

Everyday Science

Teacher's Guide **3**





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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. Bearing 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.



Everyday Science
Teacher's Guide 3

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 curiosity and often provoke 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 child 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 which is easy as well as effective can be adopted:

- (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 by 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 gains 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.

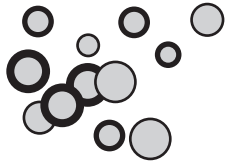
Sketches and diagrams on the blackboard are an important aspect to the teaching of science, but too much time should not be spent on them as the students lose interest. An alternative to drawing on the blackboard is a ready-made chart or one made by the teacher can be displayed in the class. The use 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.

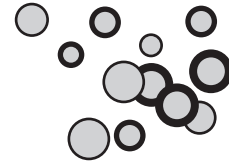
Practical work arouses interest in science. Class activities can be organized in such a way that the whole class participates either in groups or individually, depending on the type of work to be done or the amount of material available.

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



Living things

Objectives:

- To know that many kinds of living things live on the Earth
- To know that the Earth is the only planet which has air and water
- To know that living things need air
- To know that living things need water
- To know 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

- All living things need water and oxygen to live.
 - Oxygen helps to burn the food that is inside our bodies. This makes energy.
Energy helps living things to move and work.
 - Water helps to carry food from one part of the body to another.
 - Food is burnt inside the body to make energy.
 - All living things need food to stay alive.
- Earth
 - air
 - gills
 - lungs
 - stomatas
 - water
 - food
 - herbivores
 - carnivores
 - omnivores

Unit 1 Living things

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

Additional activity

Choose the best answer:

- 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 is made up of water.
1/4 1/2 3/4 [3/4]
- e) _____ can make their own food in the 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]



Types of living things: Animals

Objectives:

To know that living things can be classified

To know the different classes of animals

To know that animals can be classified on the basis of having or not having a backbone

To know the classes of invertebrates

To know 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.

Unit 2 Types of living things: Animals

Ask: Where does a snail live?

Where does a star fish 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 blackboard. 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 fish live? Draw it on the blackboard and label it.

Explain how a fish breathes and swims in water.

Explain what a fish eats.

Ask: Does a fish have babies?

Explain how a fish reproduces.

Ask: Where does a frog live?

Explain what an amphibian is.

Explain the characteristics of an amphibian with the help of a chart.

Ask: What does a frog eat?

What is a baby frog called?

Explain the life cycle of a frog.

Ask: Where does a snake live?

Where do a crocodile and a tortoise live?

Explain the characteristics of reptiles with the help of charts.

Ask: Where do birds live?

What is the body of a bird covered with?

Does a bird have teeth?

Can all birds fly?

Explain the characteristics of birds with the help of charts.

Ask: What does a parrot eat?

What does an owl eat?

Explain how birds use their teeth and claws.

Ask: What is the skin of a rabbit covered with?

What is your skin covered with?

How do you breathe?

What do you eat?

Explain characteristics of 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) shell c) soft
 d) thorax e) gills f) on land and in water
 g) dry

Additional activity

Choose the best answer:

- 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 star fish 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) One animal, which have a soft body and no legs, are called _____.
 worms crabs oysters [worms]
- f) A butter y has _____ legs and _____ wings .
 2, 4 6, 4 4, 6 [6, 4]

Unit 2 Types of living things: Animals

- 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]



Types of living things: Plants

Objectives:

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

Teaching strategy:

- Show the students a chart of different kinds of flowers.
- Show the students a specimen of a flowering plant.
- Explain the functions of each part.
- Ask: Where do plants grow?
- Can plants grow in water?
- Can plants grow in a desert?
- Do plants grow on mountains?
- Explain the various habitats of plants with examples.

Unit 3 Types of living things: Plants

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 capsicum, 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.

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 place
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) The two kind of cones are called seed cones and pollen cones.
2. a) bee, pollen, carpel
b) tube, ovule, seed, fruit

Additional activity

Choose the best answer:

- 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]

Unit 3 Types of living things: Plants

- 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]



UNIT 4

Matter

Objectives:

- To know that everything found on Earth is matter
- To know that matter takes up space
- To know that matter exists in three states
- To know the properties of solids
- To know the properties of liquids
- To know the properties of gases
- To know that we learnt about matter with our senses
- To know that matter is made up of molecules
- To know what a molecule is
- To know that different things are made of different kinds of molecules
- To know that matter can change its state by heating and cooling
- To know that molecules can move
- To know that the molecules of a solid are very close together
- To know that the molecules of a liquid are not very close to each other
- To know that the molecules of a gas are very far apart
- To know 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.

