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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.
Introduction

(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.
Teaching objectives:
To discuss the many kinds of living things that live on the Earth
To explain that the Earth is the only planet which has air and water
To explain that living things need air
To explain that living things need water
To explain that living things need food

Teaching strategy:
Show a globe to the class. Show the continents and oceans. Explain that the Earth has water and land. Explain that there is a layer of air around the Earth. Ask: What do we breathe in? Explain the gases found in air. Explain how oxygen is used to make energy for the body. Ask the students to hold their breath. Explain the breathing mechanism and its importance. Ask: Do fish breathe? Have you seen a fish open and close its mouth in the water. Explain how a fish breathes. If possible bring to class a fish in a glass jar. Ask: How do we breathe? Explain that all land animals breathe by lungs. Ask: Do plants breathe? Explain the position and function of stomata. Explain that insects also breathe by small holes on the sides of their bodies.

Ask: Why do we drink water? Why do we water plants? What will happen to a plant if we do not water it for a few days? Explain the importance of water for all living things. Ask: What is food? Why do we eat food? Explain the importance of food for all living things. Explain how green plants make their own food in sunlight. Ask: Can animals make their own food like plants? What do animals eat? Explain the different kinds of food that animals eat. Explain the terms: herbivore, carnivore, and omnivore with examples. Ask: What happens to the food that we eat? Explain the process of digestion.

Ask: Do we use up all the food that we eat? Explain that excess food is stored. Explain that excess food is stored as a layer of fat under the skin in animals. Explain that excess food in plants is stored in seeds, roots, stems, leaves, and fruits.

Answers to Activities in Unit 1
1. (a) All living things need water and oxygen to live.
   (b) Oxygen helps to burn the food that is inside our bodies. This makes energy. Energy helps living things to move and work.
   (c) Water helps to carry food from one part of the body to another.
   (d) Food is burnt inside the body to make energy.
   (e) All living things need food to stay alive.
2. (a) Earth (b) air (c) gills (d) lungs (e) stomata
   (f) water (g) food (h) herbivores (i) carnivores (j) omnivores

3. (a) herbivore (b) carnivore (c) omnivore (d) herbivore (e) carnivore
   (f) omnivore (g) herbivore (h) carnivore (i) omnivore (j) herbivore

Additional Activity
MCQs
(a) All living things need water, oxygen, and ____________.
   food carbon dioxide nitrogen [food]
(b) Oxygen helps to burn the food inside our bodies to make ____________.
   waste substances energy food [energy]
(c) Plants breathe through tiny holes in their leaves called ____________.
   lungs gills stomata [stomata]
(d) ____________ of our bodies are made up of water.
   1/4 1/2 3/4 [3/4]
(e) ____________ can make their own food in sunlight.
   Human beings Green plants Animal [Green plants]
(f) Animals that eat plants are called ____________.
   herbivores carnivores omnivores [herbivores]
(g) Animals that eat the meat of other animals are called ____________.
   herbivores carnivores omnivores [carnivores]
(h) In animals, food is stored as a layer of fat _________________.
   in the stomach under the skin in the kidneys [under the skin]
(i) Which one of the following animals is an omnivore?
   crow cow lion [crow]
(j) Which one of the following is a herbivore?
   cat hen sheep [sheep]
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| **Topic: Living things** | • to explain the importance of air, food, and water for all living things  
• to describe the means by which living things take in air | • explain the importance of air for all living things                                    | Pictures of living and non-living things, of plants and animals, of lungs, gills, and breathing holes of a caterpillar, magnified picture of a section of a leaf showing stomata | Reading: p 2  
Fill in the table:  
How do the following living things breathe:  
fish _______  
plants _______  
land animals ____  
insects _______  
CW: Q1 (a) (b) |

**Key words:** water, oxygen, breathing, gills, lungs

**Method:** Show the students pictures of some living and non-living things. Ask them to discuss the differences between them. Show the students pictures of plants and animals. **Ask:** Can all animals and plants do the same things? Write a list of the things that living things can do. **Ask:** What is one thing that all animals do? Explain that all animals breathe. Discuss the ways in which animals breathe using pictures of lungs and gills. **Ask:** How do insects breathe? Explain that insects and small animals take air directly into their bodies through their outer coverings. **Ask:** Do plants breathe? Show the students a magnified picture of the stomata on the under surface of a leaf. Explain the position and function of stomata.
## Lesson Plan

**Date:**

**Time:** 40 mins

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<td>2. Living things need water</td>
<td>• to explain that all living things need water to live</td>
<td>• explain the importance of water for all living things</td>
<td>Chart paper, pictures from magazines showing uses of water</td>
<td>HW: Q1 (c) Make a chart to explain the importance of water for living things.</td>
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**Key words:** thirsty, dry, upright

**Method:** **Ask:** Why do we drink water? Do plants drink water? How do plants drink water? What would happen to a plant if it was not watered for a few days? Explain the importance of water for all living things.

Explain that one of the most common substances, which makes up about two-thirds of the weight of plants and animals, is water. Water makes blood liquid. It forms most of our sweat and it carries away waste products from the body. In both plants and animals, it helps to transport food from one part to another, and it stops the body from becoming dry. A plant wilts or dries up if it is not watered.

**Ask:** What does a plant need in order to make its food? Revise the process of photosynthesis with the help of a chart or drawings on the board. Explain how the roots absorb water through the root hairs. Also explain the evaporation of water from the leaves.
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<td>3. Living things need food</td>
<td>• to explain that all living things need food</td>
<td>• describe the importance of food for all living things</td>
<td>Pictures of different kinds of food, pictures of herbivores, carnivores, and omnivores, diagram of photosynthesis in a green plant, a chart of the human digestive system, samples of seeds, fruits, potatoes, carrots, sugar cane</td>
<td>CW: Q2, Q3 Collect pictures of herbivores, carnivores, and omnivores and paste them in your science journals.</td>
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<td>• to examine the eating habits of animals</td>
<td>• explain that plants can make their own food, that animals obtain food in different ways</td>
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<td></td>
<td>• to explain how living things use food</td>
<td>• explain how food is used by the body</td>
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**Key words:** food, energy, herbivore, carnivore, omnivore, fat

**Method:** **Ask:** What is food? Why do we eat food? Explain the importance of food for all living things.

**Ask:** How do plants eat? Discuss the process of photosynthesis and explain it by the help of a chart or a diagram on the board.

**Ask:** Can animals make their own food in the same way as plants? What do animals eat? Explain the different kinds of food that animals eat. Also discuss what herbivores, carnivores, and omnivores eat.

**Ask:** What kind of food do we eat? What are we? **Ask:** What happens to the food that we eat? Explain the process of digestion with the help of a chart. **Ask:** Does our body use up all the food that we eat? What happens to the excess food that we eat? Explain that excess food is stored in the body in different places. In animals most of the food is stored as a layer of fat under the skin. In plants excess food is stored in seeds, roots, stems, leaves, and fruits.
1. Fill in the blanks:
   (a) Living things need ________, ________, and ________ to live.
   (b) ________ is a gas used by the body to produce energy.
   (c) ________ helps to carry food from one part of the body to the other.
   (d) Plants use air, water, and ________ to make their food.
   (e) Food that is taken into the body is broken into ________ particles.
   (f) Animals store food in their bodies as a layer of ________ under the skin.
   (g) Plants store food in their stems, roots, ________ and ________.

2. Match the living thing to its breathing organ:

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<td>insect</td>
<td>stomata</td>
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<tr>
<td>cat</td>
<td>small holes on the sides of the body</td>
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<td>plant</td>
<td>gills</td>
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</table>
Types of living things: Animals

Teaching objectives:
To explain how living things can be classified
To discuss the different classes of animals
To explain that animals can be classified on the basis of having or not having a backbone
To explain the classes of invertebrates
To explain the characteristics of different classes of animals

Teaching strategy:
Show the students a chart of different kinds of animals. Ask them to name the animals. Ask them to divide them into groups of small and big animals. Ask them to pick out animals with four legs, animals with tails, etc. Explain that animals look different. Explain that plants are also of many different kinds.

Explain that living things can be classified into two large groups, i.e. plant group and animal group. Give a brief explanation of the difference between a plant and an animal. Explain that animals can be put into smaller classes.

Ask: Can you name some animals that look like the common cat? Explain that animals can be put into one class if they look alike. Ask the students to feel their backbone. Ask: Which other animal has a backbone? Does a butterfly or an earthworm have a backbone? Explain that animals which have a backbone are put into one group. Explain the importance of the backbone to an animal.

Ask: Where does a snail live? Where does a starfish live? Explain that most invertebrates live in water. Explain that they have soft bodies, and they do not have a bony skeleton. Explain the characteristics of invertebrate classes with examples. Show the students pictures of invertebrate animals. Draw a butterfly on the board. Label its parts. Count the number of legs and wings. Show the eyes and feelers. Explain the parts of the body. Explain the life cycle of a butterfly and a cockroach with the help of a chart.


Ask: Where does a snake live? Where does a crocodile and a tortoise live? Explain the characteristics of reptiles with the help of charts.

mammals with the help of charts. Does a cat lay eggs? Explain that mammals give birth to babies. Ask: What does a baby drink? Explain that mammals give milk to their babies. Explain that a whale is the biggest mammal, and the elephant is the largest land mammal.

**Answers to Activities in Unit 2**

1. (a) two (b) classes (c) bones (d) back (e) soft (f) spines (g) eight, no (h) six, four (i) ten, no (j) five
2. (a) spines (b) a shell (c) soft (d) thorax (e) gills (f) on land and in water (g) dry

4. a. starfish b. spider c. fish d. frog e. snake f. bird g. elephant

**Additional Activity**

**MCQs**

(a) All animals can be put into one group called the ____________.
   living group animal group plant group [animal group]

(b) Animals which have a skeleton of bones can be divided into ____________ classes.
   1 3 5 [5]

(c) A starfish moves about in the water with its ____________.
   legs tube feet fins [tube feet]

(d) A snail has a soft body that is protected by ____________.
   spines bones a shell [a shell]

(e) Animals, which have a soft body and no legs, are called ____________
   worms crabs oysters [worms]

(f) A butterfly has ____________ legs and ____________ wings.
   2, 4 6, 4 4, 6 [6, 4]

(g) The middle part of an insect’s body is called ____________.
   head thorax abdomen [thorax]

(h) Fish breathe in water by their ____________.
   gills lungs skin [gills]

(i) Birds have no ____________.
   beak claws teeth [teeth]

(j) An ____________ is an animal that spends part of its life in water and part of it on land.
   fish amphibian reptile [amphibian]
### Lesson plan

**Date:**

**Time:** 40 mins

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<td><strong>Students should be able to:</strong></td>
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<tr>
<td>1. The animal group</td>
<td>• to explain that living things can be classified into groups</td>
<td>• explain that one way to classify living things is to put them into groups on the basis of their characteristics</td>
<td>Pictures of a variety of animals in a zoo or in their natural environment; some live animals such as a rabbit, a parrot, a fish in a bowl, a few insects</td>
<td>Collect pictures of different kinds of animals and sort them into groups in different ways: large/small water/land fur/feathers meat eaters/plant eaters, etc.</td>
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<td>• to explain how to group or classify animals with similar characteristics</td>
<td>• identify and group animals</td>
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**Key words:** group, class

**Method:** Show the students the pictures of animals. Ask them to name the animals. Ask them to divide the animals into groups of small and large animals. Ask them to identify animals with four legs, two legs, many legs, animals with tails, etc. Explain that animals look different. Help them to observe at least two or three live animals. Ask them to compare the animals by asking the following kinds of questions: How are the animals different? How are they alike? What is the largest animal you can think of? What is the smallest animal you can think of?

Help them to observe at least two or three live animals. Ask them to compare the animals by asking the following kinds of questions: How are the animals different? How are they alike? What is the largest animal you can think of? What is the smallest animal you can think of?

