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Cambridge Primary Science

Student's Book

2nd Edition

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SCAN for BONUS RESOURCES

Consultants: **Dr Roy van den Brink-Budgen and Dr Teo Tang Wee** • Author: **Rachael Tharle**

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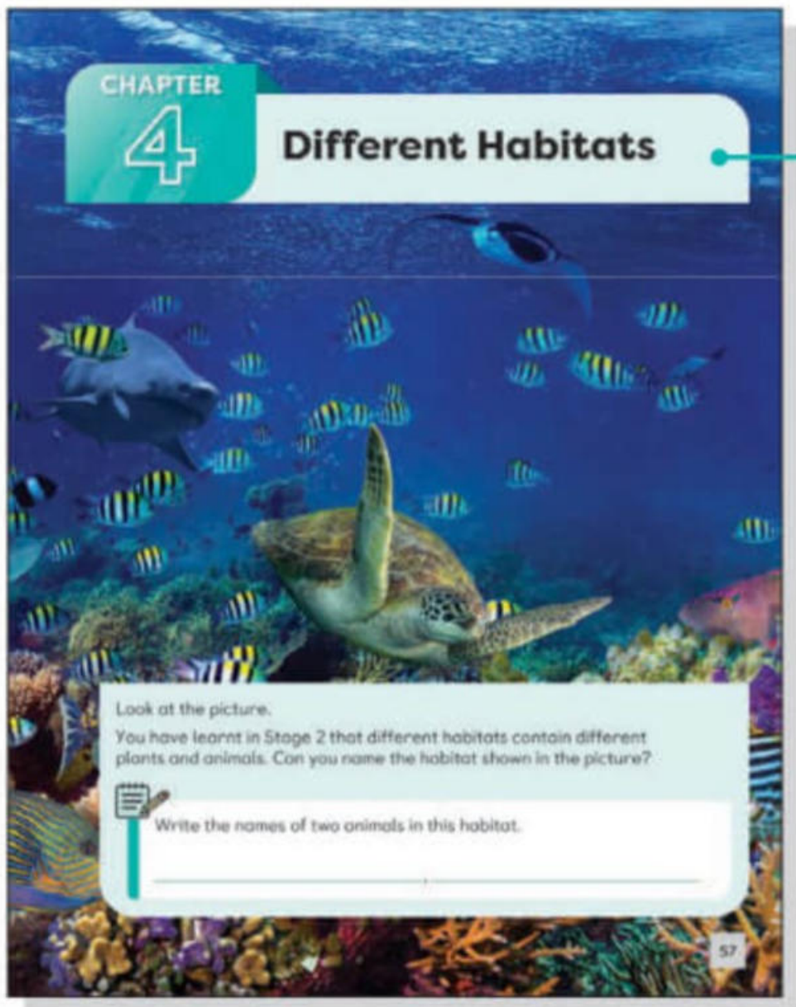
How to Use This Book

This book is written to help you learn and enjoy science. You will build the knowledge and skills needed to understand the world around you. You will also learn how to think and work like a scientist!

The Student's Book has the following features:



The **Chapter Opener** uses a real-life example and an interesting picture to introduce the topic. A fun language activity will help you build language skills as you learn science.

In this section, I will

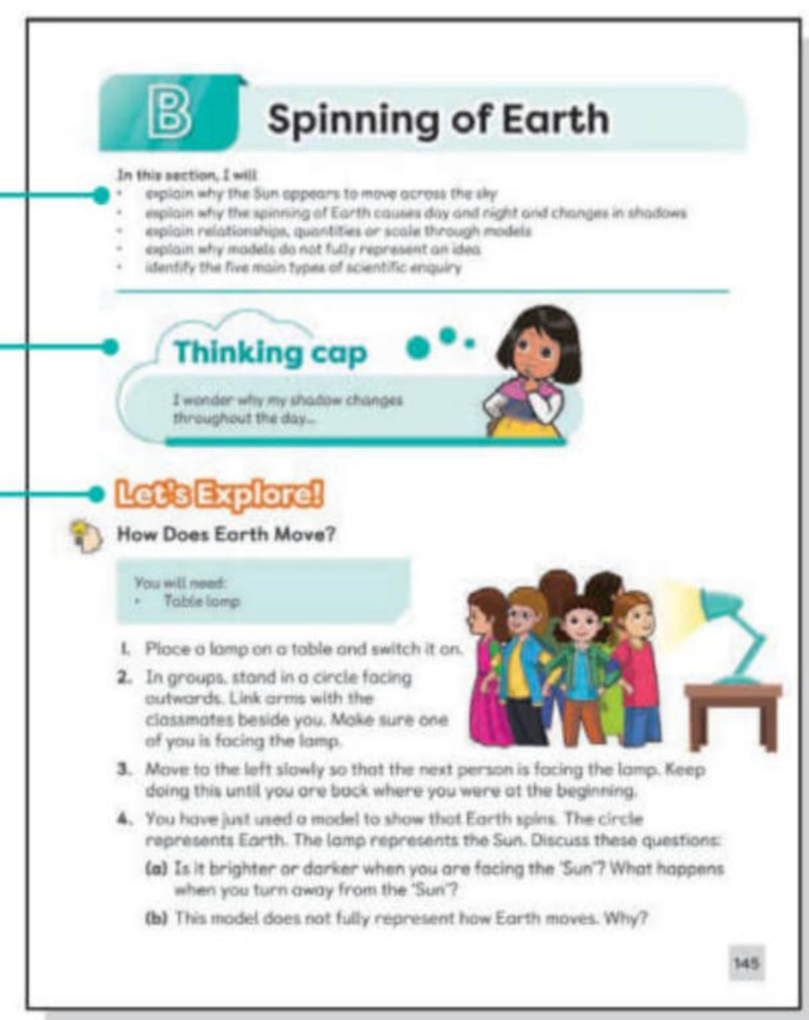
A list of the big ideas shows you what you will learn in each section.

Thinking cap

You will think about what you know about the topic and ask questions.

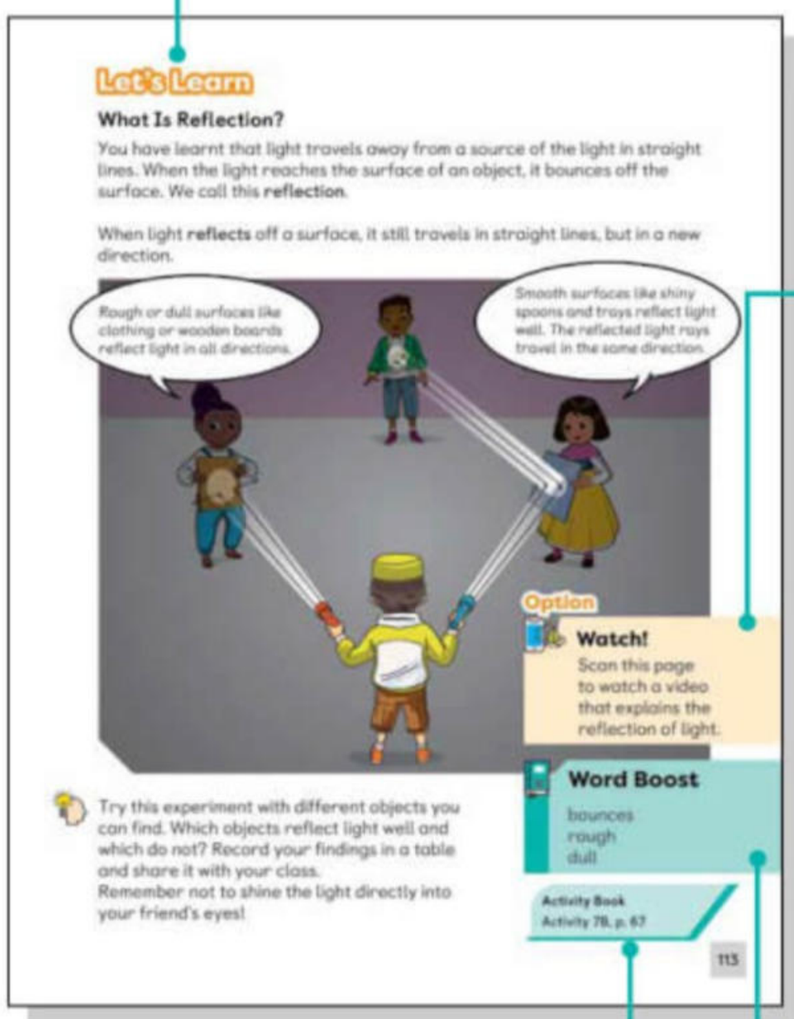
Let's Explore!

You will carry out activities to help you explore and understand the topic.



Let's Learn

Step-by-step explanations and pictures help to make science easier to learn.



Let's Learn

What Is Reflection?

You have learnt that light travels away from a source of the light in straight lines. When the light reaches the surface of an object, it bounces off the surface. We call this **reflection**.

When light **reflects** off a surface, it still travels in straight lines, but in a new direction.

Rough or dull surfaces like clothing or wooden boards reflect light in all directions.

Smooth surfaces like shiny spoons and trays reflect light well. The reflected light rays travel in the same direction.

Option

Watch!

Scan this page to watch a video that explains the reflection of light.

Try this experiment with different objects you can find. Which objects reflect light well and which do not? Record your findings in a table and share it with your class. Remember not to shine the light directly into your friend's eyes!

Word Boost

bounces
rough
dull

Activity Book
Activity 7B, p. 67

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Option

Watch!

Exciting video clips will make learning "come alive". The video clips can be launched on a smartphone or a tablet by scanning the page using the MCE Cambridge app.

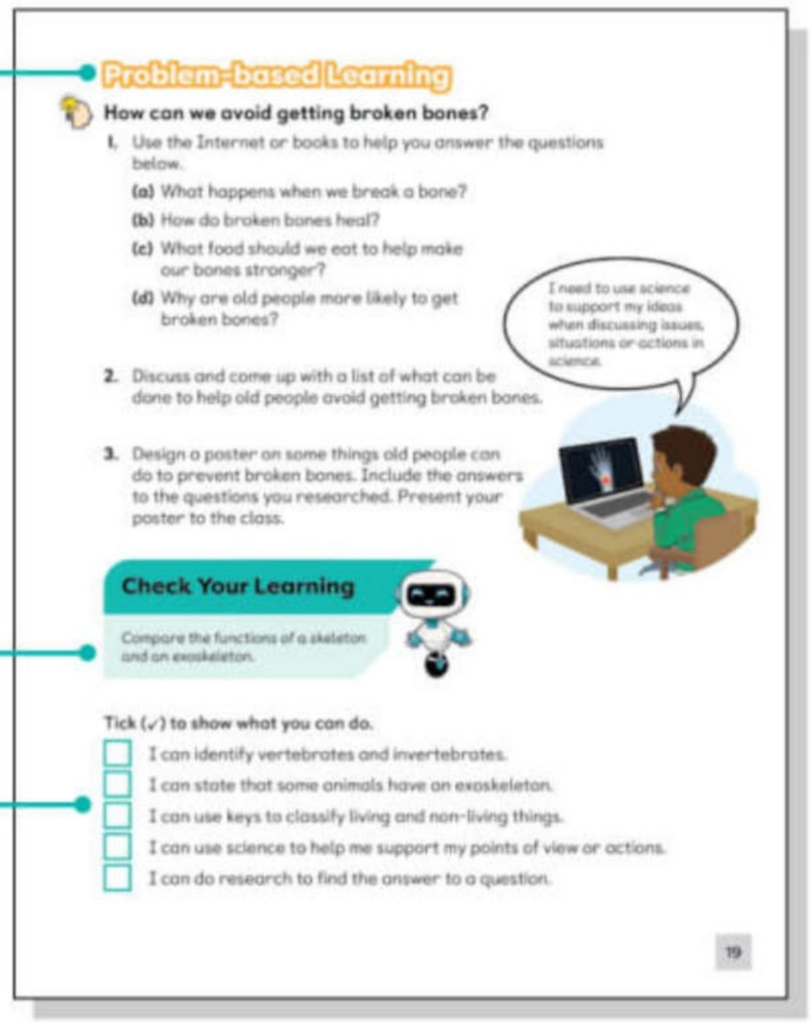
Word Boost

Build your knowledge of words to help you understand the topic better.

Activity Book links lead you to the related activities in the Activity Book.

Problem-based Learning

Apply your knowledge and skills to solve a problem that affects you, society or the environment.



Problem-based Learning

How can we avoid getting broken bones?

1. Use the Internet or books to help you answer the questions below.
   (a) What happens when we break a bone?
   (b) How do broken bones heal?
   (c) What food should we eat to help make our bones stronger?
   (d) Why are old people more likely to get broken bones?
2. Discuss and come up with a list of what can be done to help old people avoid getting broken bones.
3. Design a poster on some things old people can do to prevent broken bones. Include the answers to the questions you researched. Present your poster to the class.

I need to use science to support my ideas when discussing issues, situations or actions in science.

Check Your Learning

Compare the functions of a skeleton and an exoskeleton.

Tick (✓) to show what you can do.

- ☐ I can identify vertebrates and invertebrates.
- ☐ I can state that some animals have an exoskeleton.
- ☐ I can use keys to classify living and non-living things.
- ☐ I can use science to help me support my points of view or actions.
- ☐ I can do research to find the answer to a question.

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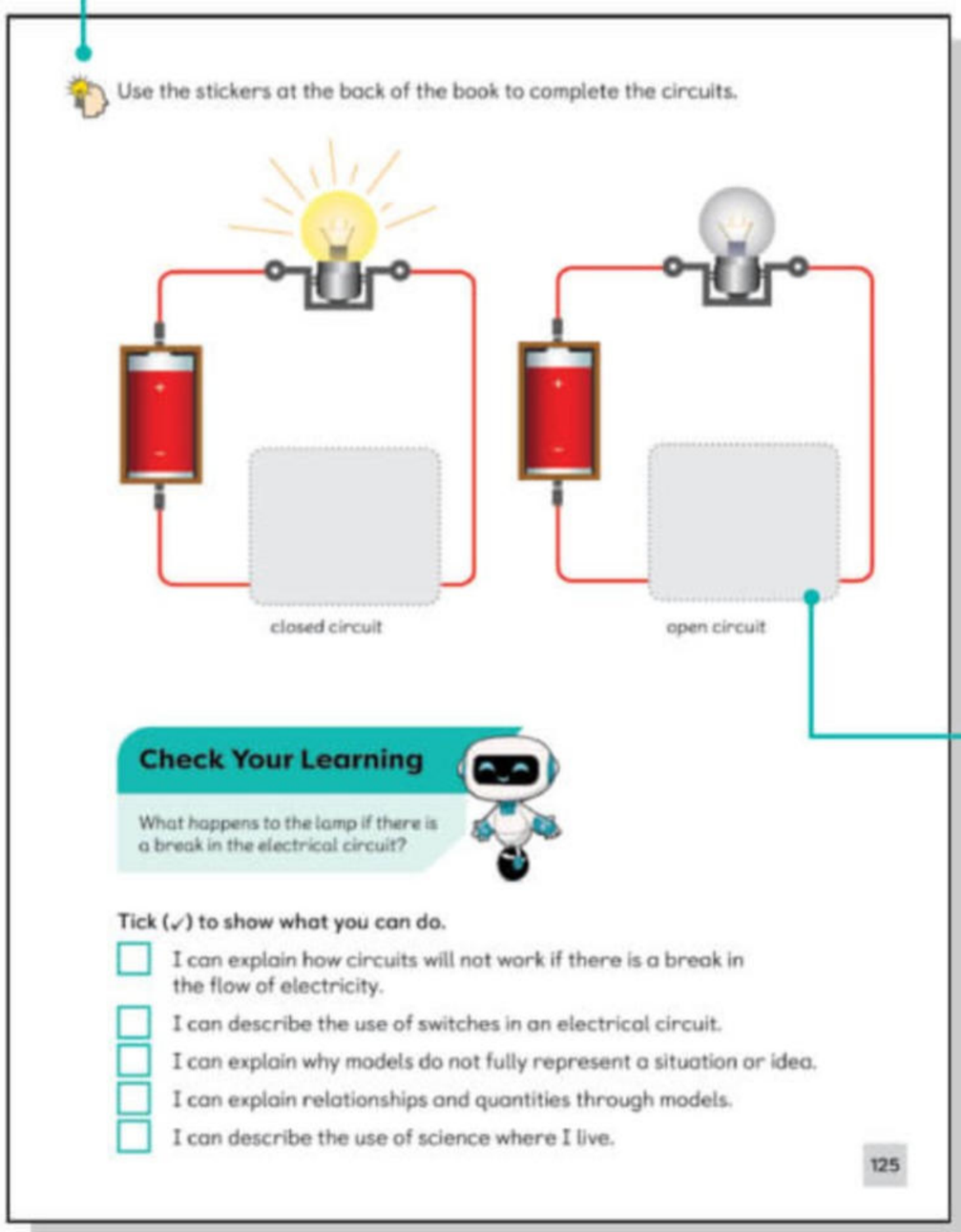
Check Your Learning

Check Your Learning helps you test yourself on what you have learnt in each section.

'I can...' statements at the end of each section help you think about what you have learnt.


Use the stickers at the back of the book to complete the circuits.

closed circuit

open circuit

Check Your Learning

What happens to the lamp if there is a break in the electrical circuit?

Tick (✓) to show what you can do.

- ☐ I can explain how circuits will not work if there is a break in the flow of electricity.
- ☐ I can describe the use of switches in an electrical circuit.
- ☐ I can explain why models do not fully represent a situation or idea.
- ☐ I can explain relationships and quantities through models.
- ☐ I can describe the use of science where I live.

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The **Thinking and Working Scientifically** icon tells you where you will develop science skills, such as using models and doing practical work.

Sticker activities make the learning of science fun. The stickers can be found at the back of the book.

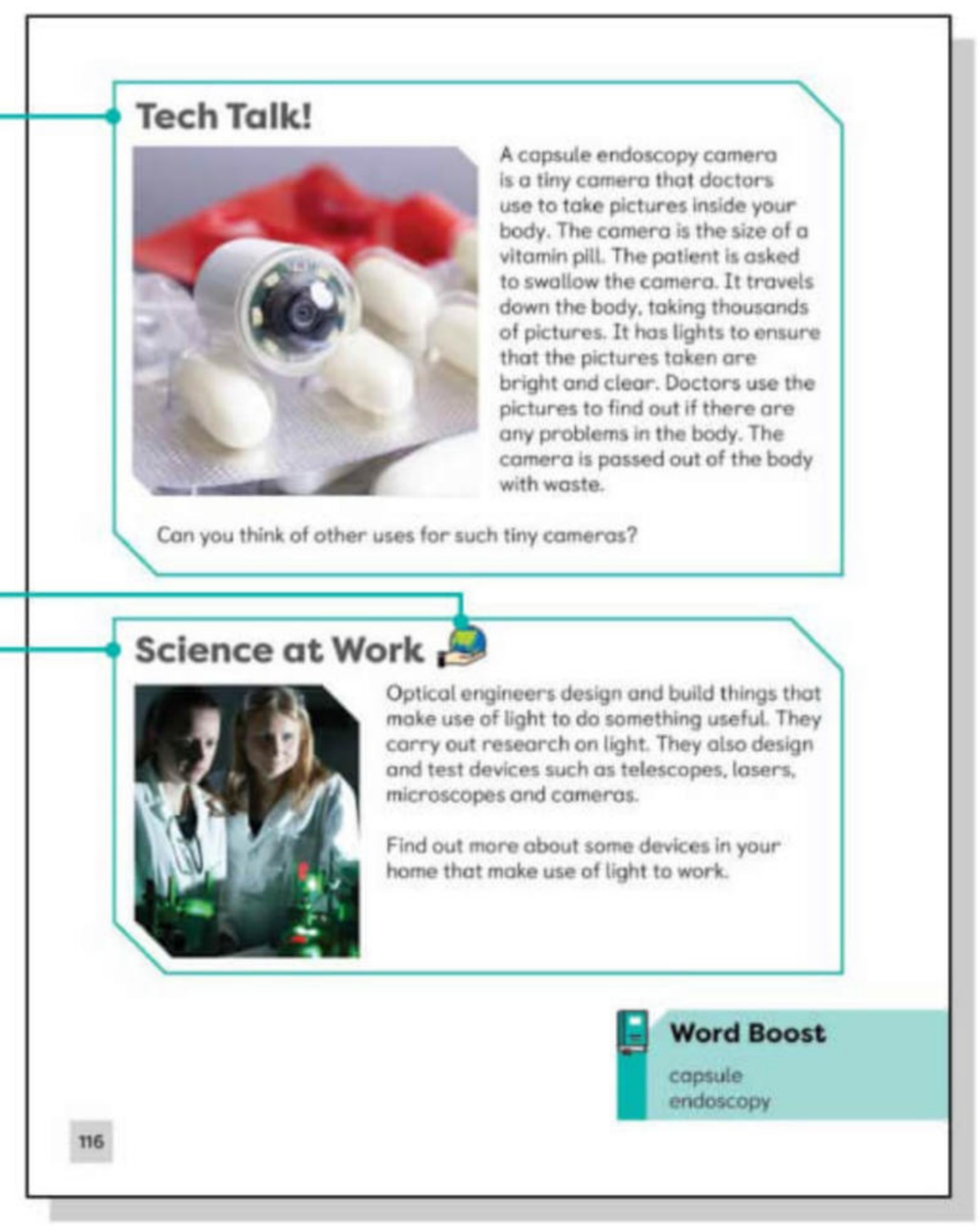
Tech Talk!

This feature shows you the latest technologies and helps build thinking skills in you.

Science in Context icon tells you how science is used in the world around you.

Science at Work

Learn about people who use science in their work and how science is found everywhere around us. A question at the end helps you build your IT and research skills.


Tech Talk!

A capsule endoscopy camera is a tiny camera that doctors use to take pictures inside your body. The camera is the size of a vitamin pill. The patient is asked to swallow the camera. It travels down the body, taking thousands of pictures. It has lights to ensure that the pictures taken are bright and clear. Doctors use the pictures to find out if there are any problems in the body. The camera is passed out of the body with waste.

Can you think of other uses for such tiny cameras?

Science at Work

Optical engineers design and build things that make use of light to do something useful. They carry out research on light. They also design and test devices such as telescopes, lasers, microscopes and cameras.

Find out more about some devices in your home that make use of light to work.

Word Boost

capsule endoscopy

116

Science Words

A

ash cloud
a cloud formed when gases found in magma escape into the air

C

crater
a large hole at the top of a volcano

crust
outermost layer of the Earth

E

earthquake
the sudden and violent shaking of the ground

I

inner core
innermost layer of the Earth

L

lava
magma that is released to the surface of the Earth

M

magma
molten rock found beneath the Earth's surface

mantle
the layer of the Earth between the outer core and the crust

O

outer core
the layer of the Earth between the mantle and the inner core

T

tectonic plates
moving pieces of the Earth's crust

V

vent
an opening in the Earth's surface through which magma flows out

volcano
a mountain with an opening for magma and gas beneath the Earth to escape

volcanic eruption
the violent release of magma from a volcano

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Science Words

The meanings of science words that appear in bold text within each chapter help you learn and understand the topics better.

Practice Worksheet

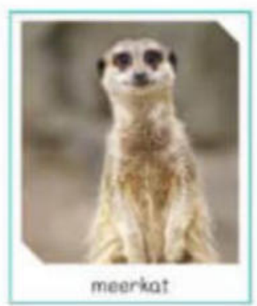
Answer these questions to test your understanding and apply what you have learnt.

Practice Worksheet

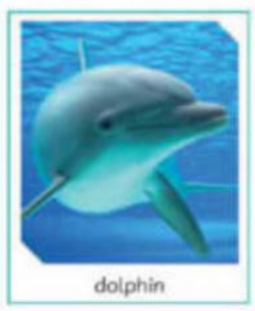
1. Tick (✓) the correct box beside each sentence.

	True	False
Polar bears and orangutans are found in the same habitat.	☐	☐
Animals that live in a desert can also live in an aquatic habitat.	☐	☐
An animal can survive only in its own habitat.	☐	☐
Some types of animals can change the colour of their body covering over time to survive in a new environment.	☐	☐
Plants can move to a different place when their habitat changes.	☐	☐

2. Draw a line to connect each animal to the habitat in which it lives.


meerkat

macaw


dolphin

rainforest | ocean | desert

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A Infectious Diseases

In this section, I will
- learn that both plants and animals can get infectious diseases
- learn to predict the possible results of a scientific activity
- produce a dot plot to explain results
- identify people who use science around me and describe how they use it

Thinking cap

My friend is ill. If I play with him, will I fall ill too?

Let's Explore!

Stop the spread!

1. Look at the two pictures below.
2. Riyaz has a cold. He sneezes several times a day. Circle the picture that shows him doing the right thing.

3. In pairs, **predict** what could happen if Riyaz plays with his friends when he is unwell. What will happen if no one is wearing a mask?

Two Social and Emotional Learning mascots, Lana and Leo, help you to learn how to work with others and take care of your feelings.

Problem-based Learning

What can we do if there is no light?

Imagine that there is a power failure at night. You have homework to do, but there is only one torch at home. There are also materials such as aluminium foil, cloth, plastic, paper plates and metal trays.

1. Work in groups.
2. Ask yourselves the following questions. You can use the Internet for help with your research.
   - Which materials will you use to make the torch brighten up a larger area? Explain why you chose these materials.
   - What else can you do to light up more areas in the house?
3. Create a poster to show how you will use the materials and the torch to light up your entire room. Include ray diagrams in your poster.
4. Share your poster with the class.

Check Your Learning

Describe how you are able to see this page.

Tick (✓) to show what you can do.

- ☐ I can state how light reflects off surfaces.
- ☐ I can describe how we see objects that are not light sources.
- ☐ I can identify risks and explain how to be safe during practical work.
- ☐ I can do practical work safely.
- ☐ I can create tables and diagrams to show observations.
- ☐ I can draw a diagram to show a scientific idea.
- ☐ I can choose and use the right equipment.
- ☐ I can identify people who use science around me and describe how they use it.

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Think and Work Like a Scientist — Page 2

CHAPTER 1 Bones and Muscles — Page 3

A Bones and the Skeleton
- What Is a Skeleton?
- What Are the Functions of the Skeleton?

B Muscles and Movement
- How Do Muscles Work?

C Animals and Skeletons
- What Are Vertebrates and Invertebrates?

- Learn to measure in standard units and explain why they are better than non-standard units.
- Create tables and diagrams to show measurements.
- Identify and explain patterns in results.
- Identify the five main types of scientific enquiry.
- Use keys to classify living and non-living things.
- Do research to find the answer to a question.

- Identify people who use science around me and describe how they use it.
- Use science to help me support my points of view or actions.

CHAPTER 2 Diseases — Page 23

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- What Are Infectious Diseases?
- Can Animals Get Infectious Diseases?
- Can Plants Get Infectious Diseases?

B Medicines
- Why Do We Need Medicines?
- How Can We Use Medicines Safely?

C Vaccines
- What Are Vaccines?
- Are There Vaccines for Animals?

- Learn to predict the possible results of a scientific activity.
- Produce a dot plot to explain results.
- Learn to measure in standard units and explain why they are better than non-standard units.
- Identify the five main types of scientific enquiry.
- Do research to find the answer to a question.

- Identify people who use science around me and describe how they use it.
- Describe how evidence obtained through enquiry has changed scientific knowledge and understanding over time.

Biology/ Chemistry/ Physics/ Earth and Space

Thinking and Working Scientifically

Science in Context

CHAPTER 3 Energy from Food — Page 42

A Growing, Living and Being Healthy
- What Do Plants and Animals Need?

B Getting Energy
- How Do Plants Get Energy?
- How Do Animals Get Energy?

C Producers and Consumers
- What Are Food Chains Made Up of?
- What Are Herbivores, Carnivores and Omnivores?
- What Are Predators and Prey?

- Learn to predict the possible results of a scientific activity.
- Produce a bar chart to explain results.
- Learn to sort and classify things through observations.
- Use keys to classify living and non-living things.
- Identify the five main types of scientific enquiry.

- Use science to help me support my points of view or actions.
- Identify people who use science around me and describe how they use it.

CHAPTER 4 Different Habitats — Page 57

A Animals and Their Habitats
- What Are Some Habitats?