Unit 4 Matter

Ask: Is it hard or soft?

Explain that a solid is hard.

Squeeze the marble in your st.

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 an inflated balloon and let the air out.

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 move 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 is what all things around us are made out of.

b) Matter has three forms.

c) We learn about matter with our senses.

d) Heat can change a solid to a liquid.

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

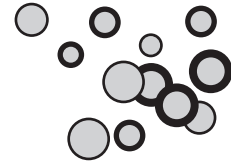
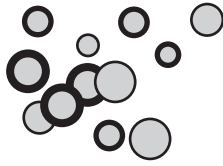
j) gas

Unit 4 Matter

Additional activity

Choose the best answer:

- 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 _____ it.
cooling heating freezing [heating]
- h) Water can be changed into steam by _____ it.
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 move about freely can slide over each other
very close together [can move about freely]



Air

Objectives:

- To know that the air covers the Earth like a thick blanket
- To know that the layer of air is called atmosphere
- To know that the atmosphere is 1000 kilometres deep
- To know that the atmosphere has many gases
- To know the importance of oxygen
- To know the importance of carbon dioxide
- To know that plants give out oxygen
- To know that carbon dioxide is produced by breathing and burning
- To know the condition of the air in different seasons
- To know that air has weight
- To know that air exerts pressure called air pressure
- To know that air pressure keeps changing
- To know that changes in air pressure affect the weather
- To know that winds are caused by changes in air pressure
- To know the instrument to measure air pressure
- To know 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?

Unit 5 Air

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) Oxygen is used by all living things for breathing. It is also used for burning things.
c) Green plants use carbon dioxide to make food.
d) Air pressure is the way air presses down all things.

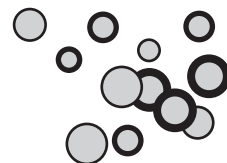


2. a) atmosphere b) 1000 c) carbon dioxide d) warm
e) water vapour f) wind g) breeze h) gale i) hurricane

Additional activity

Choose the best answer:

- 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 things breathe out _____ gas.
Oxygen Carbon dioxide Nitrogen [Oxygen]
- 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 of all is called a _____.
breeze gale hurricane [hurricane]
- j) We can measure changes in air pressure by an instrument called a _____.
thermometer anemometer barometer [barometer]



Water

Objectives:

To know that water is matter

To know that water exists in three forms

To know that water can be changed from one form to another by heating or cooling

To know that there is water vapour in the air

To know how clouds, mist, fog, and snow are formed

To know the water cycle

To know how groundwater is collected

To know how springs and wells are formed

To know 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, with reference 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

b) Water can be changed from solid to liquid form by heating.

c) Water can be changed from liquid to solid form by freezing.

d) Clouds are made up of water vapor.

e) The clouds that are formed near the ground on a cold night.

f) Groundwater is rainwater that gathers in the spaces between rocks.

2. a) ice

b) water vapour

c) water

d) rain

e) crystal

f) snowflakes

g) rain

3. a) drinking

b) watering

c) fire fighting

d) boating

e) washing

f) bathing

4. a) heating

b) heating

c) cooling

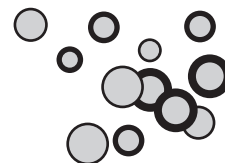
d) cooling

Unit 6 Water

Additional activity

Choose the best answer:

- 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]



Force

Objectives:

To know what force is

To know that force can move things

To know that force can change the direction of moving things

To know that force can bend things

To know that force can stretch things

To know that force can break and tear things

To know what work is

To know that work needs energy

To know the different kinds of energy

To know the different sources of energy

To know what friction is

To know the advantages of friction

To know the disadvantages of friction

To know ways to reduce friction

Teaching strategy:

Tell a student to lift a chair, to lift a heavy bag, to push a table, to burst 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.

Unit 7 Force

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 '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 different kinds of energy are solar energy, heat energy, electrical energy, and light energy.

d) The force which slows down or stops a moving thing.

e) Oil makes the parts slide over each other and there is less friction between them. Therefore we put oil to reduce friction. Another way of reducing friction is by using ball - bearing.

