Alavi

Primary

Learner's Book

5

Compiled by:

Farahnaz Fayaz, Somayeh Babaee, Mahdieh Sepasi

and Seyedeh Farideh Saneie

Book Title/ Compiler: Primary science: learner's book 5[Book]/ compiled by Farahnaz Fayaz...
Print Year: 2021
Trim Size/ No. of Pages: 29× 22/ 64
ISBN: 978-964-169-896-8
Category: FIPA
Language: English
Compiled by: Farahnaz Fayaz, Somayeh Babaee, Mahdieh Sepasi, Seyedeh Farideh Saneie
Topic: English language -- Study and teaching (Elementary)
Library of Congress Classification: PE 1065
Dewey Decimal Classification: 2/428
National Bibliography Number (NBN): 8570157

Book Title: Primary Science Learner's Book (5)
Compiled by: Farahnaz Fayaz, Somayeh Babaee, Mahdieh Sepasi and Seyedeh Farideh Saneie
Publishing Manager: Ali Mojtahedin
Print Run: 1000
Imprint: Alavi Farhikhteh
Graphic Designer: Javad Mahmoudi
Book Cover Designer: Hanieh Ferasat
Lithography: Ariofam
ISBN: 978-964-169-896-8

www.alavi.ir | pub@alavi.ir | 021-64027270
Alavi Farhikhteh: No. 19, Mirmotahari st. Tehran, Iran | 021-22892550

Introduction

The Primary Science book has been developed to match the Cambridge International Examinations Primary Science curriculum framework. It is a fun, flexible and easy to use course that gives both learners and teachers the support they need. In keeping with the aims of the curriculum itself, it encourages learners to actively engage with the content, and develop enquiry skills as well as subject knowledge.

The content pages contain many images and questions that you can use as a basis for class discussions. The emphasis in this stage is on linking what learners know about everyday life to scientific ideas.

Throughout the book, you will find ideas for practical activities which will help learners to develop their Scientific Enquiry skills as well as introduce them to the thrill of scientific discovery.

Table of Contents

CHAPTER 1 — Food and Nutrition — 5

CHAPTER 2 — States of the Matter — 15

CHAPTER 3 — Shadows — 21

CHAPTER 4 — Earth's Movements — 29

CHAPTER 5 — Simple Machines — 37

CHAPTER 6 — Investigating Plant Growth — 47

CHAPTER 7 — The Life Cycle of Flowering Plants — 53

CHAPTER 1

Food and Nutrition

What learners will learn and reinforce

The activities in this chapter give learners practice in the following topics:

Topic	In this topic, learners will:
1.1. Different nutrients	identify different types of nutrients.
1.2. Sources of minerals and vitamins	identify different sources of minerals and vitamins.

Word bank

1	nutrients	2	carbohydrate	3	protein	4	fat	5	mineral
6	vitamin	7	fiber	8	bulk up	9	waste	10	provide
11	make repair	12	calcium	13	iron	14	salt	15	substance
16	egg yolk	17	liver	18	green vegetables	19	nuts	20	carrot
21	milk	22	rice	23	bean	24	pineapple	25	apricot
26	nerve	27	gum	28	blood vessel	29	properly	30	blood clotting

1.1. Different nutrients

All living things need nutrients. **Nutrients** are the substances a body uses to build, repair and maintain itself. The process of feeding the body with nutrients is called **nutrition**.

There are five main types of nutrient we need from our food. These are carbohydrates, proteins, fats, minerals and vitamins. A sixth important part of our diet is roughage or fibre.

Fibre

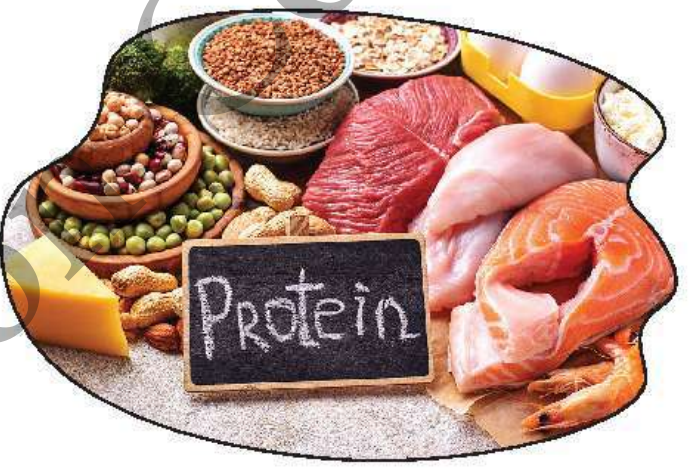
Fibre does not provide nutrition, but it helps bulk up waste so that it passes easily through the body. People who do not consume enough roughage are more likely to suffer from conspitation, which can sometimes lead to more serious diseases of the intestines.

Carbohydrates

Carbohydrates are mainly used by body as fuel. Digestion breaks them into a simple sugar called glucose. This is carried in the blood to provide energy for all our body parts.

An athlete must eat plenty of carbohydrate before a race to provide the energy needed.

Proteins



Proteins perform many important jobs in the body. Your body needs them to grow, and to make repairs when it is damaged.

Fats

The body needs some fat to build its parts and keep them working properly. Fat can also be used as fuel, for energy. Surplus fat is stored under our skin as a reserve fuel supply.

Take care! Eating too much fat can make you gain weight or become obese. As you get older too much fat can damage your heart.

Minerals

Minerals are simple substances such as calcium, iron and salt that the body needs for building bones, carrying oxygen in the blood, and controlling blood pressure. You need to eat a lot of mineral-rich foods when your body is growing.

If you lose blood, then the iron it contained must be replaced or you will become weak. Dark green vegetables and liver are good sources of iron.

Young children need calcium from milk to build strong bones.

We need some salt in our diet to replace the sodium we lose by sweating, but too much salt can raise our blood pressure.

Vitamins

Vitamins are special substances that your body needs in tiny amounts but cannot make itself.

Copy and complete this table with a description of the importance of each food group.

	Nutrient	Importance in the diet
1.	carbohydrates	provide energy
2.	proteins	
3.	fats	
4.	vitamins	
5.	minerals	
6.	fibre	





1.2. Sources of minerals and vitamins

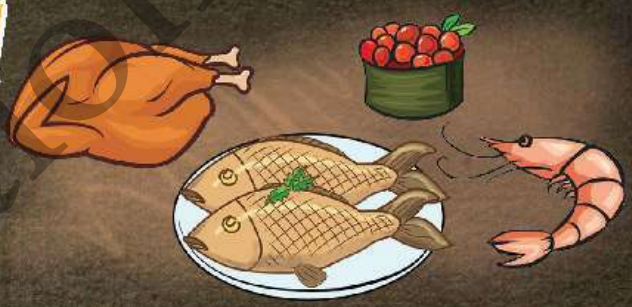
Different foods contain different amounts of the important nutrients we need. This is why we must eat a mixture of different foods – not just one type of food all the time. Foods may be grouped as sources of carbohydrate, protein or fat.

Carbohydrate

are contained in starchy foods such as roots, cereals, bread and rice, and in sweet foods in the form of sugars.

Proteins

are contained in meat, dairy products, fish, beans, seeds and nuts.

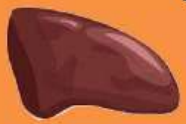


Fat-rich foods

are butter, margarine, groundnuts, animal and plant oils and fatty meat.

Sources of minerals and vitamins

This table lists some different vitamins and their importance in the body.

A	B1	B2
 egg yolk  milk  liver  carrots  green vegetables	 pineapples  rice  meat  green vegetables  egg yolk  apricots  beans	 meat  beans  egg yolk  green vegetables
keeps eyes healthy	keeps nerves healthy	keeps the skin healthy

C

vegetables

fruit

keeps the skin, gums and blood vessels healthy

D

fish

fat

egg yolk

also made in the skin by sunlight

helps the bones to grow properly

K

peas

green tea

tomato

egg yolk

green vegetables

needed for blood clotting

CHAPTER 2

States of the Matter

What learners will learn and reinforce

The activities in this chapter give learners practice in the following topics:

Topic	In this topic, learners will:
2.1. The water cycle	explain the changes of state in the water cycle.
2.2. Evaporation	identify true and false statements.
2.3. Condensation	complete sentences about condensation.