B Surviving Habitats
- Can Plants and Animals Live in Other Environments?

- Create tables and diagrams to show observations.
- Do research to find the answer to a question.
- Identify the five main types of scientific enquiry.
- Produce a bar chart and dot plot to explain results.
- Use keys to classify living and non-living things.

- Describe the use of science where I live.
- Use science to help me support my points of view or actions.
- Discuss the positive and negative effects of science and technology on the environment where I live.

CHAPTER 5 Materials, Substances and Particles

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- Can Solids Behave Like Liquids?

B Changing State
- What Happens When a Solid Melts?
- What Happens When a Liquid Freezes?
- What Are Physical Changes?

C Chemical Reactions
- What Are Chemical Reactions?

- Explain relationships, quantities or scale through models.
- Explain why models do not fully represent a idea.
- Learn to sort and classify things through tests.
- Identify the five main types of scientific enquiry.
- Learn what the variables are when doing a fair test.
- Learn to identify risks and explain how to be safe during practical work.
- Do practical work safely.
- Create tables and diagrams to show observations.
- Learn to choose and use the right equipment.
- Learn to predict the possible results of a scientific activity.
- Explain that results are more reliable when the ameasurements are taken more than once.

- Identify people who use science around me and describe how they use it.
- Describe the use of science where I live.

CHAPTER 6 Energy

Page 92

A Sound, Light and Heat
- Where Is Energy Present?

B Energy Transfer
- Where Does Energy Go?

- Create tables and diagrams to show observations and measurements.
- Learn to sort and classify things through observations.
- Identify the five main types of scientific enquiry.
- Learn to measure in standard units and explain why they are better than non-standard units.
- Do research to find the answer to a question.
- Analyse results to answer a scientific question.

- Discuss the positive and negative effects of science and technology on the environment where I live.

CHAPTER 7 Properties of Light

Page 108

A Light Travels
- How Does Light Travel?

B Reflection of Light
- What Is Reflection?
- How Do We See Objects?

- Explain why models do not fully represent a situation.
- Learn to predict the possible results of a scientific activity.
- Explain that results are more reliable when the activity is done more than once.
- Learn to choose and use the right equipment.
- Learn to identify risks and explain how to be safe during practical work.
- Do practical work safely.
- Create tables and diagrams to show observations.
- Draw a diagram to show a scientific idea.

- Identify people who use science around me and describe how they use it.

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- What Happens if There Is a Break in the Circuit?
- What Is a Switch?

B Brightness of a Lamp
- How Do Changes Affect Lamps in a Circuit?

C Conductors and Insulators
- What Are Conductors and Insulators?

- Explain why models do not fully represent an idea.
- Explain relationships and quantities through models.
- Identify the five main types of scientific enquiry.
- Identify and explain patterns in results.
- Produce a table to explain results.
- Learn what the variables are when doing a fair test.
- Learn to choose and use the right equipment.
- Learn to identify risks and explain how to be safe during practical work.
- Draw a diagram to show a scientific idea.

- Describe the use of science where I live.
- Identify people who use science around me and describe how they use it.

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- Are There Other Planetary Systems Like the Solar System?

B Spinning of Earth
- Does the Sun Move Across the Sky?
- What Causes Day and Night?
- How Do Shadows Change During the Day?

- Explain why models do not fully represent a situation or idea.
- Explain relationships, quantities or scale through models.
- Identify the five main types of scientific enquiry.

- Use science to help me support my points of view or actions.
- Describe how evidence obtained through enquiry has changed scientific knowledge and understanding over time.
- Identify people who use science around me and describe how they use it.

CHAPTER 10 Structure of the Earth — Page 152

A The Earth's Structure
- What Is the Structure of the Earth?

B Volcanoes
- What Is a Volcano?
- What Are the Features of a Volcano?

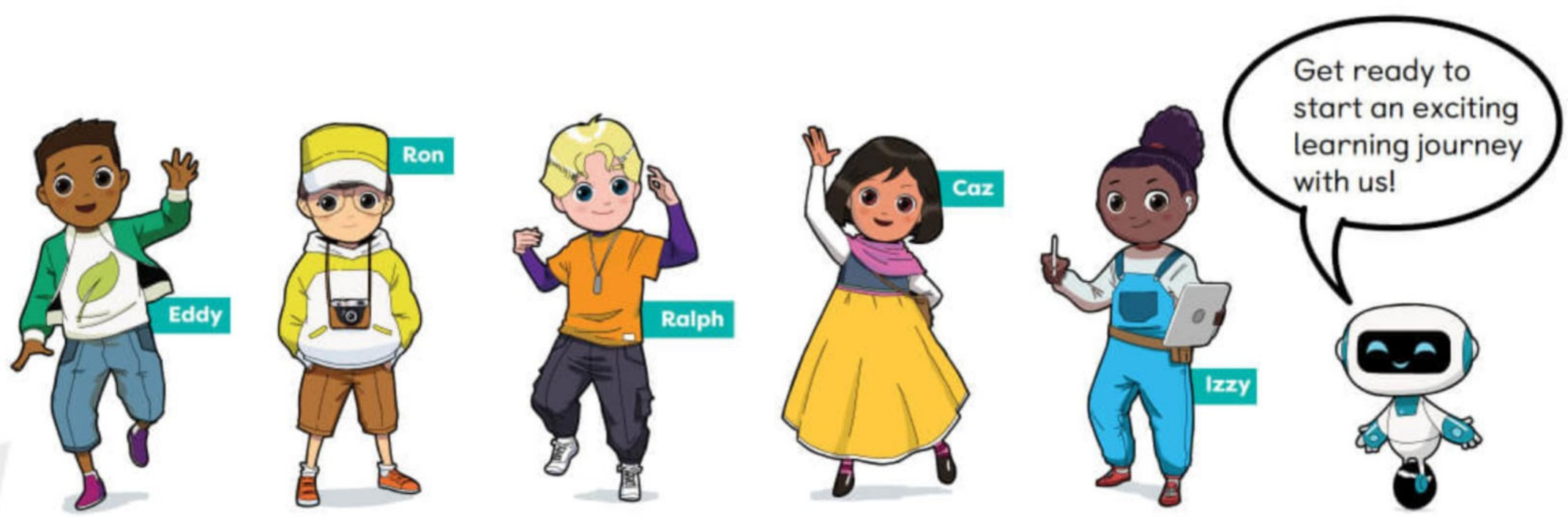
C Earthquakes
- How Does an Earthquake Occur?

- Do research to find the answer to a question.
- Explain scale through models.
- Explain why models do not fully represent a situation.
- Ask meaningful scientific questions.
- Identify the five main types of scientific enquiry.

- Use science to help me support my points of view or actions.
- Identify people who use science around me and describe how they use it.

Acknowledgements — Page 168

Stickers — Page 173



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Think and Work Like a Scientist

Scientists ask questions and find a way to answer the questions. This is called scientific enquiry. There are five types of scientific enquiry that scientists use to answer questions.

Research

Which animals are suited to live in the desert?

I can find information from books, the Internet or people around me to answer this question.

Observing over Time

How do shadows change over the day?

I can use my senses and make observations over time to answer this question.

Identifying and Classifying

Which animals are predators and which are prey?

I can compare similarities and differences to put things into groups and answer this question.

Fair Testing

Which solid melts the fastest?

I can carry out a fair test where I change something, measure something and keep some things the same to answer this question.

Pattern Seeking

What happens to the brightness of a lamp when more lamps are added to the circuit?

I can look for patterns in data to answer this question.

As you learn science in this book, you will carry out scientific activities. You will also learn which scientific enquiry you are using to find the answers to the questions.

CHAPTER 1

Bones and Muscles

You have learnt in Stage 2 that moving regularly is important for us to be healthy. What helps our bodies to move? Use the picture to help you to think of the answer.

Write three words to describe ways in which you can move.

_____, _____, _____

A Bones and the Skeleton

In this section, I will

- identify some of the important bones in the human body
- describe the important functions of skeletons
- identify people who use science around me and describe how they use it
- learn to measure in standard units and explain why they are better than non-standard units
- create tables and diagrams to show measurements
- identify and explain patterns in results
- identify the five main types of scientific enquiry

Thinking cap

When I press gently on my arm, I can feel something hard inside. I wonder what it is...

Let's Explore!

What's in me?

X-ray images are special photographs that can show what is inside our bodies. Doctors and veterinarians use X-ray images to help treat broken bones in humans and other animals.

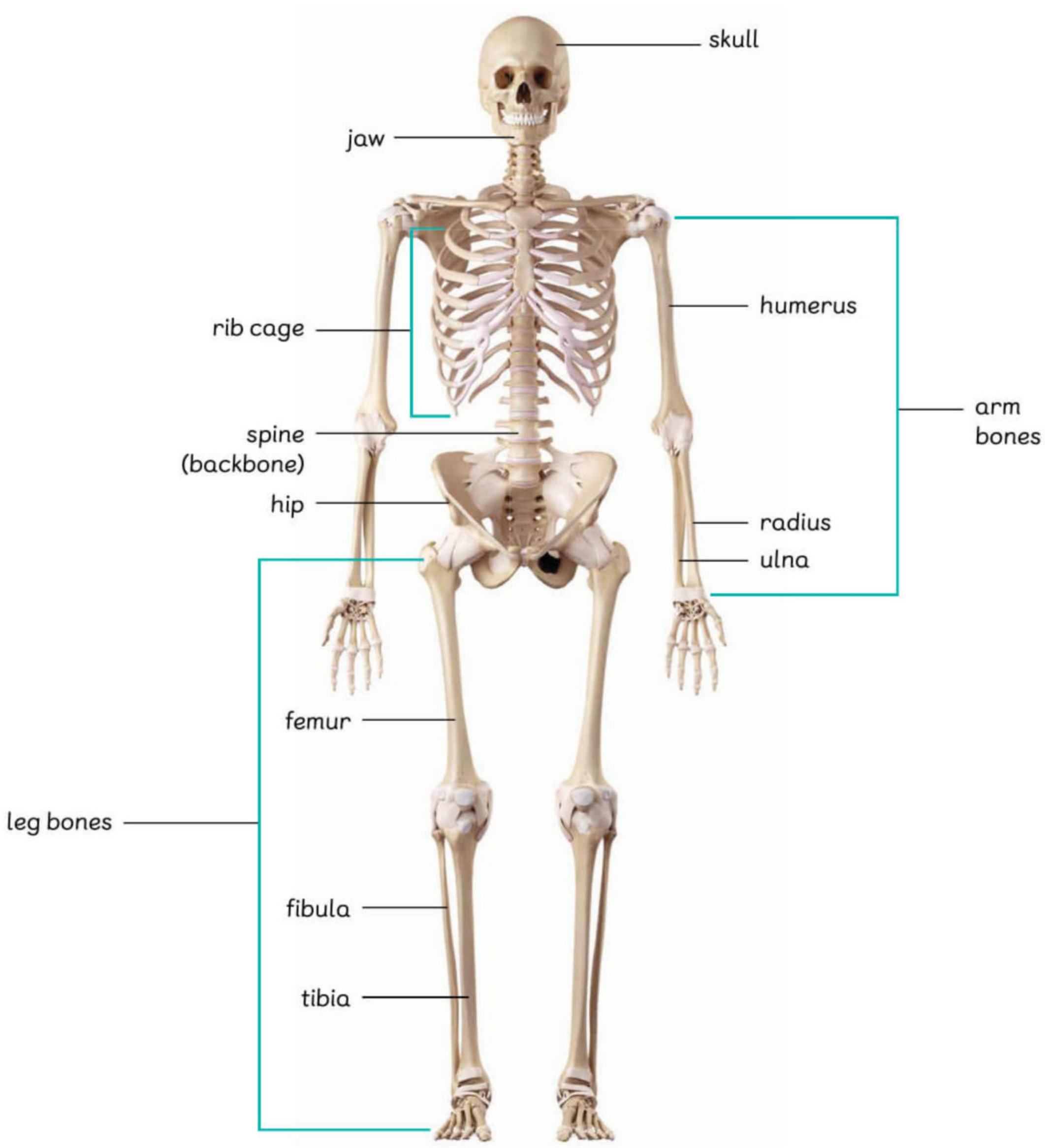
1. Look at these X-ray images. Which human body parts can you identify?
2. Write the names of the body parts below each image.

Activity Book
Activity 1A, p. 1

Let's Learn

What Is a Skeleton?

Press on your arm. Do you feel something hard inside? The hard parts inside our bodies are called bones. The **bones** form a structure called a **skeleton**.



some important bones in the human body

Pattern seeking is one of the five main types of scientific enquiry.

Let's find out how the lengths of different bones are related to a person's height.

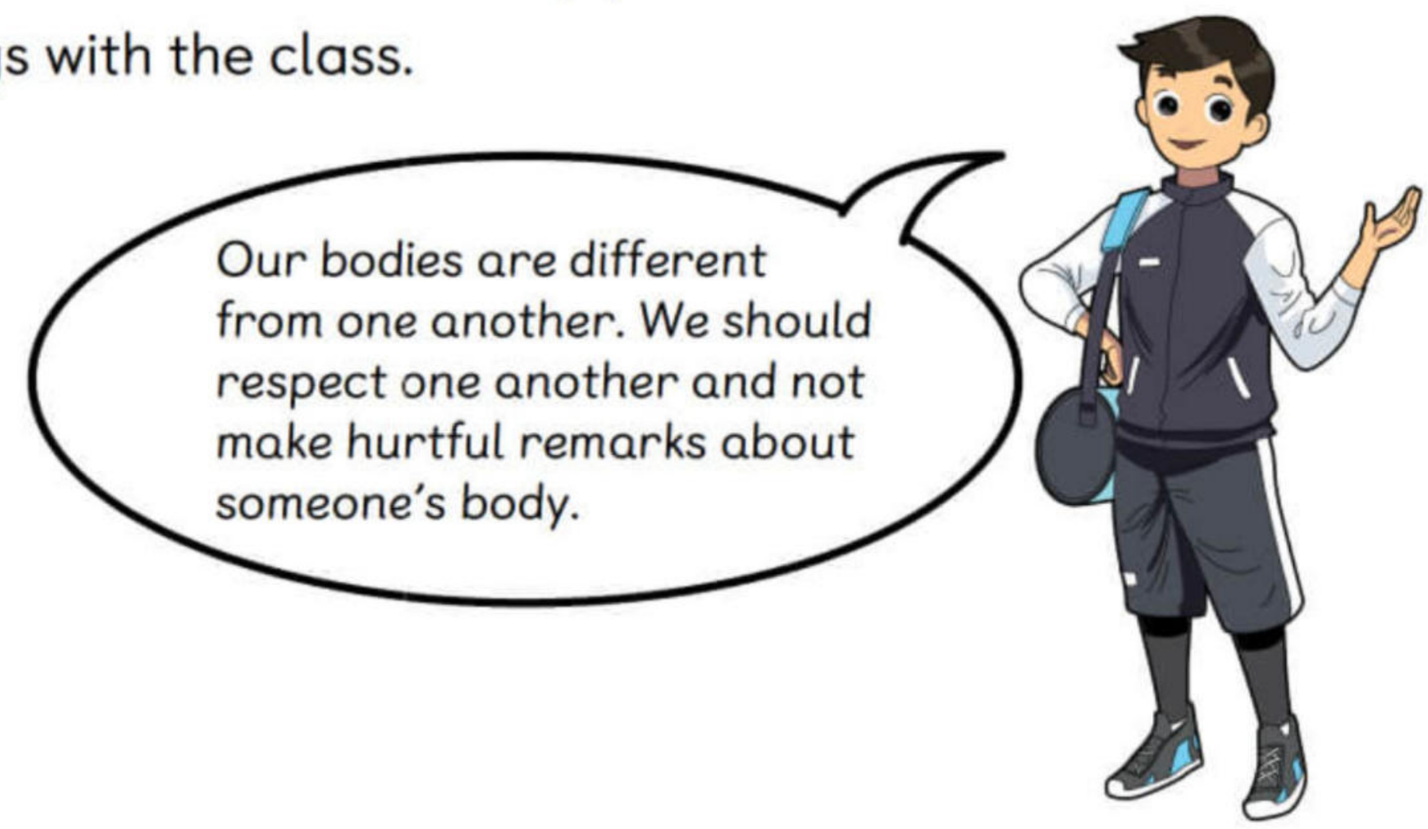
1. Work in groups.
2. Use a measuring tape to measure the different body parts of each group member. Measure the height of each group member as well.

3. Record your measurements in the table below.

Names of group members	Length of arm from shoulder to wrist (cm)	Length of leg from hip to ankle (cm)	Height (cm)

4. Compare the measurements. Can you find any patterns between the length of the bones and the height of the person?

5. Find out what types of scientists work with human bones. How do the scientists use information about the length of bones in their work?
6. Use the Internet, books or videos to help you find the answer.
7. Share your findings with the class.



What Are the Functions of the Skeleton?

The skeleton gives our body shape and provides support to it.

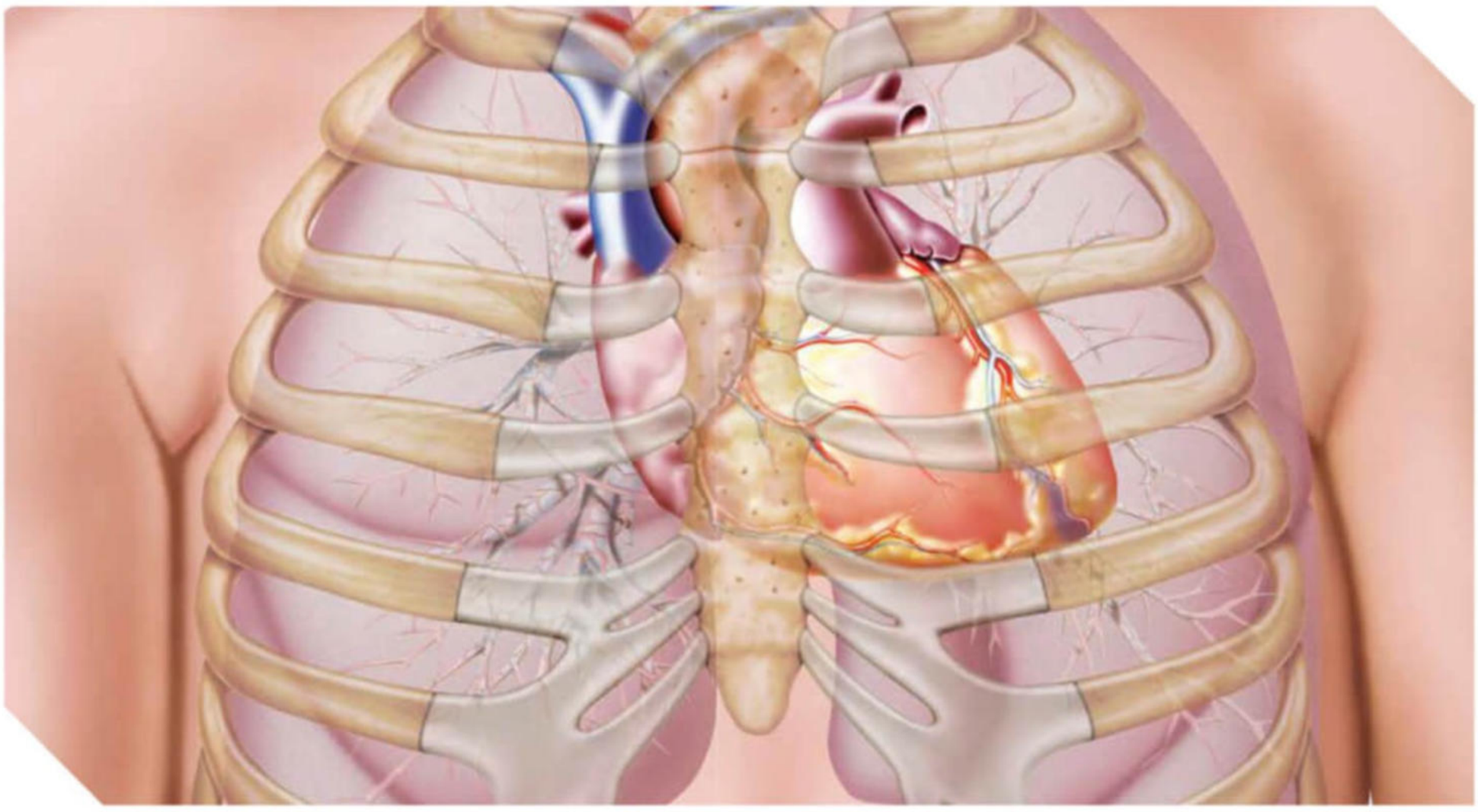
The spine supports the upper part of the body. It allows us to stand up straight and walk in an upright position.

The bones in our legs and arms help us to move around.

Word Boost

support
upright

The skeleton protects important parts of our body.



The rib cage protects organs such as the heart and lungs.

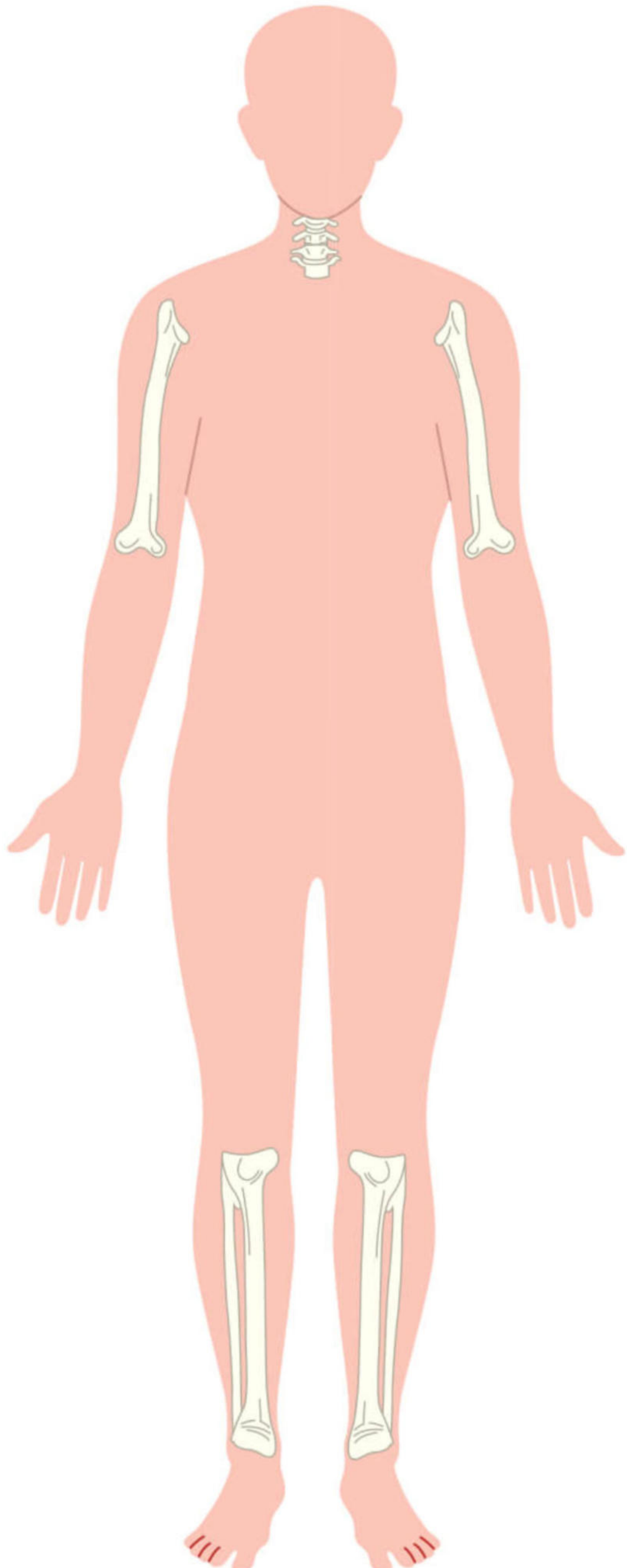
The skull protects the brain.

Option

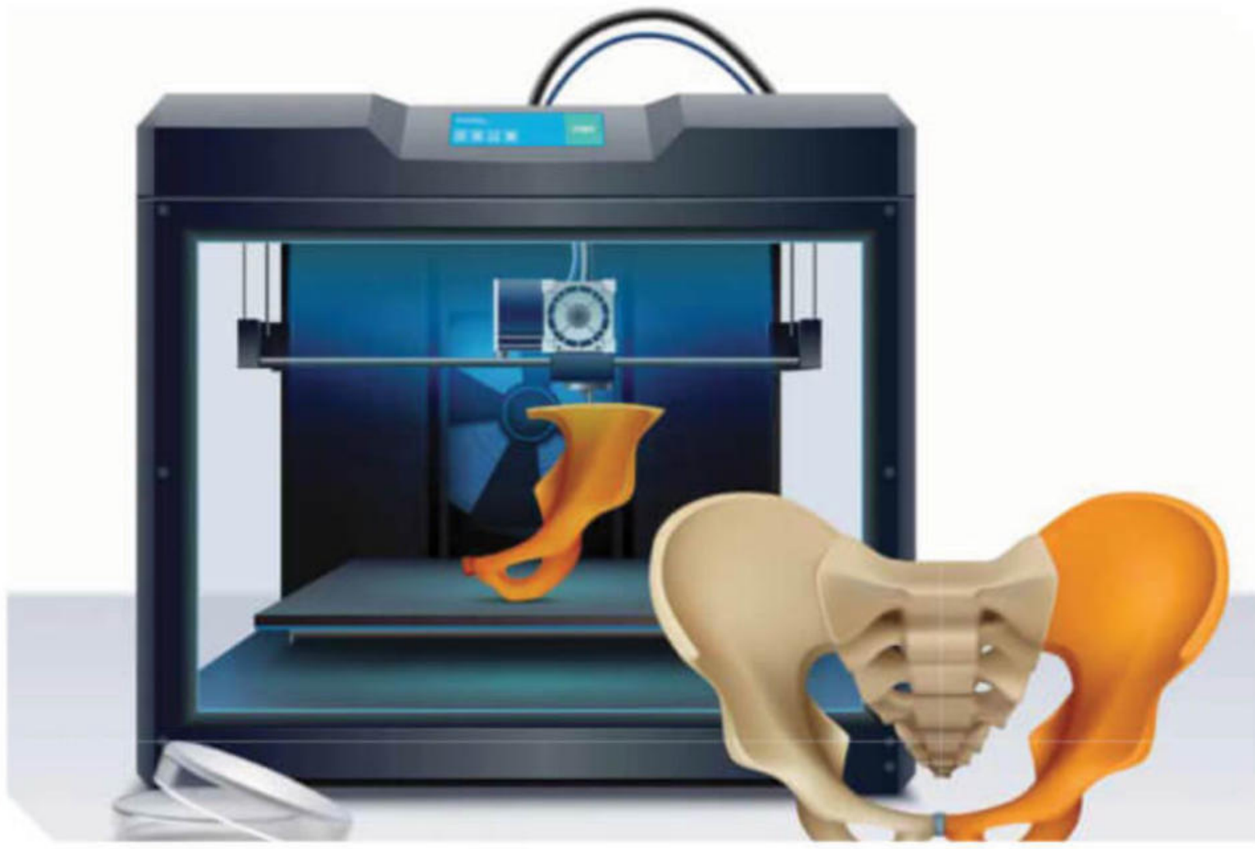
Watch!

Scan this page to watch a video that shows the functions of the skeleton.

Where do the different bones belong? Use the stickers at the back of the book to complete the skeleton. Then, label the different bones in the diagram.



Tech Talk!



Sometimes, bones are broken or damaged in accidents. Special printers known as 3D printers can make an exact copy of a person's bone. Doctors can then replace the damaged bone in the patient with the 3D-printed bone.

The natural bone grows around the 3D-printed bone, making it stronger.

Carry out research to find other ways in which 3D printers can be used to help humans and other living things.

Check Your Learning

What would happen if we did not have any bones in our body?

Tick (✓) to show what you can do.

- ☐ I can identify some of the important bones in the human body.
- ☐ I can describe the important functions of the skeleton.
- ☐ I can identify people who use science around me and describe how they use it.
- ☐ I can measure in standard units and explain why they are better than non-standard units.
- ☐ I can create tables and diagrams to show measurements.
- ☐ I can identify and explain patterns in results.
- ☐ I can identify the five main types of scientific enquiry.