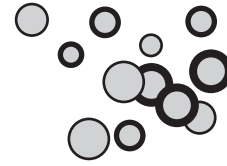
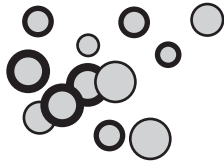


2. a) energy b) energy c) the Sun's
 d) Heat e) Electrical f) Solar energy
 g) Friction h) friction i) hot
 j) friction
3. a) electrical energy b) light energy
 c) heat energy d) heat energy

Additional activity

Choose the best answer:

- a) When we are pushing or pulling something we are using_____.
force pressure energy [force]
- b) When an object is pulled through for 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]



Heat

Objectives:

- To know that heat makes us feel warm
- To know the sources of heat
- To know the use of heat
- To know that heat is a kind of energy
- To know that we get energy from the food that we eat
- To know that the movement of molecules produces heat
- To know that fast molecules produce more heat
- To know that heat brings about a change in state
- To know that thermometers can be used to measure heat

Teaching strategy:

- Ask: What do you feel when you sit in front of a heater?
- Where do we get heat from?
- 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 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) A thermometer is a closed glass tube that has bulb at one end filled with a liquid called mercury.
3. a) heat and light b) energy c) less
d) water e) mercury

Additional activity

Choose the best answer:

- a) Heat is a kind of _____.
force work energy [energy]
- b) When molecules of a substance move fast they make it _____.
hot cold freeze [hot]

Unit 8 Heat

c) When ice is heated it melts because its molecules start moving

_____.
slower remain still faster [faster]

d) When molecules are cooled their movement _____ and they move closer to each other.

slows down becomes fast remains the same [slows down]

e) We use an instrument called a _____ to find out how hot something is.

anemometer barometer thermometer [thermometer]

f) The bulb of a thermometer is filled with _____.

water mercury oil [mercury]

g) The normal body temperature of the human body in degrees Fahrenheit is _____.

98.6 100.6 102.6 [98.6]

h) A steam engine moves due to _____.

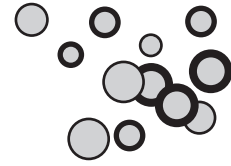
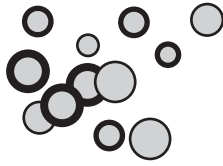
cold heat ice [heat]

i) When a thermometer is dipped into something warm, the liquid inside

_____.
falls rises stays the same [rises]

j) The energy that keeps our body warm comes from _____.

fire food fuel [food]



Light

Objectives:

- To know that the Sun gives o heat and light
- To know that burning things give o heat and light
- To know that the Moon does not have its own light
- To know that the Moon reflects sunlight
- To know reflection of light
- To know that reflection of light helps us to see things
- To know that light travels very fast
- To know that light travels in straight lines
- To know 'refraction' of light
- To know how shadows are made
- To know the size and position of shadows made by the Sun
- To know how things appear coloured
- To know the colours of white light
- To know how a rainbow is formed

Teaching strategy:

- Ask: Where does the Earth get light from?
- 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.

Unit 9 Light

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.

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.

Ask: When do you see a rainbow in the sky?

Explain the formation of a rainbow after a rain.

Answers to Activities in Unit 9

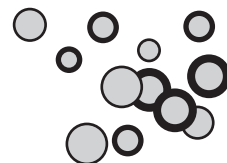
1. a) We get light from the Sun.
b) The Moon gets light from the Sun.
c) The bouncing-off of light from a shiny object is called reflection.
d) Rays are the straight lines that light travels in.
2. a) light b) Moon c) reflection d) fast e) long
3. A guitar



Additional activity

Choose the best answer:

- 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 5 6 7 [7]
- j) Plants need sunlight to make their _____.
homes food flowers [food]



Soil

Objectives:

- To know that the Earth is covered with a layer of soil
- To know where plants grow
- To know what soil is made of
- To know what a fertile soil is
- To know why plant roots are important for soil
- To know the kinds of soil
- To know the properties of different kinds of 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.

