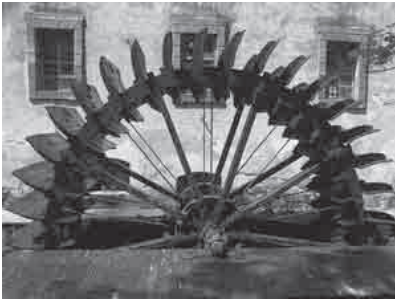


# Teacher's Guide 6

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## Everyday Science 6



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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. The teacher can then help students draw conclusions from these facts and ideas as to why and how things happen.

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

Experiments allow students to test the facts that have been learnt by them for themselves, thereby clarifying the reasoning behind the activities that are done in class.

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

## **About the Pupil's Book:**

This science series, now completely revised, has been written especially for primary level students. It provides information suitable for each student's level of understanding and has a direct appeal to students who need engaging and easy to read material. Baring in mind the interests, abilities, curiosities, and needs of student, it provides stimulating learning experiences that offer enjoyable educational motivation, thus serving as a foundation base for future learning.

The keyword in science is curiosity. The material in this series is designed to create in a child the same urge that motivates a scientist; the desire to know the answer to a question. A wide range of topics were carefully selected that will interest and inspire students.

Teachers will come to see that this series deals with those broad areas about which, most students frequently express curiosity; that it provides answers to many of the questions they ask, and offers new and exciting information in many fields.

The language is simple and easy to read, catering for the students range of abilities in 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 identify and clarify the topics that are dealt with.

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

Simple practicals interesting and stimulating presentation of factual materials— offer every chance of successful learning experiences. Knowledge of problem-solving techniques, that if 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 losing interest.

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 student to share his/her experiences. Try to relate pictures to real things. Do not rush the reading. Allow students 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.

## Introduction

### 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 through 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.

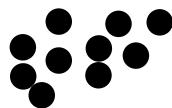
- (i) Read the text.
- (ii) Prepare a chart if necessary.
- (iii) Practise diagrams which have to be drawn on the blackboard.
- (iv) Collect all material relevant to the topic.
- (v) Prepare short questions.
- (vi) Prepare homework, tests, and assignments.
- (vii) Prepare a practical demonstration.

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) Projects

This common strategy is easy as well as effective:

- (i) Before starting a lesson, make a quick assessment of the students previous knowledge by asking questions pertaining to the topic. Relate them to everyday observations of their surroundings or from things that they have seen or read about in books, magazines, or newspapers.
- (ii) Explain the lesson.
- (iii) Write difficult words and scientific terms on the blackboard.
- (iv) Ask students to repeat them.
- (v) Help students read the text.
- (vi) Show materials, models, or charts.
- (vii) Make diagrams on the blackboard.
- (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 are 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 not only by 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 gain 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.

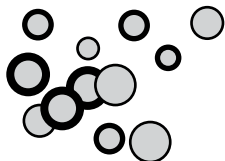
Sketches and diagrams on the blackboard are an important aspect to the teaching of science, but too much time should not be spent on them as the students lose interest. An alternative to drawing on the blackboard is a ready-made chart or one made by the teacher can be displayed in the class. The use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

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

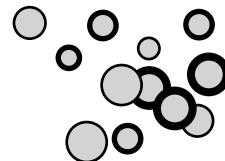
Practical work arouses interest in science. Class activities can be organized in such a way that the whole class participates either in groups or individually, depending on the type of work to be done or the amount of material available.

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.



# UNIT 1



## Introduction to Science

### **Objectives:**

To know:

- the meaning of science
- who a scientist is
- the scientific method to answering questions and reaching conclusions
- what a laboratory is
- some laboratory apparatus and instruments and their usage

### **Teaching strategy:**

Ask: What is science?

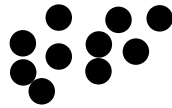
Explain the meaning of science, who a scientist is and how they work.

Take the students to the laboratory, and with the help of a lab assistant show them the various instruments and apparatus and explain their uses. Explain the rules regarding the use of equipment, and the accidents that might happen when student isn't careful. Measures to be taken in case of an emergency should also be discussed.

Explain the steps involved in solving a problem with an example from the textbook.

### **Answers to Exercises in Unit 1**

1. a) Science is the study of things and events that take place around us.  
b) A scientist is a person who studies science.

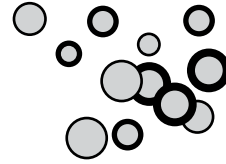
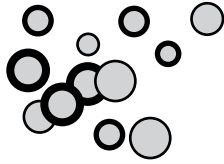


2. a) weight / balance                      b) weight / balance                      c) thermometer / temperature

**Additional Exercise:**

- a) The study of things and events that take place around us is called \_\_\_\_\_.  
science                      news                      environment                      [science]
- b) A person who studies science is called \_\_\_\_\_.  
an artist                      a scientist                      a scholar                      [a scientist]
- c) A scientist works in a special kind of classroom called a \_\_\_\_\_.  
library                      study room                      laboratory                      [laboratory]
- d) \_\_\_\_\_ have been invented to help scientists in making accurate measurements and calculations for the experiments they perform.  
Instruments                      Tools                      Models                      [Instruments]
- e) A balance is an instrument used for measuring the \_\_\_\_\_ of a body.  
temperature                      weight                      height                      [weight]
- f) Volume is measured in \_\_\_\_\_.  
metres                      kilograms                      litres                      [litres]
- g) The instrument used to measure the temperature of a body is a \_\_\_\_\_.  
thermometer                      altimeter                      ammeter                      [thermometer]
- h) A laboratory must be equipped with a re extinguisher to \_\_\_\_\_.  
put out fires    keep the laboratory cool  
heat the laboratory    [put out fires]
- i) Chemicals in a laboratory are kept in \_\_\_\_\_.  
plastic bottles                      reagent bottles                      thermos flasks                      [reagent bottles]
- j) A first aid box contains \_\_\_\_\_.  
tools    medicines and bandages  
machines    [medicines and bandages]





## Living Things

### **Objectives:**

To know:

- the differences between living and non-living things
- the characteristics of living things
- the differences between animals and plants
- the conditions that are necessary for the survival of living things
- what an environment is
- the types of environment and their important features
- how animals and plants adapt to their environments
- how animals and plants protect themselves
- what food chains and food webs are and how living organisms are interconnected for their energy requirements
- how wildlife is being destroyed and what measures can be taken to preserve it

### **Teaching strategy:**

Place a potted plant, a clockwork toy, and a live cockroach in a jam jar on your desk.

Ask: Which of these is a living thing? Depending on the answer, ask why it is a living or non-living thing.

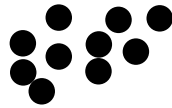
Now wind the toy and ask: Is this a living thing?

Ask students to tell the difference between a cockroach and a toy. Show the plant to the students and ask them to compare it to the cockroach.

They should be able to explain the differences of colour, movement, shape, etc.

Ask: Does the plant breathe, move, or eat? Does it have babies?

Using all the information obtained from the students, explain the differences between living and non-living things, and between plants and animals.



Ask: What conditions do you think are necessary for life?

Can you live without air? Why, or why not? Can you live without water?

Why, or why not? What will happen if we close the lid of the jar with the cockroach in it? What will happen if we put this plant in a dark cupboard and do not water it? What will happen to the toy if we put it in a freezer?

Expanding upon the answers from the students, explain the conditions that are necessary for living things, and their importance.

Ask: What type of area do you live in? What sort of climate do you like?

What type of clothes do you wear in winter? What kind of food do you like to eat in summer?

Explain that as we adapt ourselves to our surroundings, so do other living organisms.

Ask: Why do we not see lizards and frogs in winter?

Explain the terms cold-blooded, warm-blooded, and hibernation.