Explain that animals can be divided into smaller groups called *classes*. Show the students pictures of animals of the cat family. Explain that animals that look alike can be put into the same class. In the same way, ask them to name animals of the dog family.
## Lesson plan

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<td>Students should be able to:</td>
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<td>2. Animals with backbones</td>
<td>• to explain that animals can be classified on the basis of having, or not having, a backbone</td>
<td>• identify and classify animals on the basis of the presence or absence of a backbone</td>
<td>Pictures of animals, live specimens, preserved specimens of animals, mounted animals; wallcharts showing body parts of animals</td>
<td>Reading: p 9, 10&lt;br&gt;CW: Q1&lt;br&gt;Collect pictures of different kinds of animals. Divide them into groups: animals with backbones, animals without backbones.</td>
</tr>
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**Key words**: skeleton, bone, support, backbone

**Method**: Show the students pictures of skeletons of different animals. Explain that there are many kinds of animals. Animals can be grouped into two large groups: those that have a backbone and those that do not.

Ask the students what kind of animal they think they are, one with a backbone or without?

Show the students a model of a human skeleton and **ask**: What do our bones do for our body?

Explain that bones provide a frame for our body to rest on, and they protect our lungs, heart, brain and other important organs.

**Ask**: Do all animals have backbones? Explain that some animals do not have backbones. They have hard shells or many shell-like pieces to protect their bodies. Show the students pictures of a crab, a lobster, or some other invertebrate. Explain that animals that have shells belong to the group of animals without backbones. The hard covering protects the soft parts of the animal.
### Unit 2
**Topic:** Types of living things: Animals

<table>
<thead>
<tr>
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<th>Learning outcomes</th>
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<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td>to describe the classes of animals without a backbone</td>
<td>identify invertebrates</td>
<td>Pictures of invertebrate animals such as insects, starfish, snail, worm, butterfly, spider, crab, fly, etc. A chart showing the life cycles of a cockroach and a butterfly</td>
<td>Collect pictures of invertebrate animals and paste them in your science journal. Draw an insect and label it.</td>
</tr>
</tbody>
</table>

**Key words:** spiny skin, tube foot, shell, joint, wing, head, thorax, abdomen

**Method:** Ask the students to feel their backbone. **Ask:** Which animals have a backbone? Does a butterfly or an earthworm have a backbone? Explain that animals that have a backbone are put into one group. Revise the importance of a backbone for an animal.

**Ask:** Where does a snail live? Where does a starfish live? Explain that many invertebrates live in water, on land, and in the soil. They have soft bodies, and they do not have a bony skeleton.

Explain, with examples, the characteristics of animals without backbones. Show the students pictures of invertebrates.

Draw a butterfly on the board. Label its parts. Ask the students to count the number of legs and wings. Indicate the eyes and feelers. Explain the parts of its body.

Discuss the life cycles of a butterfly and a cockroach with the help of a chart.
Name: ______________________  Date: ________________

1. Write the names of the animals to which the skeletons belong:

2. How many legs does each of the following animals have?

<table>
<thead>
<tr>
<th>Animal</th>
<th>Number of legs</th>
</tr>
</thead>
<tbody>
<tr>
<td>fish</td>
<td></td>
</tr>
<tr>
<td>snake</td>
<td></td>
</tr>
<tr>
<td>frog</td>
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<tr>
<td>dog</td>
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<tr>
<td>bird</td>
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<td>worm</td>
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<tr>
<td>butterfly</td>
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<tr>
<td>crab</td>
<td></td>
</tr>
<tr>
<td>spider</td>
<td></td>
</tr>
<tr>
<td>kangaroo</td>
<td></td>
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</tbody>
</table>
Teaching objectives:

To discuss the many kinds of plants on the Earth
To explain that plants grow in different habitats
To explain that green plants can make their own food
To explain that green plants need sunlight, water, air, and chlorophyll to make food
To explain that plants make food in their leaves
To explain that some plants do not make seeds
To discuss that some plants grow from seeds
To describe the structure of a flower
To describe the functions of each part of a flower
To explain how a flower makes seeds and fruits
To discuss the different kinds of fruits
To explain that some plants are not green
To explain how non-green plants get food
To explain that some plants make cones
To discuss the kind of cones
To explain how seeds grow inside the cones

Teaching strategy:


Ask: What is the colour of the leaves of a plant? Why are most leaves green? Explain the presence of chlorophyll. Explain how plants can make their own food. Explain what a plant needs to make food. Ask: What will happen to a plant if you do not water it? What will happen to a plant if you put it in a dark cupboard. Explain how sunlight, water, and air are necessary for photosynthesis.

Ask: Do all plants have flowers? Do all flowers make seeds and fruits? Explain that ferns do not have flowers and fruits. They have sporangia on their leaves which produce spores. Explain that spores grow into new fern plants. Ask the students to name some plants that make seeds. Ask: Where are seeds made in a plant? Are tomato and green chilly, fruits? Explain that a fruit is a part of a plant that has seeds in it.

Show the students some flowers. Take the flower apart, and explain the name and function of each part. Ask: Why do petals have bright colours? Why do flowers have a scent? Explain the importance of
insects for pollination. Explain how fertilization takes place and how seeds and fruits are formed. Ask: What kind of a fruit is a tomato? What kind of a fruit is a bean pod? Explain types of fruits and their importance.

Ask: Are all plants green? Show them a picture of a mushroom, a fungus, and a cuscuta plant. Ask: Can a non-green plant make its own food? How can a non-green plant get its food? Explain how some plants get food from green plants, and how some plants get food from the soil. Draw a mushroom on the board and label it. Explain where it produces spores. Show the students a pine cone. Ask: Have you ever seen this? Where do such trees grow? Explain that pine trees grow in hilly areas. They do not have flowers. They make two kinds of cones. The seed cone makes seeds, and the pollen cone makes pollen. Explain that wind pollination takes place, and seeds fall out and grow into new plants.

Answers to Activities in Unit 3

1. (a) Plants grow in different places. Some in wet, shady places and others in hot and dry places.
   (b) Plants need air, water, and chlorophyll to make their food.
   (c) Spores grow and make new plants.
   (d) Seeds are made in flowers in seed-bearing plants.
   (e) Mushrooms get food from the soil.
   (f) The two kind of cones are called seed cones and pollen cones.

2. (a) bee, pollen, carpel
   (b) tube, ovule, seed, fruit

3. Refer to Pupil’s Book page 19.

4. Refer to Pupil’s Book page 20.

5. (a) soft and fleshy  (b) soft and fleshy  (c) dry
   (d) dry  (e) dry  (f) soft and fleshy
   (g) dry  (h) soft and fleshy

Additional Activity

MCQs

(a) Plants like the cactus grow in ________________________.
   wet shady places  hot and dry places  water [hot and dry places]

(b) Plants need ________________________ to make food.
   air and water  air, water, and chlorophyll  water and chlorophyll [air, water, and chlorophyll]

(c) Plants that do not have flowers cannot make ________________________.
   stems and roots  fruits and seeds  leaves and buds [fruits and seeds]
(d) Ferns and mosses make _________ that can grow into new plants.
   seeds       spores       pollen
   [spores]

(e) The small green leaves that cover the bud are called ___________.
   sepals       petals       carpels
   [sepals]

(f) The fruit is made in the lower part of the carpel called the ___________.
   stigma       style       ovary
   [ovary]

(g) Plants that are not green cannot make ___________.
   flowers       food       fruits
   [food]

(h) Some trees do not have flowers and fruits but they make seeds inside ______.
   carpels       cones       pods
   [cones]

(i) Mushrooms get their food from ___________ in the soil.
   water       animals       humus
   [humus]

(j) Plants that grow from seeds are called ___________.
   Seedless plants     cone-bearing plants     seed-bearing plants
   [seed-bearing plants]

Answer to crossword puzzle on page 24

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<thead>
<tr>
<th>S</th>
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<tr>
<td>C</td>
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<tr>
<td>Unit 3</td>
<td>Teaching objectives</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Topic: Types of living things: Plants</strong></td>
<td>• to explain that there are many different kinds of plants on the Earth</td>
</tr>
<tr>
<td>1. The plant group</td>
<td>• to discuss some of the different habitats of plants</td>
</tr>
<tr>
<td></td>
<td>• to explain that green plants make their own food</td>
</tr>
</tbody>
</table>

**Key words:** food, air, water, chlorophyll

**Method:** Show the students a chart of different kinds of plants. **Ask:** Where do plants grow? Can plants grow in water? In a desert? On a mountain? Explain the various habitats where plants grow.

**Ask:** What colour are the leaves of a plant? Why are most leaves green? Explain that the green colour of plants is due to a green substance called chlorophyll. Revise the process of photosynthesis in a green plant with the help of a wallchart and drawings on the board.

**Ask:** What will happen to a plant if you do not water it? What will happen to a plant if you put it in a dark cupboard? Explain the importance of sunlight, water, and air for a plant to make its food.
<table>
<thead>
<tr>
<th>Unit 3</th>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic: Types of living things: Plants</td>
<td>to describe the different kinds of plants</td>
<td>explain that some plants do not make seeds; they reproduce by producing spores which grow to make new plants</td>
<td>A fern, moss growing on a brick or damp rock, a shoe flower (hibiscus), magnifying glass</td>
<td>Draw a fern. Draw a flowering plant. CW: Q1 (c) (d)</td>
</tr>
<tr>
<td>Kinds of plants</td>
<td>to explain that not all plants produce fruits or seeds</td>
<td>explain that plants that make seeds inside flowers are called seed-bearing plants</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>to explain that some plants produce seeds inside the flowers</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key words:** seed, spore, seed-bearing plant

**Method:** Ask: Do all plants have flowers? Do all flowers make seeds and fruits? Explain that plants such as ferns do not have flowers and fruits. They have small brown spots on their leaves which are formed by a powder made up of tiny spores. Show the students a fern plant with spores in sporangia on the underside of the leaves. Explain that, like seeds, the spores fall, and if they fall on wet soil, they grow into new plants. Show the students some moss growing on a damp brick. Explain that this green mass growing on the brick is a green plant that also produces spores. Help the students to examine the moss through a magnifying glass.

Show the students some flowers. Break open the ovary to show them the ovules inside. Explain that the small ovules that they can see inside the ovary will grow into seeds and the wall of the ovary is going to become the fruit. Draw a longitudinal section of a flower on the board and explain how the ovary turns into the fruit, and the ovules turn into seeds.
### Lesson Plan

**Unit 3**

**Topic: Types of living things: Plants**

<table>
<thead>
<tr>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students should be able to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• to explain that not all plants are green</td>
<td>• explain that non-green plants cannot make their own food by photosynthesis</td>
<td>Pictures of a mushroom, and a cuscuta plant</td>
<td>Make and paint a clay model of a mushroom. CW: Q3 HW: Q1 (e)</td>
</tr>
<tr>
<td>• to explain why non-green plants cannot make their own food</td>
<td>• describe the structure of a mushroom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• to describe how non-green plants obtain their food</td>
<td>• explain how non-green plants obtain their food</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key words:** humus, soil, cap, stipe, spore

**Method:** **Ask:** Are all plants green? Show the students pictures of a mushroom and a cuscuta (a yellow climber). **Ask:** Can a non-green plant make its own food by photosynthesis? Briefly revise the process of photosynthesis and the conditions necessary for it to take place. **Ask:** How can a plant that does not have chlorophyll get its food? Explain the ways by which such plants obtain their food either from green plants or from the soil. Draw a mushroom on the board and label it. Point out the part that produces the spores.
1. Match the kind of plant to its description.