B Muscles and Movement

In this section, I will

- describe how muscles help bones move
- state the importance of movement in keeping us healthy
- identify people who use science around me and describe how they use it

Thinking cap

I wonder what makes my bones move...

Let's Explore!

What makes our arms and legs move?

1. Place your right hand around your left upper arm. Slowly move your left arm up by bending your elbow. Can you feel something inside your arm moving?
2. Now lower your left arm. Is the movement inside your arm the same or different?
3. Next, sit down and put one hand on your thigh. Slowly straighten your leg up. Can you feel something inside your thigh moving?
4. Now lower your leg. Is the movement inside your leg the same or different?
5. What do you think helps your bones to move?

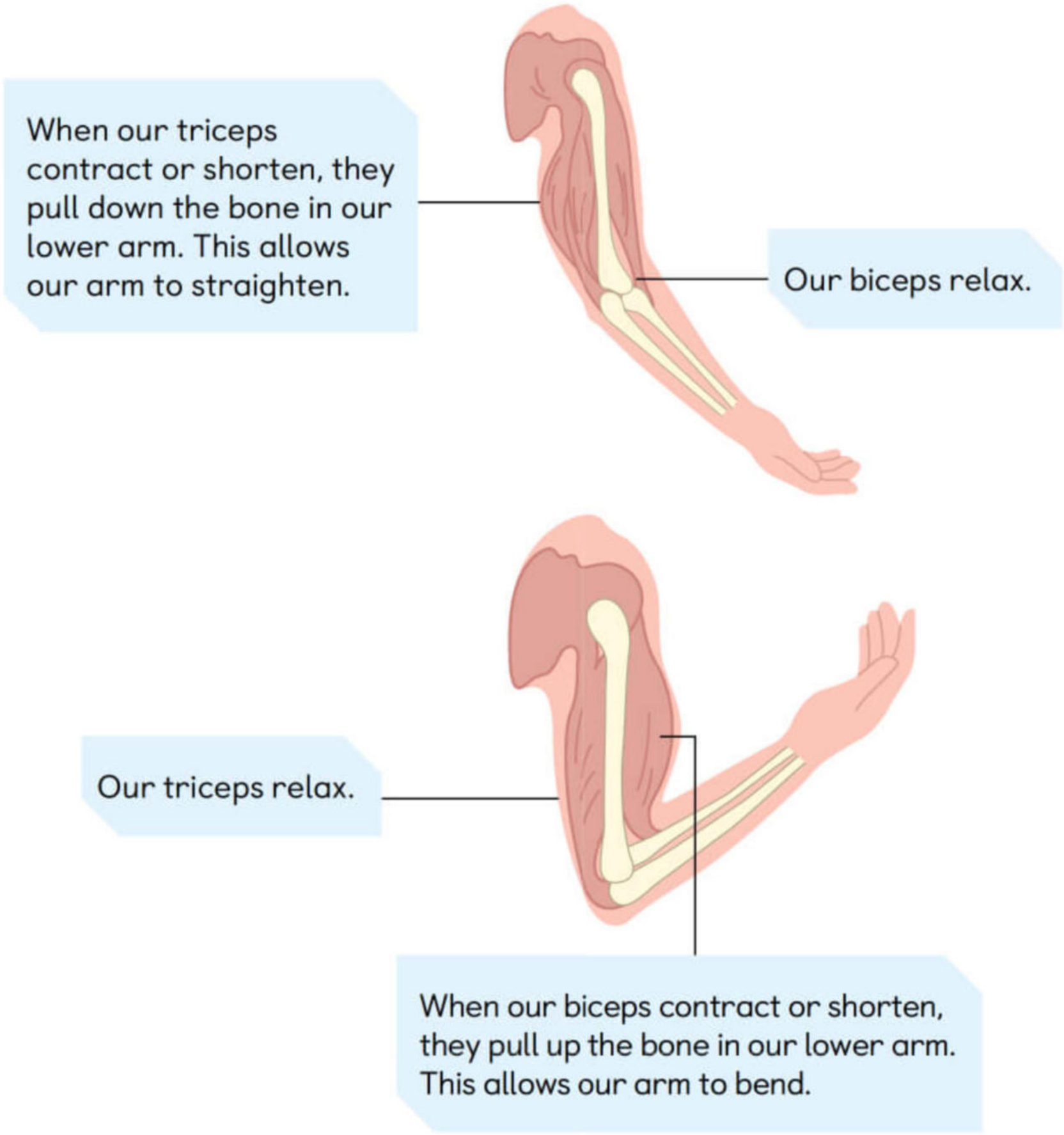
Let's Learn

How Do Muscles Work?

Bones cannot move by themselves. We are able to move because we have **muscles** that cover our skeleton. Some of our muscles are attached to our bones. Our muscles pull on our bones to make them move.

Our muscles can pull on bones, but the muscles cannot push on the bones. So our muscles need to work in pairs in order to make the bones move.

One muscle relaxes and the other contracts. This allows us to bend or straighten our arms and legs.



Your biceps and triceps muscles work to make you bend or straighten your arm.

Our bones and muscles work together to help us move.

Option

Watch!

Scan this page to watch a video that shows the functions of the muscles.

In Stage 2, you have learnt that we need to move regularly to be healthy. Exercise is very important for our bodies to work properly.

Word Boost

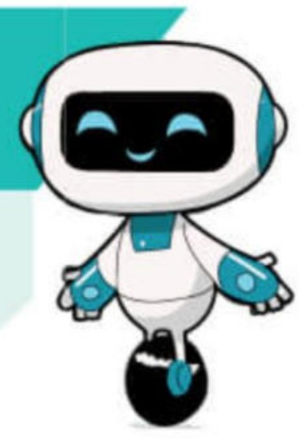
exercise
active

Activity Book
Activity IB, p. 3

Science at Work

Biomedical engineers research information about the human body. They use the information to help design and build devices to help people with broken or missing body parts.
They also observe over time how the devices are used to find if there are any ways to make the devices better. Some biomedical engineers work in hospitals to ensure that the devices work properly for patients. Find out what else biomedical engineers do to help people.

Check Your Learning



How do your muscles work to bend or straighten your knee?

Tick (✓) to show what you can do.

- ☐ I can describe how muscles help bones move.
- ☐ I can state the importance of movement in keeping us healthy.
- ☐ I can identify people who use science around me and describe how they use it.

C Animals and Skeletons

In this section, I will

- identify vertebrates and invertebrates
- state that some animals have an exoskeleton
- use keys to classify living and non-living things
- use science to help me support my points of view or actions
- do research to find the answer to a question

Thinking cap

I wonder if all animals have skeletons...

Let's Learn

What Are Vertebrates and Invertebrates?

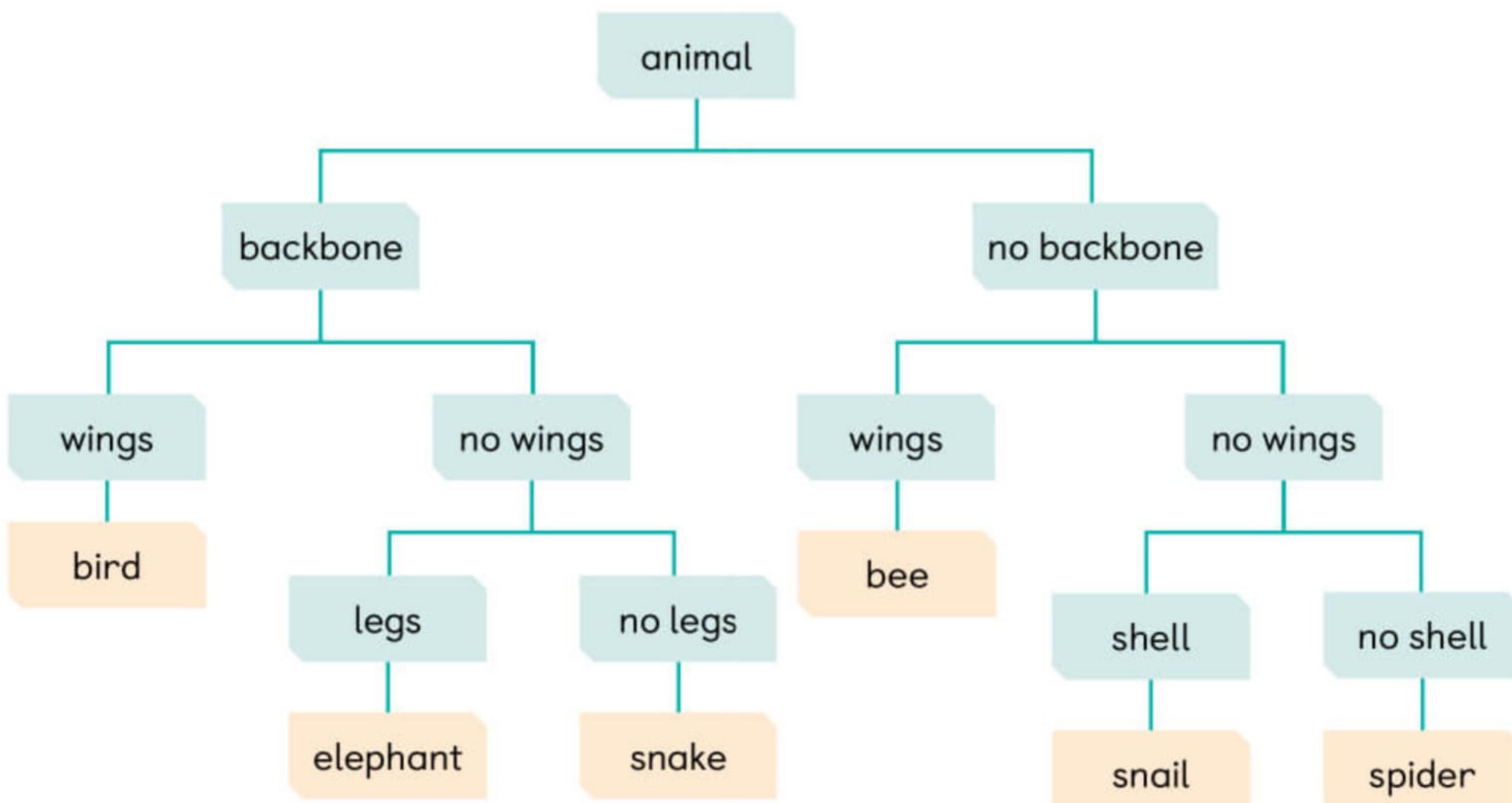
Many animals, such as humans, have a column of bones that supports their bodies. This is known as the **backbone**. The backbone is made of bones called vertebrae. Animals that have a backbone are known as **vertebrates**. There are five groups of vertebrates — fish, amphibians, reptiles, birds and mammals.

Fish, sparrows, lizards, frogs and cats are vertebrates.

Animals that do not have a backbone are known as **invertebrates**. Invertebrates such as worms have a soft body. Invertebrates such as crabs have a hard outer covering. Most of the animals in the world are invertebrates.

Jellyfish, worms, lobsters and spiders are invertebrates.

We can use **keys** to identify vertebrates and invertebrates. Keys are tools that help us to identify different objects, materials or living things.



A key can be used to identify animals.

Many invertebrates have a skeleton that is on the outside of their bodies. This is called an **exoskeleton**. The hard and stiff exoskeleton supports and protects the body of the animal.

Insects are the largest group of animals that have an exoskeleton. Their exoskeletons do not grow as the animals grow. They have moveable parts to allow the animals to move easily.

Crabs, beetles and scorpions have exoskeletons.

Some animals have exoskeletons in the form of shells. These shells grow as the animals get bigger.

Snails and clams have shells.

Activity Book
Activity IC, p. 6

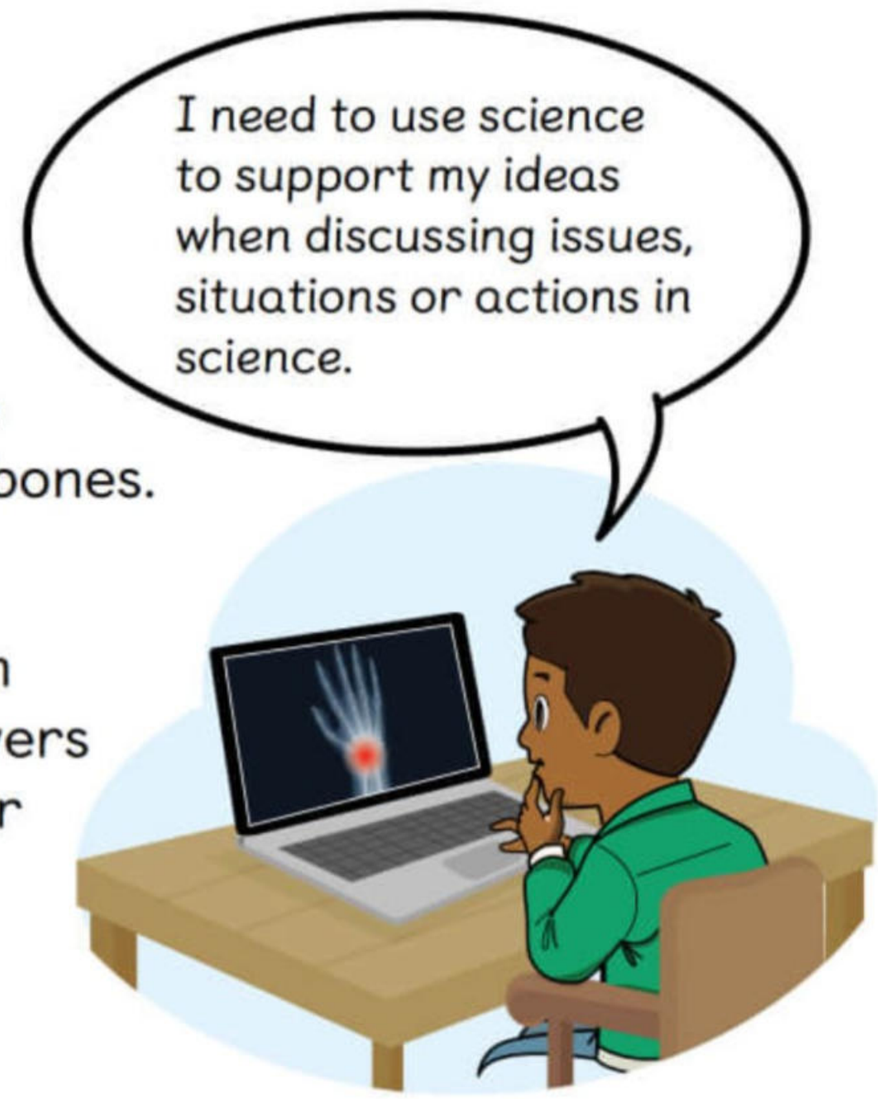
Word Boost

stiff
moveable

Problem-based Learning

How can we avoid getting broken bones?

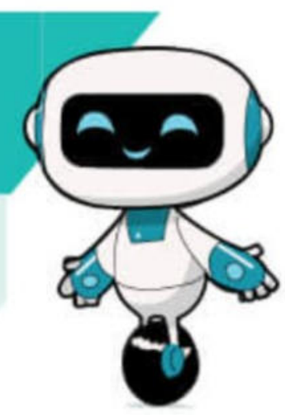
1. Use the Internet or books to help you answer the questions below.
   - **(a)** What happens when we break a bone?
   - **(b)** How do broken bones heal?
   - **(c)** What food should we eat to help make our bones stronger?
   - **(d)** Why are old people more likely to get broken bones?



2. Discuss and come up with a list of what can be done to help old people avoid getting broken bones.

3. Design a poster on some things old people can do to prevent broken bones. Include the answers to the questions you researched. Present your poster to the class.

Check Your Learning



Compare the functions of a skeleton and an exoskeleton.

Tick (✓) to show what you can do.

- ☐ I can identify vertebrates and invertebrates.
- ☐ I can state that some animals have an exoskeleton.
- ☐ I can use keys to classify living and non-living things.
- ☐ I can use science to help me support my points of view or actions.
- ☐ I can do research to find the answer to a question.

Practice Worksheet

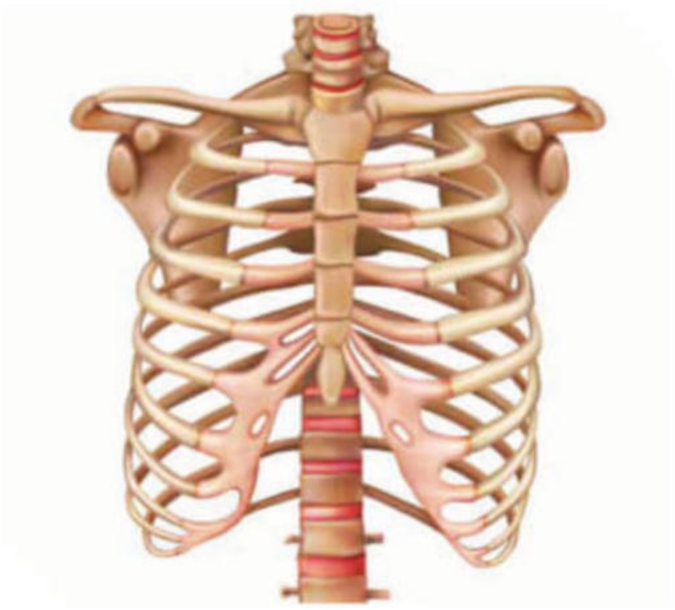
1. Tick (✓) the correct box beside each sentence.

	True	False
The skeleton supports and protects our body.	☐	☐
We can move our body without the help of muscles.	☐	☐
It is important to move our bodies to keep healthy.	☐	☐
A vertebrate has no backbone.	☐	☐
A key can be used to identify living things.	☐	☐
An exoskeleton is found on the outside of an animal such as a crab.	☐	☐

2. Which part of the skeleton protects the brain?

Circle the correct answer.

backbone



rib cage

skull

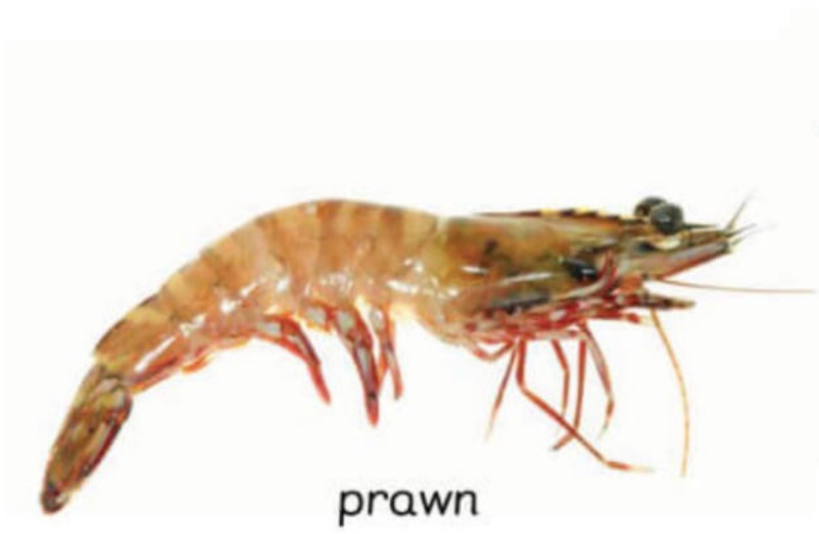
hip

3. Fill in the blanks. Use words from the boxes.

contract	down	muscles	stronger

_____ are needed for movement. Muscles in our arms _____ and relax to move our arms up or _____. When we exercise and move our bones and muscles, they become _____.

4. Which of these animals have an exoskeleton? Circle them.


prawn

bird

goldfish

centipede

mouse

butterfly

jellyfish

earthworm

snail

5. Circle the **two** correct answers.

an exoskeleton is found on the inside of the body

muscles work in pairs

our skeleton gives our body its shape

Science Words

B

backbone
column of bones that supports the body

bones
hard parts inside the body that form the skeleton

E

exoskeleton
hard skeleton outside the body of an animal

I

invertebrates
animals that do not have a backbone

K

keys
tools that help us to identify different objects, materials or living things

M

muscles
parts of the body that cover our skeleton and work with bones to make us move

S

skeleton
a structure in the body made of bones

V

vertebrates
animals that have a backbone

CHAPTER 2

Diseases

Look at the picture.

Do you remember the last time you were ill? Did you have to see a doctor or a nurse? What signs of illness did you have? Recall what you have learnt in Stage 2 about illnesses.

Write three words to describe how you feel when you are ill.

_____, _____, _____

A Infectious Diseases

In this section, I will

- learn that both plants and animals can get infectious diseases
- learn to predict the possible results of a scientific activity
- produce a dot plot to explain results
- identify people who use science around me and describe how they use it

Thinking cap

My friend is ill. If I play with him, will I fall ill too?

Let's Explore!

Stop the spread!

1. Look at the two pictures below.
2. Riyaz has a cold. He sneezes several times a day. Circle the picture that shows him doing the right thing.

3. In pairs, **predict** what could happen if Riyaz plays with his friends when he is unwell. What will happen if no one is wearing a mask?

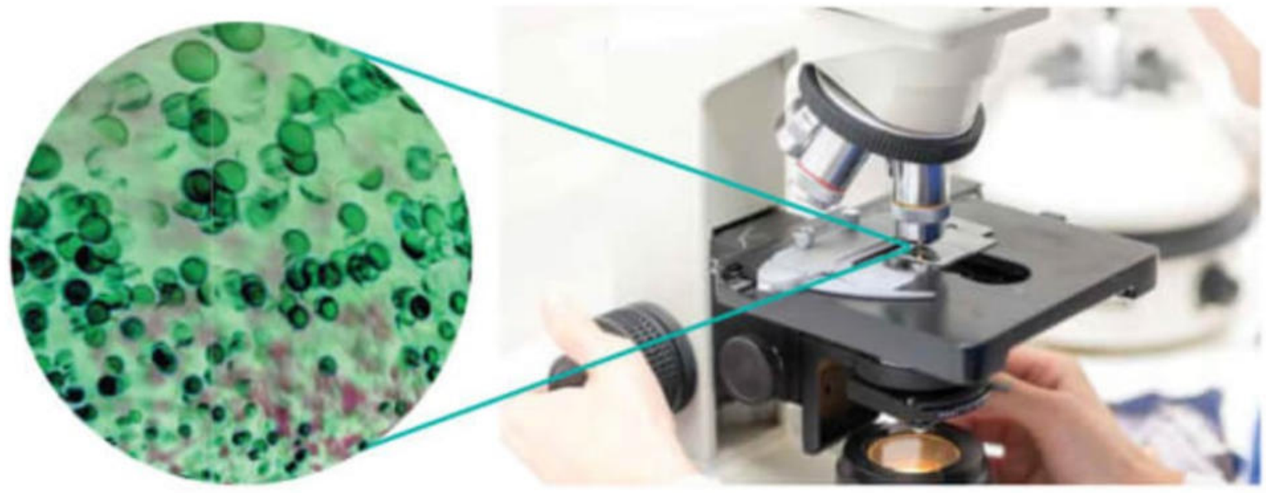
Let's Learn

What Are Infectious Diseases?

A **disease** is a condition in which your body or a part of your body is not able to function properly. Diseases that can spread from one person to another are called **infectious** diseases.

The flu and the common cold are infectious diseases.

Infectious diseases are caused by tiny living things called **germs** that enter our body and make us ill. These germs can be passed on from one person to another, spreading the disease.



We can only see germs under a **microscope**.

A **non-infectious** disease is not caused by germs and cannot be spread from person to person.

Word Boost

spread
tiny

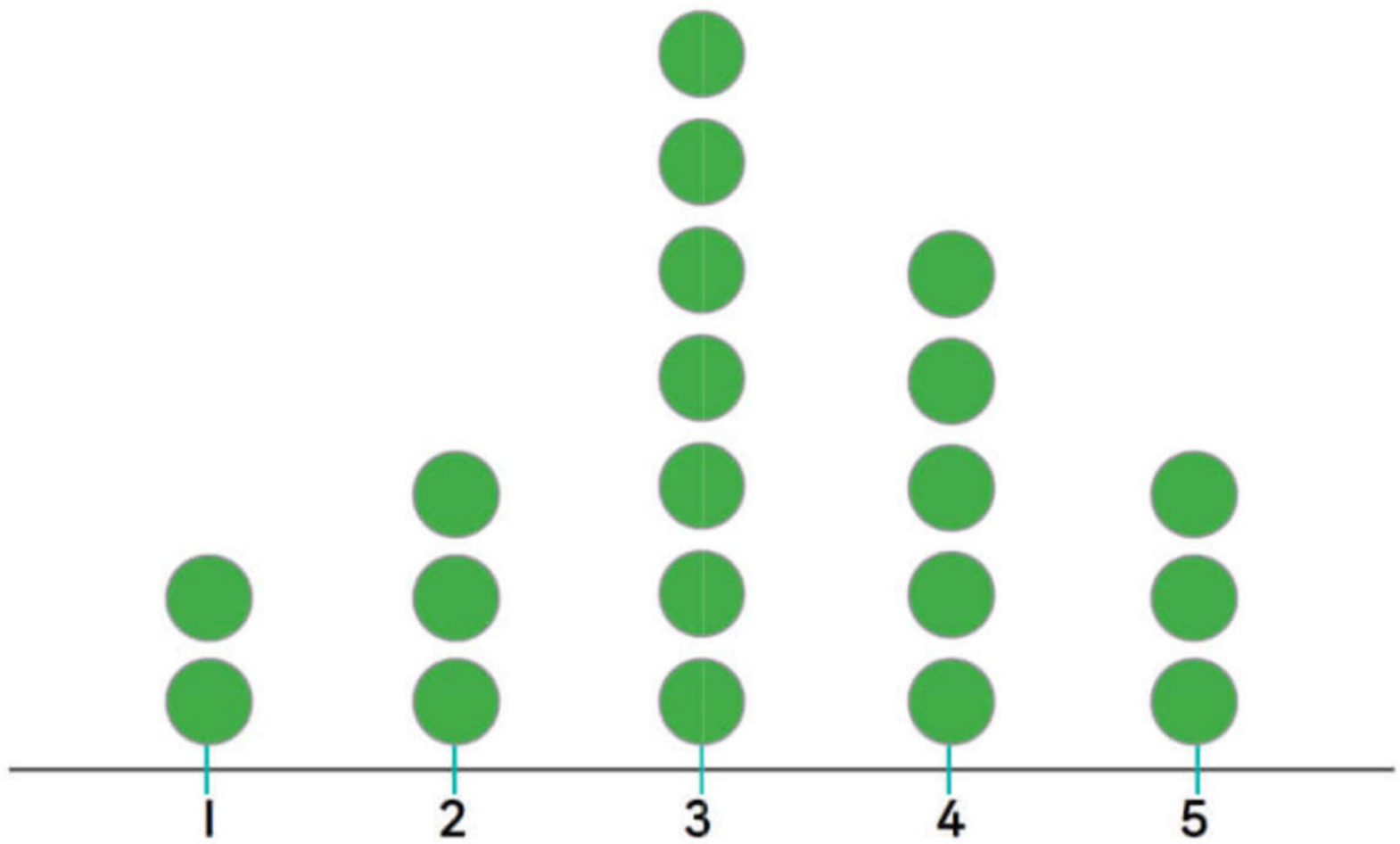
Activity Book
Activity 2A, p. 11

Word Boost

saliva
coughs
sneezes

Our bodies take time to recover from diseases. Let's conduct a survey with 20 people to find out how long each person took to recover from influenza (flu). The results from the survey can be shown using a **dot plot**.

Time taken to recover from flu



Number of days

Key: Each ● represents 1 person.

This dot plot shows that two people took one day to recover, while three people took two days to recover. Three people took five days to recover. It shows that most people took three days to recover. How many people took four days to recover from the flu?

Now, conduct a survey in your class to find out how many infectious diseases each classmate has had.

Tick (✓) the diseases you have had.

