or not, short questions should be asked every now and then.

Sketches and diagrams on the board are an important aspect to the teaching of science, but too much time should not be spent on them as the students lose interest. An alternative to board drawing is a ready-made chart or one made by the teacher can be displayed in the class. The use of visual material keeps students interested as well as helps to make mental pictures which are learnt quickly and can be recalled instantly. Pupils should be encouraged to draw and can be helped by the teacher. Diagrams that are not in the text should either be copied from the board or chart, or photocopies can be made and distributed in the class.

Simple experiments can be performed in the class. If possible, children may be taken to the laboratory occasionally and be shown specimens of plants and animals, chemicals and solutions, and science apparatus, etc.

Practical work arouses interest in science. Class activities can be organized in such a way that the whole class participates either in groups or individually, depending on the type of work to be done or the amount of material available.

It is hoped that the above guidelines will enable teachers to teach science more effectively, and develop in their students an interest in the subject which can be maintained throughout their academic years, and possibly in their lives as a whole.

These guidelines can only supplement and support the professional judgement of the teacher but in no way can they serve as a substitute for it.

Living things

Teaching objectives:

To define living things
To explain that living things can grow
To explain that living things eat food
To explain that living things need air
To explain that living things can move
To explain that living things reproduce

Teaching strategy:

Put some seeds, leaves, flowers, stones, feathers, nails, bottle caps, coins, pencils, rubber bands, pins, etc. on the table. Ask children to sort them into things that are alive, and not alive. Draw a butterfly and a chair on the board. Ask: Which one of these is alive? Why is it a living thing? Explain the characteristics of living things.

Ask: Is a plant a living thing? Explain the characteristics of plants as living things. Ask the names of animal babies. Explain that animal babies grow. Explain that a seed grows to make a plant.

Ask: What do you eat? Why do you eat food? Explain that food gives you energy to work and play. It helps you to grow. Ask: What does a cow eat? Explain herbivores with examples. Ask: What does a lion eat? Explain carnivores with examples. Ask: What does a hen eat? Explain omnivores with examples.

Ask: Do plants eat food? Explain photosynthesis in green plants. Ask: Have you seen a yellow plant? Show the students a cuscuta stem. Explain the parasitic mode of nutrition in non-green plants.

Ask: What does a frog eat? Explain that insectivorous plants also eat insects by trapping them in especially modified parts. Ask: What is a mushroom? Is it a plant? Explain saprophytic mode of nutrition.

Ask: Why do we breathe? How do we take in air? Explain the importance of breathing for all living things. Explain that all living things breathe by taking in air into their bodies. Ask: Do animals move? Do plants move? Ask: How do fish, birds, frogs, etc. move? Show the students pictures of different animals. Explain movement in animals. Ask: Can a plant hop and jump? Explain the movement of roots, stems, leaves, and flowers. Ask: Where does a chick come from? What does a chick grow up to be? Explain that all babies grow up and resemble their parents. Ask: Do plants have babies? Explain plants have flowers which make seeds. Draw a germinating seed on the board. Explain that a seed grows to become a plant like the one it came from.

Answers to Activities in Unit 1

1. (a) grow (b) eat (c) breathe (d) move (e) have babies.
2. (a) dog (b) cow (c) kangaroo (d) plant
3. (a) by his nose and mouth (b) by small holes on its body
   (c) by its gills (d) by small holes in the leaves
4. (a) Living things need food to grow.
   (b) Plants make food in their green leaves, in the presence of sunlight.
   (c) A caterpillar breathes through small holes on the sides of its body.
   (d) A fish swims in water using its tail and fins.
   (e) A plant has flowers which make seeds.

Additional Activity

MCQs

(a) Which is the only planet in the solar system which is known to have living things?

Venus Earth Mars [Earth]

(b) A tadpole grows into a _____.

kitten puppy frog [frog]

(c) All living things need _____ to grow.

air water food [food]

(d) Human beings eat _____.

plants and animals plants only animals only [plants and animals]

(e) Green plants make their own _____.

water food air [food]

(f) Plants that are not green cannot make their own food so they take food from _____.

animals green plants soil [green plants]

(g) Plants take in air through small holes in their leaves called _____.

gills lungs stomata [stomata]

(h) A fish swims in water by its _____.

wings legs fins [fins]

(i) Seeds grow to make new _____.

flowers leaves plants [plants]

(j) A baby kangaroo is called a _____.

nestling joey calf [joey]

Lesson plan

Date: Time: 40 mins

Unit 1 **Topic: Living things**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
1. Characteristics of living things	• to explain the differences between living and non-living things • to examine the characteristics of living things in order to distinguish between them	• explain the difference between living and non-living things, and between animals and plants	Seeds, leaves, flowers, stones, feathers, nails, bottle caps, coins, pencils, rubber bands, pins, toy animals, and insects, etc.	CW: Q1
Key words: living things, grow, eat, breathe, move **Method**: Put a selection of living and non-living items on the table. Pick up each and ask questions such as "Can it move?", "Will it grow bigger?" On the basis of such questions divide the items into two sets—one of living things and the other of non-living things. Identify the characteristics of living things. Discuss the differences between plants and animals. Ask the students to separate the living things into plants and animals.				

Lesson plan

Date: Time: 40 mins

Unit 1 **Topic: Living things**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
2. Living things grow	• to explain that all living things grow and become adults and then reproduce; the life cycle thus continues	• explain that two of the characteristics of living things are growth and reproduction	Pictures of animals and their young, wall chart of the life cycles of a frog and a butterfly; seeds	CW: Q2 HW: Paste pictures of young animals in your science journal.

Key words: life cycle

Method: Ask the names of animal babies. Explain that animal babies grow to become adult animals. **Ask**: Do plants grow? What does a plant grow from? Sow some soaked bean seeds in a Petri dish containing some moist sawdust, and water them every day. Observe what happens. Explain the germination of seeds.

Use the wallcharts to explain the life-cycles of the frog and butterfly. Explain the process of growth in animals and plants.

Lesson plan

Date: Time: 40 mins

Unit 1 **Topic: Living things**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
3. Living things eat	• to explain how plants and animals eat	• explain that most humans eat both plants and animals; some animals eat only plants, some eat only other animals; green plants make food in their leaves in the presence of sunlight	Pictures of herbivores, carnivores, and omnivores, pitcher plant, mushroom, dodder plant	CW: Q. What do the following animals eat: hen, crow, lion, zebra, alligator, lizard, mosquito, butterfly, polar bear, monkey?
Key words: sunlight, green plant, food **Method**: **Ask**: What do you eat? What do animals eat? Do plants eat? Explain the different eating patterns in herbivores, carnivores, and omnivores without using these terms which may be too difficult at this stage. **Ask**: Why do we eat? Explain that food gives us energy to work and helps us to grow.				

Lesson plan

Date: Time: 40 mins

Unit 1 **Topic: Living things**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
4. Living things breathe and move	• to explain that living things breathe in order to stay alive; living things also move	• explain that all living things need to breathe in order to live • explain that all living things are able to move	An aquarium or a goldfish in a bowl; some leaves, close-up pictures of fish gills, a human nose, a caterpillar Pictures of a man running, animals, birds in flight, wings, fins, tails, stem and roots of a plant	CW: Q3 CW: Q. How do the following animals move: fish, bird, frog, snake?

Key words: gills, nose, stomata, leg, wing, fin, tail, glide

Method: Explain to the students that all living things need one thing besides food to stay alive. What is it? It's air. All living things need to breathe. Explain the different ways in which the various animals mentioned in the book breathe.

Another characteristic of living things is that they can move. Ask the students to stand to show the many different ways they can move their bodies. They may jump, hop, skip, run, move their arms, legs, and head. Describe the different ways animals and birds use their bodies to move about. Plants move too—stems grow upwards and roots downwards. Flowers such as the sunflower move the direction of their heads in order to follow the Sun. Read the lesson with the students for reinforcement. Show them the pictures you have collected to illustrate motion in birds, animals, and humans.

Lesson plan

Date: Time: 40 mins

Unit 1 **Topic: Living things**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
5. Living things have babies	• to explain that all living things produce offsprings	• explain that another characteristic of living things is that they reproduce	Some more pictures of animals and their offspring; hens/eggs	CW: Q4 HW: Complete Worksheet 1
Key words: egg, seed, baby, joey, calf **Method**: **Ask**: Where does a chick come from? Which animals lay eggs? Which animals have babies? Does a plant have babies? How do new plants grow? Explain to the students that another characteristic of living things is that they produce babies of their own kind. Explain how a seed grows into a plant. The adult plant then produces seeds.				

Name: _____ Date: _____

1. Match the baby to its parent:

(1) 

(a) 

(2) 

(b) 

(3) 

(c) 

2. Circle the characteristics that are common to all living plants and animals:

feeding breathing walking growing crying

having babies moving running

Name: _____ Date: _____

1. Sort the objects from the list into living and non-living things.

Living things	Non-living things

potted plant car earthworm stone chair cat
boy tree cup pencil clock book fish frog
snake coin paper clip book apple

2. Underline the things needed by plants to stay alive:

soil water air weeds rocks wind light stones

Kinds of animals

Teaching objectives:

To explain that there are many different kinds of animals
To describe that animals are of different colours
To explain that animals have different coats
To discuss animals of different sizes
To explain that animals live in different places
To discuss some strange animals

Teaching strategy:

Show students pictures of different kinds of animals. Ask: What is the colour of a zebra, giraffe, peacock, lion, etc? Explain that animals have different colours. Ask: Why do we wear clothes? What do we have on our skin? What is the body of a fish covered with? Ask: Does a frog have hair? Explain that animals' bodies are covered with different kinds of coats, which protect their bodies.

Ask: Which is the biggest animal in the world? Which is the smallest animal in the world? Explain that animals are of different sizes. Show the students pictures of various animals. Ask: Can a polar bear or seal live in a warm place? Why not? Can seals live on a mountain?

Where do earthworms live? Where can we see wild animals in a city? Explain that animals live in different places, such as cold and hot places, in soil, in water, and on land. Show pictures of some strange animals. Tell them their names. Ask: Where do you find such animals? Explain their characteristics.

Answers to Activities in Unit 2

1. a. scales b. fur c. feathers
2. a. (i) elephant (ii) giraffe
   b. (i) spider (ii) fly
3. very cold places: polar bear
   very hot places: camel
   water: dolphin
   land and water: frog
4. (a) starfish (b) jellyfish (c) seahorse (d) sea anemone (e) octopus
5. (a) The green colour helps it to hide in the trees.
   (b) A porcupine has sharp quills.
   (c) A caterpillar eats leaves.
   (d) An ostrich is the biggest living bird?
   (e) A crocodile lives both in water and on land.
   (f) A seahorse is a fish that looks like a horse.

Additional Activity

MCQs

(a) Animals have different colours which help them to _____.

hide from their enemies protect them from the sun

[hide from their enemies]

(b) The body of a fish is covered with _____.

feathers scales shells [scales]

(c) The soft body of a snail is protected by _____.

feathers scales a shell [a shell]

(d) An animal that can live in very cold places is a _____.

crocodile polar bear ostrich [polar bear]

(e) An animal that lives in very hot places is a _____.

penguin camel polar bear [camel]

(f) A sea anemone looks like a _____.

star horse flower [flower]

(g) An animal that lives on land and in the water is _____.

crocodile dolphin jellyfish [crocodile]

(h) An octopus has _____ arms.

5 7 8 [8]

(i) The body of a porcupine is covered with _____.

scales fur quills [quills]

(j) A parrot can hide in the leaves of trees because its colour is _____.

blue green yellow [green]

Lesson plan

Date: Time: 40 mins

Unit 2 **Topic: Kinds of animals**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
1. Kinds of animals	• to show that animals are of many colours and that they have different outer coverings	• explain that animals are of various sizes and colours	Pictures of animals of different colours and with different outer coverings	CW: Q1 HW: Collect pictures of different kinds of animals.
Key words: enemy, hide, shell, feathers quill, fur, scale **Method**: Show the students pictures of animals which have different outer coverings and are of different colours. Ask the students to identify the animals. Discuss why animals have different colours and coats. Explain that animals need to hide from their enemies. Their skin also protect their body.				