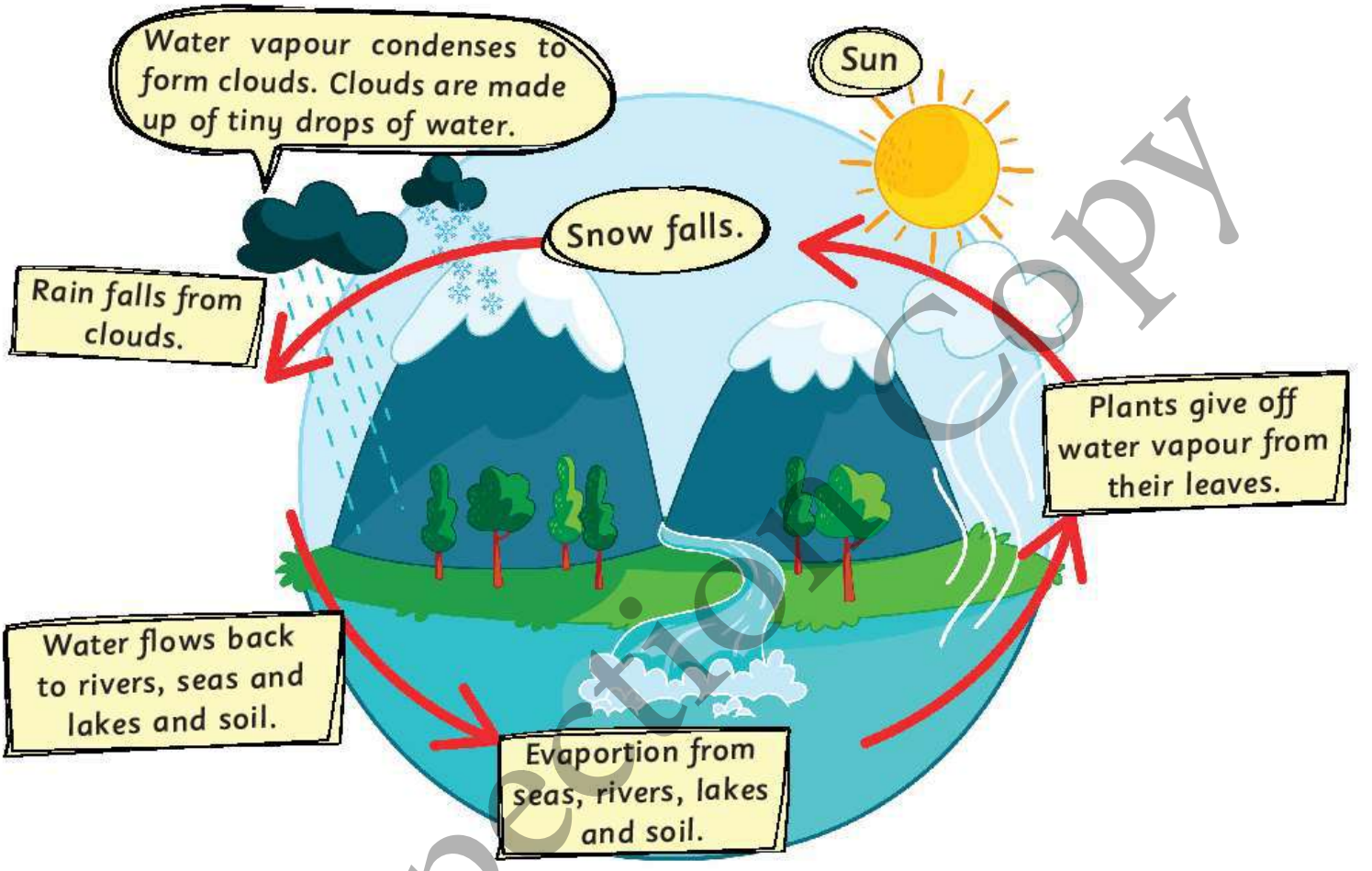
Word bank

1	water cycle	2	evaporation	3	condensation	4	water vapor	5	condense
6	form	7	cloud	8	drop	9	surface	10	fall
11	heat up	12	particle	13	occur	14	disappear	15	again
16	lose	17	cool down	18	melt	19	warm	20	cool
21	opposite process								

2.1. The water cycle

Explain the water cycle.

Look at the diagram of the water cycle.



The water cycle happens mainly because of evaporation and condensation. Freezing and melting also happen in the water cycle.

- The water cycle is the movement of water from the Earth's surface into the air and back again.
- In the water cycle, water evaporates from Earth's surface, condenses to form clouds and falls back to Earth as rain.

2.2. Evaporation

If water is heated up, its particles gain energy. They begin moving faster, which makes them bump into each other and transfer energy. Eventually some particles will have so much energy that they will break free from the surface of the water. We say that the particles have evaporated.

In the water cycle, water evaporates from the Earth`s surface.

Evaporation: True or False

Look at these statements about evaporation. Mark each one as either true (✓) or false (✗).

- ☐ Evaporation occurs when a liquid changes to a gas.
- ☐ Heat makes evaporation happen faster.
- ☐ Particles of a liquid must lose energy before they can evaporate.
- ☐ Evaporation makes wet clothes dry.
- ☐ Water disappears when it evaporates.

2.3. Condensation

Complete sentences about condensation.

Choose words from the box to complete the sentences about condensation. You will not need to use all the words.

solid	gas	liquid	gain	lose
melting	evaporation	drops	drops	
heat up	cooler	cool down	warmer	

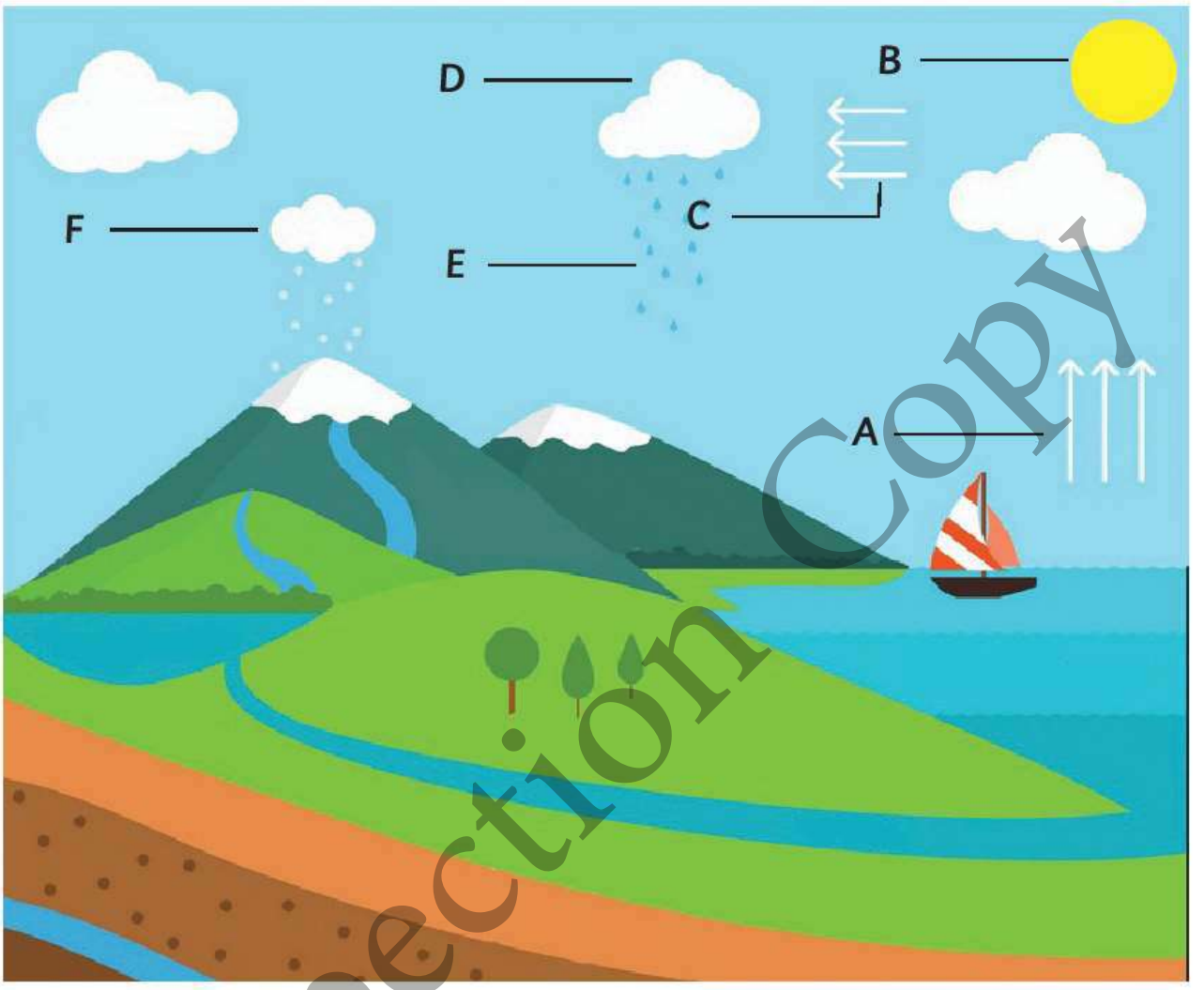
1) Condensation happens when a ..... changes to a ..... .

2) We know that condensation has happened when we see ..... of water on a surface.

3) Condensation happens when water vapour touches a ..... surface. This makes the particles of water vapour ..... and ..... energy.

4) The opposite process to condensation is ..... .

Look at the diagram of the water cycle and explain how it works.



CHAPTER 3

Shadows

What learners will learn and reinforce

The activities in this chapter give learners practice in the following topics:

Topic	In this topic, learners will:
3.1. Light travels in straight lines.	explain how shadows are formed.
3.2. Which materials let light through?	discover that opaque, translucent and transparent materials let through different amounts of light.

Word bank

1	light	2	travel	3	straight line	4	light source	5	shadow
6	block	7	shine	8	form	9	let through	10	opaque
11	translucent	12	transparent	13	pass through	14	total	15	partial

3.1. Light travels in straight lines

Identify the light sources in these two images.

Light from the sun travels in straight lines.

Light travels in straight lines from this film projector.

Shadows

When light is stopped or blocked by some types of solid objects, it cannot shine through the object.

A shadow forms on the other side of the solid object.

The light of the Sun is blocked by Charlie and his ball. Shadows are formed.

Explain your answer by filling in the blanks in these sentences. Choose from the words in the box.

blocked	straight	Charlie's	solid

A shadow forms when light is ..... by a ..... object. Light travels in ..... lines, so ..... shadow is drawn in the right place.