Ask: Do you have a pet fish? How do you look after it? What do you give it to eat? Where do you keep it?

Explain the importance of natural and artificial environments, and the features of a natural environment. Explain the features of an artificial environment (such as a fish aquarium or a birdcage) where the animals do not have to search for their food and they cannot change their surroundings.

Ask: What would happen if you let your pet free?

Explain the meaning of adaptations and the features that enable an organism to live in a particular environment.

Ask: Where do different kinds of food come from?

Explain the importance of photosynthesis and that plants are the main producers for all living things and the Sun is the main source of energy.

Ask: What do plants eat? What does a rabbit eat? What does a dog eat?

What does a lion eat?

Explain the different kinds of food and the animals which eat it.

Explain the concept of food chains and food webs and how living organisms depend on each other for their food requirements.

Ask: Which animals eat plants? Which animals eat meat? Which animals eat both plants and meat?

Explain herbivores, carnivores, and omnivores.

Ask: What happens to animals if we cut down trees?

Explain how natural habitat are being destroyed by man's activities.

## Unit 2 Living Things

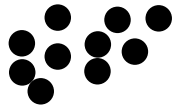
Ask: How can we protect wildlife and preserve natural habitats? Explain how humans are polluting the environment and destroying the natural habitats of wild organisms. Discuss the dangers of all this with the students.

Do the activities.

Summarize the lesson.

### Answers to Exercises in Unit 2

- The study of living things is called biology.
  - The scientific name of for a living thing is organism.
  - All cells have the same basic structure: Cell membrane, cytoplasm and nucleus.
  - It controls the whole working of the cell.
  - Through a process called photosynthesis the plants use sunlight, carbon dioxide to make simple sugars such as glucose. Glucose is then used by the plant, or changed into insoluble substances and stored in different parts of the plant such as the stem, root, leaves seeds and fruits to be used later.
  - Animals can't make their own food, they obtain their food from plants and other animals.
  - Respiration is the process by which food is oxidized in the body cells to produce energy.
  - The process by which poisonous materials are removed from the body is called excretion.
- |                       |                |                     |
|-----------------------|----------------|---------------------|
| a) the red blood cell | b) nerve cell  | c) cellulose        |
| d) nucleus            | e) chlorophyll | f) gills            |
| g) stomata            | h) Urea        | i) roots and shoots |
| j) food               |                |                     |
- |                   |                   |                     |
|-------------------|-------------------|---------------------|
| a) mouse          | b) biology        | c) plant cells only |
| d) photosynthesis | e) carbon dioxide | f) stomata          |
| g) excretion      | h) fins           | i) 75%              |
| j) the Sun        |                   |                     |
- the interrelationships between living organisms and their surroundings.
  - eat plants
  - eat meat
  - break down the dead bodies of plants and animals
  - eat plants and animals
  - is the surroundings of a living organism
  - are in danger of dying out
  - are extinct
  - is the surroundings of a living organism
  - predators



5. a) b

A) Animal cell: (i) Nucleus      (ii) Glycogen granules      (iii) Cytoplasm  
                    (iv) Cell membrane                              (v) Vacuole

B) Plant cell: (i) Nucleus      (ii) Large vacuole      (iii) Chloroplasts  
                    (iv) Strach grains                              (v) Cellulose cell wall

c) Plant cell

Animal cell

a) a thick cell wall

A cell wall is absent

b) chloroplasts present

chloroplasts absent

c) large central vacuole

small scattered vacuoles

6. a) An eagle's beak is adapted for tearing flesh.

b) A camel can store food in its hump.

c) A humming bird has a tubular beak to suck nectar from flowers.

7. a) Desert plants leaves are reduced to spines.

b) Desert plants have thick, fleshy stems that store water.

c) Most flowers have bright colours and strong scents to attract insects for pollination.

8. a) Water

b) Light

c) Temperature

9. Animal

Plants

a) Blending with the surroundings  
- camouflage

a) Some plants have thorns or spines.

b) Rolling up

b) Some plants have poisonous juices.

c) Pretending to be dead

c) Some plants have a strong smell.

10. a) When farmers cut down trees they destroy the natural habitats of animals and plants.

b) When poisonous materials from vehicles, factories and houses are discharged.

c) By hunting, humans are destroying many species of wild animals and birds.

**Additional Exercise:**

MCQs

a) All plants, animals, and other living things are made up of \_\_\_\_\_.

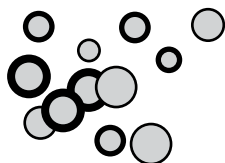
cells                      water                      air                      [cells]

b) A group of similar cells which are specialized to perform a particular function are called \_\_\_\_\_.

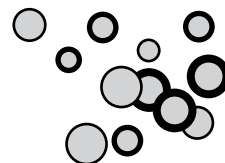
cells                      tissues                      organs                      [tissues]

## Unit 2 Living Things

- c) Different types of tissues are grouped together to form \_\_\_\_\_.  
cells            tissues            organs            [organs]
- d) \_\_\_\_\_ systems are made up of many organs which work together.  
Cell            Tissue            Organ            [Organ]
- e) The \_\_\_\_\_ system in plants is composed of specialized tissue called xylem and phloem.  
vascular        digestive        respiratory        [vascular]
- f) Loss of water from the leaves through the stomata is called \_\_\_\_\_.  
respiration    circulation    transpiration    [transpiration]
- g) \_\_\_\_\_ is a process by which food is oxidized in the body cells to produce energy.  
Respiration    Transpiration    Digestion        [Respiration]
- h) The muscular organ found in the centre of the chest is a \_\_\_\_\_.  
liver            heart            kidney            [heart]
- i) The process by which insoluble food is broken down by the action of enzymes into simple soluble substances is called \_\_\_\_\_.  
digestion        respiration        excretion        [digestion]



# UNIT 3



## Water

### **Objectives:**

To know:

- What water is
- The water cycle
- States of water
- Types of water
- Disadvantages of hard water
- Properties of pure water
- Purification of drinking water in the laboratory
- Uses of water
- Water pollution

### **Teaching strategy:**

Ask: What is water made of?

Explain the chemical formula of water and the composition of water.

Draw the water cycle on the board.

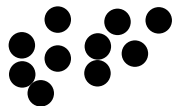
Ask: What happens to water from seas and oceans? Explain the formation of rain and snow.

Explain the meaning of: melting, boiling, evaporation, condensation, freezing.

Demonstrate the “Test for pure water” activity from the book.

Explain the types of water, and how hard water can be changed to soft water.

Mention the disadvantages of hard water.



Ask: What are the properties of pure water?

Explain them.

Ask: What kind of impurities can water contains?

Mention them.

Ask: Can we purify water?

Explain the distillation process, and how Chlorine is added to kill germs.

Ask: What are the ways water is used in our daily lives?

Mention the uses of water.

Ask: How does the water become polluted?

Explain the meaning of water pollution, and how oil pollution occurs and its effects

Do the activities with the students.

### Answers to Exercises in Unit 3

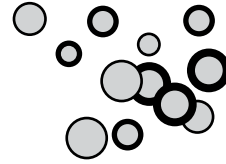
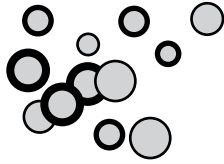
1. a) Water is a combination of oxygen and hydrogen, its chemical formula is  $H_2O$ .
- b) Because freshwater contains dissolved air, they use it for breathing.
- c) We can test whether a sample of water is pure or not by testing its boiling point. Pure water boils at  $100^{\circ}C$  while impure water does not.  
Freezing: The changes in the state of water from liquid to solid.
- d) 1- Pure water has no colour, taste or smell  
2- It freezes at  $100^{\circ}C$ .  
3- It boils at  $100^{\circ}C$ .  
4- It is a bad conductor of electricity.  
5- It is a very good solvent.  
6- It reacts with many metals and non-metals.
- e) bacteria, mud, sand and minerals salts
- f) Water can be purified by a process called distillation. Water is heated in a flask to form steam. The vapor that is produced is cooled to form liquid water.
- d) 1 - Dirty water from houses and factories.  
2 - Waste liquid from factories is dumped into rivers .  
3 - Oil pollution is caused by oil spills from oil tankers at sea.