Chicken pox ☐

Mumps ☐

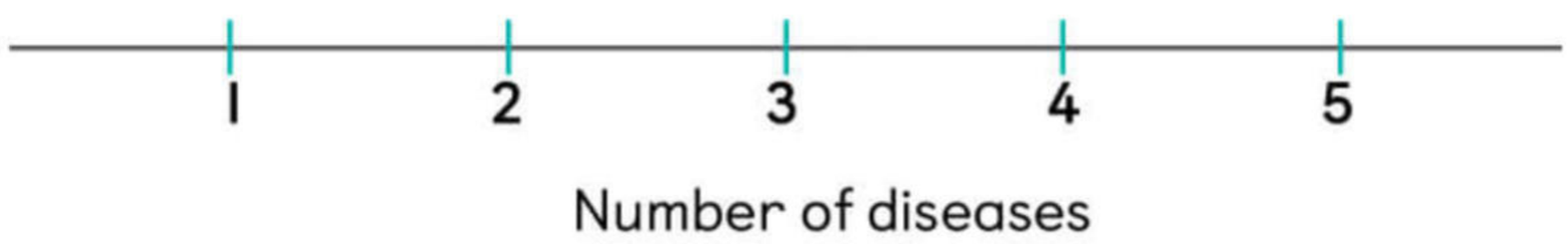
Influenza ☐

Hand, foot, mouth disease (HFMD) ☐

I have had _____ of these diseases before.

Let's make a dot plot about infectious diseases your class has had. Use the stickers from the back of the book to complete the dot plot below.

Number of diseases the students in the class had



Number of diseases

Key: Each ● represents 1 student.

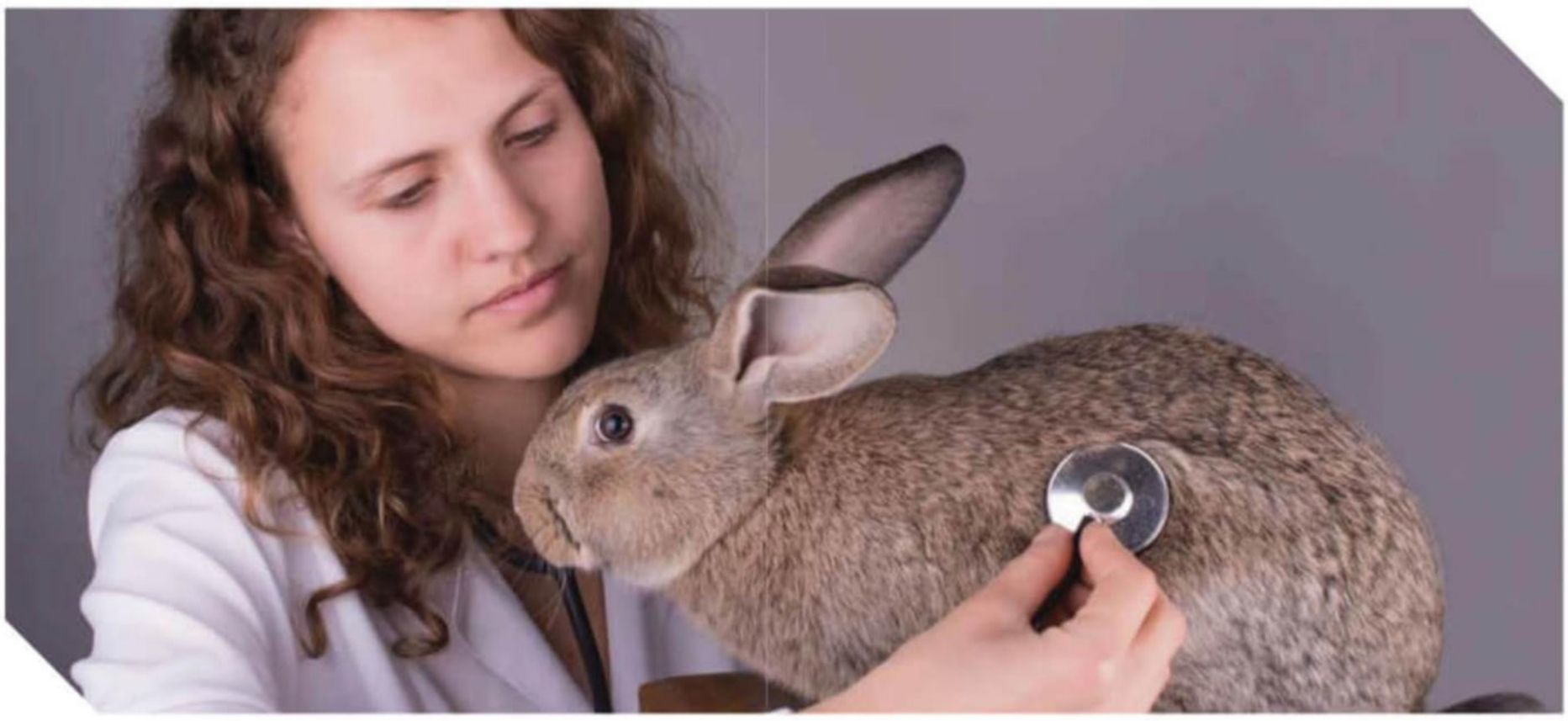
What can you interpret from the results in the dot plot?

Can Animals Get Infectious Diseases?

Animals can also get infectious diseases. These diseases can spread from one animal to another. Some infectious diseases can also spread from animals to humans. This may lead to an **outbreak**, when the disease spreads rapidly, affecting a lot of people.

Infectious diseases such as bird flu can spread from one bird to another. It can even spread from birds to humans.

Science at Work



A veterinarian or a vet is a doctor who treats sick and injured animals. Some vets treat small animals that we may have at home, such as birds and cats. Others treat farm animals or animals in zoos. Vets use different medicines on animals and provide them with special care. Vets play an important role in keeping animals healthy. Would you like to grow up and become a vet? Why or why not?

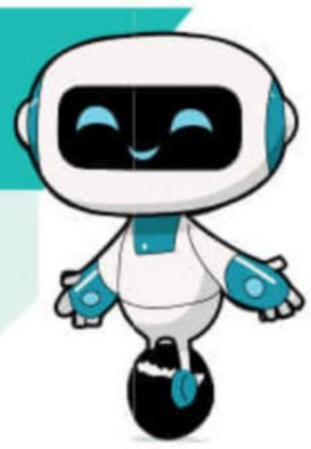
Can Plants Get Infectious Diseases?

Plants can have infectious diseases too. The infectious diseases can spread from one plant to another. They can affect the health of the plant, causing it to lose leaves, droop or even die. Some examples of infectious diseases in plants are leaf rust, stem rust and white mould.

a rose plant with healthy leaves

a rose plant with leaf rust

Check Your Learning



Do infectious diseases only affect humans? Explain.

Word Boost

droop
rust
mould

Tick (✓) to show what you can do.

- ☐ I can state that plants and animals can have infectious diseases.
- ☐ I can predict the possible results of a scientific activity.
- ☐ I can produce a dot plot to explain results.
- ☐ I can identify people who use science around me and describe how they use it.

B Medicines

In this section, I will

- learn that medicines can be used to treat some illnesses
- describe how to use medicines safely
- learn to measure in standard units and explain why they are better than non-standard units

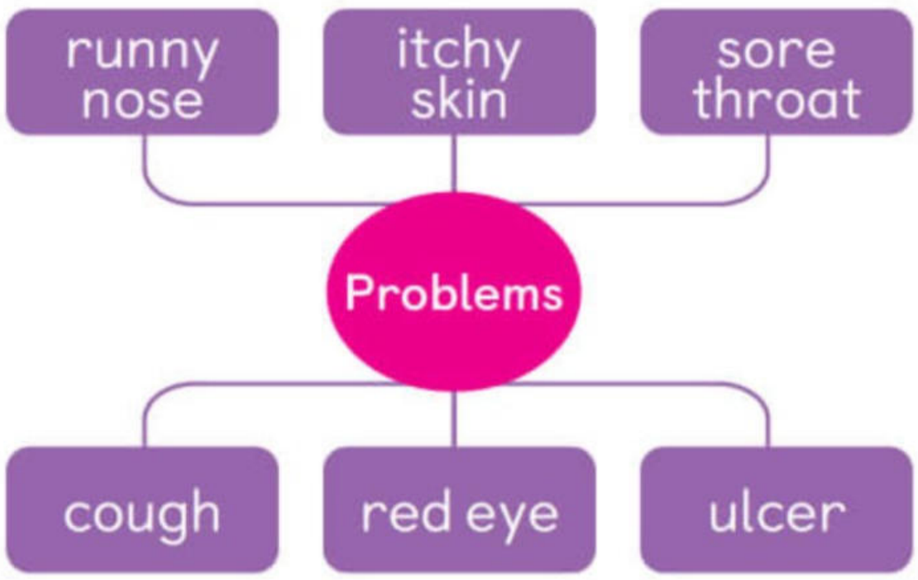
Thinking cap

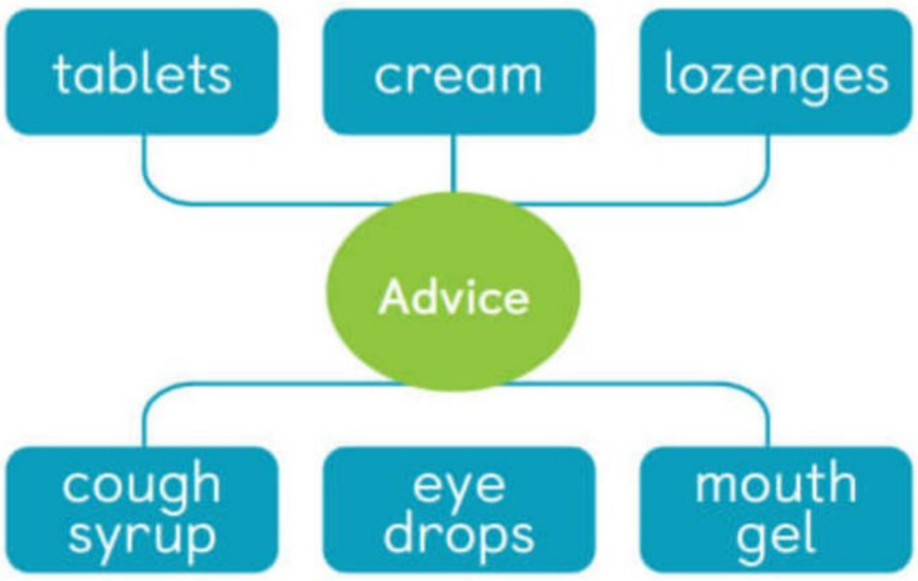
What must I do to feel better when I am sick?

Let's Explore!

Get well soon!

1. In pairs, pretend that one person is a doctor and the other person is not feeling well.
2. Make up your own dialogue. What would the doctor say? What would the person feeling ill say? You can also use the suggestions given below.





3. Share your dialogue with your class.

Let's Learn

Why Do We Need Medicines?

Medicines help us to treat diseases. Medicines are usually prescribed by a doctor.

Different medicines are used to treat different illnesses. Some medicines help to relieve fever or pain. Other medicines help to treat cough or a runny nose. Some creams help to soothe itchy skin.

Medicines come in different forms, such as tablets, liquids and powders.

We can also buy some medicines at a pharmacy.

Word Boost

prescribed
pharmacy

How Can We Use Medicines Safely?

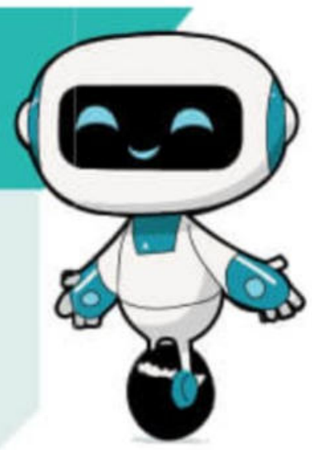
All medicines come with instructions. It is important to read and follow the instructions. Medicines can be dangerous if you take too much of them. An adult or a trained doctor, nurse or pharmacist will let you know the correct amount or dose of medicine you should take.

Use a dosing cup or oral syringe to measure doses in millilitres. Spoons cannot measure medicine accurately as they come in different sizes.

Can you tell how much medicine is in each picture?

Do not take someone else's medicine. It can make you more ill.

Check Your Learning



Why do we need to take medicines when we become ill?
Name two ways in which you can use medicines safely.

Word Boost

instructions
pharmacist
dose

Tick (✓) to show what you can do.

- ☐ I can state that medicines can be used to treat some illnesses.
- ☐ I can describe how to use medicines safely.
- ☐ I can measure in standard units and explain why they are better than non-standard units.

Activity Book
Activity 2B, p. 13
Activity 2C, p. 16

C Vaccines

In this section, I will

- learn that vaccinations can prevent some infectious diseases of animals
- describe how evidence obtained through enquiry has changed scientific knowledge and understanding over time
- identify the five main types of scientific enquiry
- do research to find the answer to a question

Thinking cap

I wonder why I had to get vaccines when I was a baby...

Let's Learn

What Are Vaccines?

Our body is able to protect us from many germs. However, sometimes our bodies cannot fight off some types of germs and they make us very sick.

When your body is protected against a disease, you are said to have **immunity** against it. **Vaccines** give us immunity against many diseases. When we take a vaccine for a disease, it can protect us from the disease for a long time. Vaccination also helps stop diseases from spreading. This can prevent outbreaks.

Some vaccines can be taken by mouth. Others need to be taken using an injection.

In the past, people did not know the cause of many diseases. People would die from diseases such as smallpox.

600 — Smallpox was widespread around the world. Many people died.

1576 — Doctors in China took scabs from smallpox sores of an infected person and placed them into a healthy person. They noticed that the healthy person developed symptoms of smallpox, but did not die from the disease.

1742 — Doctors in Turkey used a similar method used in China and found that fewer people died from smallpox.

1796 — Edward Jenner, an English doctor and scientist, found out that if a person had gotten cowpox, then he or she would not get smallpox. Through research, he discovered the smallpox vaccine.

1980 — The use of smallpox vaccine has helped to remove smallpox from the world completely. The world is officially declared free of smallpox.

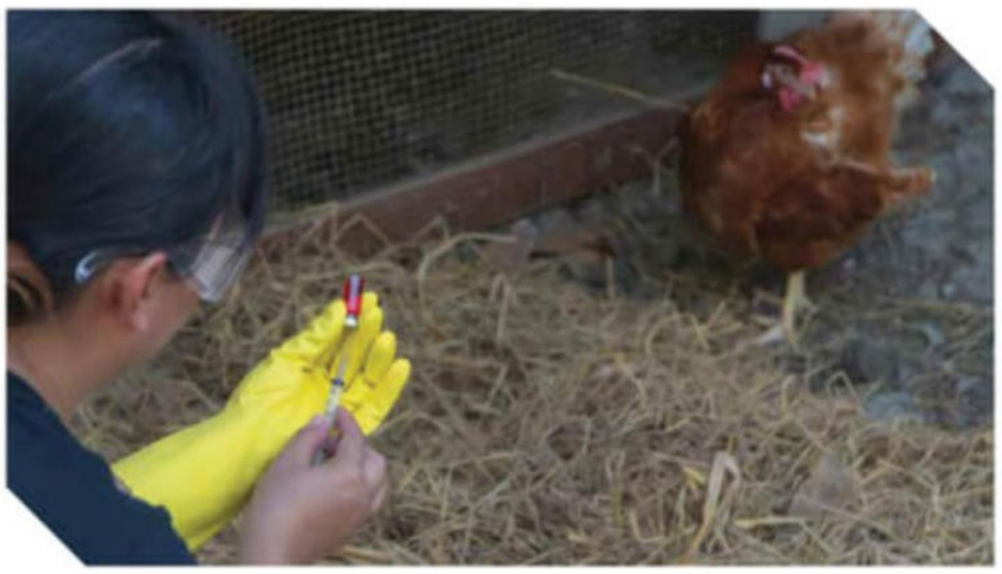
Option

Watch!

Scan this page to watch a video that shows the history of vaccines.

Are There Vaccines for Animals?

Vaccines can also help prevent diseases in animals. Pets and farm animals are given vaccines to keep them healthy. This can also help to stop the spread of the disease to other animals as well as to people. This reduces the risk of an outbreak.



Vaccines are given to farm animals such as cows and chickens.

Word Boost

scabs
developed
symptoms
risk

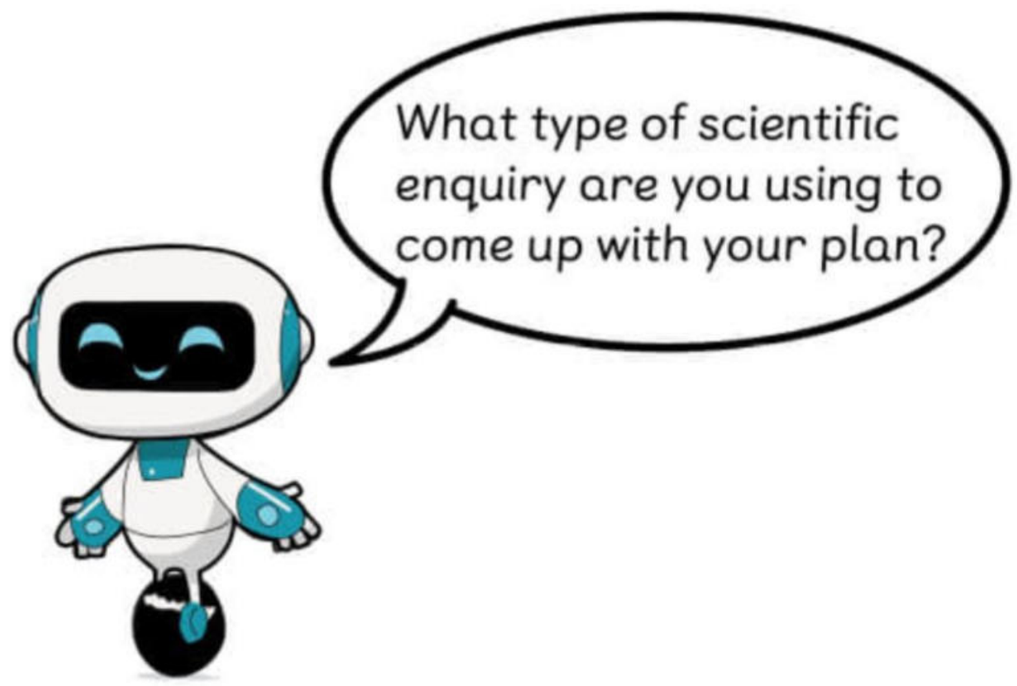
Activity Book
Activity 2D, p. 17

Problem-based Learning

How can we prevent the spread of a disease?

An **epidemic** is the spread of a disease that affects a large number of people within a community. When the disease spreads worldwide, it is known as a **pandemic**.

1. Work in groups.
2. Imagine that an epidemic, caused by a virus, is spreading in your area.
3. You have been tasked to find ways to stop the spread of the disease before it spreads worldwide.
4. Use the Internet to find out news articles about SARS, MERS and Covid-19. Find out what was been done to stop the spread of these diseases.



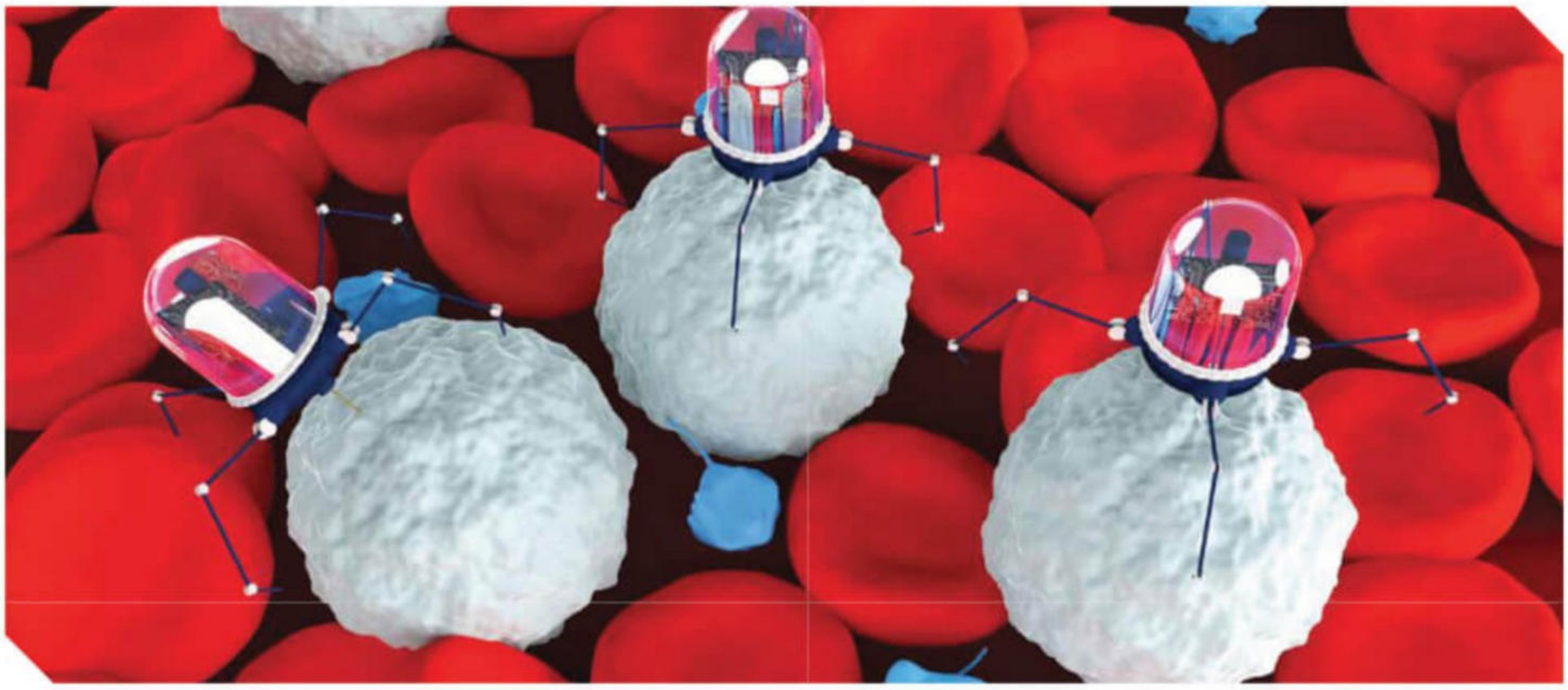
5. Use the information you have found to answer the questions below to come up with your plan.

How does this disease spread?

What can be done to stop the spread of this disease?

How can we treat the people who are affected by this disease?

Tech Talk!



Nanorobots are extremely tiny robots. In fact, they are thinner than the width of a human hair! They are very useful to doctors. Some nanorobots can be injected to deliver medicines to specific parts of the body. Other nanorobots can seek out and destroy harmful substances in the body. This makes them very useful in fighting diseases.

Where else do you think nanorobots can be used?

Check Your Learning

What is the difference between medicines and vaccines?

Tick (✓) to show what you can do.

- ☐ I can state that vaccinations can prevent some infectious diseases of animals.
- ☐ I can describe how evidence obtained through enquiry has changed scientific knowledge and understanding over time.
- ☐ I can identify the five main types of scientific enquiry.
- ☐ I can do research to find the answer to a question.

Practice Worksheet

1. Tick (✓) the correct box beside each sentence.

	True	False
An infectious disease can only spread from one animal to another.	☐	☐
Medicines can be used to treat diseases.	☐	☐
We should take the correct amount of medicine.	☐	☐
Vaccines are given only to people, not animals.	☐	☐

2. Which of these plants has a disease? Circle it.

3 What do you need to do to use medicines safely?

Tick (✓) the **two** correct answers.

- Follow the instructions that come with medicines. ☐
- Take a bigger amount of medicine to get well more quickly. ☐
- Take medicines on your own without asking an adult. ☐
- Do not take other people's medicine. ☐

4. Draw a line to match each word to its meaning.

word	meaning
vaccine	something that is used to treat a sick person or animal
disease	something that protects people and animals against disease
infectious	condition in which the body or a part of the body does not function properly
medicine	able to be passed from one person or animal to another

Science Words

D

disease
a condition that causes harm to the health of a person, animal, or plant; illness; sickness

dot plot
a chart that uses dots to show information

E

epidemic
the spread of a disease that affects a large number of people within a community

G

germs
tiny organisms that can cause disease or infection

I

immunity
the ability of the body to defend itself from an infectious disease

infectious
capable of being passed to others by germs that enter the body

M

medicines
substances used to treat diseases, injuries, pain, or other symptoms

microscope
an instrument used to observe very small objects

N

non-infectious
cannot spread from one person to another

O

outbreak
the rapid spread of a disease

P

pandemic
the worldwide spread of a disease

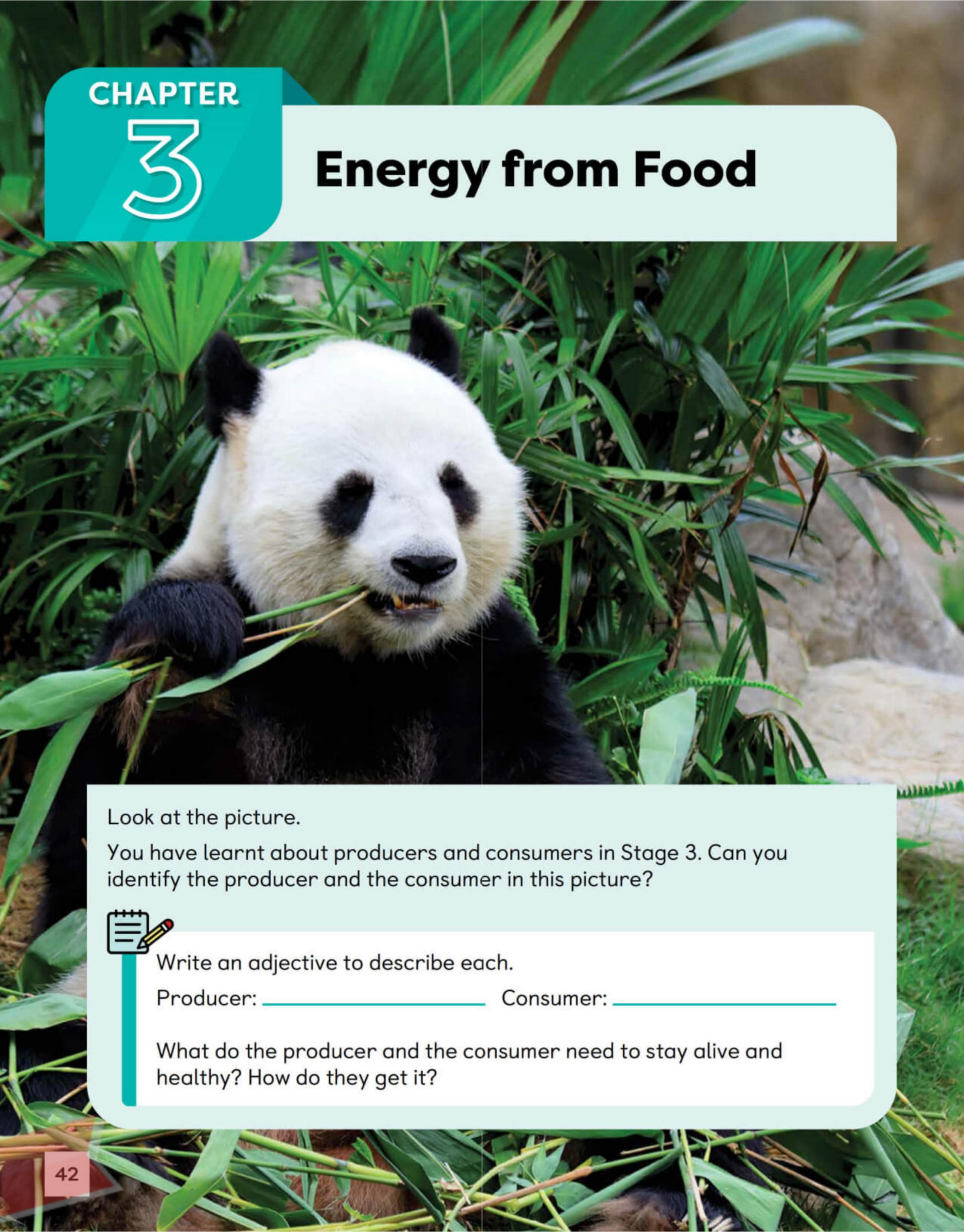
predict
to state what will happen in the future

V

vaccines
substances used to protect people and animals from certain diseases

CHAPTER 3

Energy from Food



Look at the picture.