- Light travels in straight lines.
- Shadows form when light is blocked by a solid object.
- One can predict where a shadow falls and test their prediction.

3.2. Which materials let light through?

When the Sun shines on your back, you see your shadow in front of you. This is because your body does not let any light through it. Materials that do not allow light to pass through are **opaque**. They form a black shadow.

Some objects are made of materials that allow light to pass through them. Objects that allow all the light to pass through are **transparent**. These do not form any shadow when a light shines on them.

Objects that allow some light to pass through are translucent. These form a weak shadow when a light shines on them. The shadow is grey rather than black.

Transparent materials give shade 1 or no shadow. Opaque materials give shade 5 or total shadow. Translucent materials give partial shadows with shades 2, 3 or 4.

Identify opaque, transparent and translucent materials.

- Opaque materials do not let light through.
- Translucent materials let some light through.
- Transparent materials let all the light through.

CHAPTER 4

Earth's Movements

What learners will learn and reinforce

The activities in this chapter give learners practice in the following topics:

Topic	In this topic, learners will:
4.1. The Sun, the Earth and the Moon	discover that the Earth moves around the Sun and the Moon moves around the Earth in orbits.
4.2. Does the Sun move?	understand that the Sun does not really move even though it appears to.
4.3. Exploring the solar system	name different planets.

Word bank

1	move	2	orbit around	3	oval path	4	orbit	5	represent
6	solar system	7	consist of	8	planet	9	revolve around	10	comet
11	asteroid	12	Mercury	13	Venus	14	Mars	15	Jupiter
16	Earth	17	Neptune	18	Uranus	19	Saturn	20	astronaut
21	astronomer	22	spacecraft						

4.1. The Sun, the Earth and the Moon

What are the Sun, the Earth and the Moon?

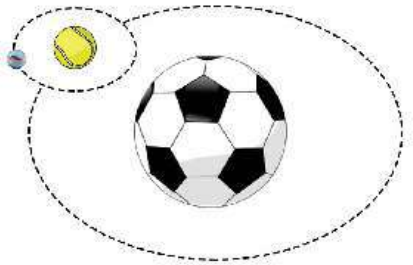
A camera on the spacecraft Galileo took this image of the Earth and the Moon on its way to explore the planet Jupiter. The image shows us that the Moon is much smaller than the Earth and that they are surrounded by black, empty space. The Sun lights up part of the Earth and the Moon. The Sun is shining because it is a star.

All stars give out light. Earth is a planet. Planets reflect the light of the Sun. The Moon also reflects the light of the Sun.

The Earth and the Moon are constantly moving in space. But they make the same movments all the time. The Moon moves around the Earth and the Earth moves around the Sun.

4.2. Does the sun move?

Model the movements of the Earth and the Moon



You will need:
Three different sized balls (football, tennis ball and a marble).

In the model, the football represents the Sun, the tennis ball represents the Earth and the marble represents the Moon.

Place the 'Sun' in the centre of a large table or open space. Do not move the 'Sun'.

One person moves the 'Earth' slowly in an oval path around the 'Sun'. This represents Earth's orbit around the Sun.

Another person should move the 'Moon' quickly in an oval path around the 'Earth'. This represents the Moon's orbit around the Earth.

Copy the diagram and add these labels:

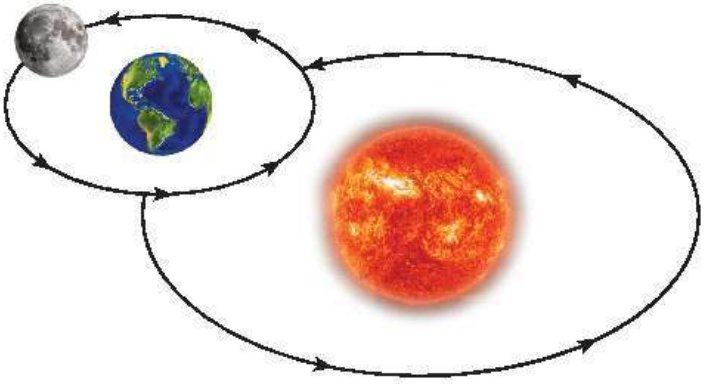
A. Sun

B. Earth

C. Moon

D. Earth's orbit around the Sun

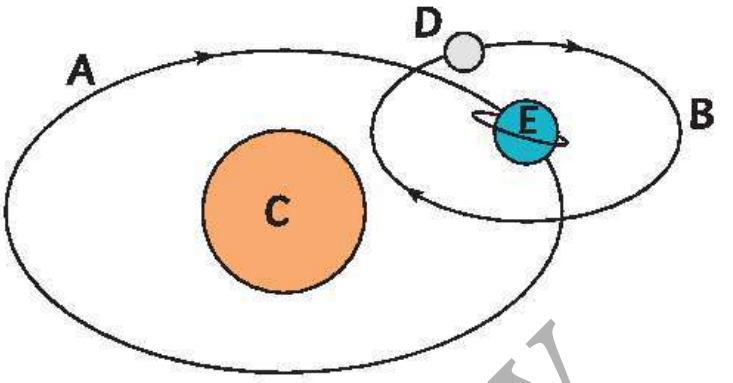
E. Moon's orbit around the Earth



- The Earth moves around the Sun in an orbit.
- The Moon moves around the Earth in an orbit.

Analyse a diagram of the Sun, Earth and Moon

Complete the table by filling in the letters from the diagram in the second column. You will need to use some letters more than once. The first one is done for you as an example.



	Letter on diagram
Moon	D
Sun	
Earth	
orbit of the Moon around the Earth	
orbit of the Earth around the Sun	
a planet	
a star	
a body in space that gives out light	
a body in space that reflects light	

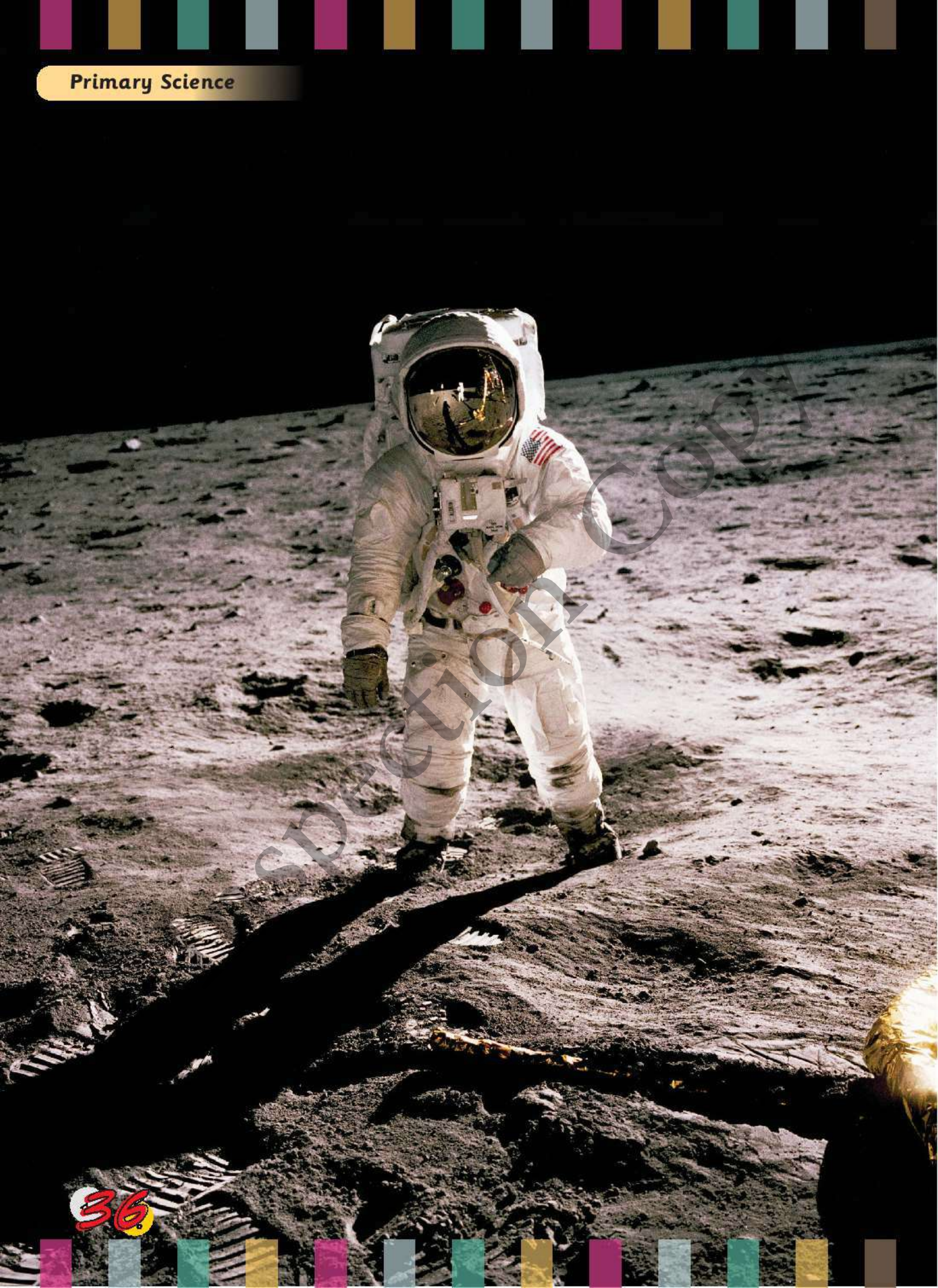
The Earth moves around the Sun and the Moon moves around the Earth in orbits.