Lesson plan

Date: Time: 40 mins

Unit 2 **Topic: Kinds of animals**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
2. How animals differ	• to explain that animals are of different colours and have different outer coverings	• identify animals from their outer coverings and colours	A wallchart showing many different animals	CW: Q1 HW: Worksheet
Key words: enemy, hide, shell, feather, quill, fur, scale, stripe **Method**: Show the students pictures of animals with different outer coverings. Ask them to identify the animals. Discuss why animals have different coloured coats. Explain that animals need to hide from their enemies. Show them pictures of animals in their natural habitats where they are camouflaged against the background by their skins. Also explain that animal skins are especially designed to protect them against the weather.				

Lesson plan

Date: Time: 40 mins

Unit 2 **Topic: Kinds of animals**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
3. Animals are of different sizes	• to discuss the difference in sizes of animals	• explain that animals are of different sizes	Pictures of large and small animals	CW: Q2 HW: Glue pictures of the smallest and the largest animal you have seen, in your journals.

Key words: size, caterpillar, ladybird

Method: Discuss with the students the smallest and the largest animals that exist.

Explain that animals are of different sizes. Insects are very small. The bee hummingbird is the smallest bird in the world and is just 2 inches long! Compared with this, an ostrich is a very large bird. Show the students pictures of some large and small animals. Teach them the names of unfamiliar ones. Ask them to draw their favourite animal.

Lesson plan

Date: Time: 40 mins

Unit 2 **Topic: Kinds of animals**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
4. Animals live in different places	• to discuss animals' habitats	• explain that animals live in different habitats and have special features to help them survive in that particular environment	Pictures of animals living in very hot and very cold places, water animals	CW: Q3 Draw an animal that lives in a very cold place.

Key words: seal, flipper, fur, fat, desert, fin, shell

Method: Ask students what special clothes they would wear if they went to Murree in winter. Can they wear their summer clothes? In the same way, animals that live in the snow have to have a special outer covering to keep them warm. Now show them pictures of a polar bear and a seal. In the same way, explain to them that every environment is inhabited by animals that are adapted to it. Show the students pictures of animals that live in very cold countries, in very hot places, in the desert, in fresh water, and in the sea.

Ask: Can a polar bear or a seal live in a hot place? Can seals live on a mountain? Where do earthworms live?

Discuss the animals' adaptations for living in such environments. **Ask**: Where do crocodiles and turtles live? Explain that they are animals that can live in water as well as on land.

Name: _____ Date: _____

Read the description and then write the name of the animal:

(a) It looks like a horse and has black and white stripes.

_____

(b) It looks like a horse and lives in the sea.

_____

(c) It is a lizard that changes colour to hide from its enemies.

_____

(d) It is a fish with blue and yellow stripes.

_____

(e) The largest running bird that lives in the desert.

_____

(f) A fish with wings, shaped like a kite.

_____

(g) A sea animal with legs shaped like flippers.

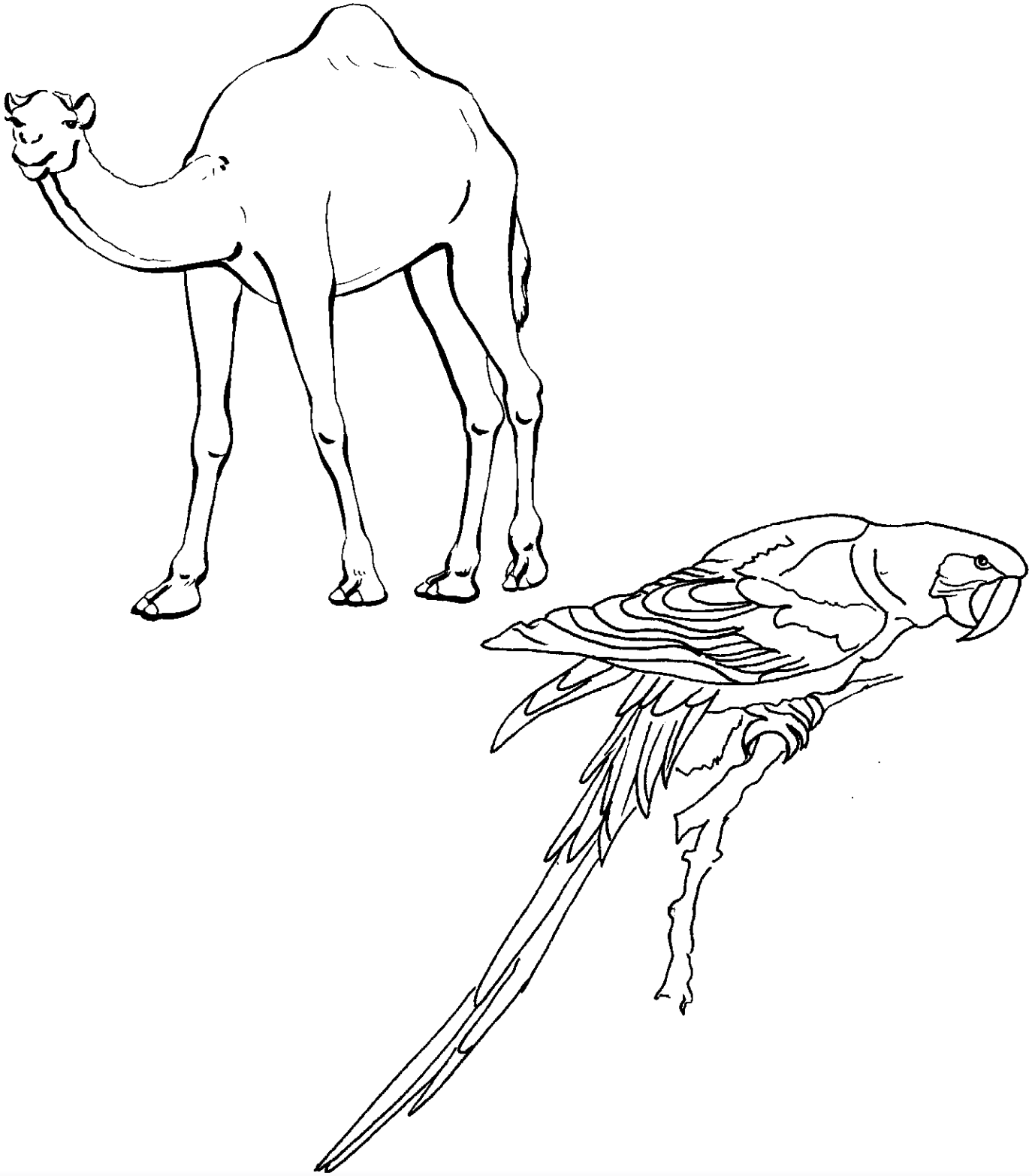
_____

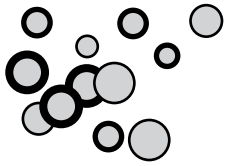
(h) A large desert animal that can live without food or water for many days.

_____

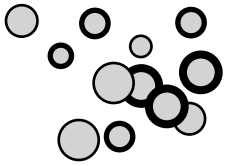
Name: _____ Date: _____

Colour these animals in their natural colours.





UNIT 3



Kinds of plants

Teaching objectives:

To explain that there are many different kinds of plants
To explain that plants are living things
To explain that most plants are green
To describe the parts of a plant
To discuss the functions of each part
To explain that green plants can make their own food
To discuss what a green plant needs to make food
To explain that plants are of different kinds
To explain that plants have tubes to carry food and water
To describe the structure of some strange plants

Teaching strategy:

Show the students pictures of different kinds of plants. Tell them the difference between trees, shrubs, herbs, and mosses.

Ask: What is the colour of the leaves? Explain that plants are mostly green. Show the students a complete herb. Point to the various parts and name them. Draw a plant on the board and label the parts.

Ask: What does a root do? Where does the root grow? What does a stem do?
Where do leaves grow? Why are leaves green? Explain the function of each part.

Show the students some flowers. Ask: What do flowers do? Why are flowers brightly coloured? Why do flowers have a scent? Explain that seeds are formed inside the flower. A flower turns into a fruit. Cut some fruits and show seeds inside them.

Ask: How do we eat? What do we eat? Do animals eat? Do plants eat? Explain how green plants make their own food in sunlight.

Draw a tree, a shrub, and a herb on the board.

Ask: Which is the biggest plant? Which is the smallest plant? Explain the structure and difference between a tree, a shrub, and a herb.

Ask: Do all plants have stems? Show moss growing on a piece of brick or rock. Explain that mosses are plants that have no stems. They grow in moist, shady places.

Ask: How does water from the soil go up to the leaves? How does food from the leaves go to all parts of the plant? Cut a longitudinal section of a carrot and show it to the students. Explain that the yellow centre is made up of tubes which carry the water and food.

Dip some lettuce leaves in water coloured red. Ask the students to observe them after one day. The veins in the leaves will become coloured. Explain that the coloured water has gone up the tubes that are in the stem and leaves.

Show pictures of different kinds of plants. Explain that they have different shapes and colours. Some plants catch insects. Some plants eat dead plants. Some plants grow on other plants and absorb food from them.

Answers to Activities in Unit 3

2. (a) Most plants are green.
   (b) Roots suck water and salts from the soil.
   (c) The stem takes water and salts from the roots to the leaves.
   (d) Flowers make fruits.
   (e) Leaves make food for the plant.

3. (a) no (b) yes (c) no (d) yes (e) yes

4. a. pitcher plant b. venus flytrap c. touch me not d. shrub

Additional Activity

MCQs

(a) Most plants are _____.
red green blue [green]

(b) _____ of a plant sucks water from the soil.
Roots Stem Leaves [Roots]

(c) Green leaves of a plant make _____ for the plant.
water food air [food]

(d) Flowers help the plant to make _____.
seeds stems roots [seeds]

(e) The stems of trees are _____.
short and branched soft and weak hard and woody [hard and woody]

(f) Plants that have soft, weak stems are called _____.
herbs shrubs trees [herbs]

(g) Mosses do not have _____.
roots stems leaves [stems]

(h) Special tubes carry water from the _____ to all parts of the plant.
stems roots leaves [roots]

(i) Special tubes carry food from the _____ to all parts of the plant.
stems roots leaves [leaves]

(j) The venus flytrap catches _____.
insects birds fish [insects]

Lesson plan

Date: Time: 40 mins

Unit 3 **Topic: Kinds of plants**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
1. Plants	• to identify the parts of a plant, and explain their functions	• describe the parts of a plant and explain the functions of each	A recently uprooted plant showing all the parts, including roots	CW: Q1, Q2 Collect some plants. Press them and paste them in your science journals. Ask the teacher to help you write their names. HW: Draw the cross sections of some fruits to show where the seeds are.

Key words: root, stem, leaf, flower, mineral

Method: Show the students a fresh green plant. Point to the various parts and tell them the names of the parts. Draw a plant on the board and label the different parts. **Ask**: What is the function of the root? Where does the root grow? What is the work of the stem? Where do the leaves grow? Explain the functions of each part. **Ask**: What is the function of the flower? Explain why flowers are brightly coloured; and why some flowers are scented. Explain that the flower turns into the fruit and the seeds are formed inside the fruit. Cut some fruits open and show the students the seeds inside them.

Lesson plan

Date: Time: 40 mins

Unit 3 **Topic: Kinds of plants**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
2. Kinds of plants	• to identify the different kinds of plants	• describe the main types of plants	Pictures of herbs, shrubs, and trees; some fresh herbs such as coriander and mint; if possible, bring a piece of bark or a stone on which moss is growing	CW: Q3 HW: Paste pictures of herbs, shrubs, and trees in your science journal, and label them.
Key words: herb, shrub, woody, moss, pitcher, mushroom, thorn, cactus, moist, shady **Method**: Show the students pictures of herbs, shrubs, and trees. Explain the differences between them. Ask the students to smell the herbs you have brought and discuss their uses. **Ask**: Do all plants have stems? Show the students some moss growing on a piece of bark or a stone. Explain that mosses are plants that have no stems. They grow in moist, shady places.				