You have learnt about producers and consumers in Stage 3. Can you identify the producer and the consumer in this picture?

Write an adjective to describe each.

Producer: _____ Consumer: _____

What do the producer and the consumer need to stay alive and healthy? How do they get it?

A Growing, Living and Being Healthy

In this section, I will

- state what plants and animals need to grow, live and be healthy

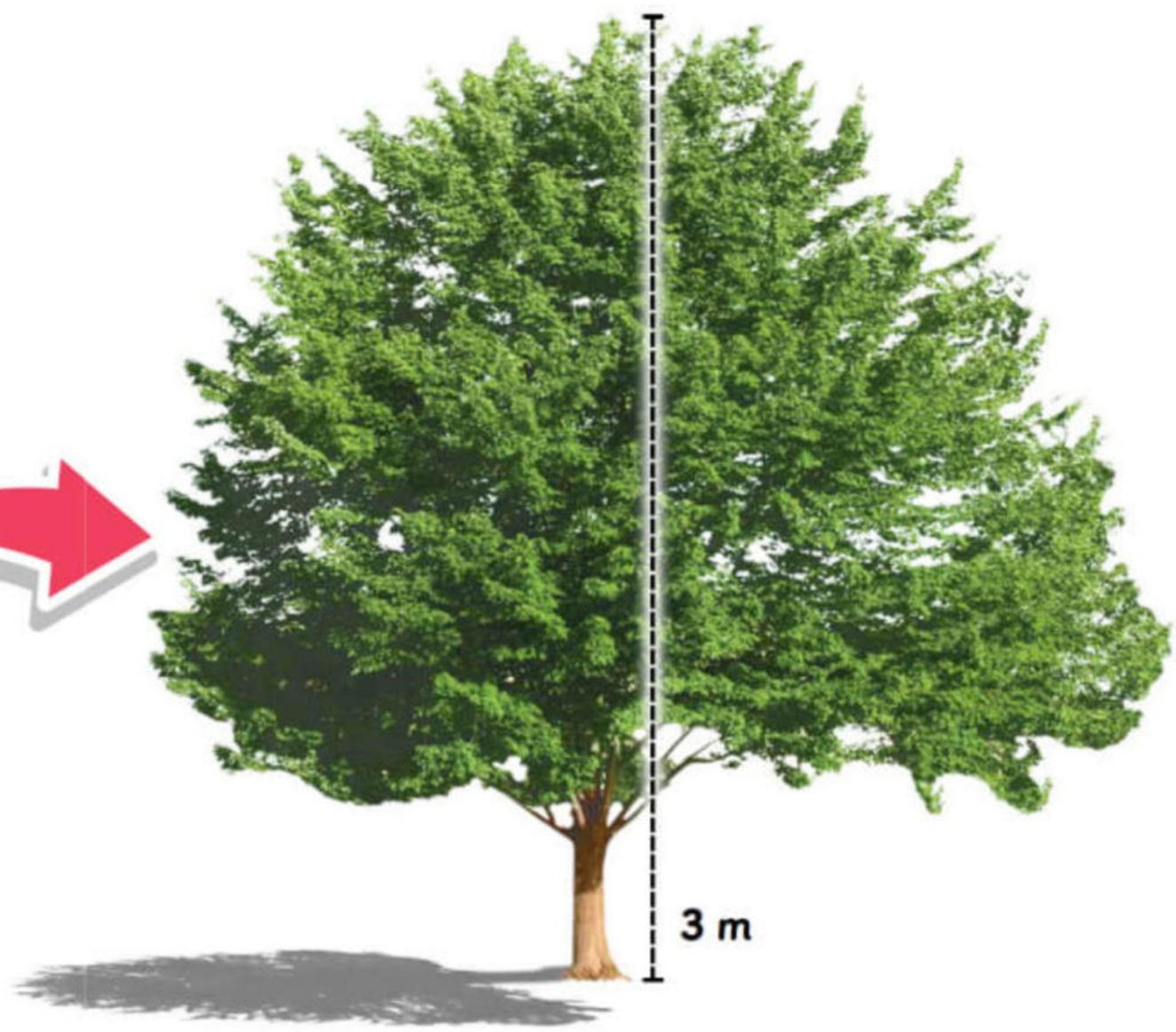
Thinking cap

Do plants and animals need the same things to stay alive?

Let's Explore!

All grown up!

1. In pairs, compare the two pictures below.



2. Discuss these questions:
   (a) In what ways has the plant changed?
   (b) What does the plant need to grow into a tree?

Let's Learn

What Do Plants and Animals Need?

You have learnt that living things need air, water and food to stay alive.

Living things, such as plants and animals, get **energy** from food. They need this energy to grow, live and stay healthy.

We need energy to study.

We need energy to play.

We need energy to grow.

Check Your Learning

Where do plants and animals get the energy to grow, live and be healthy?

Word Boost

healthy

Tick (✓) to show what you can do.

☐ I can state what plants and animals need to grow, live and be healthy.

B Getting Energy

In this section, I will

- explain how plants and animals get energy
- learn to predict the possible results of a scientific activity
- use science to help me support my points of view or actions
- produce a bar chart to explain results

Thinking cap

I wonder why plants need sunlight...

Let's Explore!

A walk in the garden

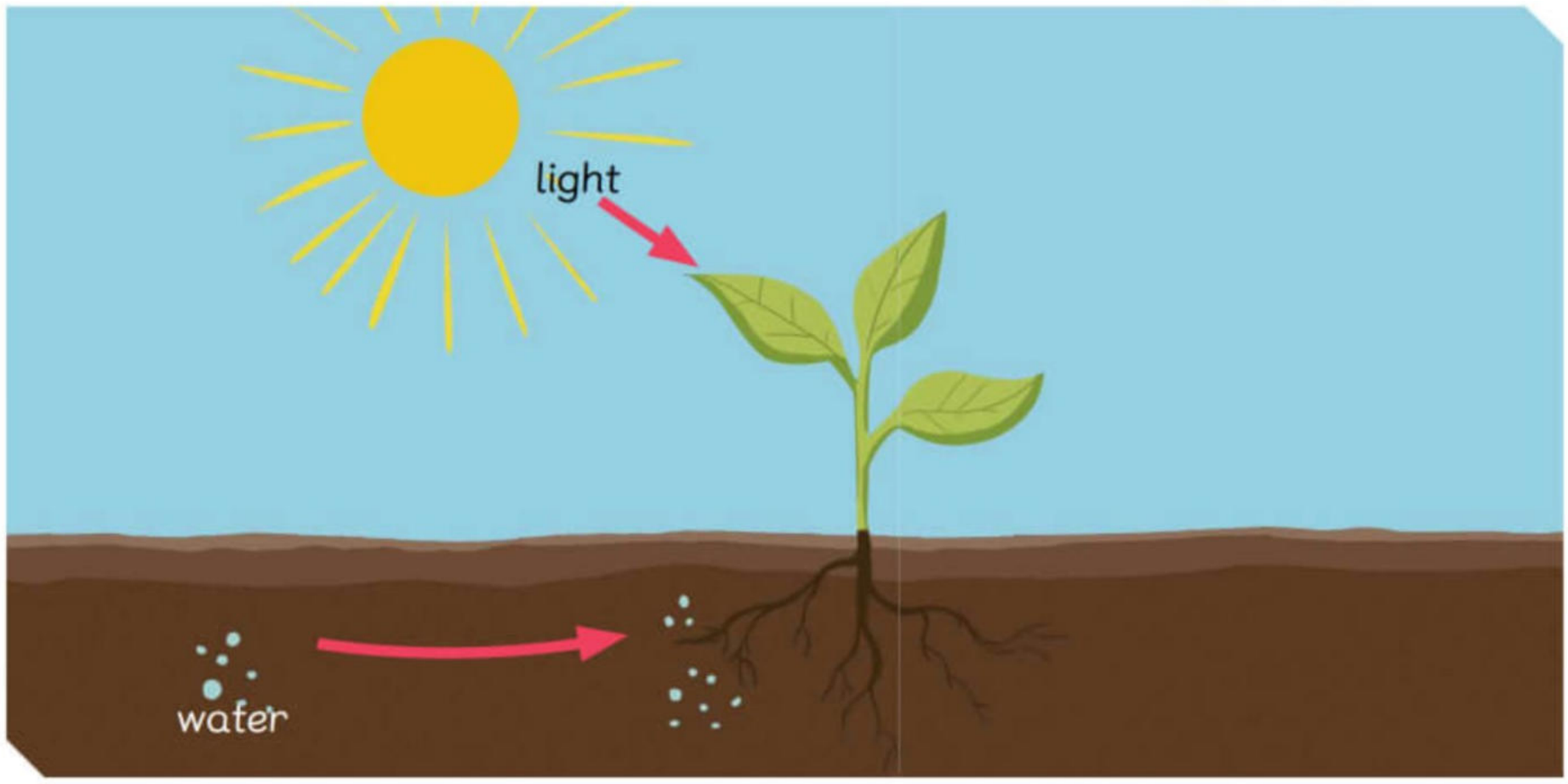
1. In groups, walk around the school garden.
2. Observe the animals in the garden. What do the animals eat?
3. Observe the plants in the garden. Discuss with your group how plants get their energy.
4. Predict what will happen if all the plants are removed from the garden and placed inside a dark cupboard.

Take note of the signs in the garden and follow the rules.

Let's Learn

How Do Plants Get Energy?

You have learnt in Stage 3 that leaves make food for the plant. This process is known as **photosynthesis**.



Leaves contain a green substance called **chlorophyll** that traps light for photosynthesis. Thus, we can say that plants get their energy from light.

Tech Talk!

A smart plant pot can help you take better care of your plants! It monitors the amount of light, water and temperature your plant gets. A digital display shows your plant's "mood".

What are the advantages and disadvantages of having a smart plant pot?

Activity Book
Activity 3A, p. 23

How Do Animals Get Energy?

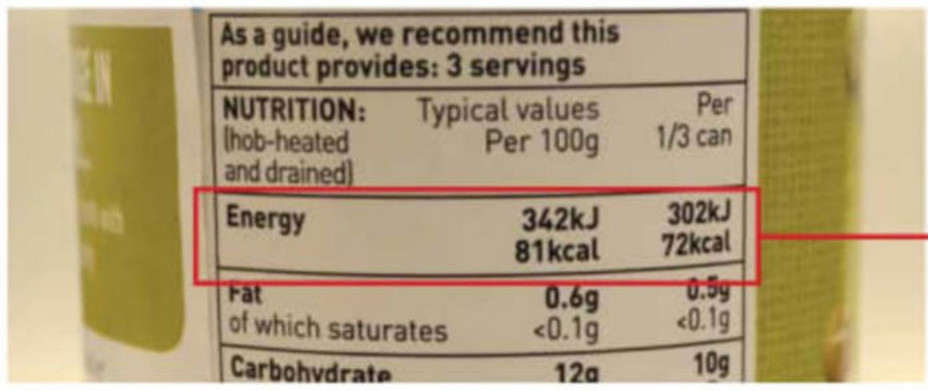
Animals do not make their own food. They get their energy from the food they eat. Animals eat plants or other animals to get energy.

Problem-based Learning

What would astronauts in space need?

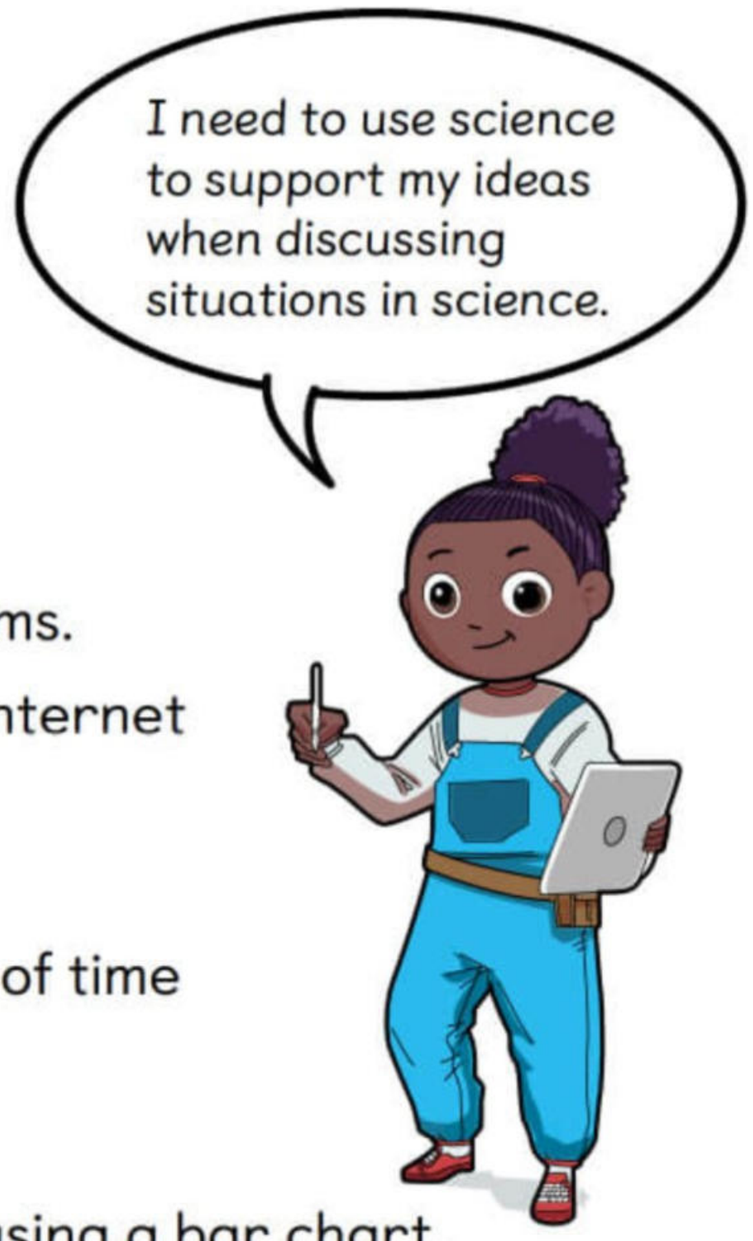
Imagine that there is a group of astronauts travelling in space for six months. They need to have energy to stay alive and healthy while in space.

1. Look at the food label below.



As a guide, we recommend this product provides: 3 servings		
NUTRITION: (hob-heated and drained)	Typical values Per 100g	Per 1/3 can
Energy	342kJ 81kcal	302kJ 72kcal
Fat	0.6g	0.5g
of which saturates	<0.1g	<0.1g
Carbohydrate	12g	10g

The amount of energy in food is measured in Kilojoules (kJ).



2. Work in groups to collect food labels from food items.
3. Discuss the following questions. Use books or the Internet to help with your research.
   - Which food items are high in energy?
   - Which food items can be kept for a long period of time without going bad?
4. Record your findings in a table.
5. Present the amount of energy for each food item using a bar chart.
6. Select the food items that are suitable for the astronauts.
7. Share your findings with the class.

Check Your Learning

What would happen to a plant if there was no light?

Tick (✓) to show what you can do.

- ☐ I can explain how plants and animals get energy.
- ☐ I can predict the possible results of a scientific activity.
- ☐ I can use science to help me support my points of view or actions.
- ☐ I can produce a bar chart to explain results.

C Producers and Consumers

In this section, I will

- describe what food chains are made up of
- learn to sort and classify things through observations
- use keys to classify living and non-living things
- identify the five main types of scientific enquiry
- identify people who use science around me and describe how they use it

Thinking cap

What kind of living things make up a food chain?

Let's Explore!

Make a food chain

1. Work in groups.
2. Look at the stickers of the living things at the back of the book. Discuss which of them are **producers** and which are **consumers**.
3. Paste the stickers below to make a food chain.

4. Discuss these questions:
   (a) Which of these living things get their energy from light?
   (b) Which of these living things get their energy from eating plants?
   (c) Which of these living things get their energy from eating animals?

Let's Learn

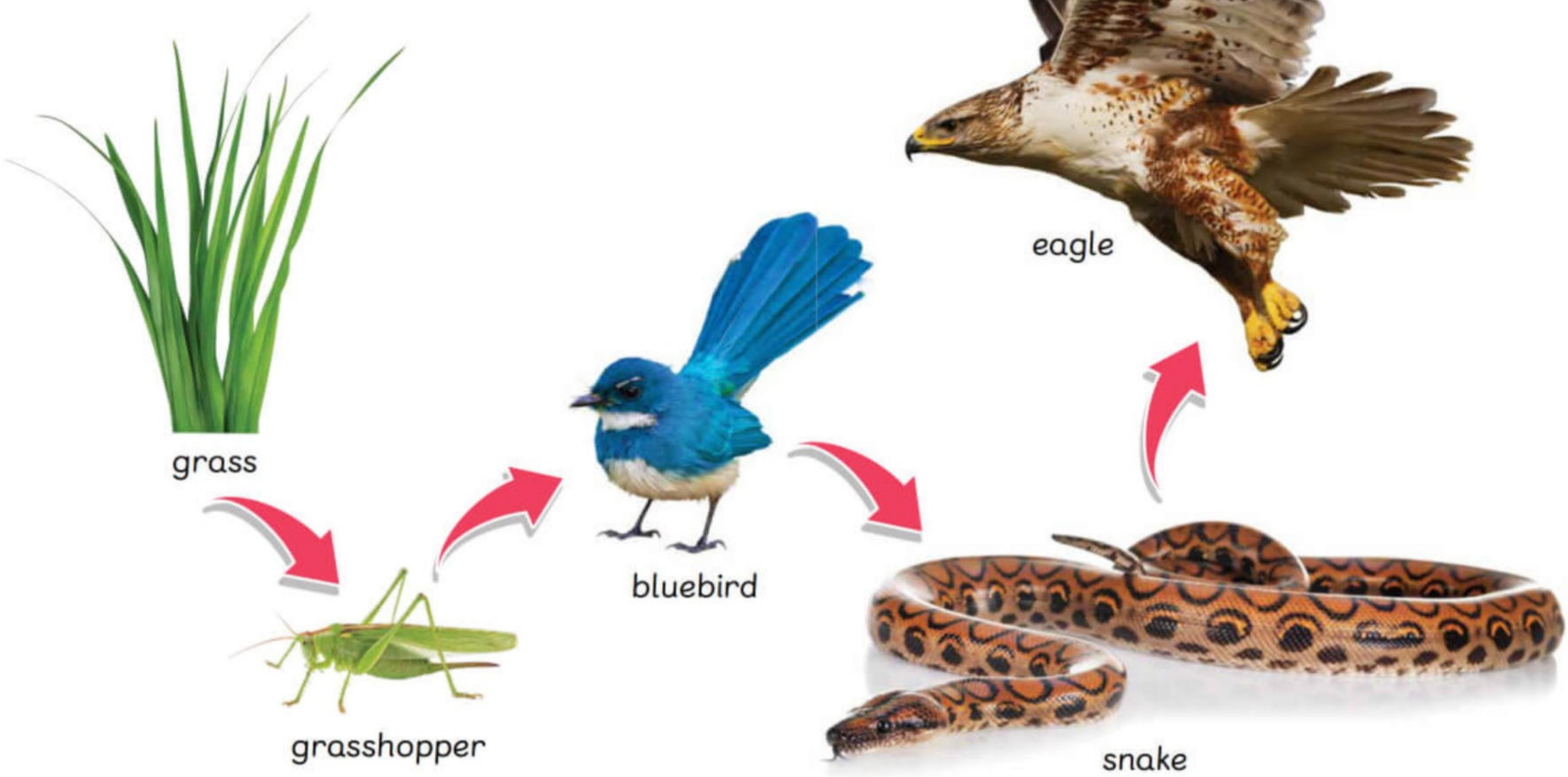
What Are Food Chains Made up of?

You have learnt about food chains in Stage 3. A food chain shows the transfer of energy from one living thing to another in the form of food.

A food chain is made up of producers and consumers. All food chains start with producers, which make or produce their own food. All plants are producers.

All animals are consumers as they eat or consume other living things.

Look at the food chain below.



Which is the producer in this food chain?
Which are the consumers?

Activity Book
Activity 3B, p. 27

Option

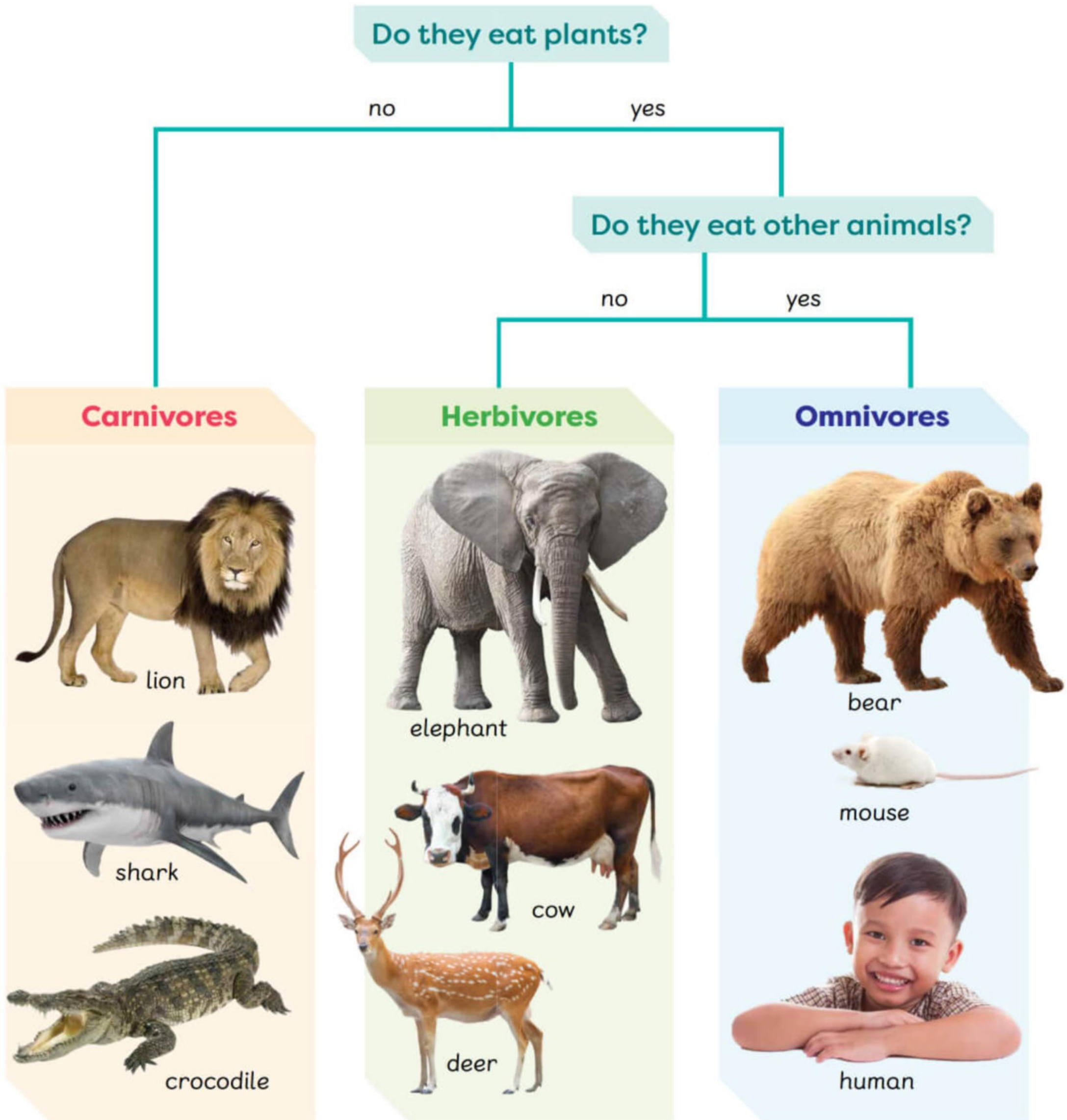
Watch!
Scan this page to watch a video about producers and consumers.

Word Boost

transfer
produce
consume

What Are Herbivores, Carnivores and Omnivores?

Consumers can be classified into different groups. We can use a key to identify different groups of animals.



Some animals eat only other animals. They are known as **carnivores**.

Some animals eat only plants. They are known as **herbivores**.

Some animals eat both plants and other animals. They are known as **omnivores**.

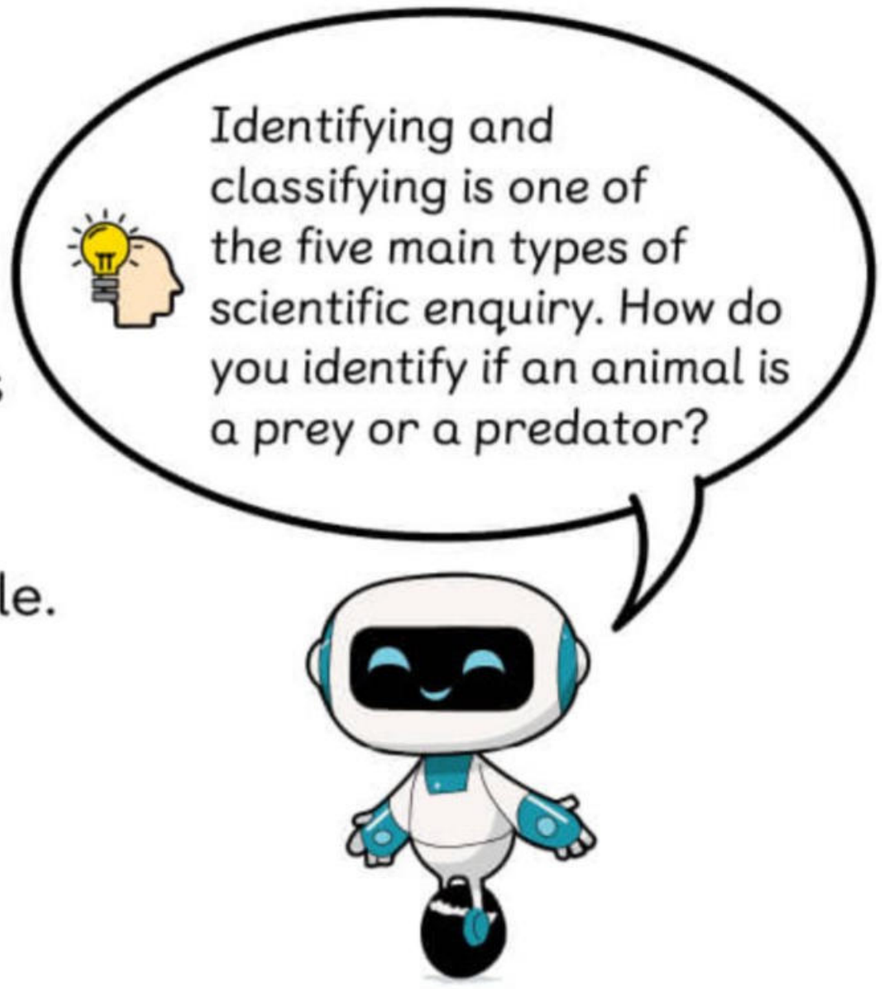
What Are Predators and Prey?