4.3. Exploring the solar system

The solar system consists of the Sun, which is a star, and eight planets. The diagram shows the solar system.

Earth is one of the planets. All the planets revolve around the Sun. There are also many moons. Our Moon is one of these.

A comet is a lump of ice and dirt that moves in a large orbit around the Sun. Between Mars and Jupiter are rocky objects called asteroids that orbit the Sun. When rocks and particles from space enter Earth's atmosphere, we call them meteors or shooting stars.



CHAPTER 5

Simple Machines

What learners will learn and reinforce

The activities in this chapter give learners practice in the following topics:

Topic	In this topic, learners will:
5.1. Six kinds of simple machines	identify six types of simple machines.
5.2. Classes of levers	identify three classes of levers.

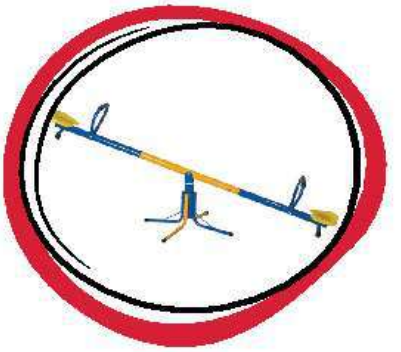
Word bank

1	can opener	2	axe	3	scissors	4	seesaw	5	wheel
6	screw	7	simple machine	8	ramp	9	inclined plane	10	wedge
11	lever	12	pulley	13	wheel and axe	14	lift	15	push up
16	pull down	17	turn	18	put together	19	jar lid	20	light bulb
21	move up	22	move down	23	split apart	24	class	25	fulcrum
26	load	27	effort	28	farther out	29	closer to	30	between

5.1. Six kinds of simple machines

Look and label.

can opener	axe	scissors
seesaw	wheel	screw

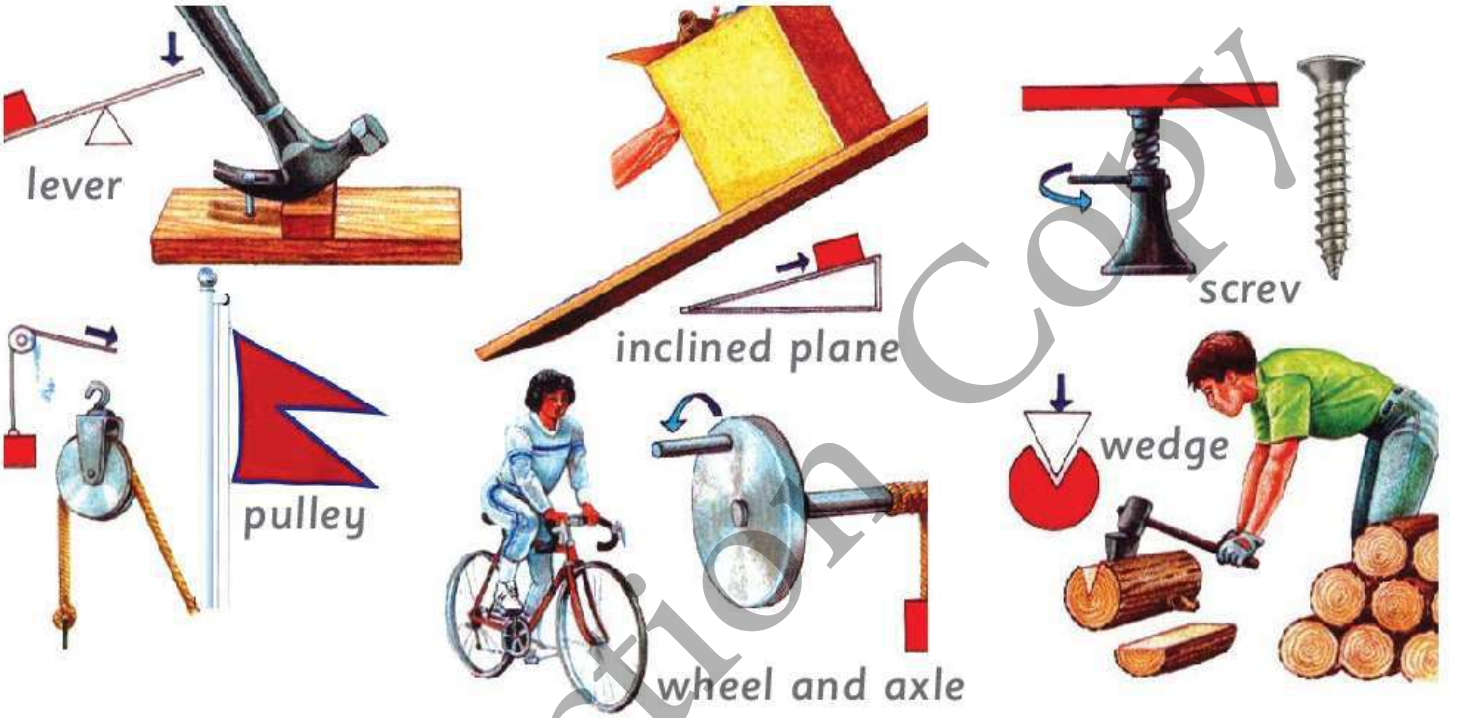


What is each of the machines used for? Discuss with a partner.

When someone says the word machine, do you think of a slide or a jar lid? These objects really are machines. They are called simple machines. Simple machines help you do work with less force.

There are six kinds of simple machines. Have you ever seen any of these machines before?

To understand how simple machines work, you need to know about force. Force makes things move. You use force when you push against something or pull something.



Look at the pictures. In one, a man is lifting a heavy box. In the other, a man is using a ramp. It takes less force to slide the box up the ramp than to lift it up.

A ramp is a kind of simple machine called an **inclined plane**.

Inclined plane

Inclined planes make it easier to move things up or down. The road in this picture is an inclined plane.
The slide on your playground is also an inclined plane.

Wedge

A wedge is another kind of simple machine.
An axe is a kind of wedge. It goes into the wood and splits it apart.

Screw

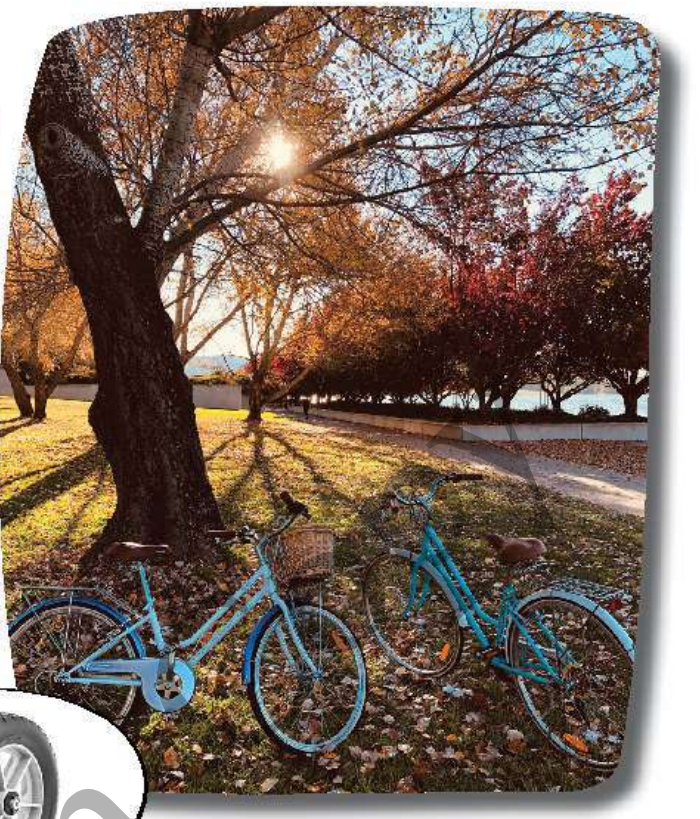
A screw is also a simple machine. The lid of a jar and the bottom of a light bulb are both kinds of screws.
Screws make it easier to put things together. Think about the lid on a jar. As you turn the lid, it screws down onto the jar, closing it tightly.

Lever

In the pictures below, you see levers. A lever is a simple machine for pushing things up. When you push down on one end of the lever, the other end goes up.
Did you know that a seesaw is also a lever?

Wheel and axle

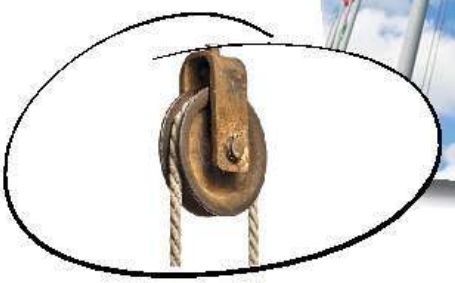
The next simple machine is a wheel and axle. The axle is a kind of rod, or bar, that goes through the wheel. Together, they turn and help things move. Cars, bikes, and wagons all use wheels and axles.



Pulley

A pulley is a simple machine used for lifting things.