Lesson plan

Date: Time: 40 mins

Unit 3 **Topic: Kinds of plants**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
3. How water travels inside a plant	• to explain that plants contain tubes that carry water	• describe how water travels from the root of a plant to its leaves	A lily flower with its stalk standing in a glass of coloured water	CW: Worksheet
Key words: tube, food, water **Method**: Show the students the veins in the petals of the lily and explain that these are very fine tubes that help to carry food and water inside the plant. Explain the worksheet question.				

Lesson plan

Date: Time: 40 mins

Unit 3 **Topic: Kinds of plants**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
4. Some strange plants	• to explain that some plants are unusual in their structures and behaviour	• identify some unusual plants and describe their structures	Pictures of the pitcher plant, touch-me-not plant, Venus flytrap, cactus, mushroom	CW: Q4 Q. Why do plants trap insects? Collect pictures of some strange plants and paste them on a chart. Write their names.

Key words: touch-me-not, pitcher, flytrap, cactus, thorns

Method: Show the students pictures of some unusual plants. Ask them to guess why the pitcher plant, the touch-me-not and the Venus flytrap are called by these names. Discuss the structures of these plants and explain how they catch insects. **Ask**: Why does the cactus have thorns? Explain that the leaves of a cactus are reduced to spines so that they do not lose water when growing in the desert. **Ask**: If the mushroom is not green, how does it get its food? Explain that the mushroom feeds on the remains of dead plants in the soil.

Name: _____ Date: _____

1. Draw a circle around the things that a plant needs to stay alive.

soil air water

weeds light minerals

2. Match the type of plant to its description:

Description	Type of plant
Tall, hard woody stem	cactus
Not very tall, has many branches	moss
Soft, weak stem	tree
No stem, grows in moist, shady places	pitcher plant
Not green, gets food from dead plants	herb
Traps insects in its pitcher-like leaves	shrub
Catches insects in a trap	mushroom
Thick fleshy stems, with leaves like thorns	Venus fly-trap

Roots

Teaching objectives:

To explain that roots grow in the soil
To explain that roots suck water and salts from the soil
To explain that roots store food
To describe how roots fix the plant in the soil
To discuss that some roots are thick and strong
To discuss that some roots are thin and weak
To explain the difference between taproots and fibrous roots
To explain that roots absorb water by root hairs

Teaching strategy:

Draw a complete plant on the board. Indicate by arrows how water travels from the soil into the roots and through the stem up to the leaves.

Ask: What is the name of the lower part of the plant? What is the function of the root? Explain that the root grows in the soil. It sucks water and salts. If a root is thick, it has stored food in it. Show the students some thick roots such as a carrot, radish, and beetroot. Ask: Why do we eat carrots and beetroots? Explain that these are roots that have stored food in them. Show the students some grass roots and onion roots. Explain the difference between thick and thin roots. Ask: What is the difference between a carrot and an onion's root? Explain the difference between a taproot and a fibrous root.

Ask: How do roots suck water? Explain the presence of root hairs that are microscopic. We cannot see them, but they help the root to absorb water. Ask: Why does a plant dry up if we pull it out of the soil and put it in another pot? Explain that when we pull it out we break the root hairs and they cannot suck any water.

Answers to Activities in Unit 4

1. (a) soil (b) food (c) thin (d) tap (e) fibrous

3. a. water and salts from the soil b. the root tip

Additional Activity

MCQs

(a) Roots grow in the _____.

soil sky air [soil]

(b) Roots suck _____ from the soil.

food air water [water]

(c) Roots which have one thick part are called _____.

fibrous roots tap roots fat roots [tap roots]

(d) Small roots of the same size are called _____.

tap roots cap roots fibrous roots [fibrous roots]

(e) The tip of the root is protected by _____.

root hairs root tips root cap [root cap]

(f) The root cap protects the _____.

root hairs root tips stem tips [root tips]

(g) The kind of root which stores a lot of food is _____.

tap root fibrous root thin root [tap root]

(h) The turnip is an example of a _____.

root hair tap root fibrous root [tap root]

(i) Roots with many branches of the same size are called _____.

fibrous roots tap roots branched roots [fibrous roots]

(j) Water and salts are sucked up by the plant by _____.

root cap root hairs tap root [root hairs]

Lesson plan

Date: Time: 40 mins

Unit 4 **Topic: Roots**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
1. Roots	• to explain what a root is • to explain the functions of a root	• explain what a root is and describe its functions	A plant with its roots intact	CW: Q1 Write the names of two plants that have thick roots, and two plants that have thin roots.
Key words: root, suck, fix, soil **Method**: Show the students a complete plant. Point out the root and explain that roots fix the plant in the soil. **Ask**: What other work do roots do for a plant? Explain that roots absorb water and salts for the plant. If a root is thick, it contains stored food.				

Lesson plan

Date: Time: 40 mins

Unit 4 **Topic: Roots**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
2. Kinds of roots	• to examine different kinds of roots	• describe different kinds of roots and explain their functions	A carrot, a radish, an onion	CW: Q2 HW: Draw the different types of roots and label them.
Key words: tap-root, fibrous root **Method**: Show the students the carrot and the radish. **Ask**: What is the shape of these roots? Explain that a carrot and a radish are both forms of tap-root. A tap root is thick and fleshy because a lot of food is stored in it. Show the students the roots of the onion plant. **Ask**: What do these roots look like? Explain that fibrous roots are thin. They have many branches and they do not store much food.				

Lesson plan

Date: Time: 40 mins

Unit 4 **Topic: Roots**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
3. How roots suck water	• to explain that root hairs absorb water for the plant	• recognize the microscopic structure of the root, and explain how a root hair absorbs water and mineral salts from the soil	A root, a microscope	HW: Q3 Draw the microscopic structure of a root tip and label it.
Key words: root hair, mineral **Method**: Gently pull out the roots of a plant and wash off the soil by dipping it in a beaker of water. Place the root tip of the washed root on a microscopic slide and help the students to observe it. **Ask**: What do you see? Explain that the roots have very fine root hairs which help to absorb water and mineral salts for the plant. Students should be able to see the root cap at the tip of the root. Explain that the root cap protects the root tip.				

Name: _____ Date: _____

1. Label the parts of a root, and write the functions of each part.

_____

_____

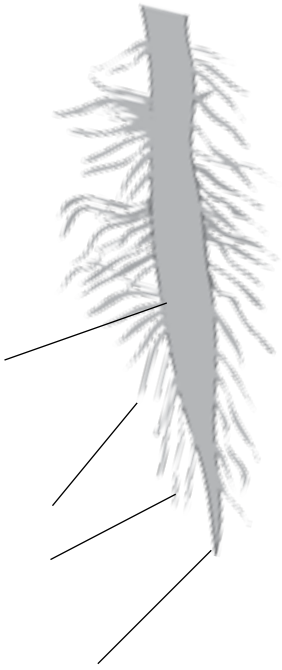
_____

_____

_____

_____

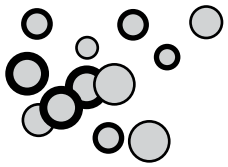
_____



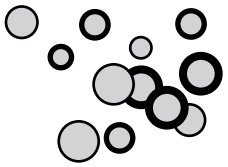
2. Name the kind of root.

_____ _____

Which root stores a lot of food? _____



UNIT 5



Leaves

Teaching objectives:

To explain that leaves grow on the stem
To discuss that leaves are flat and green
To describe the parts of a leaf
To explain the function of midrib and veins
To explain the arrangement of veins in different leaves
To discuss the shapes of different leaves
To explain the difference between simple and compound leaves
To describe how leaves make food

Teaching strategy:

Collect different kinds of leaves. Show them to the students. Give each student one leaf and ask them to study it carefully. Draw a simple leaf on the board and label it. Explain the function of each part. Ask the students to trace around the shape of the leaf with a pencil and then draw lines to represent the midrib and veins. Draw a leaf having a network of veins and a leaf having parallel veins on the board. Explain the difference between the two. Show the students actual samples. Ask children to copy the diagrams from the board. Show the students leaves of different shapes and sizes. Ask them to draw them and write their shapes.

Show students how to make a leaf print by rubbing a pencil or crayon on a piece of paper placed over a leaf. Teach the students how to press leaves between sheets of newspaper.

Show the students some simple and compound leaves. Point out the leaflets. Explain the difference between them. Ask students to draw a simple and compound leaf.

Ask: What is the main function of a leaf? Why is a leaf green? How does air enter a leaf? How does water come into a leaf? Why do leaves turn towards the Sun? Explain how leaves make food. Also explain that leaves make glucose which is the food of the plant.

Answers to Activities in Unit 5

1. (a) Leaves grow on the stem of a plant.
   (b) A leaf is a flat, green part of a plant.
   (c) The green colour of a leaf is due to chlorophyll.
   (d) When only one leaf grows on a leaf stalk, the leaf is called a simple leaf.
   (e) The midrib and veins carry food and water.

3. (a) true (b) false (c) true (d) false (e) true

Additional Activity

MCQs

(a) All leaves grow on the _____ of plants.

roots stems leaves [stems]

(b) Chlorophyll is the _____ coloured substance in the leaf.

yellow red green [green]

(c) The flat, green part of the leaf is called _____.

leaf stalk leaf blade midrib [leaf blade]

(d) The midrib and veins in the leaf carry _____.

food only water only food and water [food and water]

(e) When one leaf grows on a leaf stalk the leaf is called a _____.

leaflet simple leaf compound leaf [simple leaf]

(f) When two or more leaves grow on a leaf stalk the leaf is called _____.

compound leaf simple leaf leaflet [compound leaf]

(g) The process by which green leaves make food is called _____.

respiration photosynthesis excretion [photosynthesis]

(h) The food of the plant is _____.

rice butter glucose [glucose]

(i) A leaf makes food with the help of _____.

air, water, sunlight

water, sunlight, and chlorophyll

water, air, sunlight, chlorophyll [air, water, sunlight, chlorophyll]

(j) Air enters a leaf by small holes called _____.

pores holes stomata [stomata]

Lesson plan

Date: Time: 40 mins

Unit 5 **Topic: Leaves**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
1. Leaves	• to examine a green leaf	• describe what a leaf is and explain why it is green	Different kinds of green leaves	CW: Q1 (a) (b) (c)
Key words: leaf, chlorophyll **Method**: Give each student a leaf and ask them to study it carefully. Discuss their observations. Explain that a leaf is the flat green part of a plant. The green colour is due to the presence of a green substance called chlorophyll.				

Lesson plan

Date: Time: 40 mins

Unit 5 **Topic: Leaves**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
2. Parts of a leaf	• to identify the parts of a leaf	• identify the parts of a leaf	Leaves of different shapes and sizes	HW: Q1 (e), Q2

Key words: midrib, vein, leaf stalk, leaf blade

Method: Ask the students to examine the leaves. Draw a leaf on the board, and label its parts. Ask the children to draw the outlines of their leaf and draw in the veins and midrib. Ask them to label the parts, and describe its shape.

Demonstrate how to make a leaf rubbing by rubbing a pencil or crayon over a piece of tracing paper placed over the leaf. Help the students to make their own leaf rubbings.

Lesson plan

Date: Time: 40 mins

Unit 5 **Topic: Leaves**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
3. Kinds of leaves	• to explain what a simple and a compound leaf are	• distinguish between a simple and a compound leaf • explain the functions of the parts of a leaf	Samples of some simple and compound leaves	CW: Q1 (d) Draw a simple leaf and a compound leaf in your science journals.
Key words: simple leaf, compound leaf, leaflet **Method**: Show the students some simple and compound leaves. Explain that a simple leaf is a single leaf on a leaf stalk. A compound leaf is made up of many small leaves, called leaflets, growing on a single leaf stalk. Ask the students to draw and label simple and compound leaves in their science journals.				