## Unit 3 Water

2. a) Three-fourths      b) Animals      c) Photosynthesis  
d) germs or impurities      e) filtration      f) chlorine  
g) soft

3. a) ii      b) ii      c) iii      d) ii      e) iii      f) iii





## Air

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### Objectives:

To know:

- what the atmosphere is composed of
- the layers of the atmosphere
- what atmospheric pressure is
- that air has weight
- that air pressure can be measured by a barometer
- the types of barometers
- the effects of atmospheric pressure
- the uses of air pressure
- what air pollution is

### Teaching strategy:

Ask: What do we breathe? Where is air? Can we see air? Can we feel air? What is air made of ?

Explain that we cannot see air but we can feel it. We can see things moving when the wind blows. Air is a mixture of gases. Oxygen is important for breathing and burning. Carbon dioxide is used by plants to make food by photosynthesis. Nitrogen cannot be used directly by living things, but it is changed into chemical substances which are absorbed by plant roots. Nitrogen is used to make proteins.

Ask: Does air contain water?

Put some ice cubes in a drinking glass and explain the condensation of atmospheric water vapour on the outside of the glass.

Show a chart of the layers of the atmosphere or draw the layers on the board.

Explain that the troposphere is the most important layer as it contains all the important gases for living things.

## Unit 4 Air

Ask: Have you heard of the ozone layer? Why is it important?

Explain that the ozone protects us from the harmful ultraviolet rays of the Sun.

Demonstrate by an experiment that air exerts pressure, and has weight.

Explain that the level of air pressure is highest at sea level and decreases as we go higher up.

Ask: Have you seen a doctor take the blood pressure of a patient?

Explain that the pressure of the air can also be measured. The pressure of the atmosphere at sea level is 1 kilogram per cubic centimeter.

Draw a centimetre cube on the board and explain that the weight of the air on this small cube is equal to one kilogram.

Ask: How much air pressure would there be on our bodies? Why don't we feel the air pressure?

Explain that our blood pressure balances it. Draw a simple barometer on the board.

Explain that the height of the mercury column measures the air pressure.

Show the students pictures of an aneroid barometer and an altimeter.

Explain their usage.

If you climb uphill why do you start panting?

Explain that as we go up a hill the air pressure decreases, and we have to breathe faster to take in more air.

Ask: What do you feel just before a storm?

Explain that a low pressure area is created and air rushes in from an area of high pressure to an area of low pressure, and a storm builds up. Changes in air pressure cause changes in weather.

Fill a glass with water. Tell a student to suck it with a drinking straw.

Ask: What would happen if the glass was tightly closed from the top?

Explain that air pressure helps us suck liquids, fill fountain pens, syringes and many other things.

Ask: What is the air like in a village or a hilly area? What is the air like in a busy city? Why is the air cleaner in the countryside?

Explain the causes of pollution and how we can reduce it. Tell students to make placards and charts to make others aware of the hazards of air pollution.

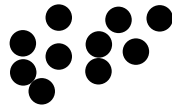
Do the activities.

Summarize the lesson.

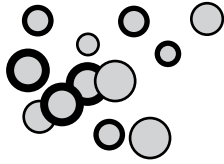
### Answers to Exercises in Unit 4

1. a) The atmosphere is a layer of air that surrounds the Earth.

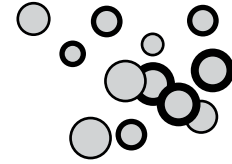
b) About one - fifth is oxygen, nearly four - fifths is nitrogen and the rest is made up of argon, carbon dioxide and small amount of other gases.



- c) The layers of air are: troposphere, tropopause, stratosphere, ionosphere. The most important layer is troposphere because it contains oxygen gas and is the nearest to Earth.
- d) Atmospheric pressure is the weight of the air that is in the atmosphere.
- e) A simple barometer consists of a long glass tube which is sealed at one end. It is filled with mercury and inverted in a dish containing mercury. The height of the column of mercury in the tube measures the atmospheric pressure, which is equal to 760 mm of mercury at sea level.
- f) Changes in air pressure cause changes in the weather. As warm air rises it produces an area of low pressure near the ground. Cooler air moves down to take its place. Rain clouds are formed in low pressure areas. Low pressure causes strong dust storms and hurricanes because air rushes from regions of high pressure to regions of low pressure. When there is high pressure the weather is often sunny.
2. a) hundreds of kilometers      b) pressure      c) 760 mm of mercury  
d) Barometer      e)decreases      f ) air pressure  
g) barometer      h) high      i) altimeter  
j) barometer
3. Choose the correct answer:
- |                                  |                   |
|----------------------------------|-------------------|
| a) high pressure to low pressure | b) storms         |
| c) lower to higher altitudes     | d) temperature    |
| e) altimeter                     | f ) 760 mm        |
| g) pilot                         | h) air            |
| i) high altitudes                | j) high altitudes |



# UNIT 5



## Pollution

### **Objectives:**

To know:

- what pollution is
- plants are very important for life on earth
- different kinds of pollution
- how to control pollution
- about disappearing life

### **Teaching strategy:**

Ask: How many people live on Earth? What does earth give us? Can we live on another planet? Why?

Explain that more than six thousand people live on Earth. We get clothes, food oxygen and everything we need to survive from Earth. Explain the number people living on earth is increasing and in order to fulfill the needs of these people we need to plant more crops which means killing more trees to do so.

Ask: Why are plants important? Can we live without them? Why?

Explain that plants provide food for humans and animals. Explain the other uses of plants and trees.

Tell students about the “Plant a tree today” foundation. Tell them the benefits of planting trees for the future. Ask them to bring small seedlings with them to school. Allow students to each plant a tree around the school.

Ask: What is an environment? How is pollution affecting the environment?

Explain that the natural world that surrounds us is called an environment. Explain that humans are making the environment dirty. Explain the ways in which people are making the environment dirty. Mention and explain the different types of pollution.

## Unit 5 Pollution

Take students outside the school building and onto the playground. Ask them to be quite and listen carefully. Let students say the names of things they can see or hear that may be causing pollution.

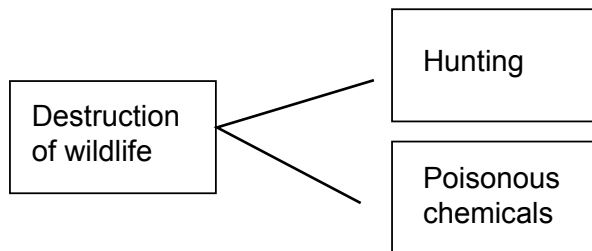
Ask: How can we control pollution?

Explain the different ways in which we can control pollution.

Project: students can make a poster about pollution and how to stop pollution. They need to then present this poster to their class and talk about it.

Ask: Why are animals disappearing?

Explain that animals are being killed. Draw a diagram on the board of the different ways in which animals are killed. Like this:

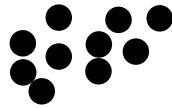


Do the activities.

Summarize the lesson.

### Answers to Exercises in Unit 5

- The earth gives us everything we need to live, it gives us air to breathe, food to eat and water to drink.
  - Cutting down trees and building new factories and industries.
  - Plants are important because they provide food for humans and animals. They also give out oxygen gas which is needed for humans and animals to breathe.
  - Trees are important because they provide shelter and food for animals.
  - The environment is the natural world that surrounds a living thing.  
Pollution is the appearance of unwanted and harmful things in the environment.
  - Factory chimneys, burning coal and burning oil.
  - A river is polluted when chemicals from fertilizers are washed into it, and chemicals from factories and houses flow into it.