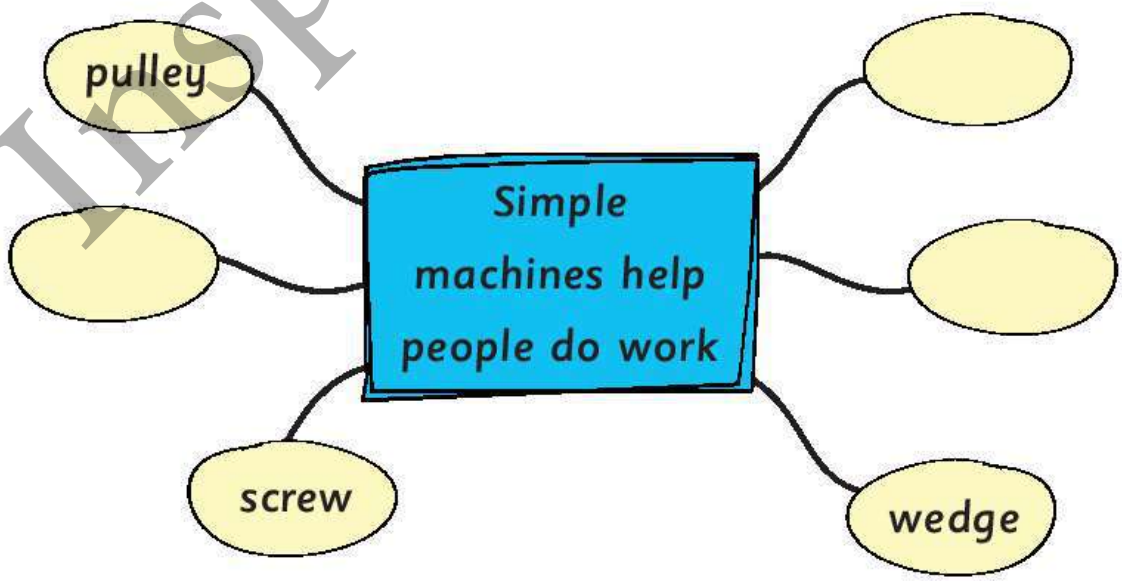
When you pull on one end of a pulley's rope or chain, whatever is on the other end goes up. The man in this picture is using a pulley to hoist the flag.



Simple machines make it easier to do work. They let you move an object with less force.

People have used simple machines since long ago. We still use them today. All kinds of workers are glad to have simple machines.

Complete the web.



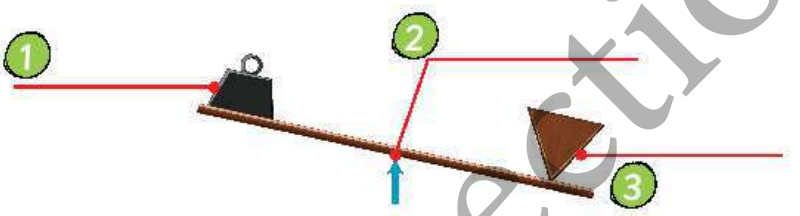
5.2. Classes of levers

Levers come in three basic classes. They each have a fulcrum or pivot point. Each lever has a force put into the lever called an effort or input force. Each lever also has a force, called the load, which is the object being moved. The type of lever is determined by where the effort and load are placed in relation to the fulcrum.

Use the terms in the word box to label each class of lever and the diagrams. Some terms are used more than once.

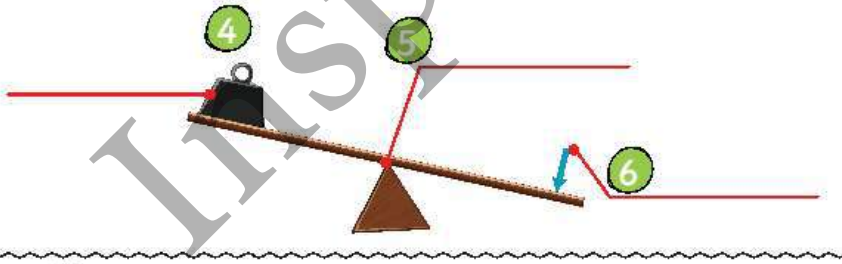
first class	second class	third class
fulcram	load	effort

Type of lever: .....



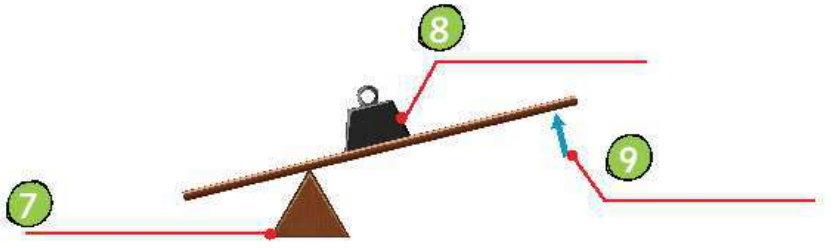
The effort and load are on the same side of the fulcrum, but the effort is closer in.

Type of lever: .....



The fulcrum is between the effort and the load.

Type of lever: .....



The effort and load are on the same side of the fulcrum, but the effort is farther out.

Use the terms in the word box to label each class of lever in the illustrations.

first class	second class	third class

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

9 _____

CHAPTER 6

Investigating Plant Growth

What learners will learn and reinforce

The activities in this chapter give learners practice in the following topics:

Topic	In this topic, learners will:
6.1. Seeds	identify different types of seeds.
6.2. How seeds grow	investigate seed germination.
6.3. What do plants need to grow?	identify the factors that plants need for growth.

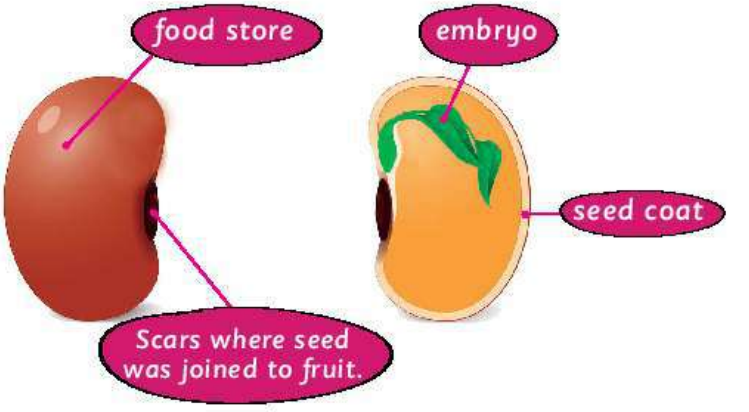
Word bank

1	seed	2	seed coat	3	embryo	4	food store	5	pod
6	contain	7	germination	8	absorb	9	swell	10	split
11	germinate	12	environment	13	shrivel	14	factor	15	light
16	water	17	air	18	warmth				

6.1. Seeds and fruits

Have you ever swallowed a seed when you were eating an apple or an orange? We find seeds inside fruits. Fruits and seeds can be different sizes and shapes.

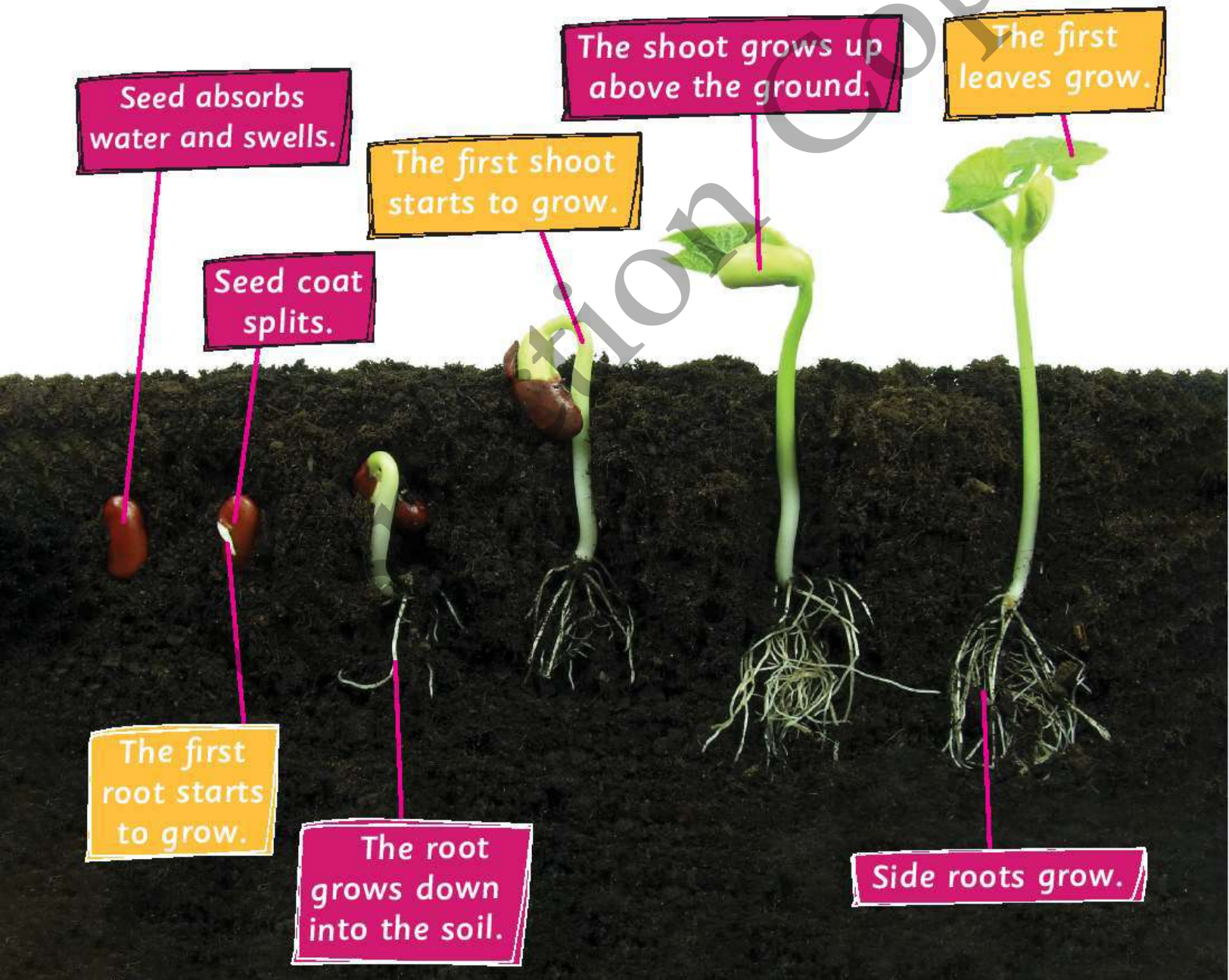
Here is a bean seed with its parts labeled.