Lesson plan

Date: Time: 40 mins

Unit 5 **Topic: Leaves**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
4. Functions of leaves	• to explain the functions of leaves	• explain the functions of the parts of a leaf	A chart of photosynthesis	CW: Q. What is the food of a plant? Q. What does a plant need in order to make its own food? HW: Q3
Key words: food, air, water, chlorophyll, sunlight, pore, photosynthesis **Method**: **Ask**: What is the main function of the leaf? Why is a leaf green? How do air and water enter the leaf? Why do leaves turn towards the Sun? Explain the process of photosynthesis with the help of diagrams and charts. The food of the plant is glucose which is made in the green leaves of a plant.				

Name: _____ Date: _____

1. Fill in the blanks:

   (a) The green colour of a leaf is due to the presence of a substance called c_____.

   (b) A leaf is joined to the stem by the leaf s_____.

   (c) The flat green part of a leaf is called leaf b_____.

   (d) The m_____ and the v_____ carry water and food to all parts of the plant.

   (e) The small leaves of a compound leaf are called l_____.

2. (a) The things that a green leaf needs to make its food are:

   a ___ ___,

   c ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ,

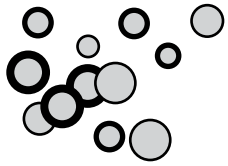
   w ___ ___ ___ ___,

   s ___ ___ ___ ___ ___ ___ ___.

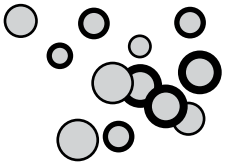
   (b) The food of the plant is g ___ ___ ___ ___ ___ ___.

   (c) The food of the plant is made by a process called

   p ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___.



UNIT 6



Fruits and seeds

Teaching objectives:

To explain that a fruit is made from a flower
To discuss the different kinds of fruits
To explain that fruits contain seeds
To explain that the number of seeds varies in different kinds of fruits
To discuss that seeds are of different shapes and sizes
To describe the parts of a seed and their functions
To explain the difference between monocot and dicot seeds
To describe the functions of seed leaves
To explain that the baby plant in a seed grows to form a new plant
To explain that a seed needs air, water, and warmth to grow

Teaching strategy:

Show the students an apple. Explain that an apple is a fruit. It grows on an apple tree. It contains seeds from which new apple trees can grow. Show the students the stem from where it was attached to the tree. Show them the bottom of the apple, which has the dried up parts of the apple flower. Cut the apple lengthwise and show the seeds inside.

Ask students to name different fruits. Show them some soft and juicy fruits like an orange, a tomato, etc. Show them some dry fruits such as poppy fruit, pea pod, groundnut, etc. Explain the difference between them.

Ask: How many seeds are there in a tomato, a pea pod, a groundnut, in an orange, an apple, etc? Explain that some fruits have many seeds, some have few seeds, and some have only one seed. Show the students different kinds of seeds. Explain that seeds are dry and hard. They can be small or big. Give each student a groundnut. Ask them to draw it. Tell them to break it open and observe the seeds. Ask them to locate the tiny hole on one end. Now tell them to break it open. Ask: How many seed leaves does it have? Can you see the baby plant? Show them the baby plant with a magnifying glass.

Show the students maize grains. Explain that it has only one seed-leaf. Soak some bean seeds, gram seeds, and maize grains in water. Put some cotton wool in a plastic dish. Pour water over the cotton wool and place the soaked seeds in it. Place the dish in a well-lighted, airy place and water it every day. Show the germination of seeds to the students and ask them to draw the various stages of germination of the seeds.

Answers to Activities in Unit 6

1. (a) tomatoes (b) orange (c) grapefruit
2. (a) few seeds (b) one seed (c) few seeds
   (d) few seeds (e) one seed (f) many seeds (g) many seeds
3. (a) hard (b) seed (c) hole
   (d) plant (e) warmth
5. (a) A fruit is made from a flower.
   (b) Seeds are made in the ovary of a flower.
   (c) A baby plant is inside the seed.
   (d) Air and water go inside the seed by this tiny hole.
   (e) The baby plant gets food from the seed leaves.

Additional Activity

MCQs

(a) A fruit is made from a _____.

leaf stem flower [flower]

(b) A mango is a _____ fruit.

dry juicy hard [juicy]

(c) Seeds are made inside the _____.

fruit flower roots [fruit]

(d) A _____ has many seed.

papaya mango banana [papaya]

(e) A seed has a hard outer covering called _____.

skin seed coat shell [seed coat]

(f) A seed has a tiny hole through which _____ go into the seed.

air and water air and soil air and food [air and water]

(g) The seed has a _____ inside it.

leaves flowers baby plant [baby plant]

(h) The seed leaves have _____ for the baby plant to grow.

air water food [food]

(i) A bean seed has _____ seed leaves.

2 3 4 [2]

(j) A maize seed has _____ seed leaf.

1 2 3 [1]

Lesson plan

Date: Time: 40 mins

Unit 6 **Topic: Fruits and seeds**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
1. Fruits	• to explain the different kinds of fruits	• identify different kinds of fruits	Different dry and fleshy fruits	CW: Q1 Draw three dry and hard fruits and write their names.

Key words: fruit, soft, juicy, hard, dry

Method: Show the students an apple. Explain that an apple is a fruit and it grows on an apple tree. Show them the stem by which it was attached to the tree. Turn the apple upside down and show them the dried up parts of the apple flower. **Ask**: How is a fruit produced?

Explain that the ovary of the flower grows to make the fruit. It contains seeds from which new plants can grow.

Show the students some soft, juicy fruits such as an orange, a plum, a tomato, etc., and some dry fruits such as peas, ground nuts, almond, etc. Explain the differences between them.

Lesson plan

Date: Time: 40 mins

Unit 6 **Topic: Fruits and seeds**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
2. Seeds	• to demonstrate that fruits contain seeds • to demonstrate that the number of seeds varies in different kinds of fruit • to identify the parts of a seed and their functions	• explain that plants grow from seeds and that seeds are formed inside fruits • identify the parts of a seed and explain their functions	Different kinds of seeds, soaked bean seeds, a magnifying glass	CW: Q2 Draw the longitudinal sections of an apple, a tomato, a mango, and a pea pod and draw the seeds in them. HW: Q3 (a)–(d) Draw a bean seed and label its parts. Which part of the seed grows into a new plant?

Key words: few, many, dry, hard, small, big, seed coat, seed leaf, baby plant

Method: **Ask**: How many seeds are there in a tomato? a pea pod? a ground nut shell? an orange? an apple? etc. Explain that different fruits have different numbers of seeds. Show the students different kinds of seeds. Explain that seeds are dry and hard, and some are big and others are small. Give each student a ground nut and ask them to draw it. The outer covering is called the seed coat. Tell them to break it open and examine the seeds. Ask them to find the tiny hole that is at one end. Now ask them to break open the seed and see what is inside. The tiny bud that they see lying between the seed leaves is the baby plant. Show them the baby plant through a magnifying glass. Show the students a maize grain. Ask them to try and open it. Explain that it is not possible to open the maize grain because it has only one seed leaf.

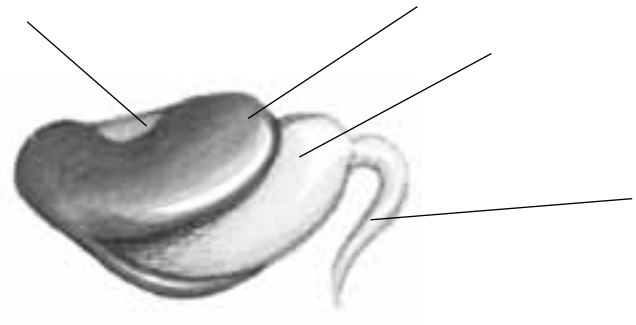
Lesson plan

Date: Time: 40 mins

Unit 6 **Topic: Fruits and seeds**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
3. Growth of a seed	• to explain how a seed grows to form a new plant	• describe how a seed grows into a new plant	Soaked bean seeds, a pot of soil, water	Draw the stages of the growth of a seed into a new plant. HW: Q3 (e)
Key words: air, water, warmth **Method**: Prepare soil in a pot for planting seeds. Plant some pre-soaked seeds in it. Keep the pot in a warm place and water it every day. After a few days you will see the seeds growing into small plants. Ask the students to draw the various stages of the growing seeds.				

Name: _____ Date: _____

1. Label the parts of the seed.



2. Write the function of:

the seed coat _____

the seed leaves _____

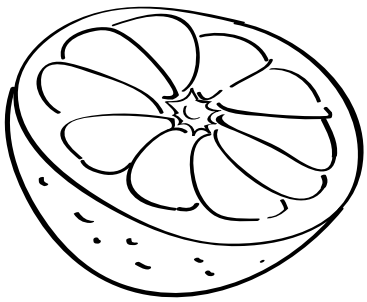
the tiny hole in the seed coat _____

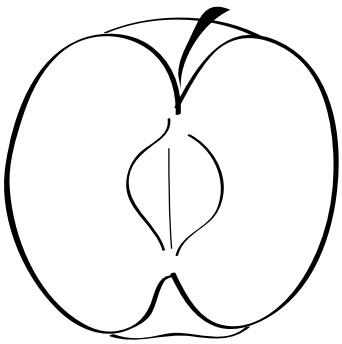
Name: _____ Date: _____

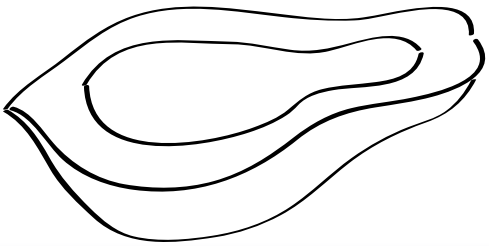
1. Draw:

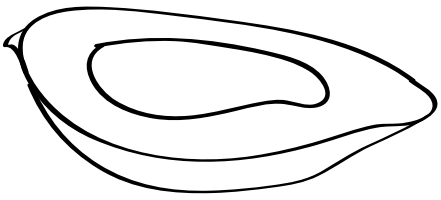
   A juicy fruit A dried fruit

2. Draw the seeds inside these fruits:









Work and machines

Teaching objectives:

To define what work is
To explain that we use our muscles to do work
To explain that we can move things by pushing or pulling them
To discuss that when we push and pull things we do work
To explain that a push or pull is called force
To explain that we have to apply force to start or stop something from moving
To discuss that we have to use more force to push or pull a heavy thing
To discuss what a machine is
To discuss what machines can do
To discuss that machines are big or small
To explain that machines need fuel
To explain why machines need fuel
To explain that the fuel of our body is food
To explain that food gives energy to the body

Teaching strategy:

Throw a ball in the air and catch it. Ask a student to carry some books. Tell the students to stand up and jump at one place for a minute. Ask: Did you get tired? Are you feeling hot? Explain that work is any kind of action. You are working even when you are playing.

Ask: What happens when you push or pull a heavy thing? How do we push and pull things? Explain that we use our muscles to do work. Put a ball on the table. Ask: Is it moving? When will it move? Push the ball slightly and explain that things cannot move unless we push them. Slide the ball on a book. Place your hand at the end of the book to stop it. Ask: Why did the ball stop? If a big car comes rolling down, can we stop it with our hands? Explain that more force is needed to pull and push big and heavy things. Explain that when you lift a heavy box, you use your muscles. You need more force.

Show the students pictures of some big machines. Show students a bottle opener and a pair of scissors. Ask: Is this a machine? Explain that machines help us to do work. Open the lid of a tin can with a spoon handle. Explain that machines make our work easy. Explain how big machines like tractors and cranes help us to move heavy things.

Ask: Why do we eat food? Explain that our body needs food to work. Ask: How does a motor car and steam engine move? Explain that the food of a machine is called fuel. Fuel helps to make energy for machines to work.

Answers to Activities in Unit 7

1. (a) work (b) Machines (c) crane (d) fuel (e) food
2. (a) to open a bottle (b) to hold two pieces together (c) to cut
   (d) to lift heavy things (e) to plough
3. (a) A push or a pull is called force. (b) The food of a machine is fuel.
   (c) A steam engine needs coal. (d) Machines help us to work. (e) A bottle opener.

Additional Activity

MCQs

(a) A push or a pull is called _____.

force work energy [force]

(b) To push a heavy thing we need _____ force.

no more less [more]

(c) _____ help us to do work.