<table>
<thead>
<tr>
<th>Description</th>
<th>Kind of plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has roots, stems, leaves. Does not produce fruits or seeds. Produces spores which grow into new plants.</td>
<td>flowering plant</td>
</tr>
<tr>
<td>Is not green. Cannot make its own food. Produces spores which grow into new plants.</td>
<td>pine tree</td>
</tr>
<tr>
<td>Tree that does not have flowers or fruits. Produces seeds inside cones.</td>
<td>moss and fern</td>
</tr>
<tr>
<td>Plant that has flowers. It produces seeds inside fruits.</td>
<td>mushroom</td>
</tr>
</tbody>
</table>

2. Label the following diagram:
Across
4. The part which contains ovules which grow into seeds
5. This brown powder falls on wet soil and makes new plants
6. The lower part of the carpel

Down
1. Small green leaves that cover the bud
2. The green substance in plants
3. A pine tree has these
**Teaching objectives:**
To explain that everything found on Earth is matter
To explain that matter takes up space
To explain that matter exists in three states
To discuss the properties of solids, liquids, and gases
To explain that matter is made up of molecules
To define a molecule
To discuss that different things are made of different kinds of molecules
To explain that matter can change its state by heating and cooling
To explain that the molecules of a gas are far apart
To explain that the movement of molecules can change the state of matter

**Teaching strategy:**
Show the students some solids and liquids. Ask: What are these things made of? Explain that everything around us is matter. Put some marbles in a box, some oil in a jug, and fill a balloon with air. Explain that matter takes up space. Show the students a marble, an egg, a wooden block. Explain that every solid has a definite shape.

Knock the marble on the table. Ask: Is it hard or soft? Explain that a solid is hard. Squeeze the marble in your fist. Ask: Does the marble change its shape? Explain the properties of solids. Show the students a glass of water or milk. Shake it. Pour the water into an empty jug. Ask: Is the liquid hard? Can it flow? Does it have a fixed shape? Explain the properties of a liquid.

Ask the students to blow on their hands. Untie the string of an inflated balloon, to let the air escape. Ask: Did you see anything? Did you feel anything? Did you hear anything? Explain that air is a gas. We cannot see it, but we can feel and hear it. Explain that a gas is also matter but it has no shape. It can blow from one place to another.

Put a bottle of milk, orange juice, and a cola on the desk. Blindfold three students and ask them to taste one each, and tell the class what they have tasted. Explain that we can know about matter with our senses. We can see colours, hear sounds, taste, and smell things. We can also feel things.

Crush a piece of chalk in a tissue paper. Explain that matter is made of tiny particles smaller than the particles of chalk. These tiny particles are called molecules. Explain that all matter is made of molecules. Ask: Can you taste salt and sugar mixed in water? Explain that molecules of different things are different. You can tell the smell of a perfume or food, because their molecules mix with the molecules of air.
Put a glass full of ice cubes on a sunny window. Ask: What will happen to the cubes after sometime? Explain that matter can change its form. Ask: Why did the ice melt? Explain that heat can change the state of matter. Light a candle. Explain that wax melts due to heat. Ask: What happens when we put water in an ice tray in the freezer? Explain that a liquid can change into a solid by cooling. Heat some water in a beaker. Show the students steam coming out. Ask: What is happening to the liquid? What is steam? Hold a cold plate on top of the beaker. Show the students the water drops that have formed on it. Ask: What has happened? Explain that steam changes to water on cooling.

Put some beads in a tin and shake it. Ask: What is happening to the beads? What would happen if the tin was bigger? Explain the movements of molecules. Explain how molecules slide over each other. Also explain how molecules bang into each other and push each other apart. Explain how this causes a change of shape and a change of state.

Answers to Activities in Unit 4

1. (a) Matter takes up space and has weight.
   (b) Matter has three forms solid, liquid, and gas.
   (c) We learn about matter with our senses.
   (d) Heat can change a solid to a liquid.
   (e) The molecules in a solid are packed very close together.
   (f) The molecules in a gas are very far from each other.

2. (a) yes  (b) no  (c) no  (d) yes  (e) no  (f) yes  (g) no

3. (a) solid  (b) gas  (c) solid  (d) liquid  (e) solid  (f) liquid  (g) gas  (h) solid  (i) liquid  (j) gas

Additional Activity

MCQs

(a) All things around us are made of ____________.
   wood  metal  matter [matter]

(b) There are ____________ states of matter.
   1  2  3 [3]

(c) A ____________ has a definite shape and it is hard.
   solid  liquid  gas [solid]

(d) A ____________ can flow and can change its shape.
   solid  liquid  gas [liquid]

(e) A ____________ has no shape and it can move from one place to another.
   solid  liquid  gas [gas]

(f) The smallest part of matter is called ____________.
   an atom  a molecule  an element [an atom]
(g) A solid can be changed into a liquid by ____________.
  cooling    heating    freezing     [heating]

(h) Water can be changed into steam by ____________.
  freezing  heating    cooling     [heating]

(i) The molecules in a solid are ________________________.
  very far apart    very close together    not very close to each other
  [very close together]

(j) A gas has no shape because its molecules ____________________.
  can slide over each other
  very close together
  can move about freely     [can move about freely]
<table>
<thead>
<tr>
<th>Unit 4</th>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic: Matter</td>
<td>Students should be able to:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 1. What is matter? | • to explain that everything on Earth is matter | • describe matter | Different samples of solids and liquids; a balloon filled with air, some marbles, a tin can, weighing scale, a piece of chalk, milk, cola, orange juice, plastic cups, drinking straws | Reading: p 25, 26  
CW: Q1 (a)  
Write the names of two solids, two liquids, and two gases.  
What is matter made up of? |
| | • to explain that matter takes up space and has weight | • explain that matter has weight and occupies space | | |
| | • to explain the atomic structure of matter | • explain that matter is made up of tiny particles called atoms and that atoms join up to form molecules | | |

**Key words:** matter, weight, space, atom, molecule

**Method:** Show the students a variety of solids and liquids. **Ask:** What are these things made up of?

Explain that everything around us is matter. Put some marbles in a tin, some water in a bottle, and fill a balloon with air. Explain that matter takes up space. Place the tin on a weighing scale. Explain that matter has weight. Ask the students to blow on their hands. **Ask:** What did you feel? Untie the string of an inflated balloon to let the air escape. **Ask:** Did you see anything? Did you feel or hear anything? Explain that air is also matter. We cannot see it but we can feel and hear it.

Put one cup of milk, one of orange juice, and one of cola on the table. Blindfold three students, give them each a straw, and ask them to taste each one and tell the class what they have tasted. Explain that we can learn about matter through our senses. We can see colours, hear sounds, taste, and smell things. We can also feel different things.

**Ask:** What is matter made up of? Crush a piece of chalk in a sheet of tissue paper and show the powder to the students. Explain that matter is made up of very tiny particles, smaller than the particles of chalk. These tiny particles are called atoms. When two or more particles join up with each other, they form a bigger particle called a molecule. **Ask:** Are the atoms and molecules of different things alike? Explain that different things are made up of different molecules.

**Ask:** Why does tea taste sweet when we add sugar to it? Explain that molecules of substances mix with each other. That is why we can smell smoke in the air when something burns.
## Lesson Plan

Date: 

Time: 40 mins

<table>
<thead>
<tr>
<th>Unit 4</th>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topic: Matter</strong></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
| **2. States of matter** | 2. Changes of state | Students should be able to: | A tumbler, ice cubes, a candle, a match box, a plate, a beaker, a burner, a tripod stand | CW: Q1 (b) (d)  
HW: Q2 |
| • to show that matter exists in three states | • explain that matter can exist in three states and that matter can change its state when it is cooled or heated | | |
| • to discuss the properties of solids, liquids, and gases | | | |
| • to describe how the state of matter can change by heating or cooling | | | |

**Key words:** solid, liquid, gas, state of matter, melt, freeze, water vapour

**Method:** Put a glass full of ice cubes on a sunny window sill. **Ask:** What do you think will happen to the ice cubes after some time?

Explain that matter can change its form or state. **Ask:** Why did the ice melt? Explain that heat can bring about a change in the state of matter. Light a candle. Let the students observe it for a while. **Ask:** What is happening to the candle? Explain that wax melts when it is heated.

**Ask:** How do we make ice at home? What happens when we put water in the ice tray and put it in the freezer? Explain that a liquid can change into a solid by cooling. Heat some water in a beaker. Show the students the steam. **Ask:** What is happening to the water in the beaker? How is steam formed? Hold a cold plate above the beaker. Show the students the water droplets that form on it. **Ask:** What has happened to the steam? Explain that on cooling, steam changes into liquid water.
### Lesson Plan

#### Date:

#### Time: 40 mins

<table>
<thead>
<tr>
<th>Unit 4</th>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topic: Matter</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Molecules and movement</td>
<td>to explain that molecules are always in motion</td>
<td>explain that molecules are constantly in motion</td>
<td>A chart showing molecules in a solid, a liquid, and a gas</td>
<td>Reading: p 29</td>
</tr>
<tr>
<td></td>
<td>to explain that the distances between the molecules of a solid, a liquid, and a gas are different</td>
<td>explain that the state of matter is determined by the distance between the molecules</td>
<td></td>
<td>CW: Q3</td>
</tr>
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<td></td>
<td>to explain how the movement of molecules can bring about a change in the state of matter</td>
<td>explain that the speed at which the molecules of a material move brings about the change of state</td>
<td></td>
<td>Draw the arrangement of molecules in a solid, a liquid, a gas.</td>
</tr>
</tbody>
</table>

**Key words**: space, slide, arrange, shape

**Method**: Put some beads in a tin can and shake it. **Ask**: What is happening to the beads? What would happen if the tin can was bigger? Explain the movement of molecules in solids, liquids, and gases. Explain that molecules slide over each other. Also explain how molecules bang into each other and push each other apart. Explain how this causes a change of shape and a change of state in matter.
1. Place the material named below under the correct heading.

<table>
<thead>
<tr>
<th>Solid</th>
<th>Liquid</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

oil   wood   air   carbon dioxide   rock
water   oxygen   petrol   smoke

2. Match the description to the correct state of matter:

<table>
<thead>
<tr>
<th>Description</th>
<th>State of matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>It can flow. It changes shape easily. Its volume can be changed.</td>
<td>Solid</td>
</tr>
<tr>
<td>It flows. It changes shape easily. Its volume cannot be changed.</td>
<td>Liquid</td>
</tr>
<tr>
<td>It does not flow. Its shape does not change. Its volume cannot be changed.</td>
<td>Gas</td>
</tr>
</tbody>
</table>
1. 

- a. Which diagram represents a solid? ________
- b. Which diagram represents a liquid? ________
- c. Which diagram represents a gas? ________
- d. In which state are the particles closest together? ________
- e. In which state are the particles farthest apart? ________
- f. In which state are the particles moving the fastest? ________
- g. What happens to the particles when a solid is heated? ________
- h. What happens to the particles when a liquid is cooled? ________

2. Word search

Fill in the blanks with suitable words. Then find and circle those words in the grid.

- a. Two or more atoms join up to form this. ____________
- b. When water is boiled it changes to this. ____________
- c. Everything on Earth is made of this. ____________
- d. It takes up the shape of the container it is poured into. ____________
- e. It cannot change its shape or size. ____________
- f. Its molecules are very far away from each other. ____________
Teaching objectives:
To explain that air covers the Earth like a thick blanket
To explain that the atmosphere has many gases and is 1000 kilometres deep
To discuss the importance of oxygen and carbon dioxide
To explain that plants give out oxygen
To explain that carbon dioxide is produced by breathing and burning
To discuss the condition of the air in different seasons
To explain that air has weight
To explain that air exerts air pressure
To explain that air pressure keeps changing
To explain that changes in air pressure affect the weather
To explain that winds are caused by changes in air pressure
To discuss the instrument to measure air pressure
To explain how to find the direction of wind and how to measure the speed of wind

Teaching strategy:
Draw a globe on the board. Outline the atmosphere around it. Explain the layer of the atmosphere around the Earth. Explain its importance for living things. Ask: Can you name some gases in the atmosphere? Which gas do we breathe in? Which gas do we breathe out? Explain gaseous exchange in plants and animals. Also explain how burning things use oxygen and give out carbon dioxide.