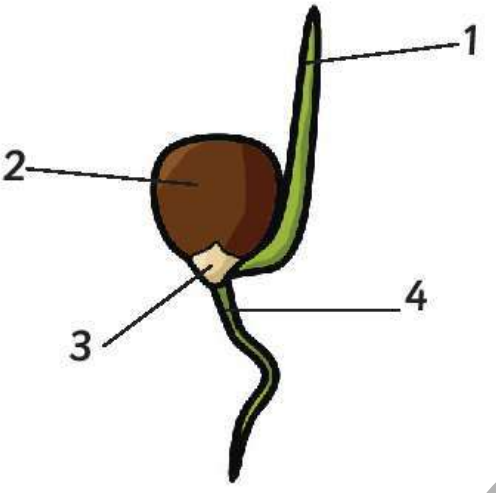
6.2 How seeds grow

Germination

If a seed is given the right conditions, and the embryo is alive, it will grow. When a seed starts to grow, we say it germinates*. This process is called* germination*. The seed uses its food store to give it the energy to grow. The seed shrivels and becomes small after germination. Here are the stages in germination of a bean seed.*



Here is a picture of a germinating seed. Write down the names of parts 1 to 4.



Match the words in column A with their meanings in column B.

	column A		column B
1	seed	A	the outer cover that protects the seed
2	embryo	B	when a seed start to grow
3	seed coat	C	everything around us
4	germinate	D	part of plant that can grow into a new plant
5	environment	E	part of a seed that grows into a new plant

6.3. What do plant need to grow?

Plants need certain things from the environment to help them grow. We call these things *factors*. Without these factors, plants will not grow well, or they might even die. Look at these pictures. Which plant is healthy and growing well?

Write down the things that plants need to grow.

Fill in the gaps using words from the box.

light	water	air	warmth	factors

a) We call the things that plants need to grow ..... .

b) Plants need ..... so they can make food to help them grow.

c) Plants need ..... to give them strong stems and firm leaves.

d) Plants need ..... but they grow best when it is not too cold or too hot.

e) Plants need ..... because they are living things.

The factors plants need are light energy, air, water and warmth.

CHAPTER 7

The Life Cycle of Flowering Plants

What learners will learn and reinforce

The activities in this chapter give learners practice in the following topics:

Topic	In this topic, learners will:
7.1. Why plants have got flowers	explain why flowers are important.
7.2. How seeds are spread	explain how seeds are suited to the way they are spread.
7.3. The parts of a flower	identify and describe the different parts of a flower.
7.4. A plant's life cycle	complete a crossword puzzle on pollination.

Word bank

1	fruit	2	flower	3	small	4	big	5	colourful
6	non-coloured	7	scented	8	unscented	9	reproduce	10	scent
11	spread	12	protect	13	disperse	14	seedling	15	carry
16	dropping	17	underground	18	spine	19	hook	20	dry out
21	burst open	22	heavy	23	drop	24	gravity	25	explosion
26	float	27	fur	28	stigma	29	anther	30	stamen
31	ovary	32	carpel	33	male	34	female	35	pollen
36	petal	37	seed germination	38	pollination	39	fertilisation	40	seed production
41	seed dispersal	42	death	43	release	44	die	45	adult plant

7.1. Why plants have got flowers

Many plants have got flowers.

There are many different kinds of flowers.

Why do plants have got flowers? Is it to smell nice?

Seeds form inside fruits. But where do fruits come from?

What job do flowers do?

No matter what the size, colour or scent, all flowers do the same important job. Can you think what it is?

Some flowers are big.

Some flowers are small.

Some flowers have scent. Others do not have scent.

Some flowers are not brightly coloured.

Some flowers are colourful.

Most plants have flowers, but not all do.

Flowers can be big or small, colourful or non-coloured, scented or unscented.

Flowers form fruits. They help plants to reproduce.

7.2. How seeds are spread

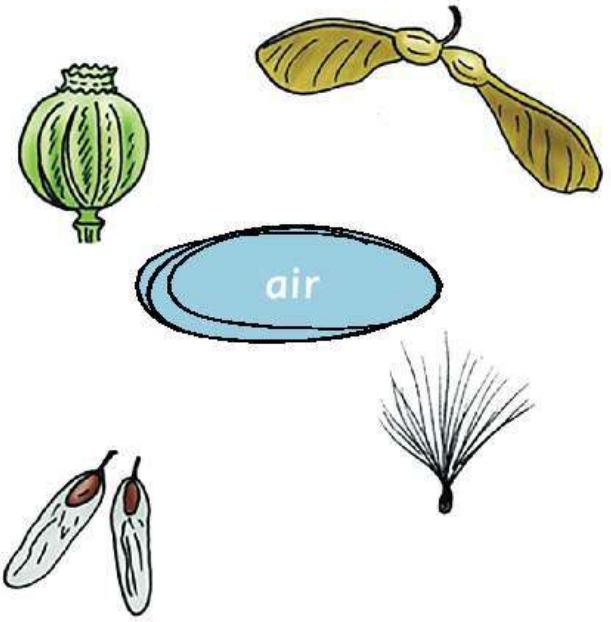
A fruit has two jobs:

- to protect the seeds inside.
- to help spread the seeds.

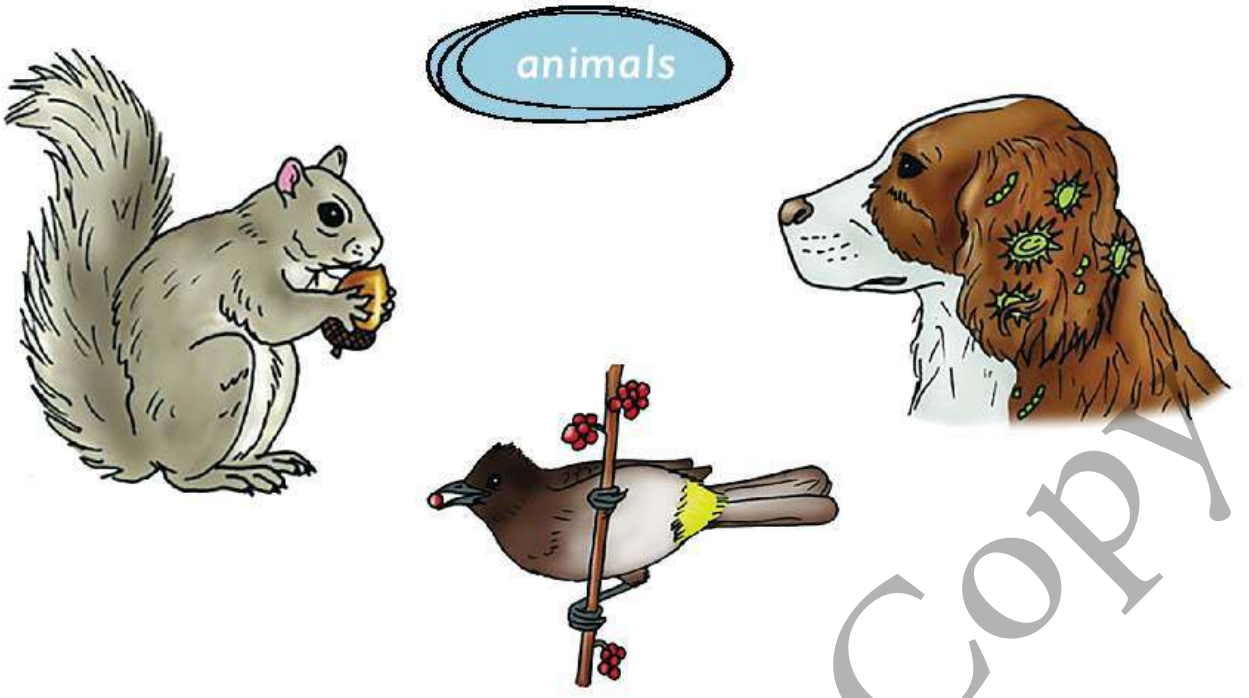
Have you ever found seeds stuck in your socks? Plants need to scatter their seeds away from themselves. We call this seed dispersal.