Machines Cars Aeroplanes [Machines]

(d) A bottle opener is a small _____.

machine car crane [machine]

(e) The food of a machine is called _____.

food fuel water [fuel]

(f) Fuel gives _____ to the machine to do work.

work energy petrol [energy]

(g) Small machines make our work _____.

difficult easy hard [easy]

(h) The fuel of our body is _____.

petrol gas food [food]

(i) A machine that helps us to lift heavy things is _____.

train crane screw driver [crane]

(j) The fuel of a steam engine is _____.

petrol oil coal [coal]

Lesson plan

Date: Time: 40 mins

Unit 7 **Topic: Work and machines**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
1. Work and force	• to explain the meanings of *work* and *force*	• explain what is meant by *work* and *force*	A rubber ball, a toy car	CW: Define work and force.

Key words: work, force, push, pull, object

Method: Throw a ball in the air and catch it. Ask a student to hold some books. Ask the students to stand up and jump on the spot ten times. **Ask**: Are you feeling hot? Are you tired? Explain that in science, any kind of action is called *work*. You are working even when you are playing. **Ask**: What happens when you pull or push a heavy object? Explain that we use our muscles to do work. Put a toy car on the table. **Ask**: When will the car move? Push the car gently. Explain that things cannot move unless we push them. Explain that a push or a pull is called a force. If we have to push or pull a heavier object, we have to use more force.

Lesson plan

Date: Time: 40 mins

Unit 7 **Topic: Work and machines**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
2. Machines	• to explain how machines help us to do work • to explain that machines can be big or small and that they need energy to work	• explain that machines help us to work, and that in order to work, machines need energy which they get from fuel	Pictures of a sewing machine, a crane, a steam engine, a screw driver, a pair of scissors, a hammer, etc.	CW: Q1, Q2 Make a list of all the machines that we use in the home to make our work easier.
Key words: machine, fuel, petrol, coal, energy **Method**: **Ask**: What do we use to lift a heavy object? Explain that we use our muscles to work. Show the students pictures of some big machines. Explain that big machines help us to lift or move heavy things. Show the students a bottle opener and a screw driver. Explain that these are small machines. Explain that anything that helps to make our work easier is called a machine.				

Lesson plan

Date: Time: 40 mins

Unit 7 **Topic: Work and machines**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
3. Fuel and energy	• to explain that machines need fuel to work • to explain that our body is a machine	• explain how the body works as a machine • explain that all machines need fuel to work	Pictures of a petrol pump, food, a steam engine	HW: Q3
Key words: fuel, petrol, food, energy, muscle **Method**: **Ask**: Why do we eat food? Explain that our body needs food for our muscles to work. What do a motor car and a steam engine need to move? Explain that the food of the machine is called *fuel*. Fuel is burned to produce energy for machines to work. A car needs petrol and a steam engine needs coal to move.				

Name: _____ Date: _____

1. Fill in the blanks:

   A push or a pull is a _____.

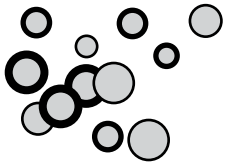
   Machines help us to do _____.

   The food of a machine is called _____.

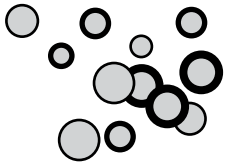
   The fuel of our body is _____.

   Food gives us _____ to work and play.

2. Draw two simple machines. Write their names and the work that they do.



UNIT 8



Light

Teaching objectives:

To explain what light is
To explain that light on Earth comes from the Sun
To explain that burning things produce light
To discuss that there is more light near the source
To describe what luminous and non-luminous things are
To describe how we can see non-luminous things
To describe transparent, translucent, and opaque things
To explain that light travels in straight lines
To describe how a shadow is formed
To discuss how the size of a shadow changes with the change in the distance of the object from the light source
To explain that shadows cast by sunlight change with the position of the Sun during the day

Teaching strategy:

Switch off the lights in the classroom and light a torch. Direct its beam on different objects in the class. Explain that we can see things when light falls on them. Ask: Can you see in the dark? Where do we get light from? How does the Earth get light? Explain the main sources of light. Hold up a candle. Ask: Is it giving out light? Light the candle. Is it giving out light now? Is there more light near the candle or away from the candle?

Explain the difference between luminous and non-luminous objects. Explain that we can see non-luminous objects because light from luminous things falls on them. Ask: Does the Sun give out light? Do stars give out light? Does the Moon give out light? Explain that the Moon is a non-luminous body. It only reflects sunlight.

Ask: Can you see through glass? Hold up a glass of water. Ask: Can you see through water? Explain that things that allow light to pass through are called transparent. Hold up a tracing paper? Ask: Can you see through it? Explain that things which allow light to pass, but through which we cannot see clearly, are called translucent. Hold up a book or piece of cardboard. Ask: Can you see through it? Explain that opaque objects do not allow light to pass through.

Light a candle on a table near a wall. Hold a pencil near it. Show the formation of its shadow on the wall. Explain that light travels in straight lines and the formation of shadows. Ask children to make shadows of their hands on the wall. Move the pencil backwards and forwards in front of the candle and show the students how the size of the shadow increases and decreases with change in distance. Take the students outside on a bright sunny day. Ask students to observe the direction of their shadows in relation to the position of the Sun.

Answers to Activities in Unit 8

1. (a) Light on the Earth comes from the Sun.
   (b) A luminous object gives out light.
   (c) A non-luminous object cannot give out light.
   (d) We cannot see things in the dark.
   (e) The Moon is not a luminous body.
   (f) A shadow is formed when an opaque object is placed in the path of light.
2. (a) transparent (b) translucent (c) transparent
   (d) opaque (e) translucent (f) opaque
3. (a) Sun (b) luminous (c) non-luminous
   (d) transparent (e) shadow

Additional Activity

MCQs

(a) We can see things when _____ falls on them.
electricity light crane [light]

(b) All the light on the Earth comes from _____.
bulbs candles the Sun [the Sun]

(c) Something which gives out light by itself is called _____.
non-luminous luminous dark [luminous]

(d) The moon is a _____ body.
luminous non-luminous burning [non-luminous]

(e) Things which let light pass through them are called _____.
transparent translucent opaque [transparent]

(f) We cannot see through _____ objects.
transparent translucent opaque [opaque]

(g) A beam of light travels in a _____ line.
curved wavy straight [straight]

(h) The shadow of an object is of the same _____ as the object.
size shape colour [shape]

(i) If the object is near the light its shadow is _____.
bigger than the object smaller than the object
of the same size as the object [bigger than the object]

(j) When the Sun is over our heads, our shadow is made _____.
on our left on our right under our feet [under our feet]

Lesson plan

Date: Time: 40 mins

Unit 8 **Topic: Light**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
1. Sources of light	• to identify various sources of light • to explain that there is more light nearer the source	• explain that light on Earth comes from the Sun • explain that there is more light near its source	A picture of the Sun, a candle, a light bulb, a torch	Reading: p 45 Which of the following is a source of natural light: a candle, an electric bulb, the Sun, a torch, a fire?
Key words: light, object, source, natural **Method**: Switch off all the lights in the room and light a torch. Direct its beam on different objects in the room. Explain that we can see things when light falls on them. **Ask**: Can you see in the dark? Where do we get light from? How does the Earth get light? Identify the main sources of light. Hold up an unlit candle. **Ask**: Is it giving out light? Light the candle. **Ask**: Is it giving out light now? Is there more light near the candle or further away from it? Explain that there is more light close to the source than away from it.				

Lesson plan

Date: Time: 40 mins

Unit 8 **Topic: Light**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
2. Luminous and non-luminous objects	• to explain the difference between luminous and non-luminous objects	• explain the difference between luminous and non-luminous objects	A picture of the Sun, a coal fire, a candle, a book, a wooden box	Reading: p 45-46 HW: Q1
Key words: luminous, non-luminous **Method**: **Ask**: Does the Sun give out light? Can you name some other things which give out light? Explain that the Sun, a fire, and a burning candle are examples of luminous objects. They give out their own light. **Ask**: Does a book, a box, or a bag give out light? Explain that non-luminous objects do not give out light. We can only see non-luminous objects when light from a luminous object falls on them. **Ask**: Do stars give out light? Does the Moon give out light? Explain that the Moon is a non-luminous body. It only reflects, or throws back, light which falls on it from the Sun.				

Lesson plan

Date: Time: 40 mins

Unit 8 **Topic: Light**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
3. Transparent, translucent, and opaque objects	• to explain how materials are classified according to the amount of light that they allow to pass through them	• explain the difference between transparent, translucent, and opaque objects	Samples of glass, water, frosted glass, butter paper, tracing paper, wood, stone, a book	Reading: p 47-48 Collect samples of transparent, translucent, and opaque materials and paste them in your science journals. HW: Q2

Key words: transparent, translucent, opaque

Method: Hold up a glass slab and **ask**: Can you see through this? Hold up a glass of water and **ask**: Can you see through water? Explain that materials that allow light to pass through them are called transparent.
Hold up a sheet of tracing paper. **Ask**: Can you see through this? Explain that things which allow some light to pass through them, but through which we cannot see clearly, are called translucent.
Hold up a piece of cardboard and **ask**: Can you see through this? Explain that opaque objects do not allow any light to pass through them.

Lesson plan

Date: Time: 40 mins

Unit 8 **Topic: Light**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
4. Shadows	• to explain what a shadow is and how a shadow is formed • to demonstrate that the size of the shadow changes with the distance of the object from the light source	• explain what a shadow is and how it is formed	Candle, pencil	Reading: p 48-49 Make a diagram to show where your shadow will be in the morning, noon, and evening. Will your shadow be longer or shorter if you stand close to a lamp? CW: Q3

Key words: shadow, light source

Method: Light a candle on a table close to a wall. Hold a pencil near it. **Ask**: What can you see on the wall? Is it bigger or smaller than the pencil? Move the pencil backwards and forwards. **Ask**: What is happening to the size of the shadow?

Explain that when an opaque object is placed in front of a light source, it blocks the path of the light and a dark patch or shadow is formed. It is the same shape as the object, but it can be smaller or larger than the actual size of the object. If it is closer to the light source, the shadow is smaller, and if it is further away, it is larger.

Take the students outside on a sunny day and ask them to observe their shadows in relation to the position of the Sun.

Name: _____ Date: _____

Fill in the blanks with the help of the word bank, then find and circle the words in the grid.

T	A	L	U	M	I	N	O	U	S	A	T
R	N	M	D	Y	U	H	K	S	H	B	R
A	W	T	O	E	F	G	L	N	A	C	A
N	S	V	X	N	Z	X	Q	R	D	V	N
S	U	J	W	N	A	W	G	H	O	T	S
L	N	T	A	B	O	O	K	C	W	Y	P
U	Q	M	P	O	G	H	L	D	L	T	A
C	N	W	R	T	F	S	F	I	N	V	R
E	F	O	P	A	Q	U	E	K	R	Q	E
N	J	G	K	T	N	H	M	L	N	P	N
T	U	J	V	C	A	N	D	L	E	S	T

candles	transparent	shadow	translucent
opaque	book	Sun	luminous

1. All the natural light on the Earth comes from the _____.
2. _____, electric lights, and torches are not natural sources of light.
3. Something that gives out light by itself is called a _____ object.
4. A _____, a table, a house, and a door are all examples of non–luminous objects.
5. If we can see through something clearly, we say that it is _____.
6. If we can see through something, but not clearly, we say it is _____.
7. If we cannot see through something at all, we say it is _____.
8. If an object is placed in the path of light, it makes a dark patch called a _____.

Name: _____ Date: _____

1. Draw a circle around the luminous objects:






2. Underline the correct word:

   (a) A dark patch formed when an opaque object is placed in the path of light is called a picture / shadow.

   (b) Light travels in a curved / straight path.

   (c) The shadow of an object is of the same / different shape as the object.

   (d) If the object is near the light source, its shadow is smaller / bigger than the object.

   (e) If the object is far from the light source, its shadow is bigger / smaller than the object.

   (f) When the Sun is directly above our heads, our shadow is above our heads / below our feet.