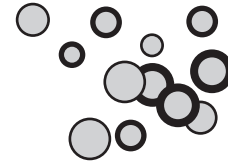
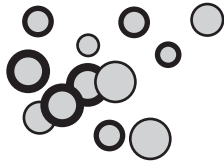
Answers to Activities in Unit 10

1. a) Soil is made of many different sized particles. It has stones, sand, clay and remains of dead plants and animals.
b) The remains of dead plants and animals in the soil.
c) 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.
d) Sandy soil, clay soil, Fertile and loam.
e) Loam is the best kind of soil for plants.
2. a) Fertile soil b) Clay soil c) Sandy soil d) Loam
3. a) clay b) sand
c) sand d) clay

Additional activity

Choose the best answer:

- 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 [sand]
- 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) The _____ of plants can grow in the cracks of rocks and break them.
Leaves Stems Roots [Roots]



The Sun and planets

Objectives:

- To know what the Universe is
- To know that the Universe has countless shiny bodies
- To know what a star is
- To know what a planet is
- To know the names of the planets of our Solar System
- To know how we learn about planets
- To know about space travel
- To know that planets spin on their axis
- To know that planets go round the Sun in fixed paths
- To know the characteristics of the planets

Teaching strategy:

- Ask: What do we see in the sky during the 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 shiny 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?

Unit 11 The Sun and planets

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

- Some of the shiny bodies are stars, comets, meteors, asteroids, and planets.
 - All the bodies in the vast space make up the Universe.
 - A star is a big ball of burning gases.
 - A planet is a body that moves around the Sun.
 - An orbit is the path a planet follows around the sun.
- space crafts or spaceships
 - astronauts
 - spacesuit
 - air
 - oxygen
- Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, pluto
- Mercury
 - Venus
 - Earth
 - Mars
 - Jupiter
 - Uranus
 - Neptune
 - Pluto
 - Saturn

Additional activity

Choose the best answer:

- Stars, asteroids, and planets are found in the vast space called _____.
sky space universe [universe]
- Stars appear to be dim because they are _____.
very small very far very cold [very far]
- Planets are bodies that move around the _____.
Sun Moon Earth [Sun]
- The planet closest to the Sun is _____.
Mercury Venus Earth [Mercury]



e) The planet that has mountains and plains 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 18 57 60 [18]

i) The planet which has many rings and moons is _____.

Mercury Venus Uranus [Uranus]

j) _____ is a planet that has 2 moons and it takes 165 days to go around the Sun once.

Saturn Uranus Neptune [Neptune]

Sample lesson plan

Unit 1 : Living things

Topic	Time	knowledge		Plan activity time	Resource material
		objectives	skills		
Force`	40 min	To know what force means	Understand the meaning and effects of force.	Previous knowledge: 5 min. Discussion: 20 min. Activity: 10 min. Q/Ans: 5 min.	Objects such as a toy car, wind-up toy, a ball, a rubber band, a plasticine, a piece of wire, etc.
`work`	40 min	To know what work means To know the relation between force and work	Explain that work needs some kind of force. Energy is needed to do work.	Previous knowledge: 5 min. Discussion: 20 min. Activity: 10 min. Q/Ans: 5 min.	A toy crane A pulley system A swing
Different forms of energy	40 min	To know what energy means To know the different forms of energy	Explain that different kinds of energy and their source. Understand that gravity is a force of nature.	Previous knowledge: 5 min. Discussion: 20 min. Activity: 10 min. Q/Ans: 5 min.	Candle, a fan, match-box, a toy cart Chart of different kinds of energy
friction		To know what `friction` is To know the effects of friction and ways friction can be reduced	Understand that friction is caused by rubbing. Explain the useful and harmful effects of friction and how they can be reduced.	Previous knowledge: 5 min. Discussion: 20 min. Activity: 10 min. Q/Ans: 5 min.	Send paper, match-box, marbles
Assessment tasks		Homework		Teacher` evaluation of the lesson	
Q.1 and 2		Q.3 and 4		The student understands the terms, force, work, and energy. They can explain the relation between force, work, and energy. They can demonstrate the effects of friction and ways to overcome its harmful effects.	



Assessment

1. Answer the following questions:

a) What are herbivores? Name three.

b) What are the 5 classes of animals with backbones?

c) What are wells?

d) How can friction be harmful? _____

e) Describe molecules in solids, gases and liquids.