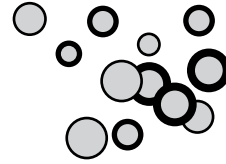
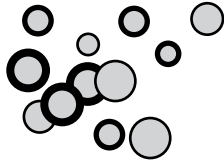


2. a) six thousand million  
b) oxygen  
c) soil  
d) Smoke  
e) acid  
f) oxygen  
g) sewage  
h) weeds

**Additional Exercise:**

Choose the best answer:

- a) More than \_\_\_\_\_ people live on Earth.  
1) Twenty million    2) six million    3) six thousand million    4) 8 thousand million  
[six thousand million]
- b) Plants take in \_\_\_\_\_ gas from the air to make their food.  
1) Oxygen    2) carbon dioxide    3) nitrogen    4) water vapour  
[carbon dioxide]
- c) Unwanted loud sounds can cause \_\_\_\_\_.  
1) Water pollution    2) air pollution    3) noise pollution    [noise pollution]
- d) Burning coal, oil, gas or wood produces \_\_\_\_\_.  
1) Nitrogen    2) water vapour    3) oxygen    4) carbon dioxide  
[carbon dioxide]
- e) Dirty water from houses is called \_\_\_\_\_.  
1) sewage    2) oil spill    3) chemicals    4) sea water  
[sewage]
- f) Farmers use chemicals called \_\_\_\_\_ to get rid of unwanted weeds.  
1) Pesticides    2) nitrogen    3) weed killers    4) fertilizers  
[weed killers]
- g) To control pollution waste materials should be \_\_\_\_\_.  
1) thrown away    2) burned    3) recycled    4) kept  
[recycled]
- h) Some animals are killed for \_\_\_\_\_.  
1) Water    2) their homes    3) food    4) soil  
[food]



## Energy

### **Objectives:**

To know:

- what energy is
- the forms of energy
- the properties of energy
- the sources of energy
- the sources of nuclear energy
- the importance of nuclear energy
- that energy can be controlled and converted for useful purposes
- the energy resources of today
- the energy resources of the future

### **Teaching strategy:**

Place your finger on an ice cube in a plate.

Ask: What is happening? Why did the cube melt?

Explain that the heat from your hand increased the speed of the vibrating molecules and this helped change the state of the cube.

Ask: What are fire crackers made up of ? What happens when you light a fire cracker?

Why does a cracker make a crackling sound when it is lit?

Explain the energy changes that take place.

Ask: How do green plants make their food by photosynthesis?

Explain the energy changes that take place.

Ask: What is energy?

Explain the meaning of energy and how it can be used to do useful work.

Ask: What are the different kinds of energy?

Explain the forms of energy and that energy can change its form.

## Unit 6 Energy

Ask: What are the energy changes that take place when a piece of paper is burnt?  
Explain that energy can neither be created nor destroyed.

Explain that all things need energy to work.

Ask: Why do we eat food? Where does energy in food come from?

Explain that energy in food is the energy of the Sun which has been trapped by green plants during the process of photosynthesis.

Ask: How is the Sun's energy recycled?

Explain the food cycle.

Ask: What is a solar cell?

Explain how the Sun's energy is used to generate electricity.

Ask: What is an atom bomb?

Explain the process of nuclear fusion and fission. Explain how nuclear energy can be used for peaceful purposes.

Ask: How does a windmill work? How is electricity generated by a dam?

Explain the use of natural elements such as wind and water to produce energy.

Explain the working of a waterwheel.

Explain how our bodies act as energy controllers and converters for various activities.

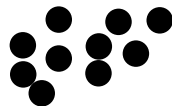
Ask: From where do we get energy for our homes and factories?

Explain the current and future resources of energy.

### Answers to Exercises in Unit 7

1. a) Energy is the ability to do work. All things need energy to move and work.  
b) All energy on the Earth comes from the Sun. It is called solar energy.  
c) Fossil fuels are dead animals that slowly turned into oil and coal.  
d) Kinetic energy is the energy in a body which is due to its moving atoms.  
Potential energy is the stored energy in a body which is due to its position.  
e) Chemical energy is the energy which is stored in chemical substances. It may be released in the form of kinetic energy or heat.  
f) Sound energy moves in the form of sound waves which are produced by vibrating bodies.  
g) The breaking apart of the nucleus of an atom is called nuclear fission. It releases huge amounts of heat energy.





- h) Solar energy is produced by the Sun due to fusion of hydrogen atoms which crash into each other making larger atoms of helium gas.
- i) Energy cannot be made out of anything and neither can it be destroyed. But it can change its form.
2. a) energy                      b) kinetic                      c) chemical                      d) Petrol  
e) kinetic                      f) chemical                      g) digested                      h) biogas
3. a) potential                      b) chemical                      c) chemical                      d) nuclear  
e) sound                      f) chemical                      g) potential                      h) kinetic  
i) electrical                      j) electrical

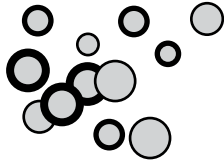
### Additional Exercise:

#### MCQs

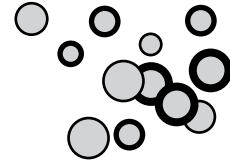
- a) The energy of the Sun is called \_\_\_\_\_.  
lunar energy                      solar energy                      electrical energy                      [solar energy]
- b) Oil and coal are called \_\_\_\_\_.  
petrol fuels                      diesel fuels                      fossil fuels                      [fossil fuels]
- c) Moving atoms have \_\_\_\_\_ energy.  
potential                      kinetic                      sound                      [kinetic]
- d) \_\_\_\_\_ energy is the stored energy of a body due to its position.  
Potential                      Kinetic                      Electrical                      [Potential]
- e) The vibrations produced by a vibrating body travel in air as \_\_\_\_\_ waves.  
light                      heat                      sound                      [sound]
- f) Fireworks have \_\_\_\_\_ energy which is released in the form of sound, heat, and light.  
electrical                      chemical                      physical                      [chemical]
- g) The splitting of atoms is called \_\_\_\_\_.  
fusion                      fission                      synthesis                      [fission]

## Unit 6 Energy

- h) Fats and carbohydrates produce \_\_\_\_\_ energy for our bodies.  
heat                      light                      sound                      [heat]
- i) When biogas mixes with carbon dioxide gas \_\_\_\_\_ gas is produced.  
chlorine                      ammonia                      methane                      [methane]
- j) Energy from the ground is called \_\_\_\_\_.  
mechanical energy                      kinetic energy  
geothermal energy                      [geothermal energy]



# UNIT 7



## Electricity

### **Objectives:**

To know:

- What electricity is
- How electricity works
- What an electric circuit is
- What static electricity is
- What lightning is
- The importance of a switch
- How to use electricity safely

### **Teaching strategy:**

Turn the classroom lights on and off a few times.

Ask: What do we need to turn on the light or ring a bell?

Explain that we need electricity for many things such as, lights, fans, computers and more. Ask for other examples of things that need electricity to work.

Ask: What is matter?

Explain that everything is made up of matter. Matter is made up of atoms.

Draw an atom on the board and label it. Explain how electrons work.

Ask: How is electricity produced?

Explain that electricity is made in a power plant. Explain what a generator is and what it does.

Do activity 1 from the book and explain how a simple circuit works.

Rub a paper against a comb.

Ask: Why did the paper stick to the comb?

Explain that rubbing two objects made of different materials against each other produces static electricity.

## Unit 7 Electricity

Ask: What is lightning?