   (g) In the morning and evening our shadows are shorter / longer.

Heat

Teaching objectives

To explain that fire produces heat
To explain that heat is a form of energy
To explain that heat can do work
To discuss the sources of heat
To describe how we can use heat
To discuss that living things have different ways of keeping warm
To describe that heat can be screened off by intervention of a suitable object
To explain that things which allow heat to pass through are called good conductors
To explain that things which do not allow heat to pass through are called poor conductors
To explain the use of good and poor conductors of heat

Teaching strategy:

Burn a piece of paper or light a candle. Ask a student to bring his hand near it. Ask: What do you feel? Explain that heat is a form of energy. We feel hot if we sit near a heater. Ask: How does a steam engine work? Explain that coal is used to heat water to make steam. The hot steam makes the engine move. Ask: How can heat be made? Tell students to rub their hands together. Ask: Do your hands feel warm? Explain that heat is produced by rubbing things together. Ask: How do we cook food? How do we iron clothes? Why do we sit near a heater in winter? Explain how heat is used by us. Ask: Why do we wear warm clothes in winter? Ask: Why do we stand under the shade of a tree on a hot day? Explain that intervention of a suitable object can screen off heat.

How do animals keep warm? Why does a bird have feathers? Explain that fur and feathers keep the bodies of animals and birds warm. Put a metal teaspoon in a cup of hot water. Touch the handle. It feels hot. Ask: How did the handle become hot? Explain that heat can pass through some solids like metals. Such substances are called good conductors of heat. Ask: Why are handles of cooking pots and cooking spoons made of wood or plastic? Explain that some materials do not allow heat to pass through. They are called poor conductors of heat. Give various examples of good and poor conductors.

Answers to Activities in Unit 9

1. (a) heat (b) energy (c) work (d) burning (e) good
2. (a) Heat is a form of energy.
   (b) Heat energy comes from the Sun and from burning things.
   (c) Animals have hair or fur on their bodies to keep warm.
   (d) Good conductors of heat are solids through which heat can pass.
   (e) Solids through which heat cannot pass are called poor conductors of heat.

Additional Activity

MCQs

(a) Heat makes us feel _____.

warm cold cool [warm]

(b) Heat is a kind of _____.

energy power fuel [energy]

(c) Animals have hair or fur on their bodies to keep _____.

cold warm wet [warm]

(d) Heat energy comes from _____ things.

washing burning blowing [burning]

(e) Metals through which heat can pass are called _____.

poor conductors good conductors semi-conductors [good conductors]

(f) Plastic is a _____ conductor of heat.

good poor weak [poor]

(g) Handles of cooking pots are made of _____ conductors of heat.

good poor weak [poor]

(h) _____ is produced by rubbing our hands.

Water Electricity Heat [Heat]

(i) We sit under a tree to protect ourselves from the heat of the _____.

Sun Moon stars [Sun]

(j) We feel _____ when we are close the source of heat.

cold wet warm [warm]

Lesson plan

Date: Time: 40 mins

Unit 9 **Topic: Heat**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
1. Sources of heat	• to explain that heat is a form of energy • to identify some sources of heat	• describe heat as a source of energy • list some sources of heat	Candle, matches	CW: Q1 Draw and label pictures of some sources of heat.
Key words: heat, energy, source **Method**: Light a candle. Ask the students to bring their hand close to it. **Ask**: What do you feel? Explain that heat makes us feel warm. When we are close to a source of heat, we feel warm. **Ask**: From where does the Earth get heat? Explain that the Sun is the main source of heat for the Earth. If we sit under the shade of a tree we feel cool because we are sheltered from the source of heat—the Sun.				

Lesson plan

Date: Time: 40 mins

Unit 9 **Topic: Heat**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
2. Uses of heat	• to identify different uses of heat	• describe some different uses of heat	Heater, iron	CW: Q2 (a) (b) Write the names of some things in the home which use heat energy to work.
Key words: energy, work **Method**: Discuss the various ways in which we use heat such as for ironing our clothes, cooking, heating the house, etc. Explain that energy is something that helps us to do work. It can also make other things work. **Ask**: From where do we get heat energy? From where does a steam engine get energy to move? What do we use to cook our food? Explain that heat energy comes from burning wood, paper, coal, and other fuels. Ask the students to rub their hands together. **Ask**: What do you feel? Explain that our hands feel hot because heat is produced by rubbing. **Ask**: Why do we wear warm clothes? Explain that warm clothes help to keep the heat that our body produces inside.				

Lesson plan

Date: Time: 40 mins

Unit 9 **Topic: Heat**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
3. Conductors and insulators	• to explain that good conductors are materials that allow heat to pass through • to explain that bad, or poor, conductors are materials that do not allow heat to pass through	• identify good and bad conductors of heat	Cooking pot with a plastic handle, metal spoon with a wooden handle, a metal teaspoon	CW: Q2 (c) (d) (e) HW: In your science journal make a list of good and poor conductors of heat.

Key words: good conductor, poor conductor, metal, wood, plastic

Method: **Ask**: Why do animals living in cold places have a lot of fur? Explain that fur and hair help to keep their bodies warm. Put a metal teaspoon in a cup of hot water. Touch the handle. How does it feel? **Ask**: How did the handle become hot? Explain that heat can pass through some solids, e.g. metals. Such materials are called *good conductors* of heat.

Ask: Why are handles of cooking pots and spoons made of wood or plastic? Explain that some materials do not allow heat to pass through. They are called *poor conductors* of heat. Rubber is another poor conductor of heat.

Name: _____ Date: _____

1. Correct the following statements:

   (a) Fire makes us feel cold.

   _____

   _____

   (b) We feel warm when we are away from the heater.

   _____

   _____

   (c) We can feel the heat of a heater when there is an object between us and the fire.

   _____

   _____

   (d) We sit under the shade of a tree to protect us from the heat of the Moon.

   _____

   _____

   (e) Animals have hair or fur to keep them cool.

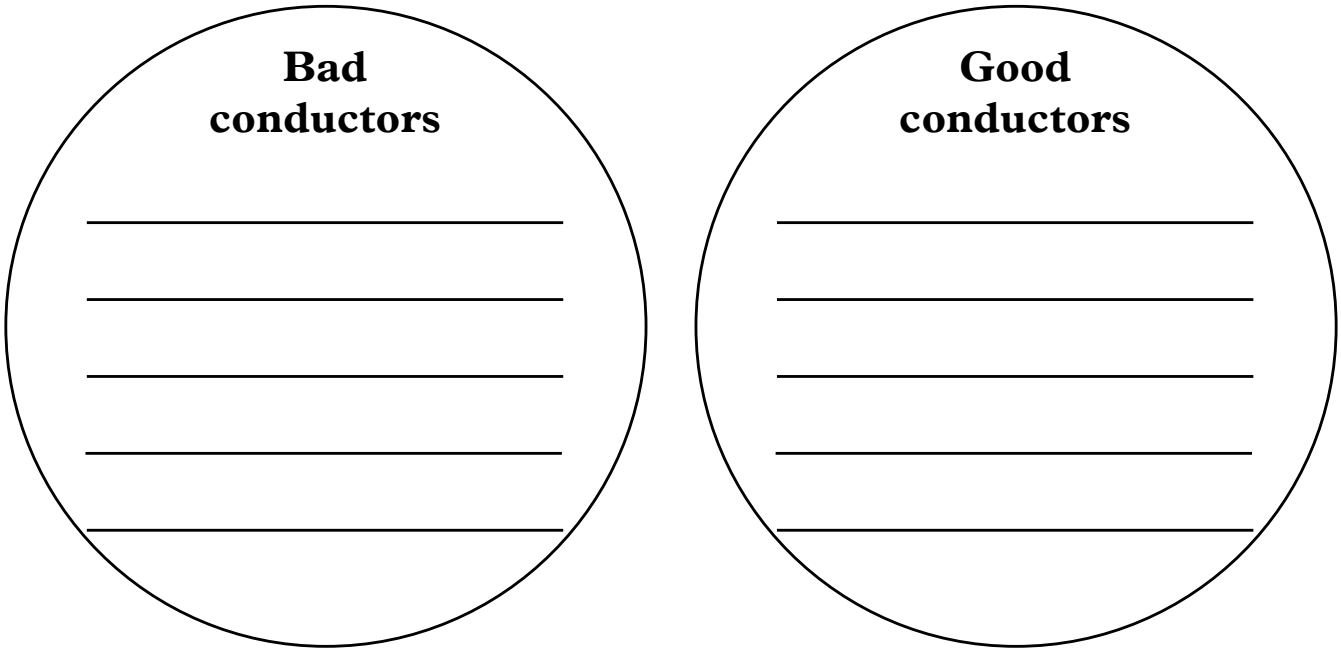
   _____

   _____

Name: _____ Date: _____

1. Circle the correct answer.
   a) A good conductor does / does not allow heat to pass through.
   b) A bad conductor does / does not allow heat to pass through.

2. Write the names of good and bad conductors of heat in the circles.



tin	silver	wood	gold	plastic
rubber	glass	cotton	wool	fur

The Sun and the stars

Teaching objectives:

To explain that stars are in the sky
To explain that stars shine at night
To explain that stars are big and spherical
To explain that stars are very far
To explain that stars are very hot
To explain that stars give off light
To explain that the Sun is a star
To explain that the Sun is a small star
To explain that the Sun is nearer to the Earth than other stars
To discuss the distance between the Sun and the Earth
To explain that the Sun is a ball of hot glowing gases
To discuss that the Sun gives heat and light to the Earth
To discuss the ways in which sunlight is useful

Teaching strategy:

Show the students a picture of the night sky. Point to the Moon and stars.

Ask: When do you see stars? Can you count the stars? Why do stars shine? Why do they look so small? Explain that stars are very big, but they look small because they are very far away. Ask: Have you seen a firecracker? Explain that gunpowder inside the cracker burns. It becomes hot and it gives off light. This is how stars burn and give off light. That is why they seem to twinkle. Show the students a chart of the Sun, the Moon, and the Earth. Indicate the distance between the Sun and the Earth. Explain the difference between the size of the Sun and the Earth.

Ask: How do plants use sunlight? Explain the process of photosynthesis. Ask: Why is sunlight good for us? Explain that sunlight makes us strong and healthy because our skin makes vitamin D in sunlight, which is good for bones.

Explain how sunlight helps in making clouds and rain. Explain the water cycle with a diagram or chart. Also explain how winds are caused by the heating of air by sunlight.

Ask: What would happen if there were no Sun? Explain the importance of sunlight for the Earth and all living things.

Answers to Activities in Unit 10

1. (a) Stars shine at night.

   (b) Stars are big.

   (c) They look small because they are very far away.

   (d) The Sun is a very small star.

   (e) The Sun is 150 million kilometers away from the Earth.

2. (a) Yes (b) No (c) Yes (d) No (e) Yes

3. The Great Bear The Little Bear

Lesson plan

Date: Time: 40 mins

Unit 10 **Topic: The Sun and the stars**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
1. Stars	• to explain that stars shine at night • to explain that the Sun is also a star • to explain that stars form groups called constellations	• recognize the heavenly bodies they see in the night sky as stars • explain that groups of stars which form specific patterns in the sky are called constellations • recognize the Sun as a star	Pictures of the stars and constellations	CW: Q1 HW: Q3 Draw the diagram of a constellation.

Key words: cloud, gas, dust particle, constellation

Method: Show the students a picture of the night sky. Point to the Moon and stars. **Ask**: When do you see stars? Explain that stars are shining all the time but we can see them only at night because during the day the light of the Sun does not allow us to see them. **Ask**: Why do stars shine? Explain that because stars are very far off, they look small; in fact they are huge balls of burning gases and that is why they shine. Show the students pictures of the Great Bear and the Little Bear. Explain that if we gaze at the sky for some time we can see some definite patterns of stars in the sky. These patterns are called constellations. Scientists have given these star shapes names by which we can identify them. Show the students pictures of constellations.