Light a candle and cover it with an empty glass. Explain what has happened. Ask: Why did the candle go out? Explain the importance of oxygen in burning and breathing.

Ask: What is the day like today? Is it hot or cold? Why is it hot or cold? Explain the temperature of air according to the season. Ask: Do wet clothes dry faster on a sunny day or a rainy day? Explain the reason for it.

Perform the balloon experiment. Ask: Which was heavier? Explain that air has weight and it presses on all things. Explain that we do not feel the weight of air because we are used to it. Ask: Why do our ears feel closed up when we go uphill in a car? Explain changes in the weight of air as we go uphill. Explain that the air has ‘pressure’.

Explain that hot air is lighter and rises, and cold air rushes to take its place. Ask: What causes wind to blow? Explain that moving air causes winds, breezes, storms, and hurricanes. Make a simple barometer as given in the book. Explain that changes in air pressure can be measured by a barometer. Also explain how a wind vane helps us to know the direction of the wind. Help students to make a wind vane out of cardboard. Explain that an anemometer is used to find the speed of wind.
Answers to Activities in Unit 5

1. (a) The atmosphere is a huge layer of air all around the Earth. It is made up of many gases, dust particles, and germs.
(b) Green plants add oxygen to the atmosphere.
(c) Carbon dioxide is added to the air by breathing and burning.
(d) The way air presses down on all things is called air pressure.
(e) Experiment on page 33.

2. (a) atmosphere
(b) 1000
(c) carbon dioxide
(d) warm
(e) water vapour
(f) cold
(g) wind
(h) breeze
(i) gale
(j) hurricane

Additional Activity

MCQs

a) The layer of air around the Earth is called _________________.
   biosphere atmosphere hemisphere [atmosphere]

b) The atmosphere is ________________ km deep.
   1000 2000 3000 [1000]

c) ________________ gas in the atmosphere is used by living things for breathing and burning.
   Oxygen Carbon dioxide Nitrogen [Oxygen]

d) All living things give out ________________ gas when they breathe out.
   oxygen carbon dioxide nitrogen [carbon dioxide]

e) On a bright sunny day the air is ________________.
   cold warm dry [warm]

f) The atmosphere is made up of the following gases _________________.
   oxygen, carbon dioxide, nitrogen
   oxygen and nitrogen
   oxygen and carbon dioxide [oxygen, carbon dioxide, nitrogen]

g) The way air presses down on all things is called _________________.
   water pressure mercury pressure air pressure [air pressure]

h) Warm air is ________________ cold air.
   lighter than heavier than as heavy or as light as [lighter than]

i) The strongest wind that blows is called a _________________.
   breeze gale hurricane [hurricane]

j) We can measure changes in air pressure by an instrument called a _________________.
   thermometer anemometer barometer [barometer]
### Lesson plan

**Unit 5**  
**Topic: Air**

<table>
<thead>
<tr>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
</table>
| Students should be able to:  
- to explain that there is a layer of air that surrounds the Earth  
- to describe the composition of the atmosphere  
- to explain the importance of the gases found in the atmosphere  |  
- explain what the atmosphere is and that it is made up of many gases  
- describe the properties of the main gases in the atmosphere  
- explain the importance of the atmosphere for life on Earth  | A pie chart of the gases in the atmosphere, a green pot-plant, a candle, a match box, an empty glass | Reading: p 32  
HW: Q1 (b) (c)  
CW: Q3 |

**Key words:** atmosphere, germ, dust particle, oxygen, carbon dioxide, nitrogen, water vapour

**Method:** Draw a globe on the board. Draw an outline of the atmosphere around it. Explain that there is a layer of air around the Earth which is called the atmosphere. It is more than 1000 km deep. Explain the importance of the atmosphere for all living things. **Ask:** Can you name some gases in the atmosphere? Which gas do we breathe in? Which gas do we breathe out? Which gas do plants use for making their food? Explain how gaseous exchange takes place in plants and animals. Also explain that oxygen is used for burning things and carbon dioxide is produced by burning. Light a candle and cover it with an empty glass. **Ask:** What has happened? Why do you think the candle went out? Explain the importance of oxygen for breathing and burning. **Ask:** What is the weather like today? Is it hot or cold? **Ask:** Do wet clothes dry faster on a sunny day or on a cloudy or rainy day? Explain that when the air is warm, the air is dry so clothes dry faster. On a rainy day there is already a lot of water vapour in the air so clothes do not dry quickly.
<table>
<thead>
<tr>
<th>Unit 5</th>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
</table>
| Topic: Air | Students should be able to: | • to explain that air exerts pressure  
• to demonstrate that air has weight | • explain that air has weight and that it exerts pressure | two balloons—one deflated, the other inflated; a long, straight stick, some thread | Reading: p 32, 33  
Draw the balloon experiment to prove that air has weight.  
HW: Q1 (d) |

**Key words:** air pressure, weight

**Method:** **Ask:** Why do you feel a blast of wind when you bang a door? Why do your clothes flap around in the wind? Explain that the way air presses down on everything is called air pressure. **Ask:** Why do our ears feel blocked when we go uphill in a car or a bus? Explain that as we climb up, the air pressure starts to lessen and we can feel it. Perform the balloon experiment. **Ask:** What does this experiment tell you about air? Explain that it tells us that air has weight. We do not feel the weight of the air because we are used to it.
### Unit 5
#### Topic: Air

<table>
<thead>
<tr>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Air pressure and weather</td>
<td>Students should be able to:</td>
<td>Pictures of a barometer, an anemometer, a wind vane, a chart of land and sea breezes, a bottle, a tub of water, rubber bands, some string, a ruler, a scale drawn on a strip of paper</td>
<td>Reading: p 33, 34&lt;br&gt;CW: Q2&lt;br&gt;HW: Q4&lt;br&gt;Make a simple barometer. (p 34)</td>
</tr>
</tbody>
</table>

**Teaching objectives**
- to explain that air pressure keeps changing, and that changes in pressure cause winds and rain
- to describe how speed and direction of wind can be measured
- to explain how air pressure can be measured
- explain that air pressure changes and that these changes affect the weather
- identify the instruments by which air pressure and the speed and direction of wind can be measured

**Learning outcomes**

**Resources/Materials**

**Activities/CW/HW**

**Key words**: weather, barometer, anemometer, wind vane

**Method**: **Ask**: Do you know how wind is caused? Explain that hot air is lighter than cold air. When the Sun shines on the Earth, the air close to the surface becomes hot and it rises. When this happens, cold air rushes to take its place. This causes the wind to blow. In the same way, storms and hurricanes are caused. **Ask**: Can we measure air pressure? Show the students pictures of a barometer and explain how it works. Also help them to make a simple barometer as explained at the end of the unit. Discuss other instruments like the anemometer which helps us to measure the speed of the wind, and the weather vane which tells us the direction of the wind.
1. Draw a pie chart showing the amount of nitrogen, oxygen, and carbon dioxide in the atmosphere.

2. Fill in the blanks to describe the properties of air:

   The layer of air which surrounds the Earth is called the _________.
   It is ________ km deep. It is made up of many _________. It also contains ________ and _________. Oxygen is used for ________ and _________. Carbon dioxide is used by plants for making _________.

3. Draw lines to match the properties to the gases.

   Used by green plants to make their food  Carbon dioxide
   Given out by all living things during breathing
   Given out by plants when making their food  Oxygen
   Given out when things burn
   Taken in when living things breathe
Teaching objectives:
To explain that water is matter
To explain that water exists in three forms
To describe how water can be changed from one form to another by heating or cooling
To explain that there is water vapour in the air
To discuss how clouds, mist, fog, and snow are formed
To explain the water cycle
To describe how groundwater is collected
To describe how springs and wells are formed
To discuss how water is used

Teaching strategy:
Show the students ice cubes, liquid water, and steam. Ask: What form of water is ice? What happens when ice melts? What happens to water when we boil it? Explain the three states of water. Ask: Why did the ice melt? Why did water change into steam? Explain that heat brings about the change, referring to the chapter on ‘matter’. Ask: What happens to water when we put it in the freezer. What happens to steam when we hold a cold plate near it? Explain that the change of state is brought about by cooling.

Ask: How do clouds form? What are clouds? What is mist and fog? What is snow? Explain the presence of water vapour in the air, and the formation of clouds, mist, snow, etc. Draw the water cycle on the board. Ask: What happens to rainwater? Explain the formation of rivers and seas.

Ask: What is a spring? What is a well? How do we get water from a well? Explain the collection of groundwater and how springs are formed. Show the water cycle by a diagram or chart. Explain how a well is dug to reach the groundwater. Ask: How do we use water? Explain the uses of water in our daily lives.

Answers to Activities in Unit 6
1. (a) Water can be changed from solid to liquid form by heating.
   Water can be changed from liquid to solid form by freezing.
   (b) High in the sky it is very cold. Water vapour that rises high above the land cools down to form clouds.
   (c) Rainwater gathers in the spaces between the rocks. This water is called groundwater.
   (d) Water is used for drinking, washing, fire-fighting, boating, bathing, etc.
   (e) Sometimes we dig deep holes in the ground to reach groundwater. These deep holes are called wells.
2. (a) ice  (b) water vapour  (c) water  (d) rain
   (e) crystal  (f) snowflakes  (g) rain
Additional Activity

MCQs

(a) The gaseous form of water is called _____________.
   - ice
   - water
   - steam
   [steam]

(b) High up in the sky it is very _____________.
   - cold
   - hot
   - wet
   [cold]

(c) Water vapour in the air cools down to form _____________.
   - ice
   - clouds
   - rain
   [clouds]

(d) Clouds that are formed near the ground are called _____________.
   - snow
   - fog
   - clouds
   [fog]

(e) When tiny drops of water in the clouds freeze they form small shapes of ice called _____________.
   - snow flakes
   - crystals
   - water vapour
   [crystals]

(f) The way that water goes from the sea to the atmosphere and back again as rain is called _____________.
   - water cycle
   - bicycle
   - rock cycle
   [water cycle]

(g) Water that gathers in the spaces between rocks is called _____________.
   - river water
   - sea water
   - ground water
   [ground water]

(h) Ground water can come out of holes and cracks in the ground to make a _____________.
   - well
   - spring
   - fountain
   [spring]

(i) Deep holes dug in the ground to reach ground water are called _____________.
   - springs
   - fountains
   - wells
   [wells]

(j) Water can be changed from ice into steam by _____________.
   - heating
   - cooling
   - evaporation
   [heating]

Answer to crossword puzzle on page 45

C
S P R I N G
Y
W S W
A T E
S T E A M
E L L
R
### Unit 6
**Topic**: Water

#### Teaching objectives

<table>
<thead>
<tr>
<th>Students should be able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• to explain what ground water is</td>
</tr>
<tr>
<td>• to explain how ground water collects</td>
</tr>
<tr>
<td>• to describe how springs are formed</td>
</tr>
<tr>
<td>• to discuss how we use water</td>
</tr>
</tbody>
</table>

#### Learning outcomes

<table>
<thead>
<tr>
<th>Resources/Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pictures of ground water, spring, well</td>
</tr>
</tbody>
</table>

#### Activities/CW/HW

| Reading: p 39, 40 |
| CW: Q1 (c) (e) |
| HW: Q1 (d) |
| Q4 |

### Key words

- groundwater
- spring
- well
- use

### Method

**Draw a diagram of the water cycle on the board.**

**Ask:** What happens to rain water? Where does it go? Explain that most of the water flows down to rivers and lakes, and some of it flows along the ground and soaks into it. Where does it collect? Explain that it collects in the spaces between the rocks.

**Ask:** What is a spring? How is a spring formed? Explain that ground water sometimes flows out of a hole or a crack in the ground and this forms a spring.