Explain how lightning is produced when positive and negative charges in the clouds jump towards each other through the air.

Ask: Can electricity be dangerous? How can we use it safely?

Explain the rules to remember when using electricity.

Do the activities.

Summarize the lesson.

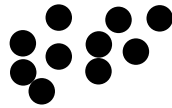
### Answers to Exercises in Unit 7

- We use electricity to turn on anything electronic.
  - It uses running water, burning fuel or nuclear energy to run the machine inside which makes electricity.
  - An electric current is produced when electrons move from atom to atom in a particular direction.
  - An electric circuit is the pathway by which an electric current moves along the wires.
  - A lightning can be seen when positive and negative charges in the clouds jump towards each other through the air.
- energy
  - power plant
  - matter
  - negative
  - attract
  - repel
  - gains
  - loses

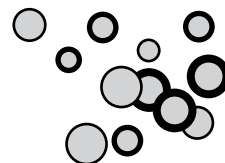
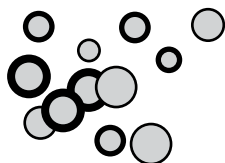
### Additional Exercise:

Choose the best answer:

- Protons have a \_\_\_\_\_ charge.  
a) Negative      b) positive      c) neutral      d) no charge  
[positive]
- The machine that makes electricity is called a \_\_\_\_\_.  
a) Power plant      b) simple circuit      c) generator      d) switch  
[generator]



3. The pathway by which an electric current moves along the wires is called an \_\_\_\_\_.
- a) wire            b) simple circuit            c) switch            d) generator
- [simple circuit]
4. \_\_\_\_\_ is produced when two objects of different materials are rubbed together.
- a) Lightning            b) electricity            c) static electricity            d) spark
- [static electricity]
5. Lightning can be seen when \_\_\_\_\_ charges jump from cloud to cloud in the air.
- a) Negative            b) positive and negative            c) positive            d) neutral
- [positive and negative]
6. Your hands should be \_\_\_\_\_ when using electricity.
- a) Wet            b) dry            c) warm            d) protected            [dry]



## Magnetism

### **Objectives:**

To know:

- what a magnet is
- the properties of a magnet
- the types and shapes of magnets
- the difference between hard and soft magnetic materials
- the structure of an atom
- what electrostatic induction is
- how to test for the presence of a charge
- kinds of electrostatic induction in nature
- uses of electromagnets

### **Teaching strategy:**

Ask: What is an atom? What are they made of?

Explain that matter is made up of tiny particles called atoms which are made up of small particles called protons, neutrons and electrons.

Draw an atom on the board and label it.

Ask: What happens when a positively charged object and a negatively charged object meet?

Explain that positively charged objects attract negatively charged objects but objects that have similar charges repel. If a charged object is brought close to a neutral object it will produce an opposite charge. This process is called induction.

Demonstrate how to test for the presence of a charge.

Explain electrostatic induction in nature.

## Unit 8 Magnetism

Ask: Have you seen a magnet? What can a magnet do?

Show different types of magnets to the students. Demonstrate that magnets attract materials such as steel and iron. Explain that the area around the magnet is called a magnetic field. Anything that is attracted to a magnet is called a magnetic force. Explain the difference between a permanent and temporary magnet.

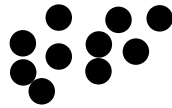
Mention the various shapes and types of a magnet.  
Explain the uses of electromagnets.

Do the activities.

Summarize the lesson.

### Answers to Exercises in Unit 8

1. a) atoms
- b) protons, neutrons
- c) electrons
- d) positive
- e) a neutral
- f) neutral
- g) repel
- h) electrostatic induction
- i) lightning
- j) lightning



2. a) 3  
b) 5  
c) 1  
d) 2  
e) 4

3. a) Bar magnet   b) Compass   c) Electromagnet   d) U-shaped magnet

4. a) attract      b) repel      c) repel      d) repel      e) attract

**Additional Exercise:**

Choose the best answer:

1. Matter is made up of \_\_\_\_\_.

- a) cells      b) protons      c) ions      d) atoms      [atoms]

2. The presence of a charge can be tested by a \_\_\_\_\_.

- a) gold leaf electroscope      b) magnet      c) compass      d) steel needle  
[gold leaf electroscope]

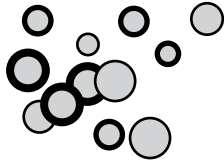
3. \_\_\_\_\_ allow electricity to pass through them.

- a) insulators      b) plastic      c) wood      d) conductors      [conductors]

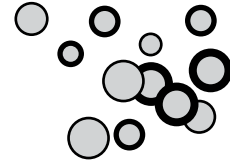
4. Magnets are of various shapes including: \_\_\_\_\_ magnets.

- a) square      b) rectangle      c) bar      d) circle      [bar]





# UNIT 9



## The Earth

### **Objectives:**

To know:

- The shape of the Earth.
- What the atmosphere is
- What the earth is made of
- The types of eclipses
- The phases of the moon
- How day and night happen
- How seasons change

### **Teaching strategy:**

Ask: What shape is the earth?

Explain that the shape of the earth is geoid, which means that it is round but slightly flattened at the top and bottom. Explain that the Earth is 5th largest planet of the solar system.

Ask: What is an atmosphere?

Explain that the Earth is surrounded by a blanket of air called the atmosphere. The atmosphere is made up of gases, such as nitrogen, oxygen, carbon dioxide and water vapour, and dust particles. We need oxygen to breathe and plants need carbon dioxide to breathe.

Ask: What is the Earth made of?

Explain that the earth has many layers and we can only see one which is called the crust. The crust is hard rocky shell around the earth and it contains two main rocks, granite and basalt. The layer below the crust is called Mantle. The Mantle is very hot and it is made up of heavy rocks some of which melt due to the very high temperature. The final and deepest layer is called the core. The core can be divided into two layers, the outer core and the inner core. Explain what the core contains. Do the Earth layers activity from the book.

## Unit 9 The Earth

Ask: Does the Moon have gravity on it? Can we breathe on the Moon?

Explain that the moon is the Earth's only natural satellite. A satellite is anything that orbits around a larger object. Explain that other planets have more than one moon circling them whereas the Earth only has one.

Ask: Who knows what an eclipse is?

Explain that there are two types of eclipses, a lunar eclipse and a solar eclipse. The lunar eclipse is when the Earth comes between the Moon and the Sun. The Solar eclipse is when the Moon comes between the Earth and the Sun.

Ask: When do we see a full Moon? What other phases does the Moon have?

Explain that the Moon revolves around the Earth once every 29.5 days. This is called a lunar month. We see a full moon when the side of the Moon that is facing the Earth is lit by the Sun. A new Moon is when we see only a thin slice of the Moon because the Moon is on the side nearest to the Sun. These are called phases of the moon. Show the students the image of the phases in the book.

Ask: Why do we have day and night?

Explain that the Earth is always spinning on an axis through the North and South poles once every 24 hours. When one side of the Earth is facing the sun it has daytime and the other side has night.

Ask: What are the four seasons? What season are we in now?

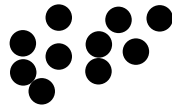
Explain that the Earth travels around the sun once a year. This movement is called a revolution. The side that phases the Sun has summer and the side that isn't facing the sun has winter.

Do the activities.

Summarize the lesson.

### Answers to Exercises in Unit 9

1. a) The Earth is the planet we live on and the fifth- largest planet of the solar system. The Earth's shape is geoid, which means it is round but slightly flattened at the top and bottom.  
b) The three layers of the Earth are the crust, the mantle and the core. The core is the hottest layer.  
c) The phases of the Moon are the sections of the Moon's surface that are reflected.  
d) The revolution which is the movement of the earth around the sun.