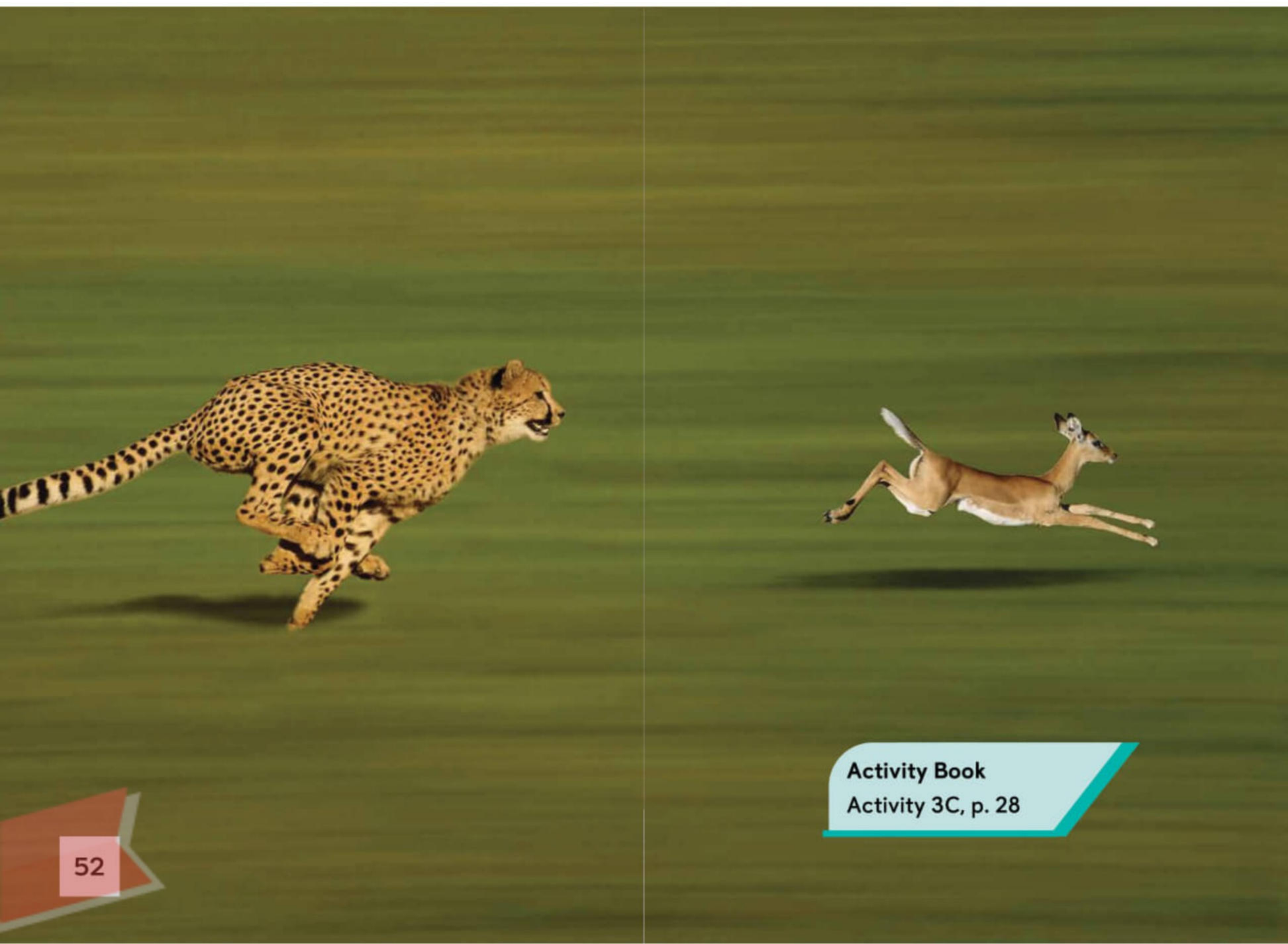
Consumers can also be classified into predators and prey.

Animals that hunt and eat other animals are known as **predators**.

Animals that are hunted and eaten by predators are known as **prey**.

Look at the picture of the cheetah and the gazelle. Which is the predator? Which is the prey?





Activity Book
Activity 3C, p. 28

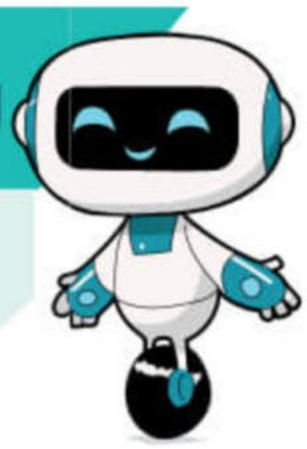
Science at Work

An ecologist is a scientist who studies how animals and plants interact with their environment. Many ecologists study food chains.

How is studying food chains in our environment useful to us? Carry out research and discuss with your classmates.

Check Your Learning

Are humans producers or consumers? Why?



Tick (✓) to show what you can do.

- ☐ I can describe what food chains are made up of.
- ☐ I can sort and classify things through observations.
- ☐ I can use keys to classify living and non-living things.
- ☐ I can identify the five main types of scientific enquiry.
- ☐ I can identify people who use science around me and describe how they use it.

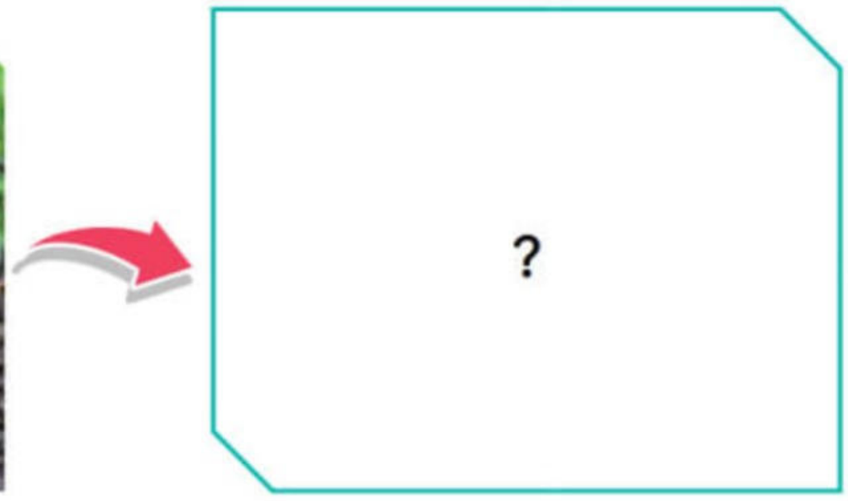
Practice Worksheet

1. Tick (✓) the correct box beside each sentence.

	True	False
Plants need light to survive and be healthy.	☐	☐
Animals are consumers as they make their own food.	☐	☐
A food chain may start with a producer or a consumer.	☐	☐
Both predators and prey are consumers.	☐	☐

2. Look at the food chain below.

grass



snake

(a) What is the missing living thing in the food chain?
Circle the correct answer.

giraffe **lion** **mango tree** **rabbit**

(b) Name the predator and the prey in the food chain.

predator: _____ prey: _____

3. Look at the picture of a garden.

(a) Which living thing in the picture makes its own food?

Circle the correct answer.

butterfly **cat** **grass** **pigeon**

(b) Name the process by which some living things make their own food.

_____

4. Look at the food chain below. Phytoplankton are tiny living things that live in water and can carry out photosynthesis. They are eaten by small organisms called zooplankton.

phytoplankton → zooplankton → fish → seagull

Which are the consumers in this food chain?

Tick (✓) the **three** correct answers.

- fish ☐
- phytoplankton ☐
- seagull ☐
- whale ☐
- zooplankton ☐

Science Words

C

carnivores
animals that eat only other animals

consumers
living things that obtain their energy by feeding on other living things

E

energy
what we need to live and carry out our daily activities

H

herbivores
animals that eat only plants

O

omnivores
animals that eat both plants and animals

P

photosynthesis
a process by which plants make their own food in the presence of light

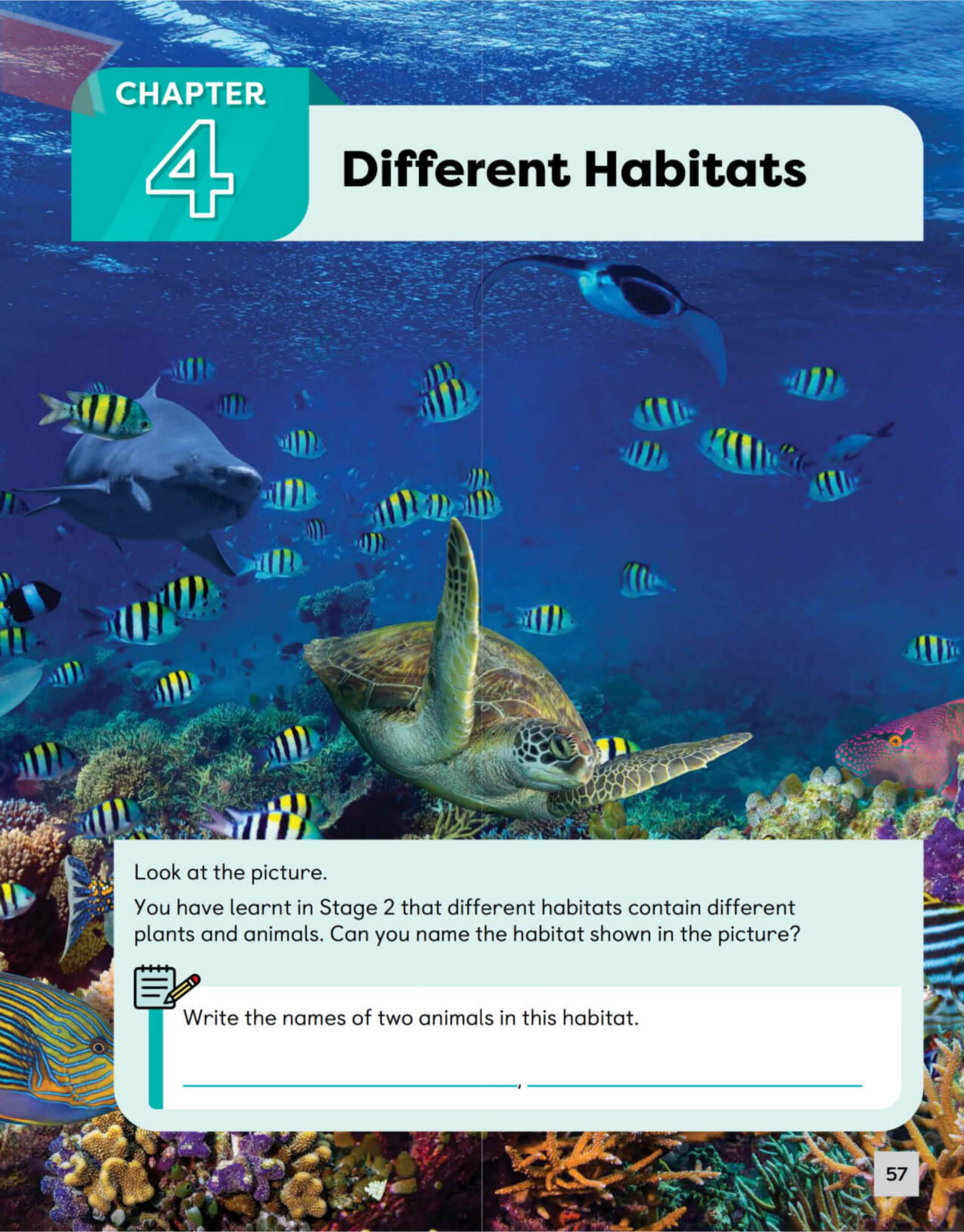
predators
animals that hunt and eat other animals

prey
animals that are hunted and eaten by predators

producers
living things, such as plants, which make or produce their own food

CHAPTER 4

Different Habitats



Look at the picture.

You have learnt in Stage 2 that different habitats contain different plants and animals. Can you name the habitat shown in the picture?

Write the names of two animals in this habitat.

_____, _____

A Animals and Their Habitats

In this section, I will

- learn that different animals are found in different habitats
- learn that animals are suited to their habitats
- create tables and diagrams to show observations
- do research to find the answer to a question
- identify the five main types of scientific enquiry
- produce a dot plot to explain results

Thinking cap

I wonder which animals live in habitats around me...

Let's Explore!

What lives here?

1. In groups, visit two habitats in your local area such as the park, the school garden or pond.
2. Draw a table on a piece of paper.
3. In your table, write the names of the two habitats. Write the names of the animals that live in these habitats. You may also draw or paste pictures of the animals.
4. Count the number of each animal that you see there.
5. Make a dot plot to show the number of the different animals in each habitat.
6. Compare the type and number of animals in the habitats. What can you interpret from the results in the dot plot?

Activity Book
Activity 4A, p. 33

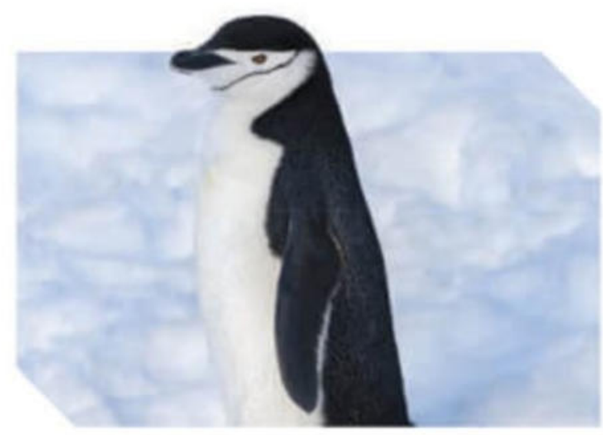
Let's Learn

What Are Some Habitats?

You have learnt that a habitat is a place in which an animal lives. A habitat provides the animal with food, water and shelter.

There are many different habitats on the Earth. There are deserts, mountains, grasslands, forests and polar regions. There are also **aquatic** habitats including oceans, rivers and lakes. Many different plants and animals live in each habitat. Animals that live in a habitat are **suited** to that habitat.

The **polar regions** are cold and there is ice all around. Animals there are suited to live in very low temperatures.



Option

Watch!

Scan this page to watch a video that shows how the polar bears are suited to live in the North Pole.

Polar bears, artic foxes, snowy owls, harp seals and penguins live in the polar regions.

Deserts are hot and have dry soil. There is very little rainfall. Animals living there have to be suited to the heat.

Desert rats, camels, fennec foxes, tarantulas and rattlesnakes live in deserts.

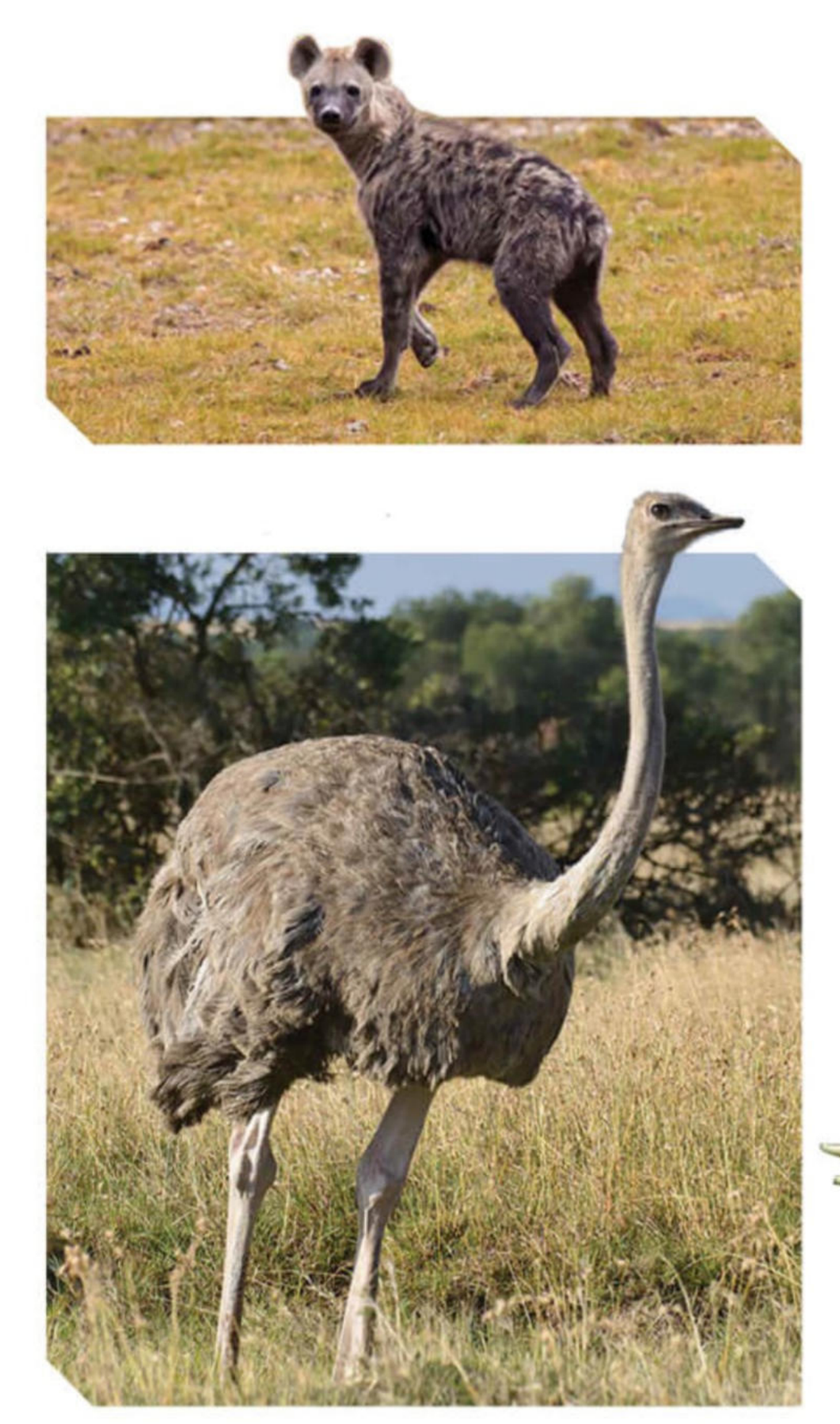
Tropical rainforests are usually warm, very humid and wet. Animals there are suited to live among the trees and plants.

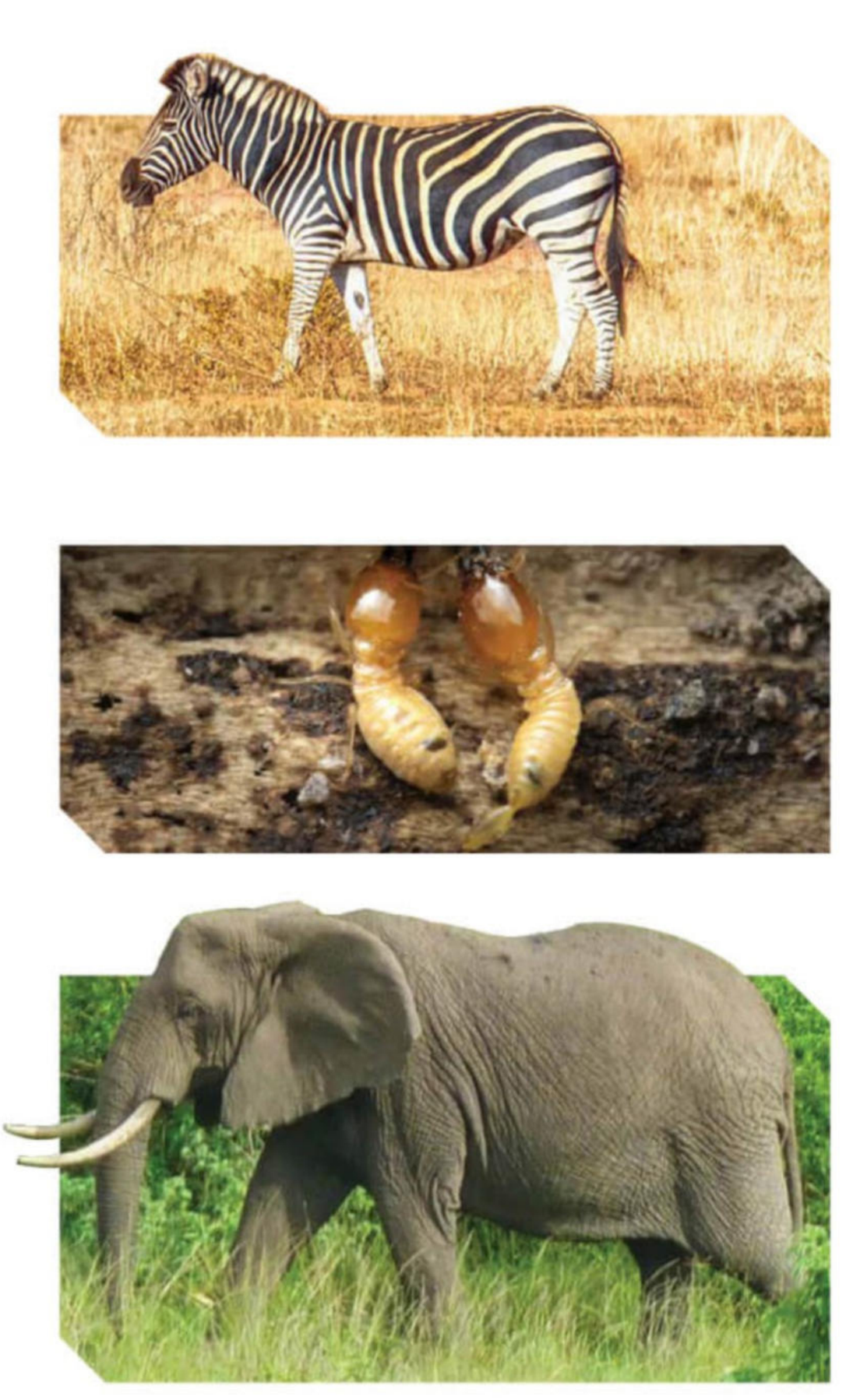
Word Boost

humid

Tigers, tree frogs, orangutans, toucans, snakes and leaf insects live in rainforests.

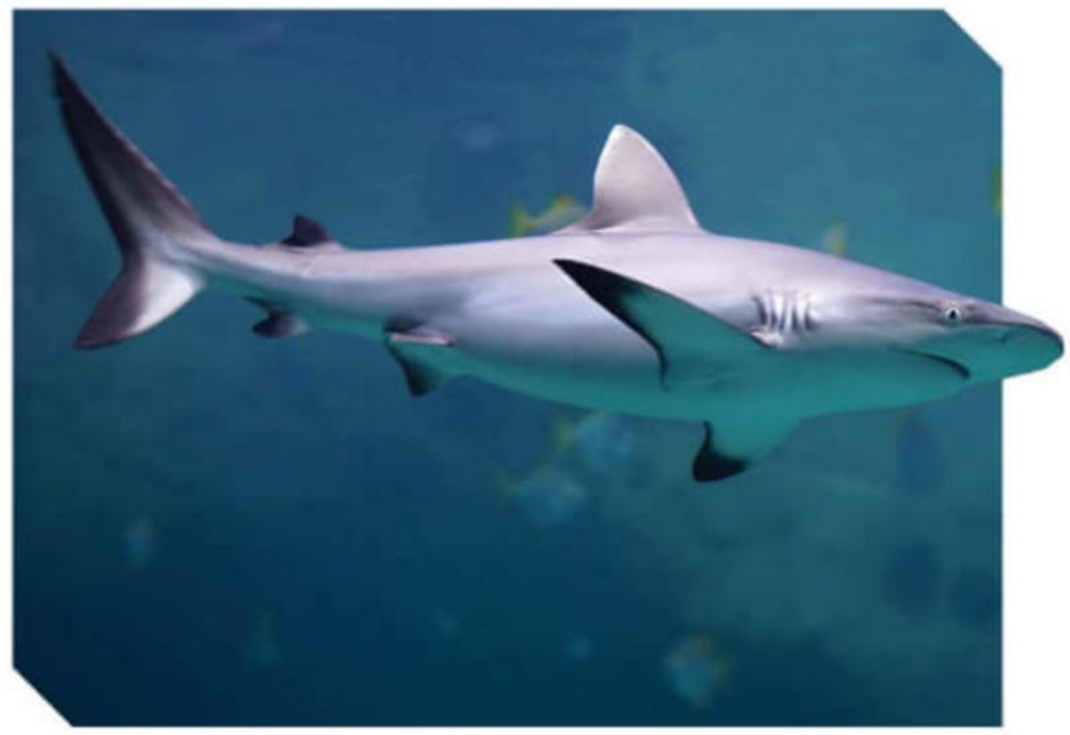
Grasslands are wide, open areas where mostly grass and flowers grow. Animals there are suited to live in the large open spaces.

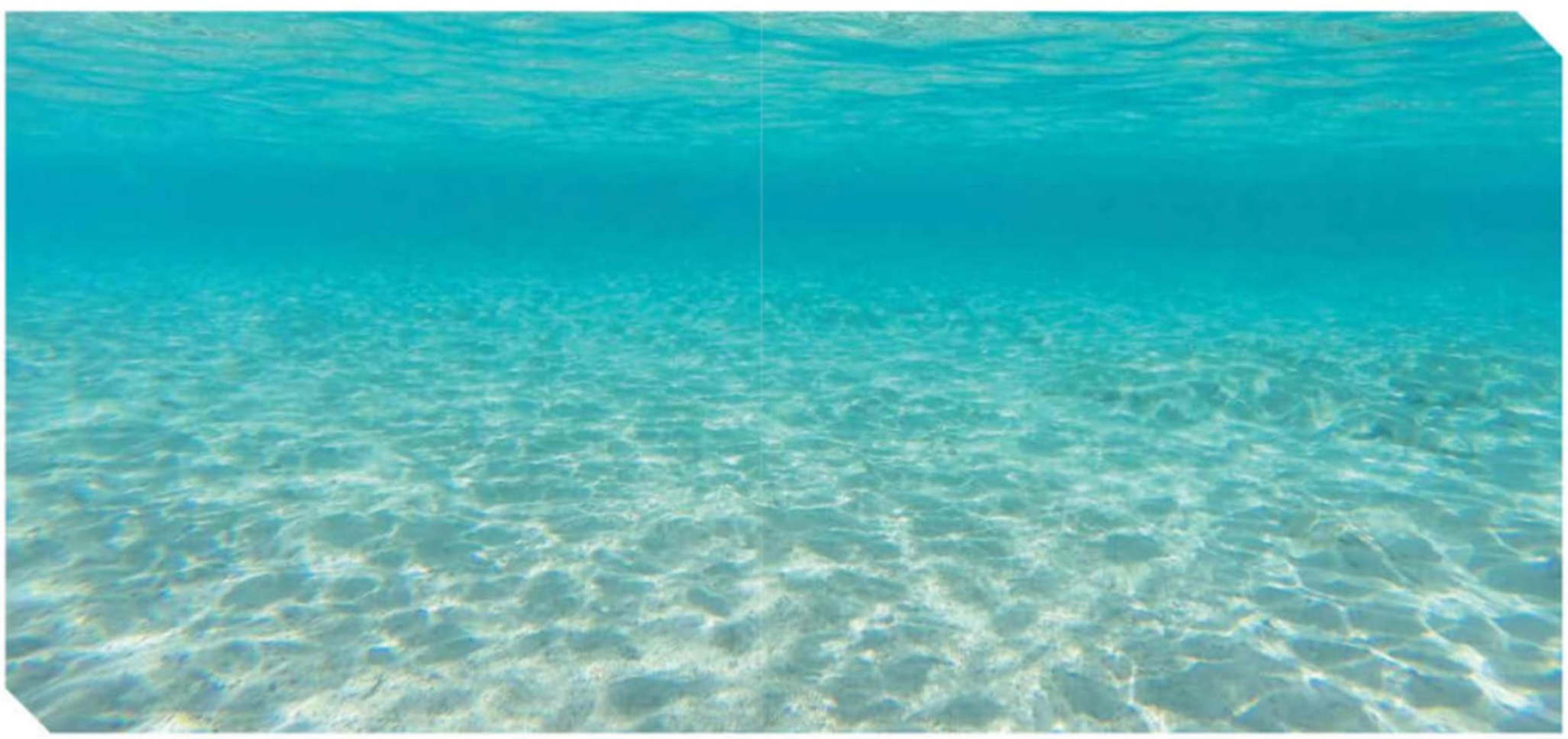




Hyenas, zebras, ostriches, termites and elephants live in grasslands.

Oceans have water that contains a lot of salt. Most animals there are suited to breathe underwater. Other animals can hold their breath underwater for a long time.





Dolphins, sharks, octopuses, turtles and sea cucumbers live in oceans.

Look at the two habitats below. Use the Internet or books to research and find answers to the following questions.

- What is each habitat like?
- What animals live in each habitat?
- How are the animals suited to live in the habitat?
- How are the animals on the mountain different from the animals in the river?

Use the stickers at the back of the book and paste the animals in the correct habitat.

mountain

river

Tech Talk!