**Ask:** How can we reach ground water? Explain that in some places we dig deep holes in the ground to reach the ground water. These deep holes are called wells.

**Ask:** How do we use water. Discuss the various ways we use water. Also discuss the importance of water and the ways in which we can avoid wasting it.
## Unit 6
### Topic: Water

<table>
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<tr>
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<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2. The water cycle</strong></td>
<td>Students should be able to:</td>
<td>Chart of the water cycle, pictures of clouds, ice crystals</td>
<td>Reading: p 37, 38, 39 CW: Q2, Q3 HW: Q1 (b)</td>
</tr>
<tr>
<td>• to explain the water cycle</td>
<td>• describe the water cycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• to explain how clouds are formed</td>
<td>• identify the different types of clouds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• to describe fog, mist, snow, and ice</td>
<td>• explain how mist, fog, snow, and ice are formed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• to explain the formation of ice crystals and snow flakes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key words:** water cycle, cloud, mist fog, snow, ice, crystal, snowflakes

**Method:** **Ask:** What are clouds? How do clouds form? Explain the processes of evaporation, condensation, formation of clouds, and rain. **Ask:** What is mist and fog? How are they formed? Explain that on cold nights clouds may be formed near the ground. This is called mist. Fog is thicker than mist, as it contains a lot of dust particles mixed with water vapour. Show the students pictures of the different kinds of clouds. Discuss the differences between them. **Ask:** What is ice, what is snow? What is the difference between them? Explain that when it is very cold, drops of water in the clouds freeze to form ice. Each tiny piece of ice is called a crystal. Crystals join up to form snowflakes which fall to the ground as snow.
# Lesson plan

**Unit 6**  
**Topic:** Water

<table>
<thead>
<tr>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
</table>
| 3. Ground water and uses of water  
• to explain how ground water collects  
• to describe how springs are formed  
• to explain what ground water is  
• to discuss how we use water  |  
• explain how ground water collects in spaces between rocks  
• explain how a spring is formed  
• explain how ground water can be reached by digging wells  
• list some of the uses of water  |  
Pictures of ground water, spring, well  |  
Reading: p 39, 40  
CW: Q1 (c) (e)  
HW: Q1 (d) Q4  |

**Key words:** groundwater, spring, well, use

**Method:** Draw a diagram of the water cycle on the board. Ask: What happens to rain water? Where does it go? Explain that most of the water flows down to rivers and lakes, and some of it flows along the ground and soaks into it. Where does it collect? Explain that it collects in the spaces between the rocks. Ask: What is a spring? How is a spring formed? Explain that ground water sometimes flows out of a hole or a crack in the ground and this forms a spring. Ask: How can we reach ground water? Explain that in some places we dig deep holes in the ground to reach the ground water. These deep holes are called wells. Ask: How do we use water? Discuss the various ways we use water. Also discuss the importance of water and the ways in which we can avoid wasting it.
1. Fill in the blanks to describe the water cycle:

High up in the sky it is very __________. Water vapour that rises high above the land cools and forms __________. Clouds contain millions of tiny drops of __________. When clouds pass over a __________, the tiny drops of water join to form bigger drops. These bigger drops of water are too heavy to float in the air, so they fall to the ground as __________.

Tiny drops of water in the clouds can freeze to form __________ when it is very cold. Each piece is called a __________. These grow bigger and fall to the ground as __________ flakes.

2. Name the type of cloud:

Clouds that form near the ground on a cold, clear night __________

Thin layers of cloud __________

Thick, white clouds __________

Thick, dark clouds __________
Crossword puzzle

Across
2. A place where groundwater flows out through a crack in the ground
5. State of water in the form of a gas

Down
1. Frozen drops of water in the clouds
3. A substance found in all three states of matter
4. A deep hole dug in the ground to reach water
Teaching objectives:

To describe force
To explain that force can move things
To explain that force can change the direction of moving things
To explain that force can bend things
To explain that force can stretch things
To explain that force can break and tear things
To define work
To explain that work needs energy
To discuss the different kinds of energy
To explain the different sources of energy
To describe friction
To discuss the advantages and disadvantages of friction
To describe ways to reduce friction

Teaching strategy:

Tell a student to lift a chair, to lift a heavy bag, to push a table, to blow up a balloon. Ask: What were you doing? Were you pushing or pulling? Explain that pushes and pulls are called force. Explain the things force can do with examples from the book.

Ask: What is work? Do you get tired when you work? Can you work if you are hungry? Explain that pushes and pulls are work. When we work we need energy. Explain that energy is a force. We get energy from food. A machine needs energy. Plants need the Sun’s energy.

Ask: How does a steam engine move? How do fans and motors move? Explain the various sources of energy and how they are used to move things. Tell students to rub their hands together. Tell them to rub their hands on the desk. Strike a matchstick against the matchbox. Ask: What happens when you rub things together? Explain the force of friction. Explain that a moving thing will continue to move on a smooth surface, but if the surface is rough it will slow down and then stop.

Ask: Can you run on a slippery road? Can you walk on ice? Explain the advantages of friction. Ask: What will happen if you rub two pieces of metal together? Explain the disadvantages of friction. Ask: Have you seen a mechanic putting oil in a machine? Why does he do it? Explain that parts of a machine rub against each other. They become hot and they wear away. Oil makes the parts slide over each other easily, and so they do not wear away. Oil reduces the friction between the moving parts.
Answers to Activities in Unit 7

1. (a) A force is a push or pull.
   (b) If we want to do something, we do it by pushing or pulling. When an object is moved to some distance it is called work.
   (c) The force which pulls objects towards the Earth is called gravity.
   (d) The different kinds of energy are solar energy, heat energy, electrical energy, and light energy.
   (e) Oil makes the parts slide over each other and there is less friction between them. Hence, we put oil to reduce friction. Another way of reducing friction is by using ball-bearing.

2. (a) energy (b) energy (c) Sun’s (d) Heat (e) Electrical
   (f) Solar energy (g) Friction (h) friction (i) hot (j) friction

3. (a) electrical energy (b) chemical energy (c) heat energy

4. (a) C (b) A (c) C (d) A (e) gravity

Additional Activity

MCQs

(a) When we are pushing or pulling something we are using ____________.
    force pressure energy [force]

(b) When an object is pulled through some distance we call it ____________.
    force pressure work [work]

(c) The force that we need to do work is called ____________.
    force pressure energy [energy]

(d) The energy from the Sun is called ____________.
    solar energy electrical energy sound energy [solar energy]

(e) Heat energy comes from ____________.
    burning things power stations wind [burning things]

(f) Steam engines use ____________ energy to make them move.
    electrical heat light [heat]

(g) Electrical energy comes from ____________.
    the Sun burning things power stations [power stations]

(h) Light energy helps us to ____________.
    see things hear sounds move things [see things]

(i) The force, which pulls objects towards the Earth, is called ____________.
    electricity gravity energy [gravity]

(j) Washing machines use ____________ energy to wash clothes.
    solar electrical heat [electrical]
<table>
<thead>
<tr>
<th>Unit 7</th>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
</table>
| Topic: Force | Students should be able to: | • to describe force and to explain what it can do  
• to define work and to explain that work needs energy | Sheet of paper, wooden ruler, rubber band, piece of copper wire, toy car, a wooden table | Reading: p 44, 45  
CW: Q4  
HW: Q1 (a) (b) |

1. What is force?  
Work and energy

• define force and explain what force can do  
• explain that when we push or pull something to make it move, we are doing work  
• identify the force needed to do work as energy

Key words: force, push, pull, bend, tear, stretch, work, energy

Method: Ask some students to do these activities: lift a chair, lift a heavy bag, push a table, blow a balloon. Ask: What are you doing? Were you pushing or pulling? Explain that pushes and pulls are forces. Explain, with examples from the unit, some of the things that force can do. Ask: What is work? How do you feel when you have been working? Can you work well when you are hungry or tired? Explain that pushing or pulling something is doing work. Ask: What do you need in order to work? Explain that we need energy to work. Ask: From where do we get energy? Discuss the different kinds of food that give us energy to work and play. Ask: What work does a machine do? Does it need energy? Explain that all machines need energy to work. Discuss some forms of energy that machines need such as electricity, heat, etc.
### Unit 7
**Topic: Force**

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<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Forms of energy</td>
<td>• to describe the different forms of energy and their sources</td>
<td>• identify the different forms of energy and their sources</td>
<td>Pictures of the Sun, a steamboat, an electric fan, a table lamp</td>
</tr>
</tbody>
</table>

**Key words:** solar energy, heat energy, electrical energy

**Method:** Ask: From where do we get energy to work and play? How do machines get their supply of energy? Explain that we get energy from food. A machine gets energy from fuel such as petrol, gas, or coal. Plants use energy from the Sun to make their food. **Ask:** How does a steam engine move? How do fans and motors move? Explain the various sources of energy and how they are useful. Solar energy is the energy from the Sun. Explain how plants use it to make their food. We use solar energy trapped by plants when we eat fruit and vegetables. Animals use it the same way. Heat energy comes from burning fuels such as coal, gas, and oil. Electrical energy is produced in power stations. It is used to make most machines work. Electricity makes our work easier. Light energy comes from the Sun as well as from other light sources such as lamps, candles, etc. Ask the students to make a list of machines that use energy to help us in our work.
### Lesson plan

**Date:**

**Time:** 40 mins

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<thead>
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<th>Unit 7</th>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
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</thead>
<tbody>
<tr>
<td><strong>Topic: Force</strong></td>
<td><strong>Students should be able to:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Force of gravity</td>
<td>• to define the force of gravity and describe how it is helpful to us</td>
<td>• explain what gravity is and how gravity is useful for us</td>
<td>Rubber ball, a toy swing, a box of matches, ball bearings</td>
<td>Reading: p 46, 47, 48</td>
</tr>
<tr>
<td>Force of friction</td>
<td>• to explain what the force of friction is and how it is useful for us</td>
<td>• explain what the force of friction is</td>
<td></td>
<td>CW: Q2</td>
</tr>
<tr>
<td></td>
<td>• to explain the harmful effects of friction</td>
<td>• explain the useful and harmful effects of friction</td>
<td></td>
<td>HW: Q1 (c) (e)</td>
</tr>
<tr>
<td></td>
<td>• to explain how friction may be reduced</td>
<td>• describe the ways by which friction can be reduced</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key words:** gravity, friction

**Method:** Ask the students to rub their hands together. Ask them to rub their hands on their desks. Strike a matchstick against a matchbox. **Ask:** What happens when you rub things together? **Ask:** Why do things become hot by rubbing? Explain that rubbing produces heat because of a force called friction. **Ask:** Can you run on a slippery road? Can you walk on ice? Explain that you cannot walk on smooth surfaces because there is no friction. Friction is a force that slows down/stops things from moving. It helps us to run and ride a bicycle because it helps our shoes and the tyres to grip the road, otherwise we would slip and fall. **Ask:** Can friction be harmful? Explain that if there is too much friction between the moving parts of a machine they will wear out. Friction is one reason why our shoes and clothes wear out. **Ask:** Have you seen a mechanic putting oil in a machine? Explain that the reason why the moving parts of a machine need to be oiled is that they become hot by rubbing against each other and then they wear out. Oil or grease helps to reduce friction between the moving parts by making them slide over each other. Show the students a ball bearing. Explain that using these tiny balls between the moving parts of machines helps to reduce friction between the moving parts. Ball bearings are used in the handlebars of bicycles.
Name: ____________________  Date: __________

1. Write the things force can do:
   a. _______________________________________
   b. _______________________________________
   c. _______________________________________
   d. _______________________________________
   e. _______________________________________

2. Write the source of each form of energy:

<table>
<thead>
<tr>
<th>Form of energy</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar energy</td>
<td></td>
</tr>
<tr>
<td>Heat energy</td>
<td></td>
</tr>
<tr>
<td>Electrical energy</td>
<td></td>
</tr>
<tr>
<td>Light energy</td>
<td></td>
</tr>
</tbody>
</table>
1. Match the kind of energy to the work it does.