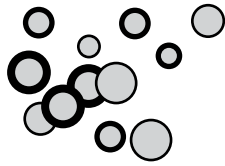


2. a) 2      b) 4      c) 3      d) 1  
3. a) Sun, Earth, Moon      b) Sun, Moon, Earth  
5. The crust, the mantle, the outer core, the inner core.

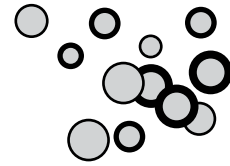
**Additional Exercise:**

Choose the best answer:

1. The Earth is \_\_\_\_\_ largest planet of the solar system.  
a) second      b) seventh      c) fifth      d) third      [fifth]
2. The mantle is the layer of Earth \_\_\_\_\_ the crust.  
a) above      b) inside      c) outside      d) below      [below]
3. The moon has large pits called \_\_\_\_\_.  
a) layers      b) rocks      c) craters      d) dust
4. We can see the shadow of the Earth slowly moving across the Moon in  
a) \_\_\_\_\_.  
a) eclipse      b) solar eclipse      c) full moon      d) lunar eclipse      [lunar eclipse]
5. The Moon revolves around the Earth one every \_\_\_\_\_.  
a) 3 hours      b) 24 hours      c) 29.5 weeks      d) 29.5 days      [29.5 days]
6. The movement of the Earth around the Sun is called \_\_\_\_\_.  
a) Winter      b) Summer      c) The weather      d) revolution      [revolution]



# UNIT 10



## The Atmosphere and Weather

### **Objectives:**

To know:

- What air is made of
- The use of atmosphere
- What thermals are
- The relationship between air pressure and the weather
- The difference between sea breeze and land breeze
- Types of Monsoon wind
- How clouds and rain are formed

### **Teaching strategy :**

Ask: What is the thin layer of air around the Earth called?

Explain that the atmosphere is important for life on Earth and without it we wouldn't be able to breathe. There is no air on the Moon so there is no weather on the Moon which means there is no rain, snow or wind.

Ask: Is air liquid, solid or gas? Can we see air? What is air made up of?

Explain that air is a gas and we cannot see it but we can feel it.

Ask students to use a paper and move it up and down in front of their faces. What do they feel?

Explain that air is made up of different gases, which are invisible, such as nitrogen and oxygen. There are many particles in the air including dirt, sand, smoke and salt.

Ask: Why is the atmosphere important?

Explain that the atmosphere is important for many reasons including allowing us to breathe. It is also important because it protects the earth from becoming too hot. The Sun rays that come to Earth pass through the air in the atmosphere and through clouds. Some of these rays are reflected back which lessens the heat transferred to Earth. If this did not happen Earth will become hotter and hotter making it difficult for all living things to live on earth.

Ask: What is wind?

Explain that moving air is called wind. The air in the atmosphere is never still.

Explain what thermals are.

## Unit 10 The Atmosphere and Weather

Ask: What is air pressure?

Explain that all air has weight and it pushes downward which is called air pressure. Air is less on mountains so they have low air pressure. Warm air weighs less than cold air. So, when the pressure is high the weather is sunny but when the pressure is low the weather is cloudy with rain or snow.

Ask: What is a breeze?

Explain that a breeze is a light gust of air. There are two types of breezes, sea breeze and land breeze. Air moves from areas of high pressure to areas of low pressure. Explain the two types of breezes.

Explain that large-scale sea breezes are called monsoon. There are two kinds of monsoon winds, summer monsoons and winter monsoons. In summer cool moist air from the sea moves towards the earth which often brings rain. During the winter the opposite happens.

Ask: Does wind feel hot or cold in summer?

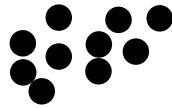
Explain that the wind feels cold in summer but even colder in winter. This is because our bodies are surrounded by a thin layer of warm air. In summer this thin layer is replaced with the cool air of the wind and in winter the same happens.

Ask: When does it rain?

Explain that clouds form in the same way that steam is formed over water. When the Sun heats sea water it evaporates and forms clouds. There are tiny water droplets in these clouds and as the clouds move they bump into each other and join together. When the clouds get big and heavy it rains. If it is very cold these droplets freeze causing it to snow.

### Answers to Exercises in Unit 10

1. a) The atmosphere is the thin layer of air around the earth.
- b) Troposphere, Tropopause, Stratosphere and Lonosphere. (Refer to page 31 in the pupil's book)
- c) The troposphere is responsible for the Earth's weather. (Refer to page 30 in the pupil's book)
- d) Oxygen, nitrogen and other particles including sand, smoke and salt.
- e) The Sun rays that come to Earth pass through the clouds and air in the atmosphere. Some of these rays are reflected back into space which lessens the heat transferred onto the surface of the earth.
- f) Air which moves is called wind.
- g) An area where the air is warm is called a low pressure area because warm air weighs less than cold air.



h) In summer cool moist air from the sea moves towards the earth which often brings rain this is called summer monsoons.

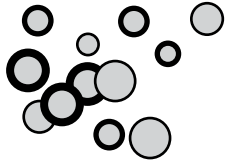
i) Snowflakes are ice crystals that have joined together

3. a) low  
b) low  
c) high  
d) high  
e) low  
f) low  
g) high

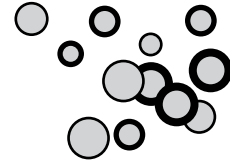
**Additional Exercise:**

Choose the best answer:

1. The two important gases in the air are oxygen and \_\_\_\_\_.  
a) carbon dioxide    b) water vapour    c) nitrogen    [nitrogen]
2. The \_\_\_\_\_ protects the earth from becoming too hot.  
a) ground    b) sea    c) atmosphere    d) rain    [atmosphere]
3. Thermals are used by air glider pilots and \_\_\_\_\_ to float in air.  
a) birds    b) planes    c) insects    d) helicopters    [birds]
4. Warm air is \_\_\_\_\_ cold air.  
a) heavier than    b) lighter than    c) the same as    [lighter than]
5. Large- scale sea breezes are called \_\_\_\_\_.  
a) sea breeze    b) land breeze    c) monsoons    [monsoons]
6. Water vapour that cools and changes into tiny droplets of water called \_\_\_\_\_.  
a) cloud droplets    b) rain    c) vapour    d) snowflakes    [cloud droplets]



# UNIT 11



## Space, Stars and Planets

### **Objectives:**

To know:

- what space is.
- what a nebulae is.
- what asteroids are.
- what comets, meteors and meteorites are.
- the planets of the solar system.

### **Teaching strategy:**

Ask: What is the sky? Why does the sky appear blue? What is space? Does space have an atmosphere?

Explain what space is. Discuss that space contains dangerous rays and particles travelling at high speed.

Show the students, charts of space and the heavenly bodies and discuss the formation, structure, and movement of each.

Ask: What is a star? What is the Sun? What are stars made up of ?

Explain the formation of stars from nebulae by the pull of gravity.

Ask: What do you see in the sky on a moonless night?

Discuss the Milky Way Galaxy and what it is composed of.

Discuss the solar system.

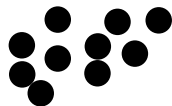
Ask: What are asteroids? Explain what asteroids are.

Ask: What are comets? Explain what they are.

Ask what are meteorites? Explain the difference between them.

Do the activities.

Summarize the lesson.



Ask: How can an artificial satellite remain in orbit in space?

Discuss the Earth's gravity in relation to the motion of a satellite.

Explain the orbits of artificial satellites and the use of different kinds of satellites for various purposes.

Ask: Who was the first man to travel in space? Which was the first animal to go into space?

Discuss space travel history with the students. Ask them to find information about space travel from the Internet and from magazines and science journals.

Perform the activities.

Summarize the lesson.