Lesson plan

Date: Time: 40 mins

Unit 10 Topic: The Sun and the stars	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
2. The Sun	• to describe the characteristics of the Sun • to explain the uses of sunlight	• describe the characteristics of the Sun • explain how sunlight is useful for life on Earth		CW: Q2 Draw a diagram to show the sizes and the distances between the Sun, the Moon, and the Earth. Draw the water cycle and a diagram of land and sea breezes on a chart and display it in your classroom.

Key words: star, sun spot, wind, rain, breeze

Method: Show the students a chart of the Sun, the Moon, and the Earth. Indicate the distances between the Sun, the Moon, and the Earth. Compare the sizes of the three. Discuss the importance of the Sun for life on Earth.

Ask: How do plants use sunlight? Revise the process of photosynthesis.

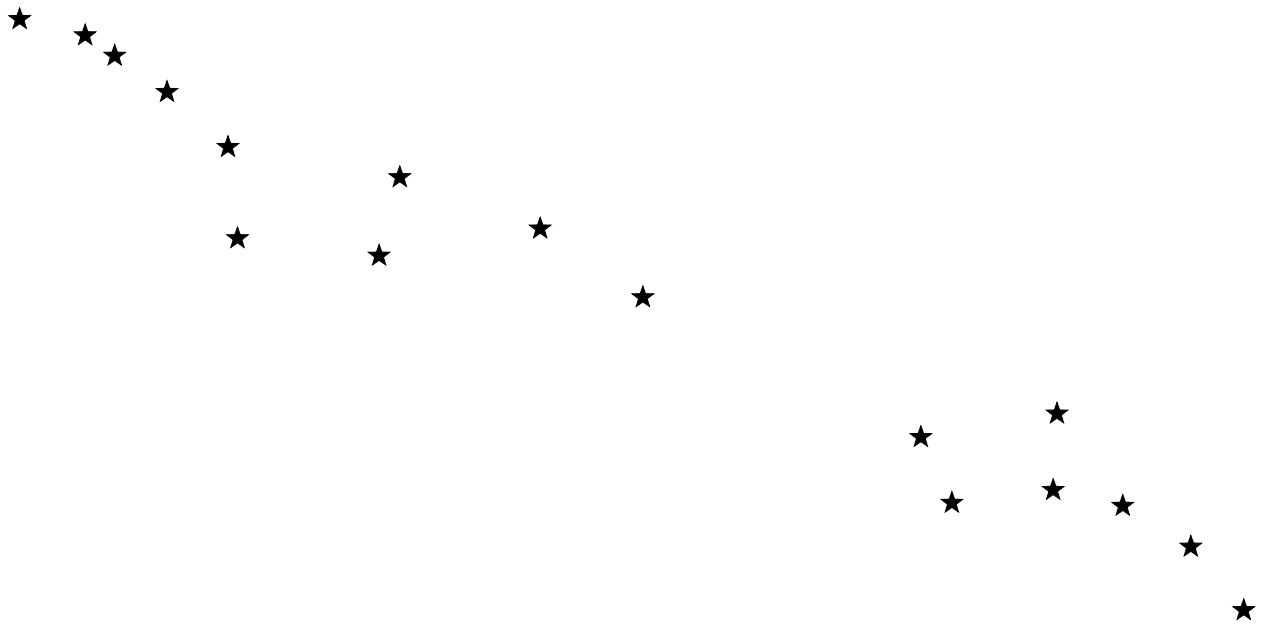
Ask: How is sunlight useful for our bodies? Explain that sunlight makes us strong and healthy, because it helps our skin to make vitamin D. Vitamin D is good for the bones besides so many other things.

Discuss the water cycle and explain how heat from the Sun helps to produce rain. Show the students the chart of land and sea breezes and explain how they are caused.

Ask: What would the Earth be like without the Sun? Explain that the Earth would be very dark and cold and nothing would be able to live there.

Name: _____ Date: _____

1. Draw lines to join the stars to make patterns. Write their names.



2. Fill in the blanks:

   (a) The Sun is a _____.

   (b) The Sun is _____ million kilometres away from the Earth.

   (c) Dark patches on the surface of the Sun are called _____.

   (d) The Sun gives us _____ and _____.

   (e) Sunlight helps our skin to make vitamin _____.

   (f) The heat of the Sun helps to make _____ and rain.

Name: _____ Date: _____

Draw arrows on the diagram to show how land and sea breezes are caused.

The Moon

Teaching objectives:

To explain that the Moon is 400,000 kilometers away from the Earth
To explain that the Moon goes round the Earth in about four weeks
To describe that there are flat plains, mountains, and deep holes on the surface of the Moon
To explain that the Moon has no air
To explain that there are no living things on the Moon
To explain that the Moon does not have its own light
To explain that the Moon gets light from the Sun
To describe the different shapes of the moon during the month
To discuss the different phases of the Moon

Teaching strategy:

Show the students a picture of the night sky. Point to the Moon and stars. Ask: What is the difference between the Moon and the stars? Does the Moon burn like the stars? Is the Moon hot? Does the Moon have its own light? Explain that the Moon is quite near the Earth, but it is not hot, because it does not burn like the Sun and stars.

Ask: Have you seen the full Moon? What do you see? Explain that the grey patches on the Moon are deep holes called craters. Also explain that there are high mountains and flat plains on the Moon.

Ask: Are there any living things on the Moon? Explain that no living thing can survive on the Moon, because it has no air. Explain that scientists who go to the Moon take air in special tanks, so that they can live there for a little while. Draw the different phases of the Moon on the board. Write their names.

Ask: What is the shape of the Moon? What is the shape of the new Moon? Why do we see different shapes of the Moon? Explain that the Moon goes round the Earth. It takes about 28 days to go once round it. As it goes round, sunlight falls on it at various angles and so we can see different shapes at different times of the month.

Answers to Activities in Unit 11

1. (a) The Moon is 400,000 kilometers away from the Earth.
   (b) The Moon takes about 28 days to go once around the Earth.
   (c) The deep holes are called craters.
   (d) The Moon has no air.
   (e) The Moon does not have its own heat and light.
2. (a) Crescent moon (b) Half moon (c) Full moon

Additional Activity

MCQs

(a) Stars shine in the sky _____.

at night | in the morning | in the afternoon | [at night]

(b) Stars are big balls of burning _____.

wood | coal | gases | [gases]

(c) The Sun gives us _____.

Light and water | heat and light | air and water | [heat and light]

(d) The Sun is _____ million kilometres away from the Earth.

130 | 140 | 150 | [150]

(e) The moon is _____ kilometres away from the Earth.

300,000 | 400,000 | 500,000 | [400,000]

(f) Deep holes on the surface of the moon are called _____.

wells | holes | craters | [craters]

(g) Which one of the following statements about the moon is not true?
The moon has air.
The moon does not have its own heat and light.
The moon has many flat plains and mountains. [The moon has air.]

(h) The moon takes about _____ days to go once round the Earth.

14 | 21 | 28 | [28]

(i) Sunlight helps our skin to make vitamin _____.

A | B | D | [D]

(j) The Sun is a _____.

moon | star | planet | [star]

Lesson plan

Date: Time: 40 mins

Unit 11 **Topic: The Moon**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
1. The Moon	• to explain what the Moon is • to describe the characteristics of the Moon	• describe the characteristics of the Moon	Charts and pictures of the Moon; pictures of astronauts and spaceships	CW: Q1 Draw a picture of the Moon showing mountains, craters, and plains. Paste pictures of an astronaut and a rocket in your science journal.

Key words: distance, quarter, size, plain, mountain, crater

Method: Show the students pictures of the night sky. Point to the Moon and the stars. **Ask**: What is the difference between the Moon and the stars? Discuss these differences. **Ask**: Why do we see dark patches on the Moon? Explain that the surface of the Moon has mountains, plains, and deep holes called craters. Discuss the characteristics of the Moon. **Ask**: Are there any living things on the Moon? Explain that nothing can live on the Moon because it has no air or water. Show the students pictures of a spaceship and astronauts. Explain that people who go to the Moon need to wear special clothes and they have to take a supply of oxygen, so that they can live there for a short time.

Lesson plan

Date: Time: 40 mins

Unit 11 **Topic: The Moon**	**Teaching objectives**	**Learning outcomes** The students should be able to:	**Resources/Materials**	**Activities/CW/HW**
2. Phases of the Moon	• to explain that the Moon goes round the Earth once every twenty-eight days	• identify and describe the phases of the Moon	Pictures of the phases of the Moon	CW: Q2
Key words: crescent moon, full moon, half moon **Method**: Show the students pictures of the phases of the Moon. **Ask**: Why do we see different shapes of the Moon at different times of the month? Explain that the Moon goes round the Earth once every twenty-eight days, and we can see different parts of the Moon as it goes round.				

Name: _____ Date: _____

1. Underline the correct word(s).

   (a) The Moon is 150 million km / 400,000 km away from the Earth.

   (b) The Moon is a quarter / half the size of the Earth.

   (c) The Moon takes about 28 / 38 days to go once around the Earth.

   (d) The Moon has many rivers / flat plains.

   (e) The Moon has deep holes / high mountains called craters.

   (f) The Moon gets light from the Sun / Earth.

   (g) The changing shapes of the Moon are called the phases / seasons of the Moon

2. Fill in the blank spaces to explain why the Moon seems to change shape during the month.

   The Moon moves round the _____. As it moves, _____ light falls on a part of its surface. The shape that we see depends on how much of the Moon is lit up by the _____. The changing shapes of the Moon are called the _____ of the Moon.

3. Draw the different shapes of the Moon and write their names.

The Earth

Teaching objectives:

To explain that the Earth is round
To explain that the Earth does not produce its own light
To explain that the Earth gets light from the Sun
To discuss that the temperature of the Earth is just right for living things
To discuss the living things that live on the Earth
To explain that there is a layer of air around the Earth
To explain that air is necessary for living things
To recognize that three-fourth of the Earth is covered with water
To recognize that one-fourth of the Earth is land
To explain that there are many oceans, seas, lakes, and rivers on the Earth
To explain that there are many high mountains, flat plains, and valleys on the Earth
To explain how day and night are formed
To describe the different layers inside the Earth

Teaching strategy:

Show the students a globe. Light a table lamp on top of the globe. Ask: Where does light on Earth come from? Explain that light comes from the Sun. Ask: Is the Earth hot or cold? Which parts of the Earth are hot? Which parts of the Earth are cold? Explain that the Sun is at a suitable distance from the Earth, so it is neither hot nor cold.

Ask: What are the living things found on Earth? Write some names of animals and plants living on Earth. Ask: What do living things need to live? Explain that there is a layer of air around the Earth, which helps living things to breathe. Point to the oceans on the globe. Explain that three-fourth of the Earth is covered with water. Write the names of the oceans on the board. Point to the continents on the globe. Explain that one-fourth of the Earth is land. Explain that land comprises high mountains and flat plains. Draw a mountain on the board.

Place the globe on the table. Light a lamp on one side. Explain that the globe is the Earth and the lamp is the Sun. Spin the globe. Explain that the Earth spins on its axis like the globe. Now turn the globe slowly. Show the students the part where the light falls. Explain that the part that gets the light has day. It becomes hot. The side that is away from the light has night. It is cool. Explain that the Earth spins on its axis once in 24 hours.

Ask the students where in the sky is the Sun when they are coming to school? Where in the sky is it now? Where is it in the evening? Explain that the side from where the Sun rises is called East, and the side where it sets is the West. Draw the directions on the board and write their names. Show the students a compass needle. Explain how it is used to find directions.

Explain that below the ground that we stand on there are many layers inside the Earth. Draw the diagram on the board and talk about the different layers. Explain that the outer layer is called the crust. The crust is covered with things that we see, e.g. oceans, continents, mountains, etc. Explain the various layers under the crust. If possible build a model of the different layers inside the Earth.

Answers to Activities in Unit 12

1. (a) ball (b) plants, animals (c) water (d) axis (e) day
2. (a) The Earth gets heat and light from the Sun.
   (b) Animals and plants need air to breathe.
   (c) Three fourths of the Earth is covered with water.
   (d) The turning of the Earth on its axis causes day and night.
   (e) It takes the Earth 24 hours to turn on its axis.