<table>
<thead>
<tr>
<th>Kind of energy</th>
<th>Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light</td>
<td>pulls everything towards the Earth</td>
</tr>
<tr>
<td>Sunlight</td>
<td>slows down or stops a moving thing</td>
</tr>
<tr>
<td>Heat</td>
<td>made in power stations</td>
</tr>
<tr>
<td>Electricity</td>
<td>helps to burn things</td>
</tr>
<tr>
<td>Gravity</td>
<td>helps us to see things</td>
</tr>
<tr>
<td>Friction</td>
<td>helps plants make their own food</td>
</tr>
</tbody>
</table>

2. Fill in the blanks using the word bank and then circle the words in the grid. Note that one word is extra.

gravity work friction force machine energy

a. A push or pull is called a __________.
b. __________ is when an object is moved some distance.
c. The force which we need to do work is called __________.
d. __________ is the force which pulls objects towards the Earth.
e. __________ is the force which slows down or stops a moving thing.
Teaching objectives:
To explain that heat makes us feel warm
To discuss the sources of heat
To discuss the uses of heat
To explain that heat is a kind of energy
To explain that we get energy from the food that we eat
To explain that the movement of molecules produces heat
To describe that fast molecules produce more heat
To describe that heat brings about a change in state
To explain that thermometers can be used to measure heat

Teaching strategy:
Ask: What do you feel when you sit in front of a heater? From where do we get heat? Explain the sources of heat. Ask: How do we use heat? Explain that heat is very useful in our daily lives. It is also used to make machines move.

Explain that energy is a kind of force, which helps us to do work. Ask: How do we get energy? Show the students a chart of foods that give energy. Ask: What did you eat for breakfast? Which food has the most energy? Explain the use of food in our body.

Refer to the chapter on Matter. Ask: What is matter made up of? Explain that molecules are always moving. Moving molecules become hot. Explain that hot molecules move faster than cold molecules. Ask: Why does ice melt? Explain that heat makes the molecules move faster, and they bump into each other at a faster rate. They are pushed away from each other and a solid changes into a liquid. In the same way, water changes into steam.

Ask: How does water change into ice? Explain that cooling the molecules has an opposite effect. The molecules slow down, they come closer and the water changes into ice. Ask: How does a doctor check to see if you have fever or not? Show the students a thermometer. Draw a thermometer on the board and label it. Explain that the mercury inside goes up if something is hot, and comes down if the thing is cold. Dip a laboratory thermometer in cold water and in hot water and show the students the level of the liquid inside.

Answers to Activities in Unit 8
1. (a) Heat comes from the Sun and burning of things.
   (b) Heat keeps our bodies warm, helps us to cook food, and iron clothes.
(c) The heat energy which keeps our body warm, comes from our food.
(d) When the molecules of something move faster, they make that thing hot.
(e) When ice is heated, the heat makes the molecules of ice move faster. As the molecules move, they bump into each other and begin to move away from each other. With more heat, they move faster and move further apart until the solid ice becomes water.

3. (a) heat and light     (b) energy     (c) less     (d) water     (e) mercury

**Additional Activity**

**MCQs**

(a) Heat is a kind of ____________.
   - force
   - work
   - energy

   Answer: energy

(b) When molecules of a substance move fast they make it ____________.
   - hot
   - cold
   - freeze

   Answer: hot

(c) When ice is heated it melts because its molecules start moving ____________.
   - slower
   - remain still
   - faster

   Answer: faster

(d) When molecules are cooled their movement ____________ and they move closer to each other.
   - slows down
   - becomes fast
   - remains the same

   Answer: slows down

(e) We use an instrument called a ____________ to find out how hot something is.
   - anemometer
   - barometer
   - thermometer

   Answer: thermometer

(f) The bulb of a thermometer is filled with ____________.
   - water
   - mercury
   - oil

   Answer: mercury

(g) The normal body temperature of the human body in degrees Fahrenheit is ____________.
   - 98.6
   - 100.6
   - 102.6

   Answer: 98.6

(h) A steam engine moves due to ____________.
   - cold
   - heat
   - ice

   Answer: heat

(i) When a thermometer is dipped into something warm, the liquid inside ____________.
   - falls
   - rises
   - stays the same

   Answer: rises

(j) The energy that keeps our body warm comes from ____________.
   - fire
   - food
   - fuel

   Answer: food

Answer to crossword puzzle on page 58

```
H M E N E R G Y
A R T C U
W A R M Y
```
<table>
<thead>
<tr>
<th>Unit 8</th>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic: Heat</td>
<td>Students should be able to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. What is heat?</td>
<td>• to define heat</td>
<td>• explain that heat is a form of energy which helps us to do useful work</td>
<td>Pictures of the Sun, a fire, burning items, different kinds of food</td>
<td>Reading: p 52 CW: Q1 (a) (c) HW: Q1 (b)</td>
</tr>
<tr>
<td></td>
<td>• to identify the sources of heat</td>
<td>• list the various sources and uses of heat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• to discuss the uses of heat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• to explain that heat is a form of energy</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Key words:** heat, energy

**Method:** Ask: What do you feel when you sit in front of a heater or fire? From where does the heat come? Explain that heat is a form of energy which comes from burning things. Ask: How do we use heat? Explain that heat is very useful in our daily lives. It also helps to make machines move. Recall the lesson on force and explain that energy is the force that helps us to do work. Ask: How does our body get energy? Show the students a chart of energy-rich foods, such as carbohydrates and fats. Ask: What did you eat for breakfast? Which food has the most energy? Explain how the body uses food.
### Lesson plan

**Date:**

**Time:** 40 mins

<table>
<thead>
<tr>
<th>Unit 8</th>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topic: Heat</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Heat and molecules</td>
<td>• to explain that molecules are always in motion&lt;br&gt;• to explain that molecules move because they have energy&lt;br&gt;• to explain that heat can cause changes in the state of matter</td>
<td>• explain that the molecules of substances are always moving, and that their movement is due to the energy that they have&lt;br&gt;• explain that a change of state occurs in substances because the molecules either gain or lose energy</td>
<td>2 glass bowls, cold water, hot water, red ink, dropper</td>
<td>Reading: p 53, 54&lt;br&gt;Perform the experiment (p 53): Hot molecules move faster than cold molecules.&lt;br&gt;HW: Q1 (d) (e)</td>
</tr>
</tbody>
</table>

**Key words:** heat, energy

**Method:** Perform the experiment ‘Hot molecules move faster than cold molecules’ on page 53. Discuss the movement of molecules. Heat makes the molecules gain energy and they begin to move faster. When they do this, a change of state occurs. A solid becomes a liquid, and a liquid turns into a gas.

Heat some ice cubes in a pan. Ask the students to observe what happens. Discuss the change of state from solid to liquid, and then into water vapour, due to heat. Also discuss how the heat of the atmosphere changes during the day and night. **Ask:** Why does ice melt? Explain that heat makes the molecules move faster, and they bump into each other at a faster rate. They are pushed away from each other and a solid changes into a liquid. In the same way, water changes into steam. **Ask:** Can steam be changed into ice? Explain that cooling the molecules has an opposite effect. The molecules slow down. They move closer together and steam changes into water. If the water is cooled further, it changes into ice.
## Lesson plan

**Date:**

**Time:** 40 mins

<table>
<thead>
<tr>
<th>Unit 8</th>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic: Heat</td>
<td>3. Thermometers</td>
<td>Students should be able to:</td>
<td>A laboratory thermometer, a clinical thermometer, warm water, cold water</td>
<td>Reading: p 54, CW: Q2, HW: Q3</td>
</tr>
<tr>
<td></td>
<td>• to describe the structure and function of a thermometer</td>
<td>• describe the structure and function of a thermometer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• to explain how to read the temperature on a thermometer</td>
<td>• read the temperature on a thermometer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key words:** thermometer, mercury, measure

**Method:** Ask: How does a doctor check to see if you have fever or not? Show the students a thermometer. Draw a thermometer on the board and label it. Explain that the silvery liquid called mercury inside the tube of the thermometer goes up when the temperature rises. Show the students a laboratory thermometer as it is bigger and easier to read than a clinical thermometer. Dip the laboratory thermometer in cold water and read the temperature. Then dip it in warm water and read the temperature again. Show the students the level of the liquid inside the thermometer at different temperatures. Tell students that nowadays LED thermometers are commonly in use.
Name: ________________________  Date: ______________

1. Fill in the blanks to explain how steam changes into ice:

   When molecules of steam are ____________, they slow down and move ____________ to each other. They turn into tiny ____________ of water. When water is ____________ further, its molecules slow down and move ____________ to each other and the water ____________ into ice.

2. How is a thermometer used to measure how hot something is?

   ________________________________

3. Find the words in the crossword puzzle with the help of the hints given below:

   1. A steam engine that can do work has this due to this.
   2. The bulb of a thermometer is filled with this.
   3. Heat keeps our body ____________.
   4. Anything that can do work.
Teaching objectives:
To explain that burning things give off heat and light
To explain that the Sun gives off heat and light
To explain that the Moon does not have its own light but reflects sunlight
To explain reflection of light
To explain that reflection of light helps us to see things
To explain that light travels very fast
To explain that light travels in straight lines
To explain refraction of light
To describe how shadows are made
To discuss the size and position of shadows made by the Sun
To explain how things appear coloured
To describe the colours of white light
To explain how a rainbow is formed

Teaching strategy:
Ask: From where does the Earth get light? How do we get light in our houses? Explain the sources of light. Ask: What do we see in the sky at night? Does the Moon shine as brightly as the Sun? Explain the reflection of sunlight from the Moon. Shine a torch on a mirror. Explain the reflection of light and how it helps us to see things

Ask: What happens when we switch on a light in a room? Explain that light travels very fast. Perform the experiment given in the lesson. Explain that light travels in straight lines called rays.

Dip a ruler in a beaker of water. Ask: Is the ruler straight? Explain refraction of light. Hold a book in the beam of a torch. Explain the formation of a shadow. Tell children to make shadows with their hands. Move the torch backwards and forwards. Explain that the size of shadows changes with distance. Take the students outside. Tell them to see their shadows. Explain the formation of shadows at different times of the day according to the position of the Sun.

Ask the students colours of various things. Ask: What is the colour of white light? Explain the colours of white light. Draw a rainbow on the board. Ask: When do you see a rainbow in the sky? Explain the formation of a rainbow after a rain. Allow a beam of light to pass through a prism. Show the seven colours of white light. Explain how coloured objects reflect and absorb various colours of white light. Explain why white objects appear white and black objects appear black.
Answers to Activities in Unit 9

1. (a) We get light from the Sun.
(b) The Moon gets light from the Sun.
(c) The bouncing-off of light from a shiny object is called reflection.
(d) When rays of light pass through water or glass they bend. This bending of light is called refraction.
(e) When white light shines on something, some colours are absorbed and some are reflected. We see the colours that are reflected.
(f) Plants need light to make their food. Animals need light to see in the dark and to keep warm.