### **Answers to Exercises in Unit 11**

1. a) Nebulas are great clouds of gas and dust in space.
- b) The force of gravity pulls gas and dust particles together. As they become tightly packed the temperature inside rises to over one million degrees. Molecules of hydrogen gas join to make helium gas molecules. This mass of gas begins to shine and a star is through space.
- c) A galaxy is an island of stars spinning through space.
- d) Planets are bodies that go around the Sun.
- e) A solar system is made up of the sun, the planets and the moons.
- f) Scientist think that the planets their moons were made up of the same gas that formed the sun.
- g) An asteroid is a lump of rocky material in space.



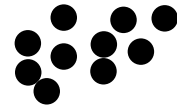
## Unit 11 Space, Stars and Planets

2. a) Space is the area beyond the earth's atmosphere.  
b) There is no air in space.  
c) Great clouds of gas and dust in space are called nebulas.  
d) The force of gravity pulls gas and dust particles together.  
e) A band of stars in the sky on a dark night is called the Milky Way.  
f) An island of stars spinning through space is called a galaxy.  
g) Bodies that go around the sun are called planets.  
h) The moon is not a planet.  
i) A lump of rocky material in space called an asteroid.
3. a) 330 000  
b) 1 384 000  
c) 149 million  
d) 14 000 0000C  
e) 6 000C  
f) Pluto  
g) Venus  
h) Earth  
i) Mars  
j) Jupiter  
k) Saturn  
l) Uranus  
m) -200C  
n) Pluto  
o) Jupiter

### Additional Exercise:

#### MCQs

- a) Space is the area beyond the Earth's atmosphere where there is no \_\_\_\_\_.  
air                      water                      light                      [air]
- b) Great clouds of dust and gas in space are called \_\_\_\_\_.  
stars                      planets                      nebulae                      [nebulae]
- c) A galaxy is a band of \_\_\_\_\_ spinning in space.  
stars                      planets                      moons                      [stars]



## Assessment

### Units 1-6

1. Answer the following questions:

- How does a scientist find answers to questions?
- What are the steps involved in solving a scientific problem?
- Define respiration. Name the parts of the human respiratory system.
- How can we preserve wildlife?
- How do green plants manufacture their food? What are the things necessary for photosynthesis to take place?
- What is 'sensitivity'? How do single-celled organisms respond to changes in their environment?

2. Fill in the blanks:

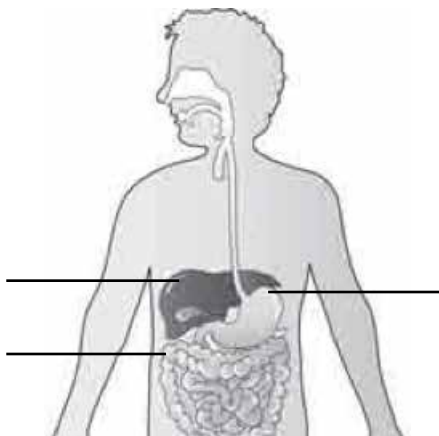
- Scientific equipment is called \_\_\_\_\_.
- \_\_\_\_\_ of animals and plants are kept in a laboratory.
- Walls of plant cells are made up of hard material called \_\_\_\_\_.
- The process by which poison is removed from the body is called \_\_\_\_\_.
- The part of Earth's surface where living things can be found is called \_\_\_\_\_.
- Small organisms such as \_\_\_\_\_ and \_\_\_\_\_ feed on dead animals.
- Armadillos and \_\_\_\_\_ roll up into a ball when in \_\_\_\_\_.
- \_\_\_\_\_ is the process when steam is cooled and changes into water.
- The stratosphere contains a gas called \_\_\_\_\_ which is like oxygen.
- \_\_\_\_\_ is when atoms are squeezed together.

3. Differentiate between: (10 marks)

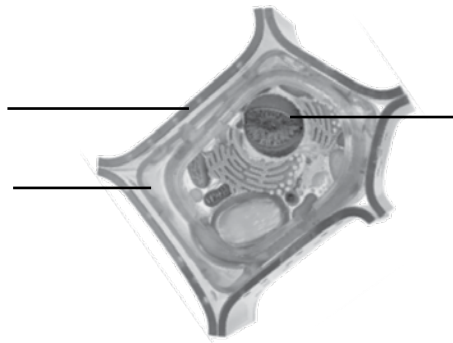
- Melting point and boiling point
- Simple barometer and aneroid barometer
- An animal cell and a plant cell
- Photosynthesis and respiration

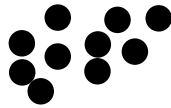
4. Label any two of the following diagrams:

A



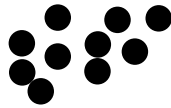
B





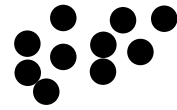
### Assessment (1-6) Answers

1. a) A scientist solves a scientific problem by locating the problem, collecting information, performing experiments, recording the observations, and then drawing a conclusion.
  - b) The steps involved in solving a problem are, locating the problem, collecting information, performing an experiment, recording the observation and drawing a conclusion.
  - c) Respiration is the process by which food is oxidized in the body cells to produce energy. Oxygen is taken into the body from the air and carbon dioxide is given out.  
The respiratory system is composed of the nose, windpipe or trachea, bronchi, bronchioles, and air sacs or alveoli.
  - d) 1. More trees should be planted. 2. Ponds should be made. 3. Spraying of insecticides should be stopped. 4. Hunting should be controlled. 5. Pollution of air, soil and water should be reduced to a minimum.
  - e) The process by which green plants make their food is called photosynthesis. Photo means light and synthesis means putting together. so photosynthesis means putting together by light. For photosynthesis to take place, a plant must have four things: carbon dioxide, water, chlorophyll, and light.  
Process of photosynthesis Air, containing carbon dioxide, gets into the leaf through millions of stomata.  
The air then goes into the spaces between the cells that make food. Water and mineral salts come from the soil. The carbon dioxide dissolves in the water on the cell walls and passes into the cells with the water. The cells that make food contain the green material chlorophyll.  
Inside a leaf, the cells that contain chlorophyll make carbohydrates. This is a chemical change which can only take place in the presence of light.
  - f) All living organisms are sensitive to changes inside and outside their bodies. Animals respond to changes in their environment by moving elsewhere. Plants respond to changes in their surroundings by moving their parts.  
In some simple, unicellular organisms such as amoeba, chlamydomonas, and euglena, the cytoplasm as a whole is sensitive. The eye-spots in euglena and chlamydomonas help them to detect changes in light intensity, enabling them to move away from bright light.
2. apparatus, Specimen, cellulose, excretion, biosphere, bacteria and fungi, hedgehogs –danger, condensation, ozone, fusion



## Assessment Answers

3. i) The melting point of ice is 0C which is when ice changes to water. The temperature of water when it is boiling is called the boiling point of water. Water boils at 100C.
- ii) A simple barometer consists of a long glass tube which is sealed at one end. It filled with mercury and inverted in a dish containing mercury.
- iii) An animal cell has no definite shape. It has a thin cell membrane. The nucleus is in the centre of the cell. It has small vacuoles scattered in the cytoplasm.  
A plant cell has a thick cell wall made of cellulose. It has a large central vacuole which is filled with cell sap. Its nucleus is to one side.
- iv) The process by which green plants make glucose from simple substances like carbon dioxide and water, in the presence of sunlight, is called photosynthesis.  
It is a building-up process.  
The process by which food is broken down to release energy is called respiration.  
Carbon dioxide and water are produces as a result and energy is released in the form of heat
4. a) Liver, Stomach, Colon  
b) Cell wall, Large vacuole, Nucleus



## Assessment

### Units 7-11

1. Answer the following questions:

- What is the atmosphere? What is the fraction of the different gases found in it?
- Describe an atom. How are electrons distributed in an atom?
- How does the change from season to season happen?
- What is the cooling effect of wind?
- How is electricity produced?