Scientists use wildlife cameras to take pictures or videos of animals in their habitats. The cameras are hidden in trees and rocks, so animals are not frightened away. The pictures and videos are used to observe and collect information, which helps to protect these animals. They also provide scientists with views of rarely seen animals.

You have learnt that there are five main types of scientific enquiry — identifying and classifying, research, fair testing, observing over time and pattern seeking. Find out how scientists use the types of scientific enquiry to protect the animals in the habitats.

Check Your Learning

Name three different habitats and two animals that are suited to live in each habitat.

Word Boost

wildlife
rarely

Tick (✓) to show what you can do.

- ☐ I can state that different animals are found in different habitats.
- ☐ I can state that animals are suited to their habitats.
- ☐ I can create tables and diagrams to show observations.
- ☐ I can do research to find the answer to a question.
- ☐ I can identify the five main types of scientific enquiry.
- ☐ I can produce a dot plot to explain results.

B Surviving Habitats

In this section, I will

- learn that plants and animals can survive in environments other than their habitats
- do research to find the answer to a question
- describe the use of science where I live
- use keys to classify living and non-living things
- produce a bar chart to explain results
- use science to help me support my points of view or actions
- discuss the positive and negative effects of science and technology on the environment where I live

Thinking cap

Can a camel or a cactus live in an environment that is different from its habitat?

Let's Learn

Can Plants and Animals Live in Other Environments?

You have learnt that plants and animals are suited to live in their own habitats. If the environment in their habitat changes, the plants and animals may no longer be suited to live there. They will have to survive in other habitats that have different environments.

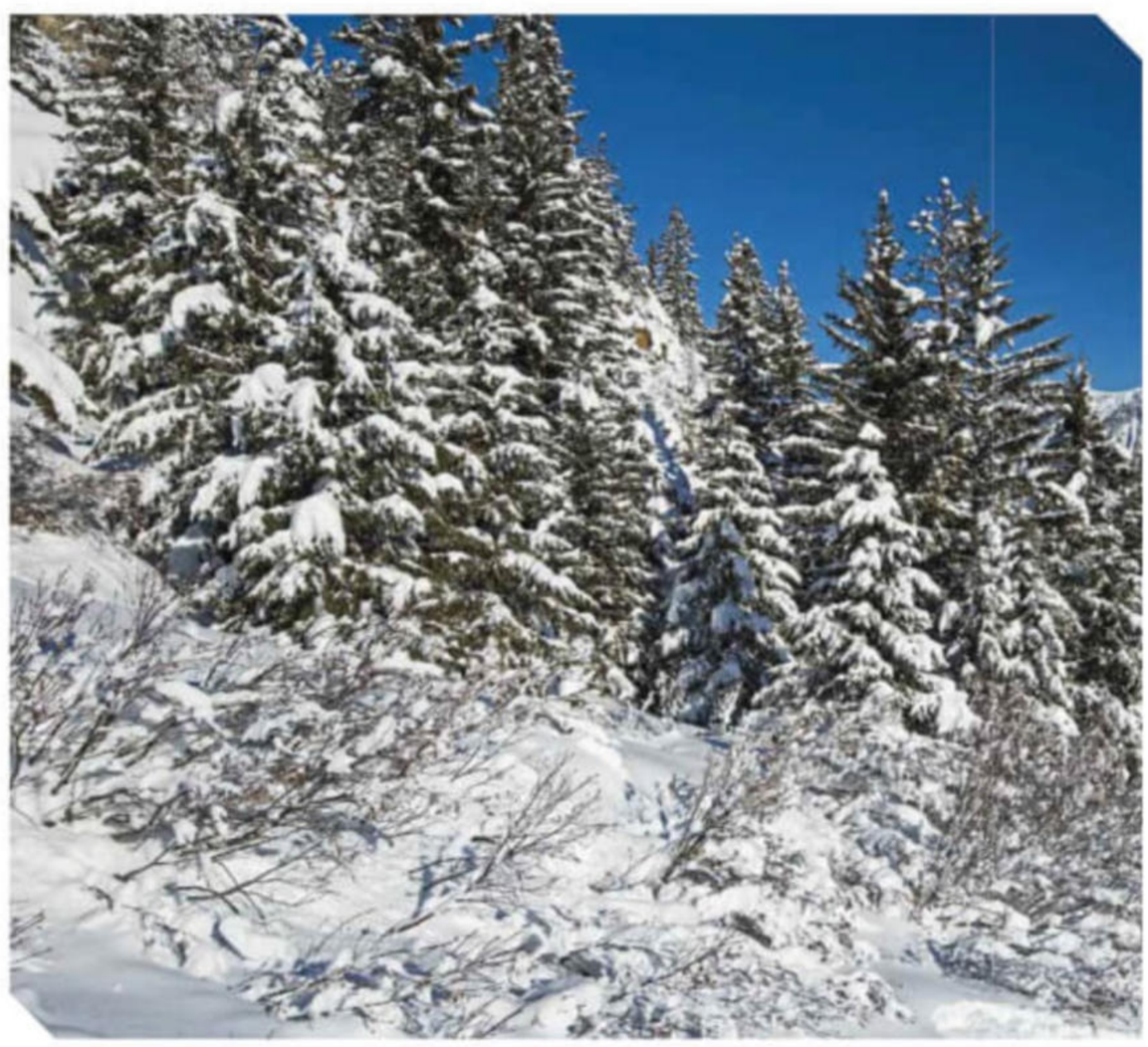
Cacti are usually found in hot and dry environments. However, they can also survive in environments that are humid.

Cacti can grow in deserts, in outdoor gardens and indoors.

Grass can be found in areas that have some rainfall. However, it can also survive in environments with much or little rainfall.

Grass can grow in grasslands, forests and deserts.

Pine trees grow in cold environments. However, they can also survive in environments with warmer temperatures.



Pine trees can grow on the mountains, in rainforests and along the beaches.

Activity Book
Activity 4B, p. 35

Deer are best suited to habitats with trees where they can hide among the trees. However, they can also survive in grasslands and mountains.

Deer can be found in forests, grasslands and mountains.

Apple snails are best suited to **swamps**. However, they can also survive in different aquatic habitats.

Apple snails can be found in rice fields, ponds and beaches.

Activity Book
Activity 4C, p. 37

Some animals move to a different place when their habitat changes.
Some animals move to a different environment when it gets cold or when there is no more food or water in their habitat.
Some animals can change their **structure** to suit the different environment they are in.
Some animals change colours over time to help them blend into their new environment.
Some animals change their behaviour to survive in a different environment.
Are there any plants and animals that live in your local area that are not originally from there?
Squirrels in the desert are active the whole year, but squirrels in cold habitats go into a long deep sleep during winter.
Word Boost
blend

Plants that live in a desert where the environment is dry generally have small or no leaves. Plants that live in a rainforest where the environment is wet generally have large leaves.

One way to identify plants is by observing the shape and colour of their leaves. Let's identify some plants using a key.

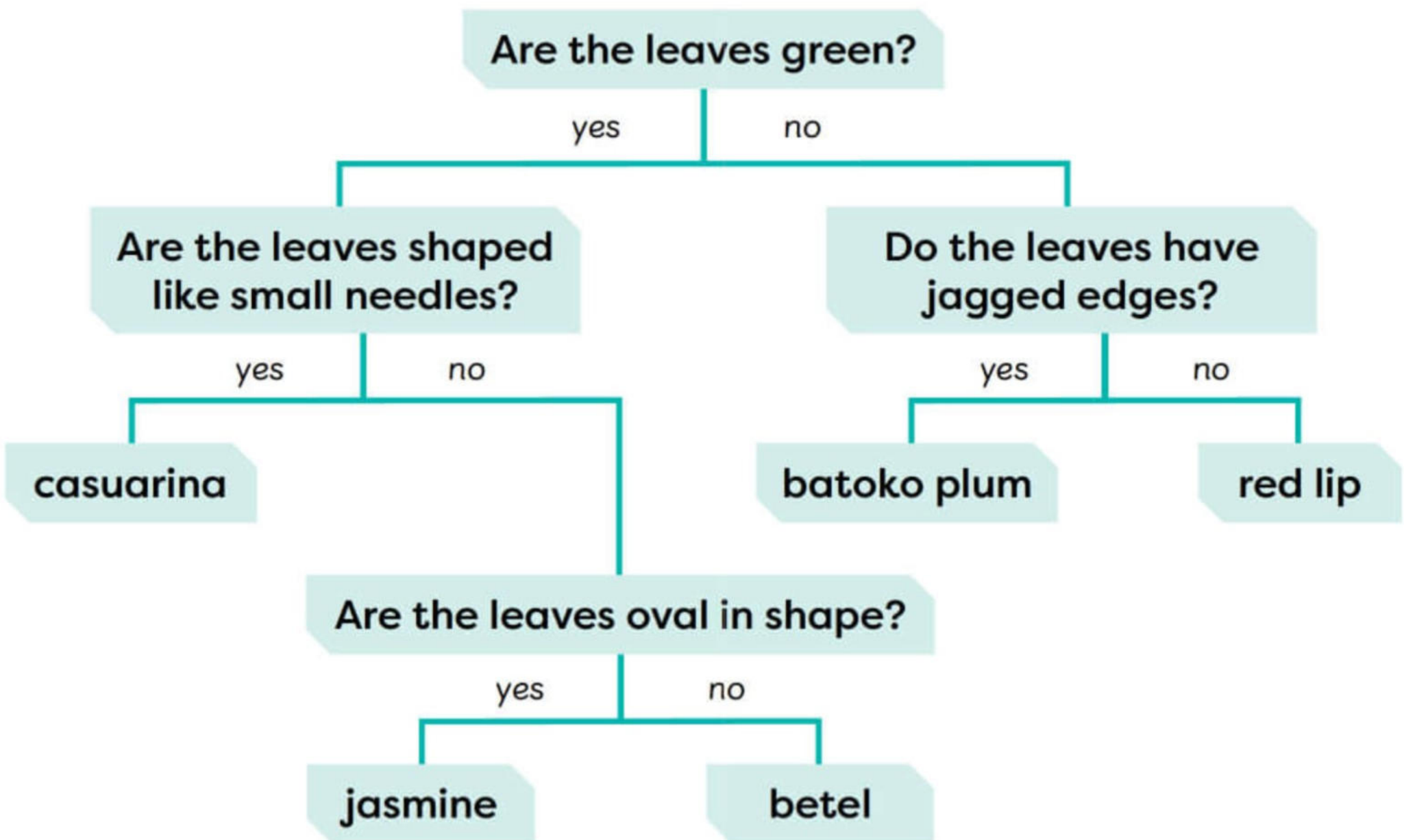
casuarina

betel

red lip

jasmine

batoko plum



What kind of plants can you find in your area?

Go on a leaf hunt. Collect any leaves that have fallen to the ground. For each type of leaf you pick up, look around to see where it came from. Look for similar plants. Count the number of plants that have the same type of leaf. You can use the Internet to find out the names of the plants the leaves came from. Create a bar chart to show the number of plants you identified.

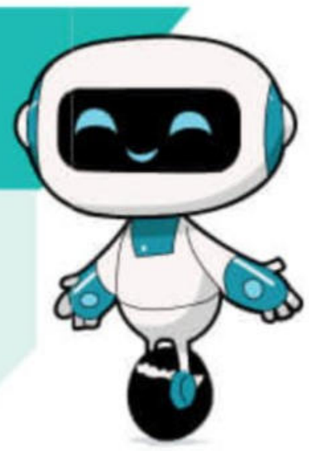
Problem-based Learning

Can you help animals survive in other environments?

Part of a rainforest has been flooded because of a dam built nearby. The dam is used to provide electricity for people. However, the animals have no home as their habitat has been destroyed.

1. Work in groups.
2. Use the Internet or books to find out which animals live in a rainforest.
3. Find out how the animals are suited to survive in their habitat.
4. Suggest ways to help the animals survive in an environment other than their habitat.
5. Discuss how dams can have positive and negative environmental effects in your area.

Check Your Learning



Can plants and animals survive in environments that are different from their habitats?

Word Boost

dam

Tick (✓) to show what you can do.

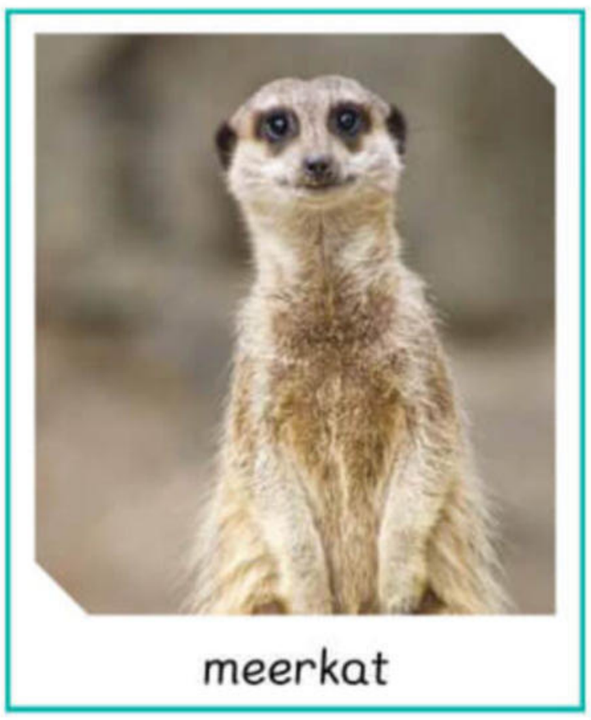
- ☐ I can state that plants and animals can survive in environments other than their habitats.
- ☐ I can do research to find the answer to a question.
- ☐ I can describe the use of science where I live.
- ☐ I can use keys to classify living and non-living things.
- ☐ I can produce a bar chart to explain results.
- ☐ I can use science to help me support my points of view or actions.
- ☐ I can discuss the positive and negative effects of science and technology on the environment where I live.

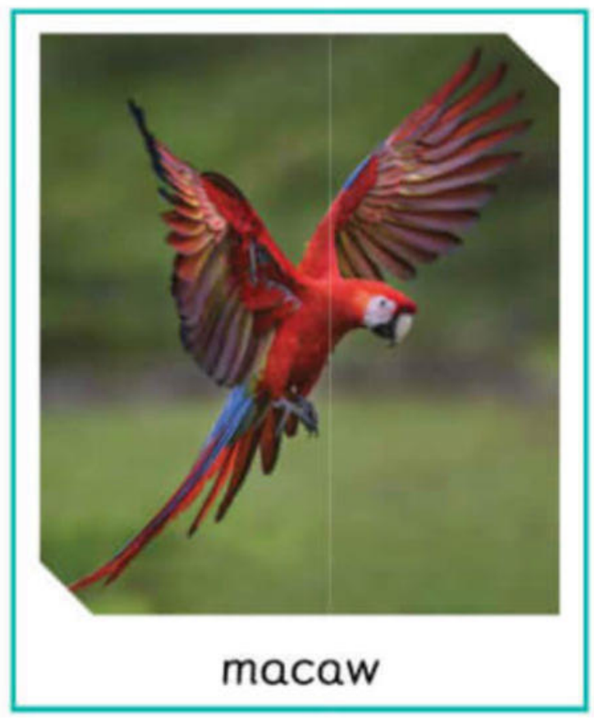
Practice Worksheet

1. Tick (✓) the correct box beside each sentence.

	True	False
Polar bears and orangutans are found in the same habitat.	☐	☐
Animals that live in a desert can also live in an aquatic habitat.	☐	☐
An animal can survive only in its own habitat.	☐	☐
Some types of animals can change the colour of their body covering over time to survive in a new environment.	☐	☐
Plants can move to a different place when their habitat changes.	☐	☐

2. Draw a line to connect each animal to the habitat in which it lives.


meerkat


macaw

dolphin

rainforest

ocean

desert

3. Samad is learning how plants and animals are suited to their habitats. His notes are shown below.

Circle the **two** statements that are correct.

all plants are suited to survive in all habitats

fish are suited to live in an aquatic habitat

plants and animals can change their structures over time to suit their new environment

plants and animals cannot survive in habitats other than their own habitat

Science Words

A

aquatic
relating to water

P

polar region
area around the North Pole or the South Pole

S

structure
the way that something is made or organised

suited
having qualities that are right for a particular purpose

swamps
areas of land that are always wet or flooded with water

CHAPTER 5

Materials, Substances and Particles

You have learnt in Stage 3 about solids, liquids and gases. Look at the picture of the iceberg floating in the sea. Can you name the states of matter of the iceberg and the sea?

Write two words to describe an iceberg.

_____, _____

A Particle Model and Properties

In this section, I will

- learn about the difference between materials, substances and particles
- describe the particle model for solids and liquids
- use the particle model to explain the properties of solids and liquids
- learn that particles are constantly moving
- describe and explain how some solids behave like liquids
- explain relationships, quantities or scale through models
- explain why models do not fully represent an idea
- learn to sort and classify things through tests

Thinking cap

I wonder why a solid doesn't fill up a container like a liquid does...

Let's Explore!

'States of matter' game

1. In groups, stand close together in neat rows.
2. Link arms with the classmates beside you. If you are at the end of the row, place your hand on the shoulder of the classmate in front of you.
3. Move slowly in one direction. Does the shape of your group change as you move?
4. Now drop your arms, spread out and hold hands with your classmates.
5. Move slowly in one direction again. Does the shape of your group change as you move?

Let's Learn

What Are Materials, Substances and Particles?

Materials are all around us. A **material** is the matter that an object is made of. Recall what you have learnt about materials. Materials can be solids, liquids or gases. Materials can be natural or human-made.

Can you identify the natural and human-made materials in the objects below?

rubber balloons

glass vase

wooden chair

metal clips

plastic containers

A **substance** is made of one type of matter. A material can be made of one or more substances. Each substance has its own properties.

Concrete is a material used to make buildings. Concrete is made of rocks, sand, water and other substances.

All matter is made up of **particles**. The particles are so tiny that we cannot see them.

Scientists use a model to understand how particles in different states of matter behave. The model is called the **particle model**. The particle model helps scientists explain the properties of matter.

How Can We Use the Particle Model to Describe Solids and Liquids?

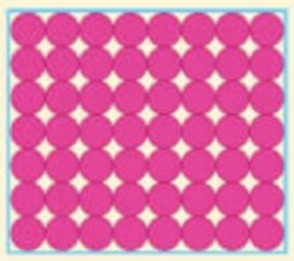
Particles in different states of matter differ in the way they are arranged and how they move about. The particles are constantly moving, even in a solid.

Option

Watch!

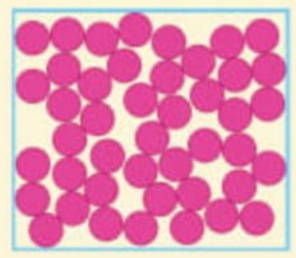
Scan this page to watch a video about the particle model for solids and liquids.

Solids



- Particles are packed very closely together. They have fixed positions. This gives solids a fixed volume.
- Particles vibrate, or move back and forth quickly. They cannot move around one another. This gives solids a fixed shape.

Liquids



- Particles are not packed as closely together as in a solid. However, there is very little space between the particles. So, liquids have a fixed volume.
- Particles move around one another. So, liquids can flow and take the shape of any container.

The particle model shows particles as flat circles. Are real particles also flat circles? Discuss with your partner and make a table to compare the differences between the particle model and real particles.

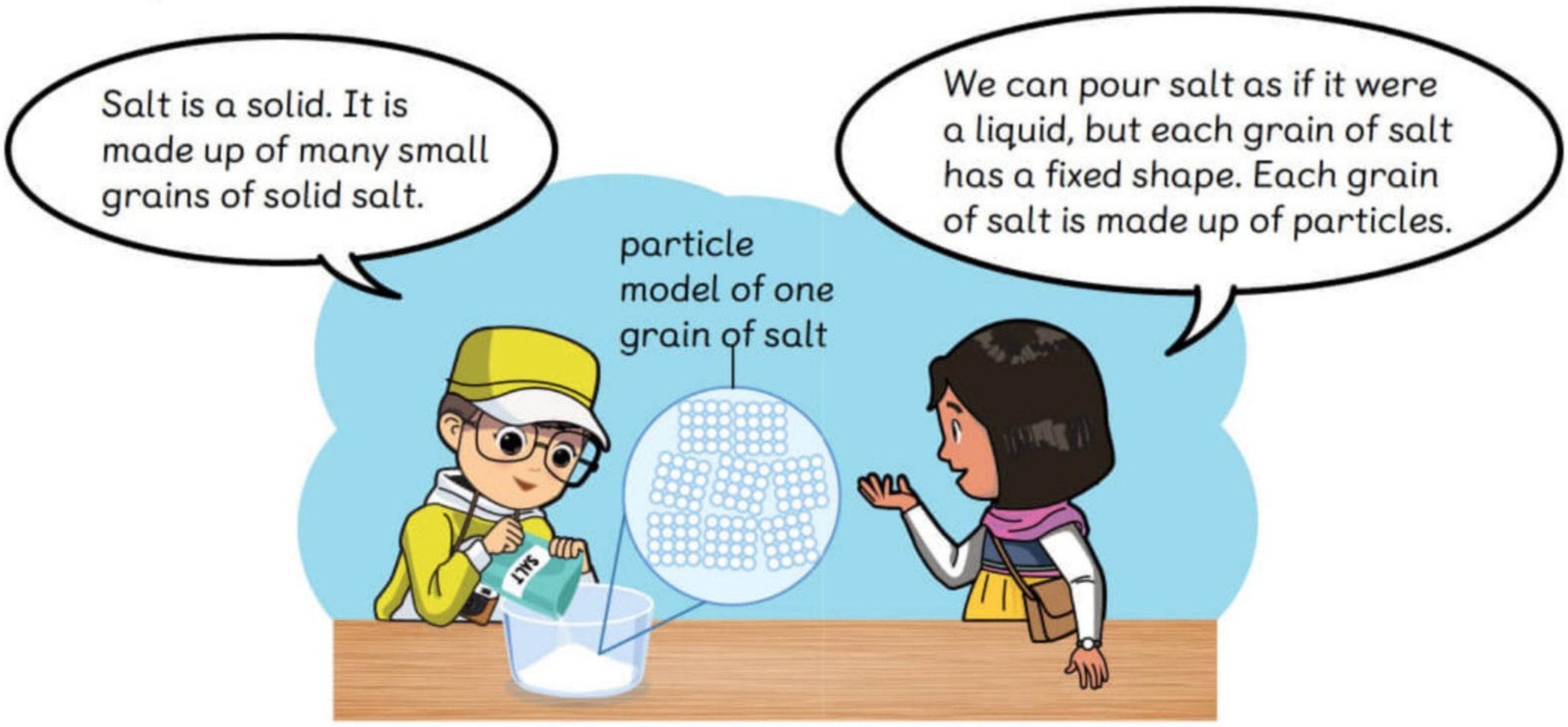
Look back at the Let's Explore! activity on page 75. Each of you pretended to be a particle. Compare what happened when your group was linked differently. When did the group represent a solid? When did the group represent a liquid?

Word Boost

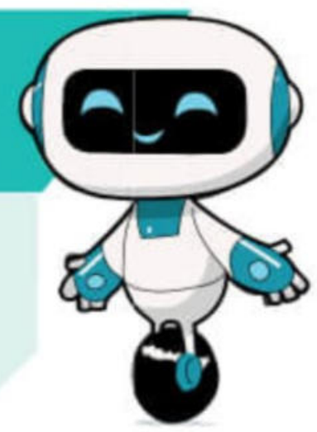
differ
constantly
vibrate

Can Solids Behave Like Liquids?

Some solids such as salt and flour can behave like liquids. They take the shape of the containers they are poured into. What other examples of solids behave like liquids? Test solids such as sand and rice to find out. Make a table to sort solids into those that behave like liquids and those that do not behave like liquids.



Check Your Learning



Compare the way particles are arranged and how they move about in a solid and a liquid.

Activity Book
Activity 5A, p. 42

Tick (✓) to show what you can do.

- ☐ I can explain the difference between materials, substances and particles.
- ☐ I can describe the particle model for solids and liquids.
- ☐ I can use the particle model to explain the properties of solids and liquids.
- ☐ I can state that particles are constantly moving.
- ☐ I can describe and explain how some solids behave like liquids.
- ☐ I can explain relationships, quantities or scale through models.
- ☐ I can explain why models do not fully represent an idea.
- ☐ I can sort and classify things through tests.

B Changing State

In this section, I will

- use the particle model to describe melting and freezing
- learn that a change of state is a physical change
- identify the five main types of scientific enquiry
- learn what the variables are when doing a fair test
- learn to identify risks and explain how to be safe during practical work
- do practical work safely
- learn to choose and use the right equipment
- create tables and diagrams to show observations
- learn to predict the possible results of a scientific activity
- explain that results are more reliable when the measurements are taken more than once

Thinking cap

I know that ice can melt into water. Are ice and water the same substance?

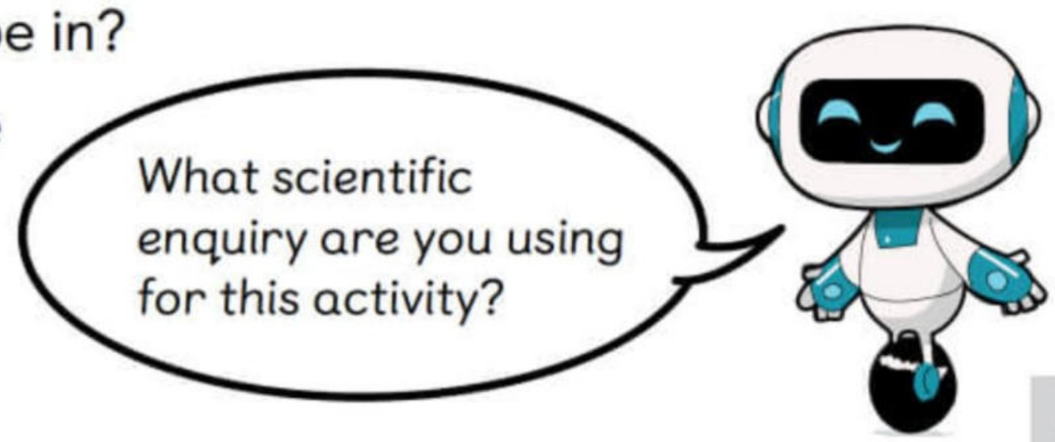
Let's Explore!

How does ice change?

You will need:

- Ice cube
- Small plastic cup

1. Work in pairs.
2. Place the ice cube in the cup.
3. Describe the shape of the ice cube. What state of matter is the ice cube in?
4. Predict what will happen to the ice cube after some time.
5. Observe the ice cube after ten minutes. What is happening to it?

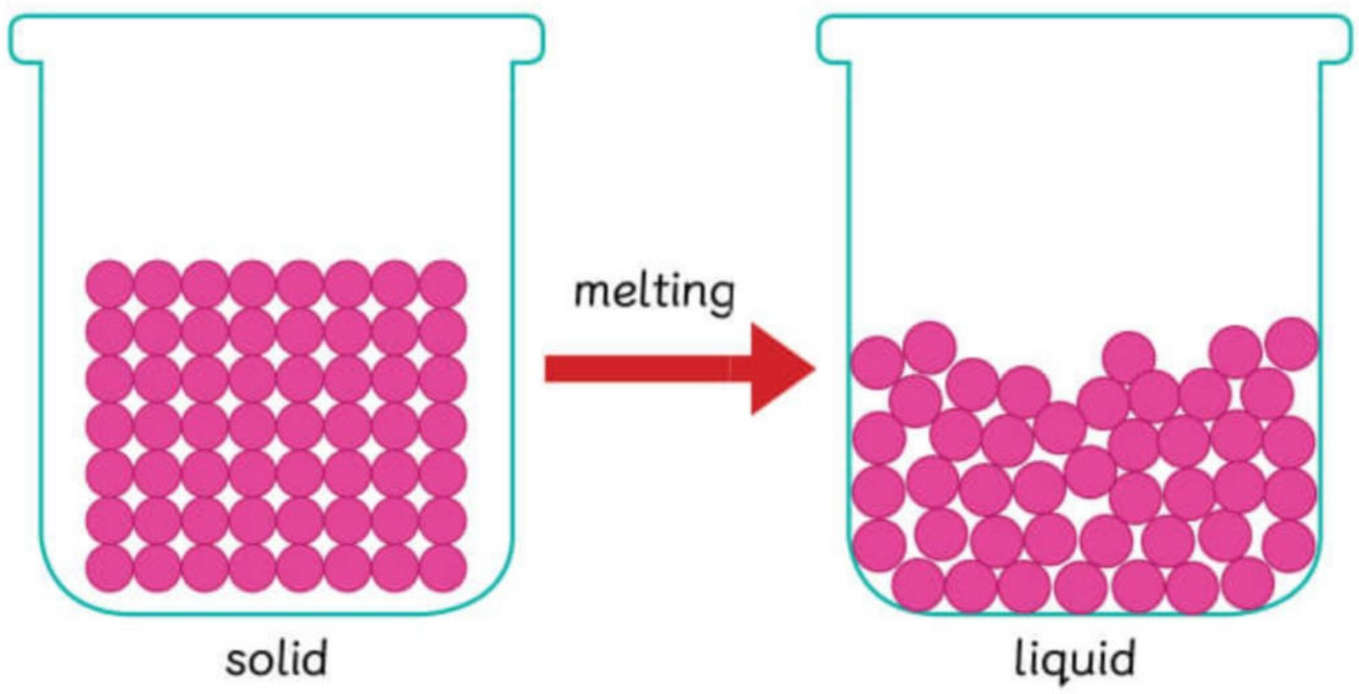


Let's Learn

What Happens When a Solid Melts?