Additional Activity

MCQs

(a) The bouncing-off of light from shiny objects is called ____________.
reflection refraction dispersion [reflection]

(b) When light from a shiny object falls on something, the ____________ light tells us its size, shape, and colour.
refracted reflected shining [reflected]

(c) Light can travel from the Moon to the Earth in less than a ____________.
second minute hour [second]

(d) Light travels in straight lines called ____________.
rays tracks lines [rays]

(e) The bending of light when it passes through water or glass is called ____________.
reflection refraction dispersion [refraction]

(f) We can see the colour of things because they ____________ light.
absorb reflect refract [reflect]

(g) A tomato looks red because it absorbs all the other colours of white light and reflects only ____________.
blue yellow red [red]

(h) A black object looks black because it ____________ all the colours of white light.
absorbs reflects mixes [absorbs]

(i) There are ____________ colours in a rainbow.
4 6 7 [7]

(j) Plants need sunlight to make their ____________.
homes food flowers [food]
### Lesson plan

**Date:**

**Time:** 40 mins

<table>
<thead>
<tr>
<th><strong>Unit 9</strong></th>
<th><strong>Teaching objectives</strong></th>
<th><strong>Learning outcomes</strong></th>
<th><strong>Resources/Materials</strong></th>
<th><strong>Activities/CW/HW</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topic: Light</strong></td>
<td>Students should be able to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Reflection of light</td>
<td>to identify the sources of light</td>
<td>• to explain that when light falls on a shiny surface it is reflected and that reflected light tells us the size, shape, and colours of the object</td>
<td>Pictures of the Moon, the Sun, a candle, a bulb, pieces of cardboard, a torch, a white screen, a pencil, a glass of water</td>
<td>Reading: p 57, 58 CW: Perform the experiment (p 57) ‘Light travels in straight lines’ (Q2). CW: Q1 (a) (b) (c) d HW: Draw diagrams to show reflection of light and refraction of light.</td>
</tr>
<tr>
<td></td>
<td>to explain what reflection of light means</td>
<td>• prove by experiment that light travels in straight lines</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>to prove that light travels in straight lines</td>
<td>• explain that light travels very quickly</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>to explain that light travels very quickly</td>
<td>• describe how light rays bend when they pass through water or glass</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>to explain how light bends when it passes through water or glass</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Key words:** reflect, bounce, reflection, refraction

**Method:**

**Ask:** From where does the Earth get light? How do we get light in our homes? Identify the sources of light. **Ask:** What do we see in the sky at night? Does the Moon shine as brightly as the Sun? Explain that the Moon does not have light of its own; it only reflects the light of the Sun which falls on it. Explain reflection of light and how it enables us to see things. Perform the experiment ‘To prove that light travels in straight lines’. Explain that light travels in straight lines called rays. Place a ruler in a glass of water and ask the students to observe it. **Ask:** Does the ruler appear straight? Explain that when light passes from air into water, it slows down and bends. This bending of light is called refraction.
Unit 9
Topic: Light

Teaching objectives
Students should be able to:

2. Light and colour
- to explain why things appear coloured
- to explain the composition of white light
- to explain how a rainbow is formed and to identify the colours of the rainbow
- to revise the importance of heat and light for living things

Learning outcomes
- explain why things appear coloured
- name the colours that make up white light
- name the colours of the rainbow
- describe how a rainbow is formed
- explain the importance of heat and light for living things

Resources/Materials
Coloured objects, a prism, picture of a rainbow

Activities/CW/HW
Reading: p 58, 59
Fill in the table:

<table>
<thead>
<tr>
<th>Colour of object</th>
<th>Reflects</th>
<th>Absorbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>blue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>red</td>
<td></td>
<td></td>
</tr>
<tr>
<td>green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>white</td>
<td></td>
<td></td>
</tr>
<tr>
<td>black</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CW: Q3
HW: Q1 (e) (f)

Key words: reflect, prism, absorb

Method: Ask the students to name the colours of various items in the classroom. Ask: What is the colour of light? Allow a beam of light to pass through a prism. Show the students the spectrum of the colours of the rainbow that is formed. Explain that white light is made up of seven colours. Write VIBGYOR on the board and ask the students to name the seven colours of the rainbow represented by the letters of the word. Ask: How do we see colours? Explain that when white light falls on a coloured object, the object absorbs all the colours and only reflects its own colour. Ask: Why does an object look white? Explain that a white object reflects all the colours. Ask: Why does an object appear black? Explain that a black surface absorbs all the colours and so it looks black. Ask: What is a rainbow? When do we see a rainbow in the sky? Explain that after rain, sunlight shines through tiny droplets of water still hanging in the air. These drops act like tiny prisms when sunlight passes through them. Together they form a rainbow on the side opposite the Sun. Discuss the importance of light and heat for all living things.
Name: ______________________  Date: ______________

1. Fill in the blanks to explain the properties of light:
   a. The Sun gives off heat and ________________.
   b. We can see the Moon at night because _______ bounces off the Moon.
   c. The bouncing off of light from a shiny object is called ________.
   d. Light travels in straight lines called ________.
   e. Light travels very ________.
   f. The bending of rays of light when they pass through water or glass is called ________.
   g. We see the colours of objects because of the ________ light.

2. In the blank spaces write which colours are absorbed or reflected in order for us to see the given coloured objects.

<table>
<thead>
<tr>
<th>Coloured object</th>
<th>Absorbs</th>
<th>Reflects</th>
</tr>
</thead>
<tbody>
<tr>
<td>tomato</td>
<td>________</td>
<td>________</td>
</tr>
<tr>
<td>orange</td>
<td>________</td>
<td>________</td>
</tr>
<tr>
<td>white paper</td>
<td>________</td>
<td>________</td>
</tr>
<tr>
<td>black shoe</td>
<td>________</td>
<td>________</td>
</tr>
</tbody>
</table>
Find the following words in the grid and circle them.

REFLECTION  PRISM  REFRACTION  RAINBOW  RAYS

```
R T U M J F A R
E O P D A N P E
F E R C W Q U F
R A I N B O W L
A G S K O P R E
C W M R F S I C
T C T I D L K T
I T R A Y S O I
O W Z V I B M O
N E R Y U F I N
```
Teaching objectives:
To explain that the Earth is covered with a layer of soil
To discuss how soil is formed
To discuss what soil is made of
To describe the kinds of soil
To discuss the properties of different kinds of soil
To describe a fertile soil
To explain why plant roots are important for soil

Teaching strategy:
Ask: Where do plants grow? Do many plants grow on mountains? Do many plants grow in hot dry places? Where do most plants grow? Explain the layer of soil on the Earth. Explain why many plants do not grow in places where there is less soil. Explain what a fertile soil is and why many plants grow on it.

Ask: What is soil made up of? Perform the experiment in the lesson and show the various particles of soil that have separated out. Ask: What do plants need to grow healthy and strong? Why does a gardener add fertilizer to the garden soil? Explain the importance of humus in the soil. Ask: What will happen to the soil if we pull out all the plants growing in it? Explain the importance of roots in preventing erosion of soil. Explain the structure of the three types of soil on the basis of soil particles. Ask: Which do you think is the best type of a soil for plants to grow in? Explain the composition of loam, and why it is the best type of soil for plants.

Answers to Activities in Unit 10
1. (a) Soil is made from rocks, and many tiny particles of different sizes. It has stones, sand, clay, and remains of dead plants and animals.
   (b) Rocks can crack by the heat of the Sun.
   (c) Remains of dead plants and animals in the soil are called humus.
   (d) If we cut down trees, the soil can easily be washed away by water or blown away by wind. It will not remain fertile any more.
   (e) The different kinds of soil are sandy soil, clay soil, and loam.
   (f) Loam is the best kind of soil for plants.
2. Sandy soil contains more sand particles. It has a lot of air in it, but it cannot hold any water. Not many plants can grow in sandy soil.

Clay soil contains tiny particles of clay. It contains very little air, but it can hold a lot of water. Not many plants can grow in clay soil.

Loam soil contains a mixture of sand and clay particles. It contains a lot of humus and a lot of air and water. It is fertile soil. Plants grow well in fertile soil.

3. (a) clay  (b) sand  
   (c) sand  (d) clay

### Additional Activity

**MCQs**

(a) Land is covered with a thin layer of ___________.
   
   air  soil  water  [soil]

(b) ___________ plants grow in deserts and rocky places.
   
   No  Few  Many  [Few]

(c) Soil is made from ___________.
   
   sand  rocks  wood  [rocks]

(d) Soil is made up of ___________ of different sizes.
   
   stones  particles  rocks  [particles]

(e) Remains of dead plants and animals in the soil are called ___________.
   
   humus  organisms  food  [humus]

(f) The kind of soil which has a lot of air and cannot hold any water is called ___________.
   
   sandy soil  clay soil  loam  [sandy soil]

(g) Soil that has very little air and can hold a lot of water is called ___________.
   
   sandy soil  clay soil  loam  [clay soil]

(h) Soil which is a mixture of sand and clay is called ___________.
   
   loam  humus  fertile soil  [loam]

(i) The best type of soil for plants is ___________.
   
   sandy soil  clay soil  loam  [loam]

(j) ___________ of plants can grow in the cracks of rocks and break them.
   
   Leaves  Stems  Roots  [Roots]
### Learning outcomes

<table>
<thead>
<tr>
<th>Unit 10</th>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topic: Soil</strong></td>
<td>Students should be able to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Soil</td>
<td>• to describe soil</td>
<td>• describe soil</td>
<td>Charts and diagrams showing how soil is formed</td>
<td>Reading: p 62, 63</td>
</tr>
<tr>
<td></td>
<td>• to explain how soil is formed</td>
<td>• explain how soil is formed</td>
<td>Jam jar, garden soil, water, a stick</td>
<td>Perform the experiment (p 63)</td>
</tr>
<tr>
<td></td>
<td>• to examine what soil is made of</td>
<td>• describe the composition of soil</td>
<td>‘To find out what soil is made up of’</td>
<td>HW: Q1 (a) (b) (c) (d)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Q4</td>
</tr>
</tbody>
</table>

**Key words:** soil, desert, rock, fertile soil, crack, soil particle

**Method:** 

*Ask:* Where do most plants grow? Do many plants grow on mountains? In hot dry places? Discuss what soil is. Explain that there is a layer of soil on the Earth. Discuss why many plants do not grow in places where there is little soil. Plants grow best in good soil. Explain that soils which contain plenty of minerals and water are called fertile soils. Lots of plants grow in fertile soil. *Ask:* Where does soil come from? How is soil formed? Explain that soil is made from rocks. Rocks break into tiny pieces in different ways. The heat of the Sun can make rocks crack; rainwater enters the cracks and when it freezes, it expands and breaks the rocks. Strong winds, rivers, and sea water also break rocks and grind them into small particles which finally form soil. *Ask:* What is soil made up of? Perform the experiment on p 63 and show the various particles that separate out. Ask students to draw and label the various layers of soil.
## Lesson plan

### Date: 

### Time: 40 mins

<table>
<thead>
<tr>
<th>Unit 10</th>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic: Soil</td>
<td>Students should be able to:</td>
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<tr>
<td>2. Fertile soil</td>
<td>• to describe the properties of fertile soil</td>
<td>• explain what is meant by fertile soil</td>
<td>A sample of garden soil, a diagram of the section of the Earth’s crust showing top soil, sub soil; a potted plant, pictures showing erosion due to wind and water</td>
<td>Reading: p 64</td>
</tr>
<tr>
<td></td>
<td>• to explain why plant roots are important to soil</td>
<td>• explain the importance of humus in the soil</td>
<td></td>
<td>HW: Fill in the blanks:</td>
</tr>
<tr>
<td></td>
<td>• to describe the properties of fertile soil</td>
<td>• describe the functions and the importance of plant roots for holding soil particles together</td>
<td></td>
<td>The remains of dead plants and animals in the soil is called ______.</td>
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<tr>
<td></td>
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<td></td>
<td>Humus makes the soil ______. Fertile soil contains a lot of ____ for growing plants. Humus helps the soil to hold ____ and ____.</td>
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<td></td>
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<td>______ of plants hold the soil particles together.</td>
</tr>
</tbody>
</table>

**Key words:** fertile, humus

**Method:** Ask: What do plants need to grow strong and healthy? Why does a gardener add fertilizer to the soil? What is humus? Explain the importance of humus in the soil. Ask: What would happen to the soil if we pulled out all the plants growing in it? What would happen to the soil if we cut down all the trees? What would be the effect of rain and wind on the soil if we cut down all the trees and removed all plants from it? Explain the importance of plant roots in preventing soil erosion.
### Unit 10
**Topic: Soil**

<table>
<thead>
<tr>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
</tr>
</thead>
</table>
| • to differentiate between the different types of soil  
• to explain that the texture of soil depends on the size of its particles  
• to discuss the best type of soil for plants | • identify the different types of soil  
• differentiate between various types of soil on the basis of particle size  
• explain why loam is the best type of soil for plant growth | Samples of sand, clay, garden soil, 3 conical flasks, 3 funnels, cotton wool, water | Reading: p 64  
Perform the experiment:  
‘To find out which is the best type of soil for plants’ (p 64)  
HW: Q1 (e) (f)  
Q2, Q3 |

**Key words:** sandy soil, clay, loam, fertile

**Method:** Show the students samples of different kinds of soil. **Ask** them to rub the soil between their fingers and feel the texture of each kind of soil. Discuss the various kinds of soil on the basis of their texture, particle size, and the water-holding capacity. **Ask:** Which is the best type of soil for plant growth? Discuss the properties of different kinds of soil. **Ask:** Which soil do you think is best for plant growth? Discuss the properties of loam and why it is good for plants. Perform the experiment on page 64 and discuss the results. **Ask:** Which soil holds the least water? Which soil holds the most water? Which soil do you think is best for plant growth? Discuss ways in which the texture of sandy and clay soils can be improved. Discuss the role of humus in improving soil texture and quality.
1. Fill in the blanks to explain how soil is formed:

Soil is made from _______. The heat of the Sun makes rocks _______. Rainwater _______ the cracks. When water in the cracks _______, it pushes the pieces of rocks apart. Sometimes plant _______ growing in the cracks also break the rocks.