2. Fill in the blanks:

- Every atom has a \_\_\_\_\_ which is surrounded by spinning electrons. (nucleus)
- Electrons spin around the nucleus along definite paths called \_\_\_\_\_. (Orbits)
- An electromagnet is a coil of wire with a core of soft \_\_\_\_\_ inside it. (iron)
- A \_\_\_\_\_ occurs when the Earth comes between the Moon and the Sun.  
(lunar eclipse)
- When there is \_\_\_\_\_, the weather is cloudy, with rain or snow. (low pressure)
- \_\_\_\_\_ is always covered in thick white clouds. It is the closest planet to Earth.  
(Venus)
- \_\_\_\_\_ is the second biggest planet. (Saturn)
- \_\_\_\_\_ is the only planet known to have life. (Earth)
- \_\_\_\_\_ is seen in the sky as a red planet. (Jupiter)
- It takes \_\_\_\_\_ two years to go around the Sun. (Mars)

3. Differentiate between:

- Conductors and insula-tor
- A simple magnet and an electromagnet
- Sea breeze and land breeze
- Meteors and meteorites

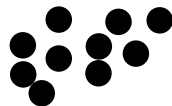
4. Name each of the following:

A \_\_\_\_\_



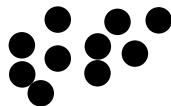
B \_\_\_\_\_





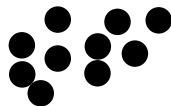
### Assessment (7-11) Answers

1. a) The Earth is surrounded by a layer of air which is like a huge ocean. It extends hundreds of kilometres above the surface of the Earth. This ocean of air is called the atmosphere. The atmosphere is made up of several layers of air, containing mixtures of different gases.  
About one-fifth of the air is oxygen, nearly four-fifths is a gas called nitrogen, and the rest is made up of argon, carbon dioxide, and small amounts of other gases.
- b) Matter is made up of tiny particles called atoms which are made up of small particles called protons, neutrons and electrons.  
An atom is made up of a central nucleus which contains positive charged particles called protons and neutral particles called neutrons. Negatively charged particles called electrons spin around the nucleus along definite paths called orbits. The number of protons in the nucleus balance the number of electrons in the orbits and therefore, the atom is neutral particle.
- c) The Earth travels around the Sun once in a year (365  $\frac{1}{3}$  days). This movement of the Earth around the Sun is called revolution. The North and South Poles are tilted towards the Sun. The part of the Earth which is tilted towards the Sun gets more light and is warmer. It experiences summer. The part which is tilted away from the Sun gets less light and is colder. It experiences winter. During spring and autumn, the Earth is tilted neither towards nor away from the Sun. It gets equal amounts of light, so it is neither hot nor cold.
- d) In summer the wind is refreshing on hot days. In winter it feels even colder when the wind is blowing. This is because the wind blows away the warm layer of air which is next to the skin.
- e) Electricity is made in a special place called a power plant. The machine that makes electricity is called a generator. A generator makes electrical energy, but it uses energy as well. It uses running water, burning fuel or nuclear energy to run the machine inside it to make electricity. It changes other kind of energy into the electric energy that we can use.
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## Assessment Answers

3. i) Materials that allow electricity to pass along them are called conductors. Metals are good conductors of electricity. In conductors, some electrons are not tightly held to their atoms. They can move through material by passing from atom to atom when pushed by an energy source.
- In insulators, the electrons are all tightly held to the atoms, so they cannot move through material, even when pushed by energy. Plastic, rubber, wood and PVC (polyvinyl chloride) are insulators. Electric wires are made of conductors. The handles and bodies of electric gadgets are made of insulators.
- ii) A simple magnet is a piece of iron or steel that can attract small pieces of iron or steel.
- An electro magnet is a coil of wire with a core of soft iron inside it which behaves like a magnet when an electric current flows through it. If the number of turns of the coil is increased, the electromagnet becomes stronger.
- iii) On sunny summer days, the land gets warmer than the water. The air near the land warms up and rises. The air pressure over the land is lower than over the water so, air moves in from the sea. This is called a sea breeze.
- At night, the land cools down quickly, but the water remains warm. The air above the water becomes warm and rises. The air pressure over the water is lower than over the land so, air moves from land to sea. This is called land breeze.
- iv) A meteor is a piece of rock which falls from space into the upper layers of the atmosphere. When it rubs against the air at great speed, it heats up due to friction and begins to glow. It burns up very quickly and turns to dust.
- Pieces of rock which do not burn up completely before falling to the ground are called meteorites.
4. a) Horse magnet                      b) Saturn



## Test Paper Answers

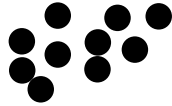
2. a) F  
b) T  
c) F  
d) T  
e) F
3. Living things use food to increase their size by making new cells. This process is called growth.
5. a) ii oxygen  
b) iii water vapour  
c) ii blue
6. 1. To vacuum dust.  
2. To fill fountain pens with ink.  
3. To fill medicine syringes.
7. Air pollution is when, harmful gases, smoke and chemicals from factories and carbon dioxide from burning coal or wood fill the air.
8. Biogas is the shape of the Earth.
9. Energy sources are limited and need to be saved for future use.
10. An electromagnet is a coil of wire with a core of soft iron inside it which behaves like a magnet when an electric current flows through it.
12. a) 17      b) 18      c) 17
13. The rotation of the Earth is what causes daytime and night-time.
14. The Moon is the earth's natural satellite. It has no atmosphere and no sign of life.
15. Electromagnets are used in many electrical gadgets, such as the electric bell and telephone. They are also used to separate metals like iron and steel from other metals in a scrap yard.
16. They use chemicals to get rid of weeds and insects.
17. A compass is a small instrument that helps us study magnetic fields.
18. a) Trees should not be cut down.  
b) New trees should be planted  
c) Crops should not be sprayed with chemicals.  
d) Waste materials and garbage should be buried.  
e) Waste materials should be recycled.
19. Static electricity is produced when two objects made of different materials are rubbed together.
20. When an atom gains or losses electrons, it becomes charged and is called an ion. When an atom gains electrons, it becomes a negative ion and when it loses electrons it becomes a positive ion.
21. The weather is often sunny when there is high pressure.
22. Clouds are formed when the Sun heats the sea and water evaporates. As the water vapour rises it begins to cool and forms clouds.
23. Comets are wandering lumps of ice and dust in space.
24. A meteor is a piece of rock which falls from space into the upper layers of the atmosphere. Meteorites are pieces of rock which do not burn up completely before falling to the ground.



# Sample lesson plan

Unit 4 Air

Topic	Time	knowledge		Plan activity time	Resource material
		objectives	skills		
Air	40 min	To explain the composition of the atmosphere. To explain the layers of the atmosphere. To explain how the atmosphere is useful for Earth.	To know the composition of the atmosphere. To understand the uses of air pressure.	Previous knowledge: 5 min. Discussion: 20 min. Activity: 10 min. Q/Ans: 5 min.	Charts of the layers. Gas jars of oxygen.
Atmosphere pressure	40 min	To show that air exerts pressure. To explain its effects and uses.	To understand the effects of atmospheric pressure and the instruments used to measure it.	Previous knowledge: 5 min. Discussion: 20 min. Activity: 10 min. Q/Ans: 5 min.	Charts showing movement of air. Barometer.
Assessment tasks		Homework		Teacher's evaluation of the lesson	
Q.1, 2	Q. 3			The students know the structure and composition of the atmosphere. They know that air exerts pressure. They understand the usefulness of air pressure.	



## Notes

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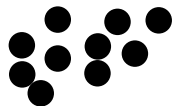
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Everyday Science  
Teacher's Guide 6

**Notes**

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