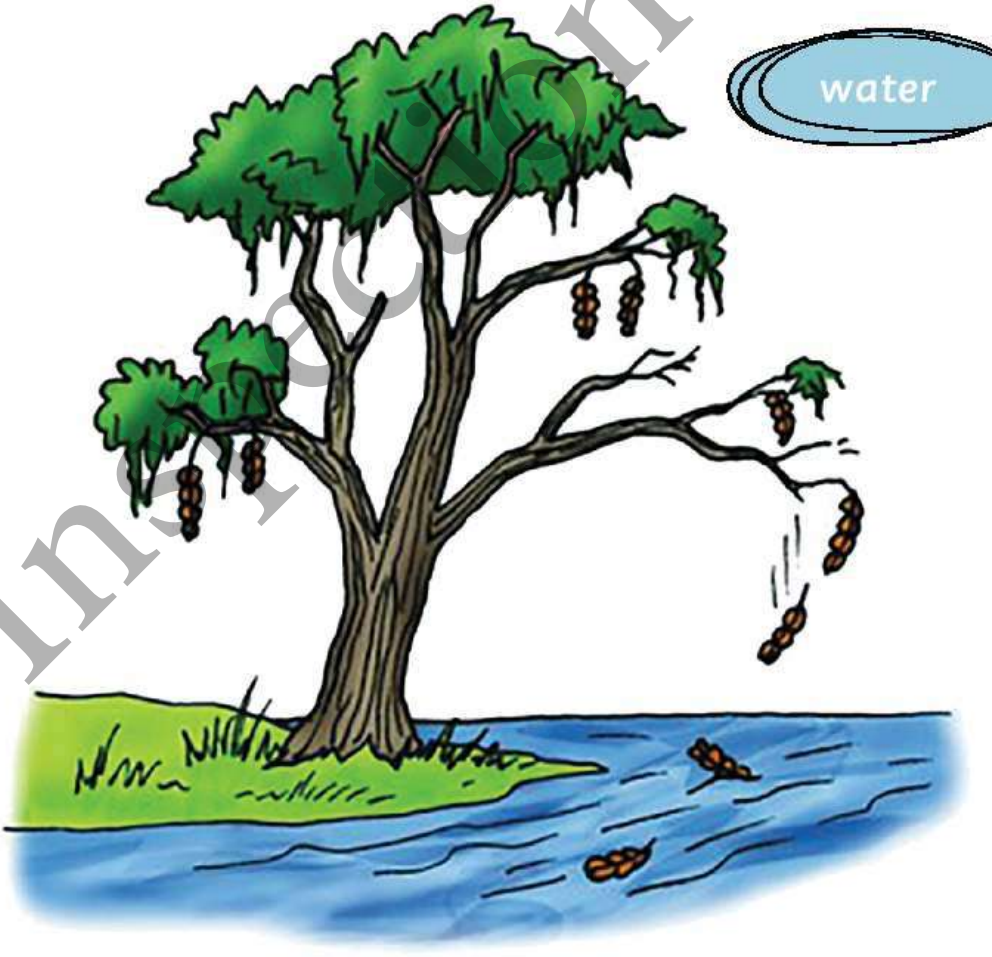
Why do you think seeds must be dispersed? What would happen if all the seeds grew next to their parent plant?

Seedlings need room to grow. They also need light and water. Seedlings cannot grow to be healthy plants if they all have to share water and light in a small area. Plants disperse their seeds in different ways.



The picture show how some plants disperse their seeds. Talk about how each seed is dispersed.





Some seeds are dispersed by animals

Animals can spread seeds. Birds, monkeys and even elephants eat colourful, juicy fruits. The seeds pass through the animal's body and are dispersed in the animal's droppings. This may be far away from where the animal ate the fruit.

Birds spread the seeds of berries and other fruits in their droppings.

Ants carry seeds underground.

Seeds can be carried a long way from the parent plant before they fall off, or the animal scratches them off.

Some seeds have spines and hooks. These stick onto the fur of animals, or the clothes of people. Mice, ants and squirrels carry seeds away from the parent plant and bury them to eat later. If the animal does not eat the seeds, the seeds will germinate in the soil.

Explain how seeds suit the way they are spread.

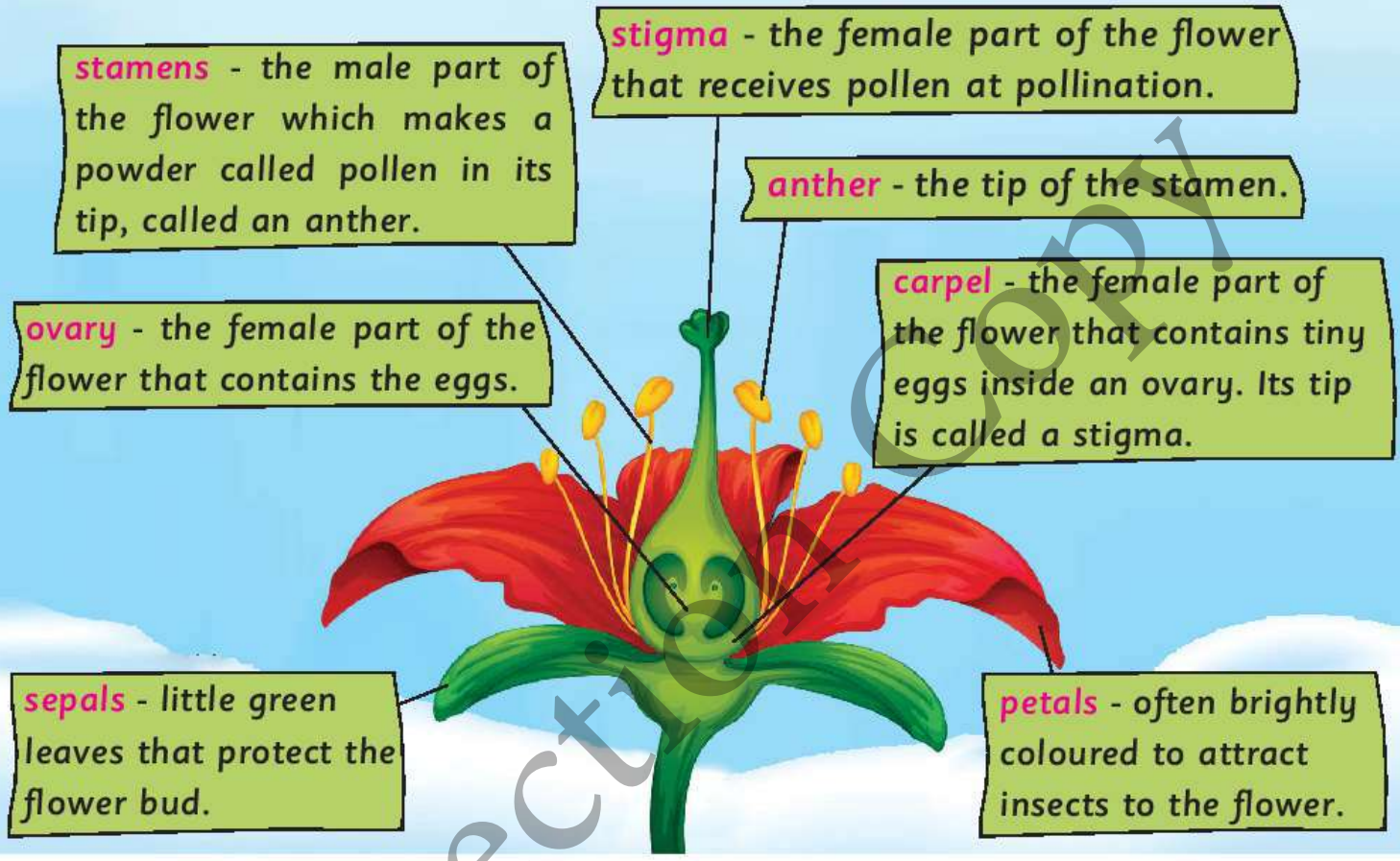
Match the way seeds and fruit are spread to the description of the seed. Draw a line from the first column to the correct answer in the second column.

by water	seed has spines and hooks
by air	seed pods dry out and burst open
by animals	fruit is heavy and drops to the ground
by gravity	seed has spongy covering that helps it float
by explosion	seed is very light with thin, papery wings

- A fruit protects the seeds inside it and helps to spread the seeds.
- Seeds must be dispersed so they have enough space, water and light to grow into new plants.
- Seeds can be dispersed in different ways.
- Animals disperse seeds in their droppings, by carrying seeds on their fur and by burying them.

7.3. The parts of a flower

Flowers have several main parts. These parts are arranged in rings, one inside the other.