2. Match the description to the kind of soil.

<table>
<thead>
<tr>
<th>Description</th>
<th>Kind of soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>It has lots of air.</td>
<td>loam</td>
</tr>
<tr>
<td>It cannot hold any water.</td>
<td>sandy soil</td>
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<tr>
<td>Not many plants can grow in it.</td>
<td></td>
</tr>
<tr>
<td>It contains very little air.</td>
<td></td>
</tr>
<tr>
<td>It can hold a lot of water.</td>
<td></td>
</tr>
<tr>
<td>Not many plants can grow in it.</td>
<td></td>
</tr>
<tr>
<td>The best kind of soil.</td>
<td>clay soil</td>
</tr>
<tr>
<td>It contains a lot of humus, air, and water.</td>
<td></td>
</tr>
<tr>
<td>Plants grow well in it.</td>
<td></td>
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</tbody>
</table>
## Wordsearch

<table>
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</table>

- AIR
- FERTILE
- ROCKS
- WATER
- ANIMALS
- HUMUS
- ROOTS
Teaching objectives:

To explain what is meant by the universe
To explain that the universe has countless heavenly bodies
To describe a star
To describe a planet
To introduce the names of the planets of our Solar System
To explain how we learn about planets
To explain space travel
To explain that planets spin on their axis
To explain that planets go round the Sun in fixed paths
To describe the characteristics of the planets

Teaching strategy:

Ask: What do we see in the sky during daytime? What do we see at night? Can you count the stars?
Show the students a picture of the universe. Explain its vastness. Explain the types of heavenly bodies in the universe. Ask: Are all the shining bodies stars? Explain the difference between a star, a planet, and the Moon.
Show a chart of the Solar System or make a diagram on the board.
Write the names of the planets. Explain the rotation of planets and their paths around the Sun. Ask: Which is the hottest planet? Which is the coldest? Which is the smallest? Which is the biggest? Which has the most number of moons? Which has rings around it? Explain the characteristics of each planet. Ask: Can you see planets in the sky? Explain that Venus can be seen as the ‘evening star’. Mars looks like a red star.

Answers to Activities in Unit 11

1. (a) Some of the shiny bodies are stars, comets, meteors, asteroids, and planets.
   (b) All the shiny bodies are in a vast space called Universe.
   (c) Stars are big balls of burning gases.
   (d) Planets are bodies that move around the Sun.
   (e) The path of a planet around the Sun is called an orbit.

2. (a) meteors  (b) asteroids
    (c) comets  (d) meteorites
    (e) large meteorites
3. Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune

4. (a) Mercury  (b) Venus  (c) Earth  (d) Mars  
   (e) Jupiter  (f) Neptune  (g) Saturn

Additional Activity

MCQs

(a) Stars, asteroids, and planets are found in a vast space called _____________.
   sky  space  universe  [universe]

(b) Stars appear to be dim because they are _____________.
   very small  very far  very cold  [very far]

(c) Planets are bodies that move around the _____________.
   Sun  Moon  Earth  [Sun]

(d) The planet closest to the Sun is _____________.
   Mercury  Venus  Earth  [Mercury]

(e) The planet which is covered in thick clouds and is almost as big as the Earth is _____________.
   Mercury  Venus  Mars  [Venus]

(f) Mars is called the _____________ planet.
   red  blue  green  [red]

(g) Jupiter is the _____________ planet.
   smallest  largest  coldest  [largest]

(h) The number of moons around Saturn is _____________.
   51  53  57  [53]

(i) The planet which has many rings and moons is _____________.
   Mercury  Venus  Uranus  [Uranus]

(j) _____________ is a planet that has 13 moons and it takes 165 days to go once round the Sun.
   Saturn  Uranus  Neptune  [Neptune]
### Unit 11
**Topic:** The Sun and the planets

<table>
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<tr>
<th>Teaching objectives</th>
<th>Learning outcomes</th>
<th>Resources/Materials</th>
<th>Activities/CW/HW</th>
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</thead>
<tbody>
<tr>
<td>Students should be able to:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. The Sun and the planets</td>
<td>• to explain what is meant by the universe</td>
<td>Pictures of the Milky Way and space, wall chart of the Solar System, pictures of the Moon, diagrams of the rotation and revolution of the Earth</td>
<td>Reading: p 67, 68 HW: Q1</td>
</tr>
<tr>
<td></td>
<td>• to describe the Milky Way</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• to describe the different celestial bodies</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• explain what is meant by the universe</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• identify the Milky Way and know that our solar system is part of this galaxy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• identify the different shining bodies in the night sky</td>
<td></td>
<td></td>
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</tbody>
</table>

**Key words:** The Milky Way, galaxy, universe, star, Solar System

**Method:** Ask: What can we see in the sky during the daytime? What do we see at night? Can you count the stars? Are all the shining bodies that you can see in the sky stars? Show students pictures of the universe. Explain with the help of pictures the types of heavenly bodies that can be seen in the sky at night and, if possible, show them a video/dvd/youtube clip about the universe. If possible, take the students to a planetarium. Explain the difference between a star, a planet, and a moon. Ask: Why do we not see stars during the day? When can we see the Moon? Is our Earth a shining body like the stars? What is the Sun? What is the difference between a star and a planet? Discuss the difference between a star and a planet. Explain the difference between the Moon, the Earth, and the Sun. Explain that the Moon is a heavenly body that goes round the Earth. It is called a satellite. Other planets also have moons. The Earth is a satellite of the Sun. Like the Earth, other planets are also satellites of the Sun. The Sun with all its satellites forms a system called the Solar System. Show the students a chart of the Solar System, or draw it on the board. Label the different planets. Explain the rotation of the planets and their paths around the Sun. Explain that each planet spins on its own axis like a top. It also goes round the Sun on a fixed path called an orbit, at its own speed.
### Unit 11
#### Topic: The Sun and the planets

<table>
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<tr>
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<th>Activities/CW/HW</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Asteroids, comets, meteors, and meteorites</td>
<td>• to describe the characteristics of heavenly bodies</td>
<td>Pictures of asteroids, comets, meteors, meteorites</td>
<td>Reading: p 68 Collect pictures of comets, meteors, and meteorites and use them to make a chart. HW: Q2</td>
</tr>
</tbody>
</table>

**Key words:** asteroid, comet, meteor, meteorite

**Method:** Show the students pictures of different heavenly bodies. Write their names on the board. Ask the students to identify them by their characteristics. **Ask:** Have you ever seen a shooting star on a starry night? Discuss the characteristics of asteroids, comets, meteors, and meteorites, and ask the students to differentiate between them.
# Unit 11
## Topic: The Sun and the planets

### Teaching objectives
Students should be able to:

- to describe and name the planets of the Solar System
- to explain that the planets go around the Sun on fixed paths
- to explain the characteristics of the planets

### Learning outcomes
- name and describe the planets of the Solar System
- describe the characteristics of the planets
- demonstrate some knowledge of space travel

### Resources/Materials
- A chart of the Solar System; pictures of astronauts and spacecrafts

### Activities/CW/HW
- Reading: p 69, 70
- Collect pictures of spacecrafts, astronauts, and rockets and paste them in your science journals.
- HW: Q3, Q4

## Key words
- planet, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune

## Method
Show the students a chart of the Solar System, or draw a diagram on the board. Write the names of the planets. Explain the rotation of the planets on their axis. Also explain the paths of the planets around the Sun. **Ask:** Which is the hottest planet? Which is the coldest? Which is the smallest? Which is the largest? Which has the most moons? Which has rings around it? Describe the characteristics of each planet. **Ask:** Can you see the planets in the sky? Explain that Venus can be seen as the evening star. Mars can be identified as the red star.
1. Fill in the blanks to identify the features of the universe:

(a) A fuzzy band of light across the sky ________________

(b) Islands of stars spinning through space ________________

(c) A vast space containing millions of shining bodies in the sky
________________________

(d) Big balls of burning gases ________________

(e) Bodies that move around the Sun ________________

(f) The Sun and its family of planets ________________

(g) The path of a planet around the Sun
________________________

(h) Machines that travel in space ________________

(i) People who travel in space ________________
1. Name the planets of the Solar System.
   a. 
   b. 
   c. 
   d. 
   e. 
   f. 
   g. 
   h. 

2. Write the name of:
   a. The biggest planet ____________________________
   b. The smallest planet ____________________________
   c. The planet nearest to the Sun ________________________
   d. The planet furthest from the Sun ______________________
   e. The hottest planet ____________________________
   f. The coldest planet ____________________________
   g. The planet that has the longest orbit ______________________
   h. The planet that has the shortest orbit ______________________
1. Why is food important for the body?

2. Fill in the blanks to complete the statements.
   a) Three-quarters of our bodies are made of ________________.
   b) ________________ gives us energy to grow and stay healthy.
   c) Animals that eat plants are called ________________.
   d) Animals that eat the meat of other animals are called ________________.
   e) Animals that eat both plants and animals are called ________________.

3. Choose the best answer.
   a) The body of a bird is covered with fur/feathers.  
   b) A bird has teeth/a beak.
   c) Mammals lay eggs/have babies.

4. Label the parts of the flower.  
5. Label the parts of the fish.

6. Name two hard and dry fruits.
   a) ________________  
   b) ________________

7. What is matter made of?

8. Write true or false.
   a) Molecules are always moving.
   b) A solid can easily change its shape.
   c) Molecules of a gas are very far away from each other.

9. How can we measure changes in air pressure?
10. Draw a simple barometer.

11. Fill in the blanks to complete the statements.
   a) Rainwater which soaks into the ground and gathers between the rocks is called _____________.
   b) Groundwater comes out of holes or cracks to make a _________________.
   c) Deep holes dug in the ground to reach the groundwater are called _________________.

12. Draw the water cycle.

13. Why do we put oil in the moving parts of a machine?

14. Things that force can do:
   a) Force can ____________________________ things.
   b) Force can ____________________________ things.
   c) Force can ____________________________ things.
   d) Force can ____________________________ things.
   e) Force can change the ____________________________ of things.

15. What happens when we heat things?

16. With which instrument can we measure temperature?

17. Why does a tomato look red?

18. Why do black objects look black?

19. Name the colours of the rainbow.

20. Name three types of soil.
   a) ____________________________
   b) ____________________________
   c) ____________________________