2. Fill in the blanks:

a) In animals, food is stored as a layer of _____ under the skin. (fat)

b) The body of an insect has a head, a thorax and a _____. (abdomen)

c) The carpel has _____ or _____ which become seeds. (eggs, ovules)

d) A _____ can change into _____ by cooling. (liquid, solid)

e) All objects fall to the ground because of _____. (the force of gravity)

f) Remains of dead plants and animals in soil are called _____. (humus)

g) The Sun and it's planets make up the _____. (Solar system)

h) Plants grow in _____ soil. (fertile)

i) We can see the colour of things because they _____ light. (reflect)

3. Name the following:

a) _____



b) _____





Assessment

c) _____

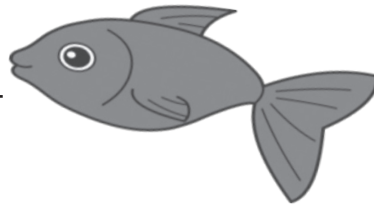


d) _____

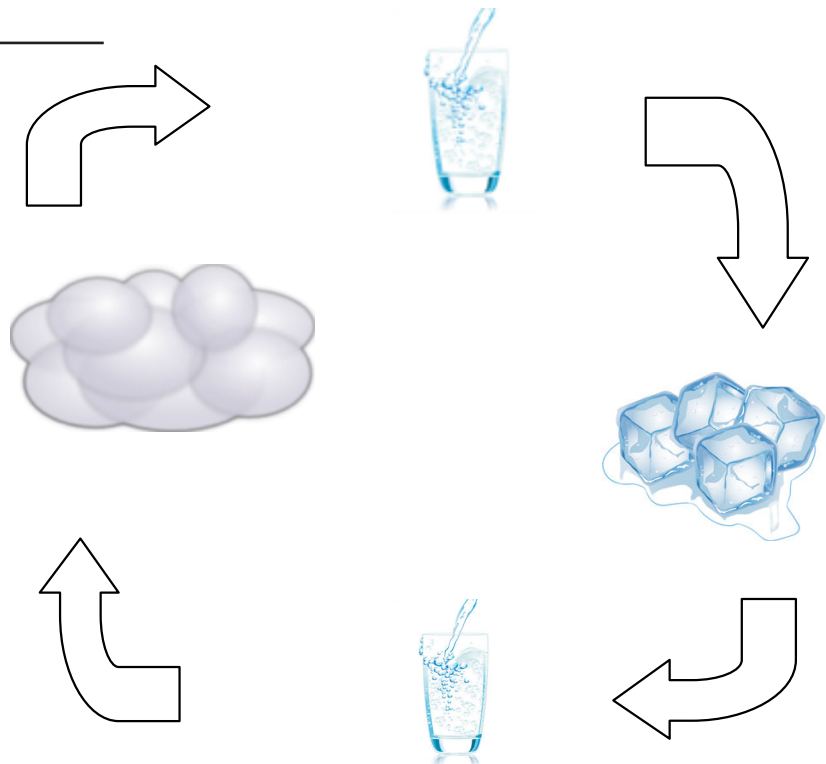


4. Label the following:

a) _____



b) _____





Assessment answers

1. a) Herbivores are animals that only eat plants. Cows, mice, horses and rabbits are herbivores.
b) Animals with backbone are divided into birds, mammals, amphibians, reptiles and fish.
c) Wells are deep holes dug in the ground to reach groundwater.

d) Friction wears out things over time.

e) Molecules in solids are very close together, but are not very close together in liquids and are very far away from each other in gasses.

3. a) Well
b) Wind-vane
c) Thermometer
d) Shadow

4. a) 1. Eye, Mouth, Fin, Tail
B) Cooling, Cooling, Heating, Heating



Answers :

1. Food gives the body energy to grow and to stay healthy. Energy keeps their bodies moving and working.
2. a) water b) Food c) herbivores d) carnivores e) omnivores
3. a) feathers b) a beak c) have babies
6. a) apple b) coconuts
7. Matter is made up of molecules.
8. a) T b) F c) T
9. We can measure changes in pressure by using an instrument called a barometer.
11. a) groundwater b) spring c) wells
12. Oil makes the parts slide over each other, and there is less friction between them.
14. a) bend
b) stretch
c) break
d) tear
e) direction
15. Heat can change the state of things.
16. Thermometer
17. Red, violet, green, indigo, blue, yellow, orange
18. a) fertile b) clay c) sandy