Use the words in the box to fill in the spaces below.

stigma	sepals	ovary	petals	anthers	stamens

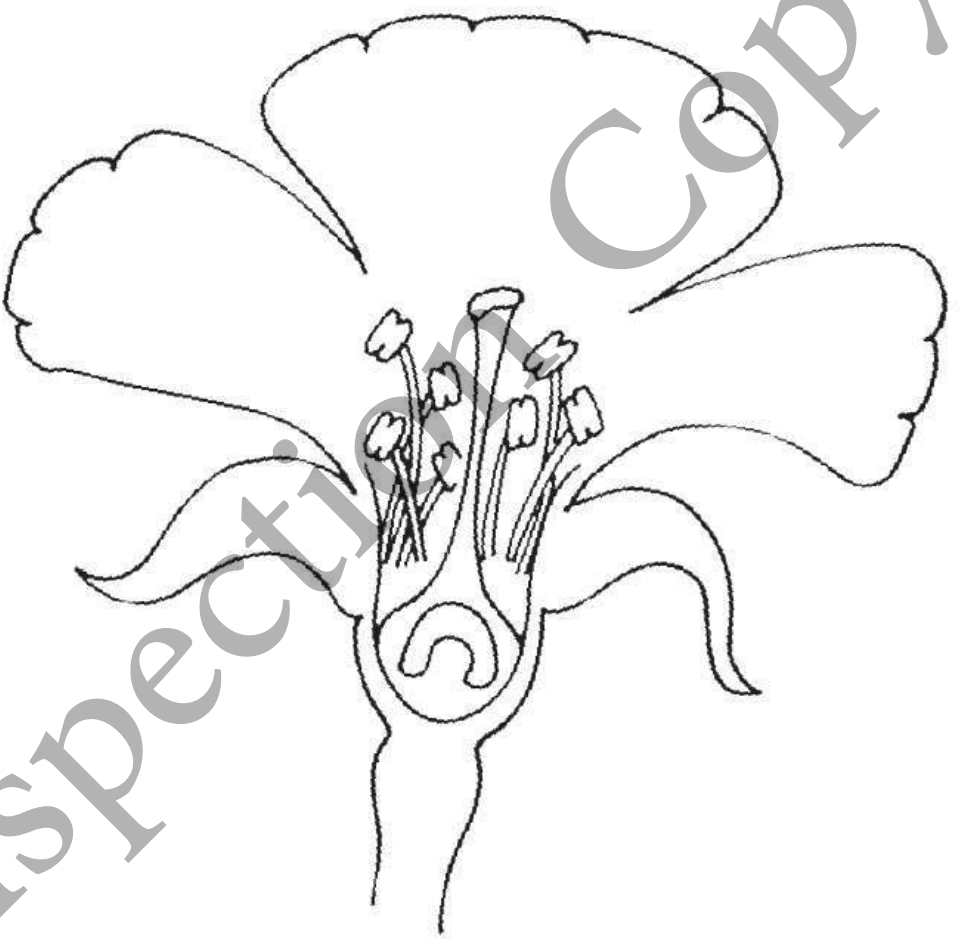
The ..... are little green leaves that protect the flower bud. The ..... often have bright colours to attract insects. The male parts of the flower are the ..... . They make pollen in their tips, called ..... . The female part of the flower is made up of the ..... , which collects pollen, and the ..... , which contains the eggs.

Identify and describe parts of a flower

Colour in the different parts of the flower.

Use these colours:

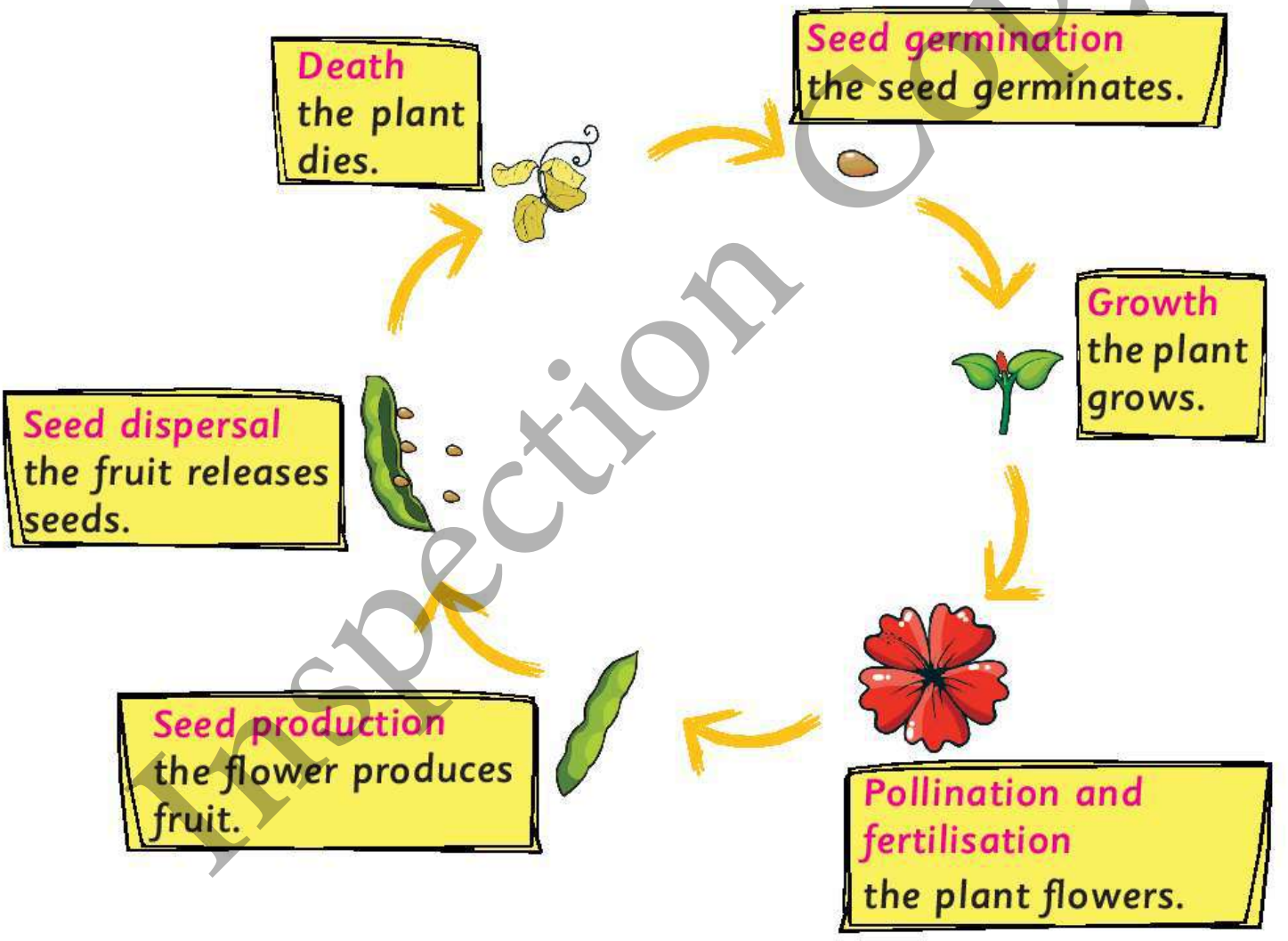
1. sepals
2. petals
3. anther
4. stamen
5. stigma
6. ovary

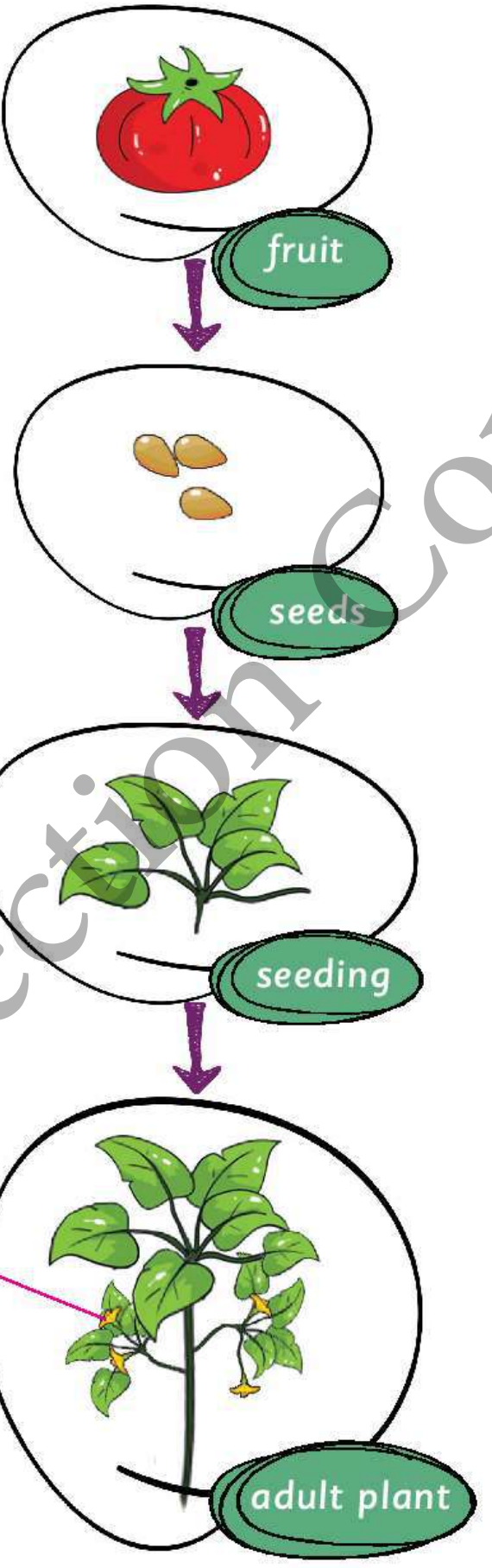


Flowers have four main parts: green sepals protect the flower bud, coloured petals attract insects, male stamens make pollen and the female carpel contains eggs.

7.4. A plant's life cycle

Think about all the changes in a plant's life, from a germinating seed until it develops into a grown plant and forms its own seeds. All these changes are called the plant's life cycle. Some plants die after they have made their seeds. Other plants flower and make seeds every year.





Complete a crossword puzzle.

Follow the clues to complete the crossword puzzle on plant life cycles. Choose your answers from the words in the box.

germination	seeds	fruit	flowering
pollinator	pollination	dispersal	fertilisation
	anthers	growth	

Across

3) This happens when the plant is ready to reproduce.

5) They form from the ferstilised egg.

8) They produce pollen.

9) This happens when the pollen lands on the stigma.

10) The way a young plant gets bigger

Down

1) This happens when the plant is ready to reproduce.

2) This happens when the seed starts to grow.

4) It contains the seeds.

6) The process by which seeds are spread.

7) It carries pollen from flower to flower.

Note