Additional Activity

MCQs

(a) The Earth gets heat and light form the _____.

Sun Moon stars [Sun]

(b) There is a layer of _____ around the Earth.

water air smoke [air]

(c) How much of the Earth is covered with water?

1/2 3/4 1/4 [3/4]

(d) How much of the Earth is made of land?

1/4 1/2 3/4 [1/4]

(e) The Earth turns on its axis once in _____.

12 hours 18 hours 24 hours [24 hours]

(f) The Earth goes round the Sun in about _____.

30 days 6 months 365 days [365 days]

(g) The innermost layer of the Earth is called the _____.

crust mantle core [core]

(h) The layer of the Earth which has many oceans, mountains, and continents is the _____.

crust mantle core [crust]

(i) The mantle is made of _____.

sand clay rocks [rocks]

(j) The hottest part of the Earth is called the _____.

mantle inner core outer core [inner core]

Lesson plan

Date: Time: 40 mins

Unit 12 Topic: The Earth	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
1. The Earth	• to explain that the Earth is a planet • to describe the characteristics of the Earth	• describe the characteristics of the Earth	A globe, pictures of the Earth, a pie chart showing ¼ land and ¾ water	CW: Q1 Make a clay model of the Earth. CW: Q2 (a) (b) Draw a pie chart to show how much of the Earth is land and how much is water.

Key words: shape, heat, light, plant, animal, air, land, ocean, river, sea, lake, mountain, plain

Method: Show the students a globe. Shine a table lamp on one side of the globe. **Ask**: Where does the light on Earth come from? Explain that the Earth is a planet of the Sun. It gets heat and light from the Sun. **Ask**: Is the Earth hot or cold? Which parts of the Earth are hot and which parts are cold?

Explain that he Sun is at a suitable distance from the Earth, so it is neither too hot nor too cold.

Ask: Where are living things found on the Earth? Explain that living things are found on land, in water, in the air and even inside the soil.

The Earth has all the things necessary for living things to exist on it. It has air, water and soil, and light and warmth. Discuss all the characteristics of the Earth. Show the students the pie chart and explain that one quarter of the Earth's surface is land and three-quarters is water.

Lesson plan

Date: Time: 40 mins

Unit 12 Topic: The Earth	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
2. Night and day	• to explain how the rotation of the Earth causes day and night	• describe how day and night come about	A globe, a lamp	CW: Q2 (c) (d)

Key words: axis, day, night

Method: Place the globe on the table. Shine the lamp on one side of the globe.

Spin the globe. Explain that the Earth spins on its axis, just like the globe. The part on which the sunlight shines has day, the part away from the light has night. Explain that the Earth spins on its axis once in twenty-four hours.

Lesson plan

Date: Time: 40 mins

Unit 12 **Topic: The Earth**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
3. Inside the Earth	• to familiarize students with the different layers of the Earth	• describe the inner structure of the Earth	A drawing of the section of the Earth	HW: Q3
Key words: crust, mantle, inner core, outer core **Method**: **Ask**: What is inside the Earth? Show the students the drawing of the inside layers of the Earth. Explain that the outer layer is the crust. It is covered with features such as oceans, continents, mountains, etc. Discuss the other layers of the Earth and what each is made of.				

Name: _____ Date: _____

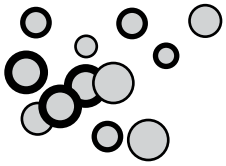
1. Draw the axis on the diagram of the Earth. Colour the side which has day yellow, and the side that has night, black.

2. How many times does the Earth turn on its axis in 24 hours?

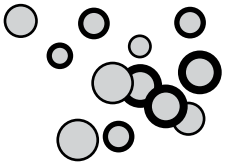
_____.

3. Match the layer of the Earth to its description.

Description	Layer
Hard rocky shell around the Earth, covered with oceans, continents, mountains, islands	inner core
Made up of heavy rocks	outer core
Made up of hot, liquid rocks	crust
The hottest part, made up of solid rock	mantle



UNIT 13



The seasons

Teaching objectives:

To discuss the seasons in a year
To explain the characteristics of each season
To explain how seasons come about

Teaching strategy:

Ask: What are the names of the four seasons? Is it hot or cold in winter? What type of clothes do we wear in winter? Explain that to keep warm we wear woollen clothes in winter. Ask: What is summer like? How do we keep ourselves cool in summer? Explain that we keep ourselves cool by wearing light clothes. Show them pictures of trees with new leaves and trees with fallen leaves. Explain what happens to trees in spring and autumn.

Answers to Activities in Unit 13

1. (a) There are four seasons in a year.
   (b) summer, winter, autumn, and spring.
   (c) The leaves fall in autumn.
   (d) The Earth makes two kinds of movements.
   (e) The Earth takes about 365 days to go around the Sun.
2. (a) warm (b) leaves (c) cool (d) autumn

Additional Activity

MCQs

(a) There are _____ seasons in a year.

4 6 8 [4]

(b) In winter it is very _____.

hot cold pleasant [cold]

(c) People wear light clothes in _____.

summer winter autumn [summer]

(d) The Earth takes about _____ days to circle the Sun.

165 265 365 [365]

(e) Leaves fall off trees in _____.

spring summer autumn [autumn]

(f) When different parts of the Earth face the Sun for some time during the year, the periods are called _____.

months seasons years [seasons]

(g) In which season are the days longer than the nights?

spring winter summer [summer]

(h) In which season are the nights longer than the days?

spring summer winter [winter]

(i) In spring and autumn the length of the days and nights are _____.

long short equal [equal]

(j) In _____ there is less daylight and the days are shorter.

summer autumn winter [winter]

Lesson plan

Date: Time: 40 mins

Unit 13 **Topic: The seasons**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
1. Seasons	• to introduce the four seasons	• describe the four seasons	Pictures of the four seasons	CW: Q1 (a) (b) (c) HW: Q2 Paste pictures of the four seasons on a chart paper and write their names.

Key words: winter, spring, summer, autumn

Method: **Ask**: Is it hot or cold today? When do you feel hot? When do you feel cold? When do new plants and leaves grow? When do leaves fall off trees?

Discuss the four seasons and the type of weather conditions during the seasons. Ask the type of food and drinks and the types of clothes that we use during the different seasons. Discuss what happens to plants and animals during the different seasons.

Lesson plan

Date: Time: 40 mins

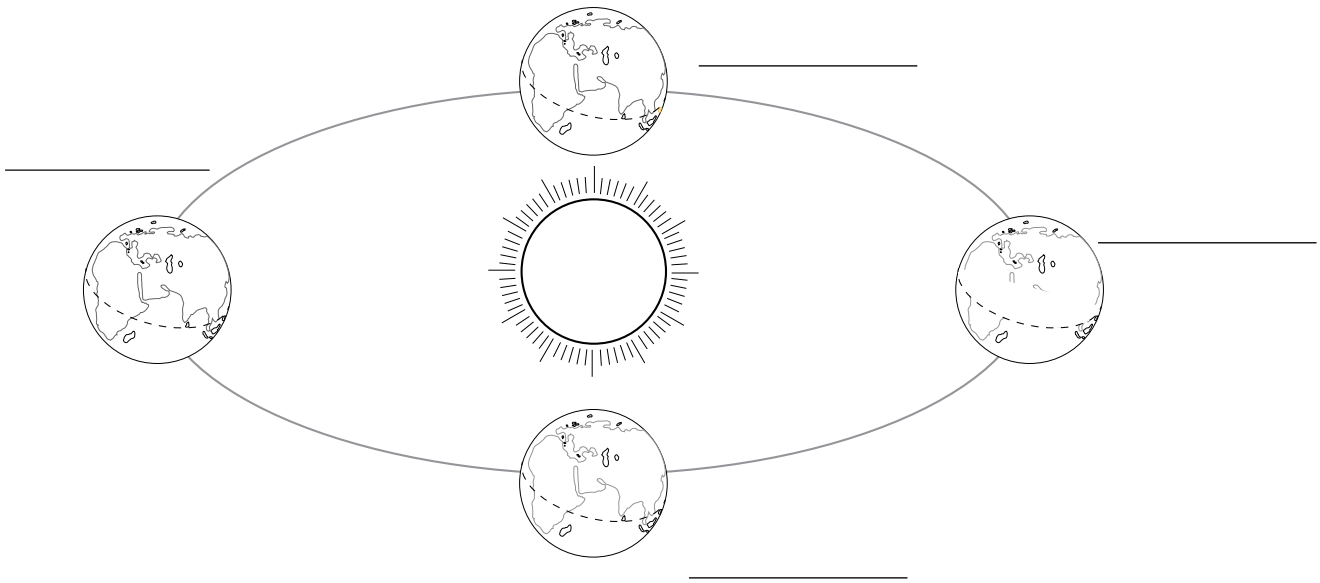
Unit 13 **Topic: The seasons**	**Teaching objectives**	**Learning outcomes** Students should be able to:	**Resources/Materials**	**Activities/CW/HW**
2. How seasons change	• to explain how seasons follow the sequence	• understand how seasons occur	A chart of the orbit of the Earth around the Sun	CW: Q1 (d) (e) HW: Q2 Draw the diagram of how seasons come about.

Key words: year, axis

Method: **Ask**: What causes change of seasons? Explain the revolution of the Earth around the Sun. Explain that during the year different parts of the Earth face the Sun for some time. We call these periods 'seasons'. With the help of the chart explain that in summer the days are longer and hotter and in winter the days are shorter and colder.

Name: _____ Date: _____

1. Name the seasons shown on the diagram.



2. Fill in the blanks:

   (a) The Earth is revolving around the _____.

   (b) The Earth takes _____ day(s) to circle the Sun.

   (c) The period of time it takes for the Earth to circle the Sun is called a _____.

   (d) The periods of the year during which the different parts of the Earth face the Sun for sometime are called the _____.

   (e) In _____ there is more daylight and the days are longer.

   (f) In _____ there is less daylight and the days are shorter.

   (g) In _____ and _____ the days and nights are of equal length.

Assessment

1. How do they move?

a) A frog	walk with our legs.
b) A bird	swims in water with flippers.
c) We	hops on land.
d) A dolphin	flies in the air with its wings.

2. Fill in the table about what animals eat.

Animal	Plants only	Animals only	Both plants and animals
a) cow			
b) goat			
c) tiger			
d) pelican			
e) hen			
f) human			

3. Fill in the table about where animals live.

Animals	Very cold places	Very hot places	Water	Land and water
a) ostrich				
b) sea horse				
c) crocodile				

4. Draw a plant on a separate piece of paper. Draw arrows to show how food and water reach the stems.
5. Write Yes or No.
   a) Herbs have soft, weak stems. ☐
   b) Shrubs have no stems. ☐

6. Fill in the blanks.
   a) A root sucks _____ and _____ from the soil.
   b) Some roots are _____ and strong.

7. Draw.

a) A simple leaf	b) A compound leaf

8. Write the names of three dry, hard fruits.
   a) _____
   b) _____
   c) _____

9. Fill in the blanks.
   a) A _____ is a small machine with which we open a bottle.
   b) The food of a machine is called _____.
   c) The fuel of our body is _____.
   d) Heavy things need a _____ force to be moved.
   e) Light things need a _____ force to be moved.

10. Choose the best answer.
    a) A beam of light is (curved/straight).
    b) The dark patch made by an object is called a (spot/shadow).
    c) The shadow of an object is of the (same/different) shape as the object.
    d) In the evening, our shadows are (shorter/longer).

11. Answer the following questions.
    a) How do we keep warm?
    b) How do birds keep warm?
    c) What is a 'good conductor' of heat?
    d) On a hot day, why might we sit under a tree?

12. Answer the following questions.

    a) How does sunlight help our skin?
    b) Are the stars hot or cold?
    c) How far is the Sun from the Earth?
    d) How do plants use sunlight?

13. Draw and label the various phases of the Moon.

14. Fill in the blanks.

    a) The Earth gets heat and light from the _____.
    b) One-quarter of the Earth is made of _____.
    c) When it is day on one side of the Earth, it is _____ on the other side.
    d) The Earth has a layer of _____ around it.