When ice is placed in a warm room, it can change into water. This change from a solid into a liquid is called **melting**.

We can use the particle model to explain what happens during melting. Recall that the particles in a solid are packed closely together. When a solid is heated, its particles gain heat. They vibrate faster and move further apart. When the particles gain enough heat, they break away from their fixed positions and move around one another. The solid becomes a liquid.



You may have seen examples of melting in your daily lives.

Solid wax melts when the candle burns.

Ice cream melts when left in a warm place.

Word Boost

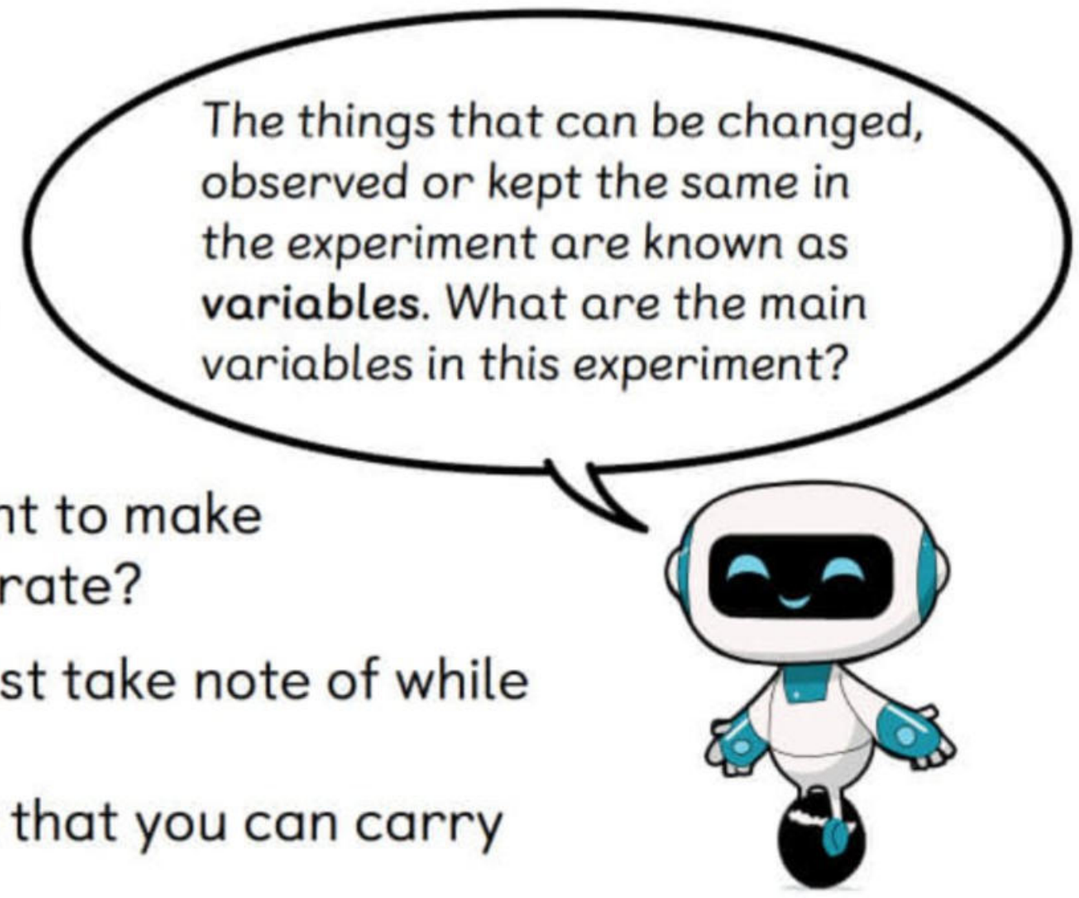
gain heat
further apart
break away

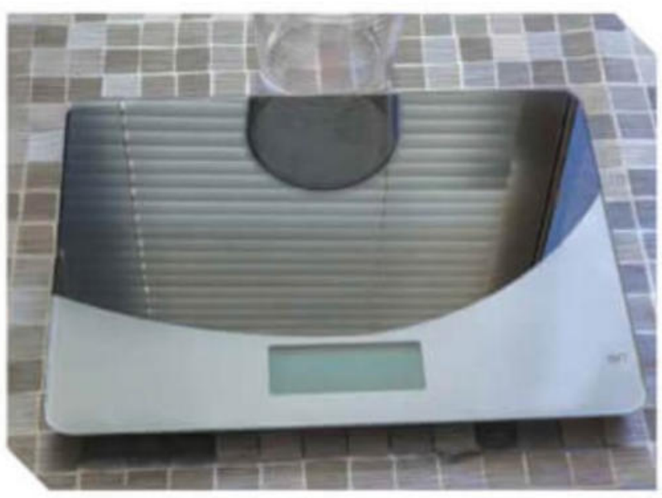
Do all solids melt at the same speed?

Let's find out which melts more quickly – ice or butter.

You have some butter, ice cubes, a stopwatch, a thermometer, a weighing scale and some bowls.
Choose and use the equipment needed to carry out the experiment.

1. Work in groups.
2. Discuss the following questions.
   - What do you need to change?
   - What do you need to measure?
   - What must you keep the same?
   - How can you use each equipment to make sure that your results are accurate?
   - Are there any risks that you must take note of while doing the experiment?
     What must you do to make sure that you can carry out the experiment safely?





3. To investigate which solid melts more quickly, you must identify the variables to make it a **fair test**. You can conduct a fair test by making sure only one variable is changed and all other conditions are kept the same. Complete the table below to identify the variables and ensure this is a fair test.

Change	the _____ of solid
Measure	the _____ it takes for each solid to melt
Keep the same	the _____ where the solids are placed the _____ of the solids

4. Predict which solid will melt faster.
5. Conduct the experiment and record your results in the table below.

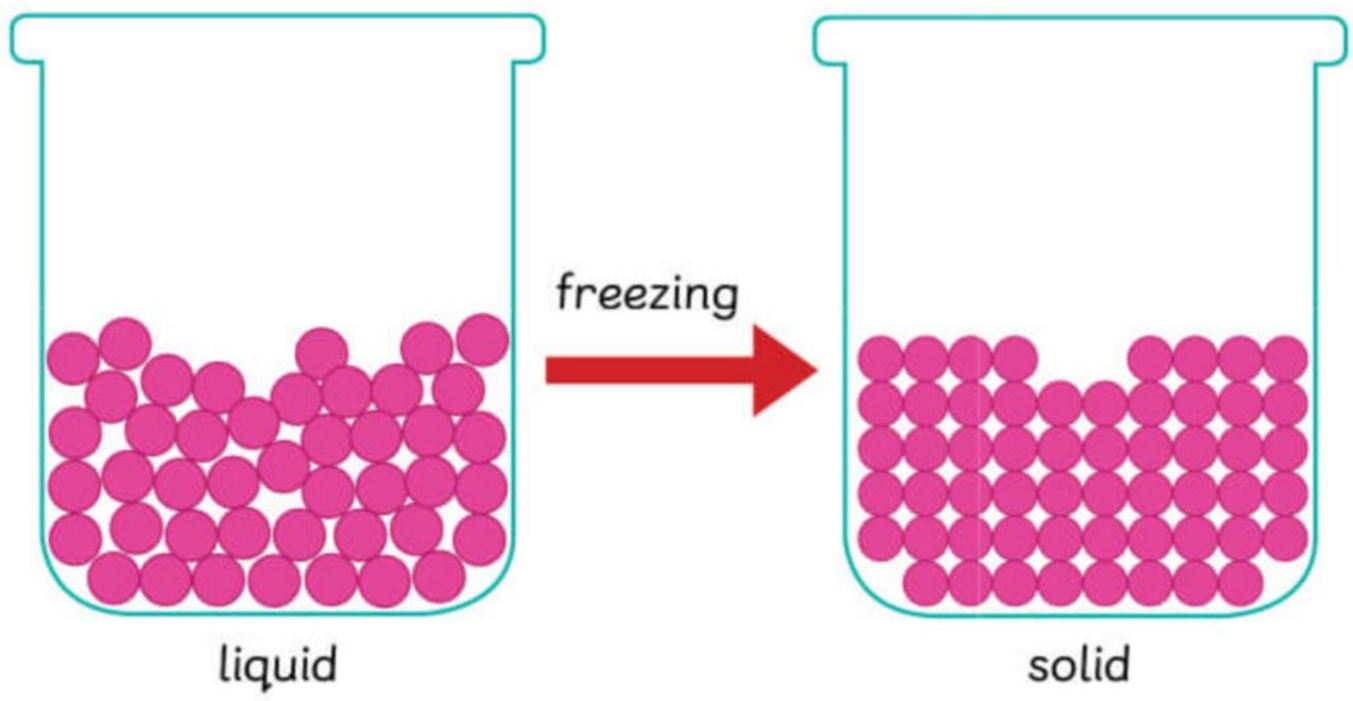
Solid	Mass	Location	Time taken to melt fully
butter			
ice			

6. Which solid melted faster?
7. Was your prediction correct? Share your results with the class.
8. Repeat the experiment. Is the result still the same?
9. Discuss with your group members why you need to repeat observations and measurements when doing this experiment.

What Happens When a Liquid Freezes?

When water is cooled enough, it can change into ice. This change from a liquid into a solid is called **freezing** or **solidification**.

When a liquid is cooled, its particles lose heat. They start to move slower and closer together. When the particles lose enough heat, they settle into fixed positions. The liquid becomes a solid.



Word Boost

lose heat
settle

What are some examples of freezing around us?

Juice in the tray freezes when placed in a freezer.

Water in the lake can freeze during winter.

What Are Physical Changes?

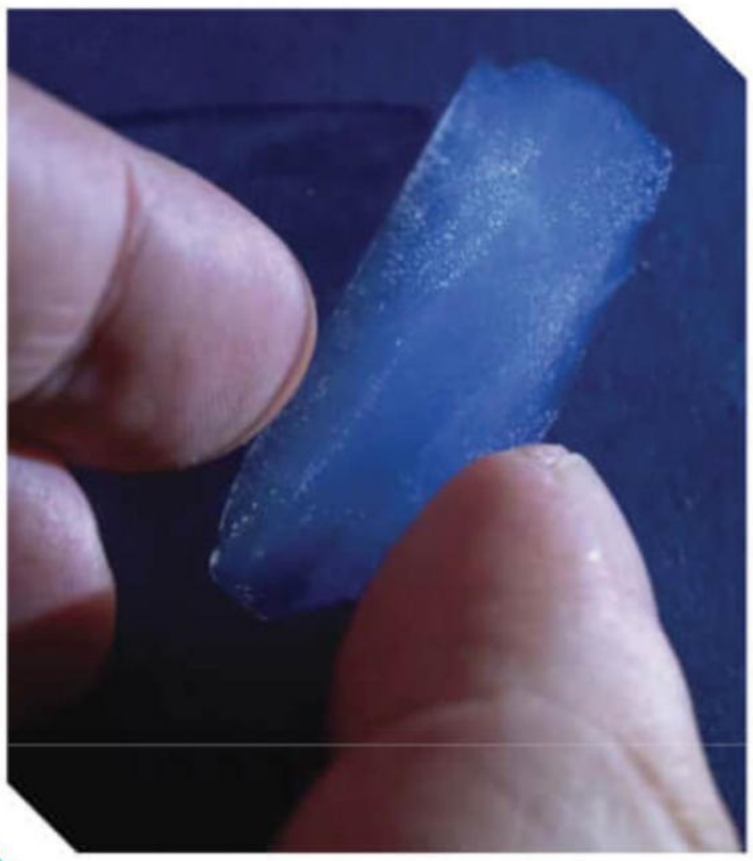
Changes of state are physical changes.

In a **physical change**, no new substance is formed. One or more physical properties of the substance may change. Examples of physical changes are changes in size, shape and appearance.

When butter melts, it changes in size, shape and appearance.
Use the stickers at the back of the book to show the particles of butter in different states.

melting

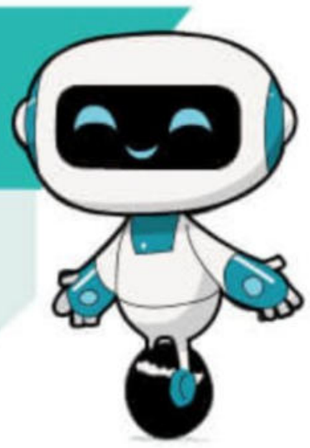
Tech Talk!



We need water to survive. However, many people around the world do not have clean drinking water. In 2020, scientists from Singapore created a water-producing aerogel. It is a special type of material that can draw water from the air. It gathers water in the gaseous state from the air, and turns it into a liquid.

Find out about the properties of aerogel that make it a useful material. How can this material be useful to your community?

Check Your Learning



Use the particle model to describe what happens during melting and freezing.

Activity Book
Activity 5B, p. 44

Tick (✓) to show what you can do.

- ☐ I can use the particle model to describe melting and freezing.
- ☐ I can state that a change of state is a physical change.
- ☐ I can identify the five main types of scientific enquiry.
- ☐ I can identify what the variables are when doing a fair test.
- ☐ I can identify risks and explain how to be safe during practical work.
- ☐ I can do practical work safely.
- ☐ I can create tables and diagrams to show observations.
- ☐ I can choose and use the right equipment.
- ☐ I can predict the possible results of a scientific activity.
- ☐ I can explain that results are more reliable when the measurements are taken more than once.

C Chemical Reactions

In this section, I will

- learn that a chemical reaction takes place when substances react to form one or more new substances
- identify people who use science around me and describe how they use it
- describe the use of science where I live

Thinking cap

I wonder what will happen if I mix two substances together...

Let's Learn

What Are Chemical Reactions?

When some substances are mixed, they may interact or react to form a new substance.

Look at this example. We mix different ingredients to make batter. When the batter is baked in an oven, a cake is formed. The cake is a new substance. A chemical change has happened.

after

before

Word Boost

react
ingredients

A chemical change involves a **chemical reaction**. One or more new substances are formed during a chemical reaction. Heat is either taken in or given out. Sometimes, we may observe a change in colour or shape.

Many chemical reactions take place around us.

When wood burns in air, it changes into ash.

A brown layer called rust forms when iron reacts with water and air.

Science at Work

Our food is made of different types of substances. Many chemical reactions take place when food products are made. Food scientists study these chemical reactions. They work to improve the taste, colour, texture and nutrients in the food products. They ensure that our food products are safe to eat.

Find out what kinds of tests food scientists carry out to make sure a food product is safe to eat.

Problem-based Learning

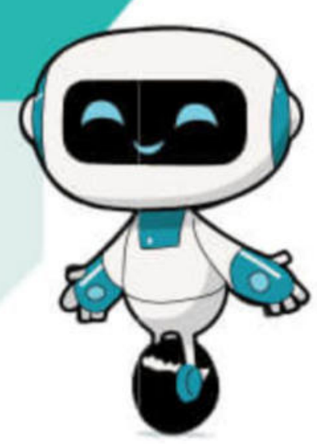
What can I do to help?

Chemical reactions can be used to make useful things. One example is plastic. Many objects we use every day are made of plastic. However, plastic can harm our environment when thrown away. Science and technology can help us make objects from natural materials that are less harmful to the environment.

1. Work in groups.
2. Find out how plastic waste can harm the environment.
3. Research on how natural materials can replace plastic for making objects. Find out the benefits of using these materials instead of plastic.
4. Write down or draw some objects that can be made using natural materials instead of plastic. Share your ideas with your class.
5. Are there any companies that use environmentally friendly products such as bamboo straws in your local area? Find out how their products are less harmful for the environment.

Check Your Learning

What is a difference between a physical change and a chemical reaction?



Tick (✓) to show what you can do.

- ☐ I can state that a chemical reaction occurs when substances react to form one or more new substances.
- ☐ I can identify people who use science around me and describe how they use it.
- ☐ I can describe the use of science where I live.

Activity Book
Activity 5C, p. 46

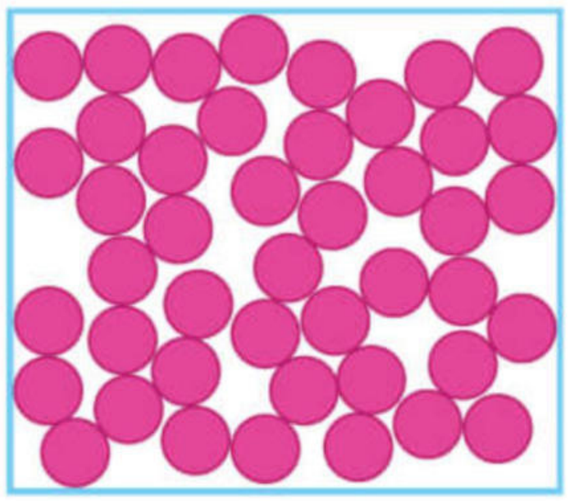
Practice Worksheet

1. Tick (✓) the correct box beside each sentence.

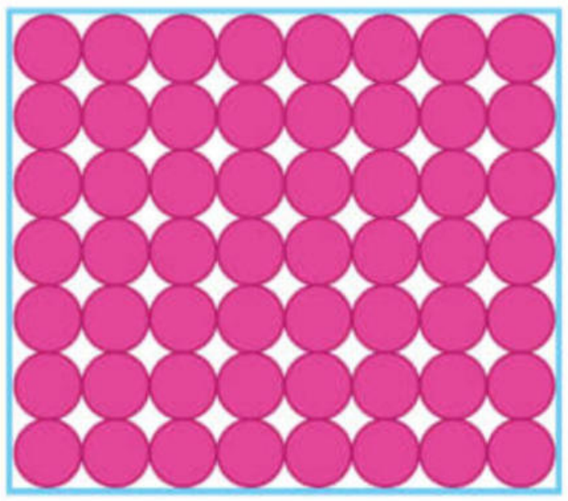
	True	False
Substances are made up of particles.	☐	☐
Particles in a solid are constantly moving.	☐	☐
The particle model helps us explain why solids and liquids have different properties.	☐	☐
Flour can be poured like a liquid because its particles are not closely packed together.	☐	☐
New substances are formed during melting and freezing.	☐	☐
A chemical reaction takes place when substances react to form one or more new substances.	☐	☐

2. (a) Particles are arranged differently in a solid and a liquid.

Write '**solid**' or '**liquid**' under each diagram.



_____



_____

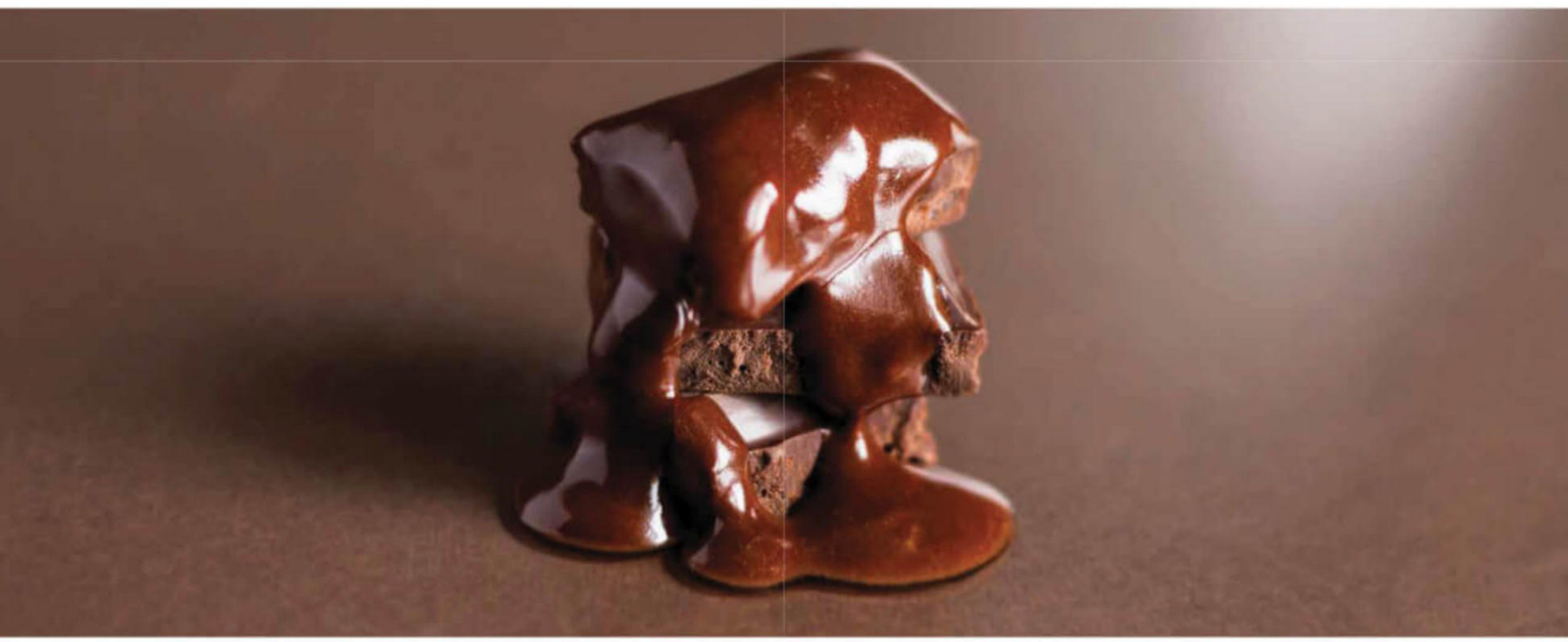
(b) Which of these explains why liquids can change in shape?
Circle the correct answer.

the particles are packed closely together

the particles can move around one another

the particles can vibrate

3. Emma leaves a piece of chocolate under the hot Sun.



Complete the sentences about what is happening to the chocolate.
Choose words from the following list.

chemical	**freezing**	**liquid**	**melting**
	physical	**solid**	

The chocolate is _____.

It is changing from a _____ into a _____.

This is a _____ change because no new substance is formed.

4. Which of these are physical changes and which are chemical changes? Tick (✓) the correct boxes.

Change	Physical	Chemical
burning a matchstick		
melting butter		
baking bread		
mixing salt and water		

Science Words

C

chemical reaction
a process that results in the formation of one or more new substances

F

fair test
an investigation where only one variable is changed and all other conditions are kept the same

freezing/solidification
the change from a liquid into a solid

M

material
the matter that an object is made of

melting
the change from a solid into a liquid

P

particles
tiny units that make up matter

particle model
the model that describes the way particles in matter are arranged and how they move about

physical change
a change in which no new substance is formed

S

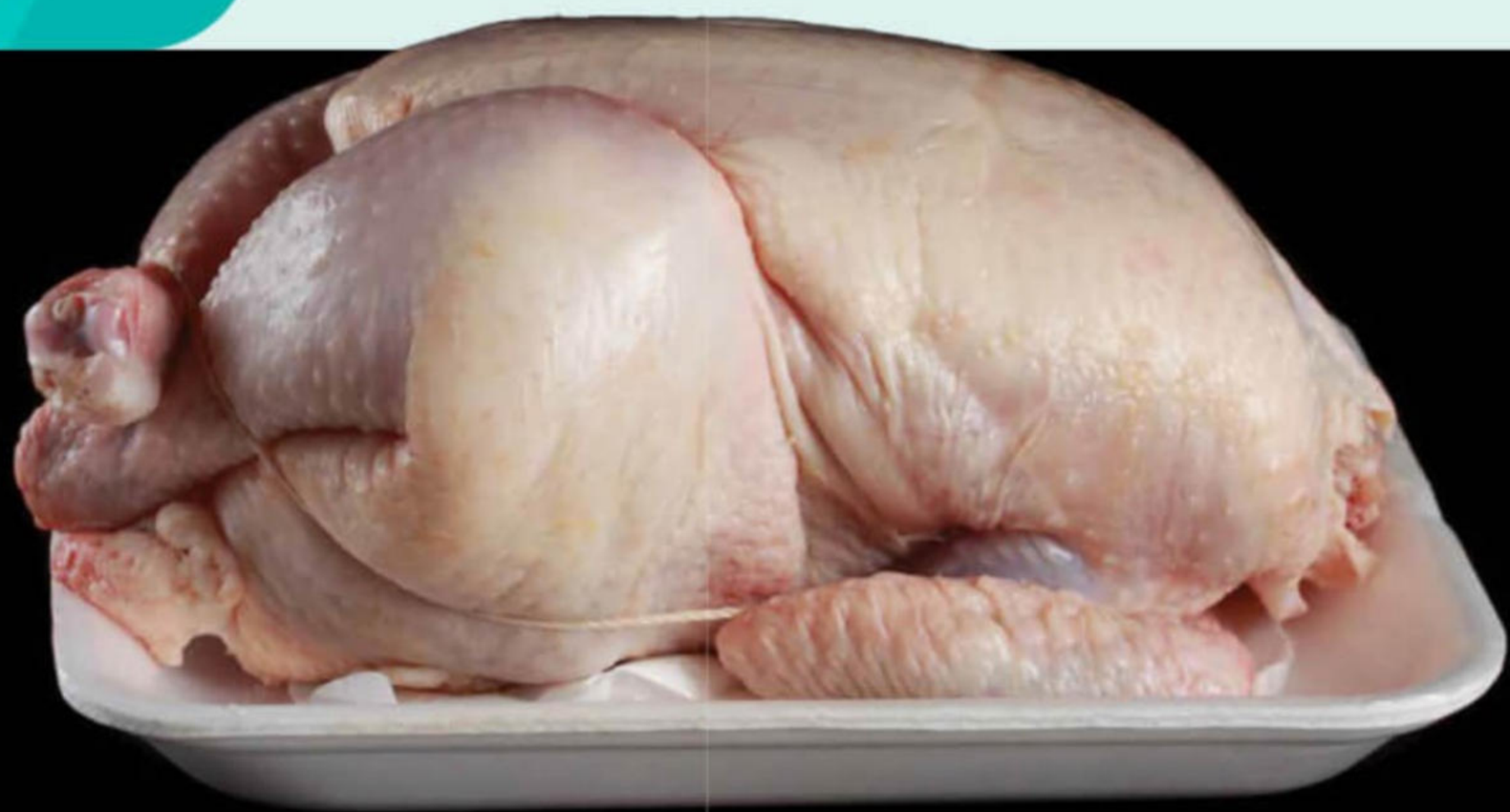
substance
something that is made of one type of matter

V

variables
factors or conditions that can be changed or kept the same in an investigation

CHAPTER 6

Energy



Look at the picture.

The photographs show a chicken before and after it was cooked in the oven. What happens inside an oven? How does the chicken get cooked in the oven?

Write a word each to describe the raw chicken and the cooked chicken.

Raw chicken: _____ Cooked chicken: _____

A Sound, Light and Heat

In this section, I will

- learn that energy is present in all matter, and in sound, light and heat
- learn that energy is needed to make things move
- create tables and diagrams to show observations
- learn to sort and classify things through observations
- identify the five main types of scientific enquiry

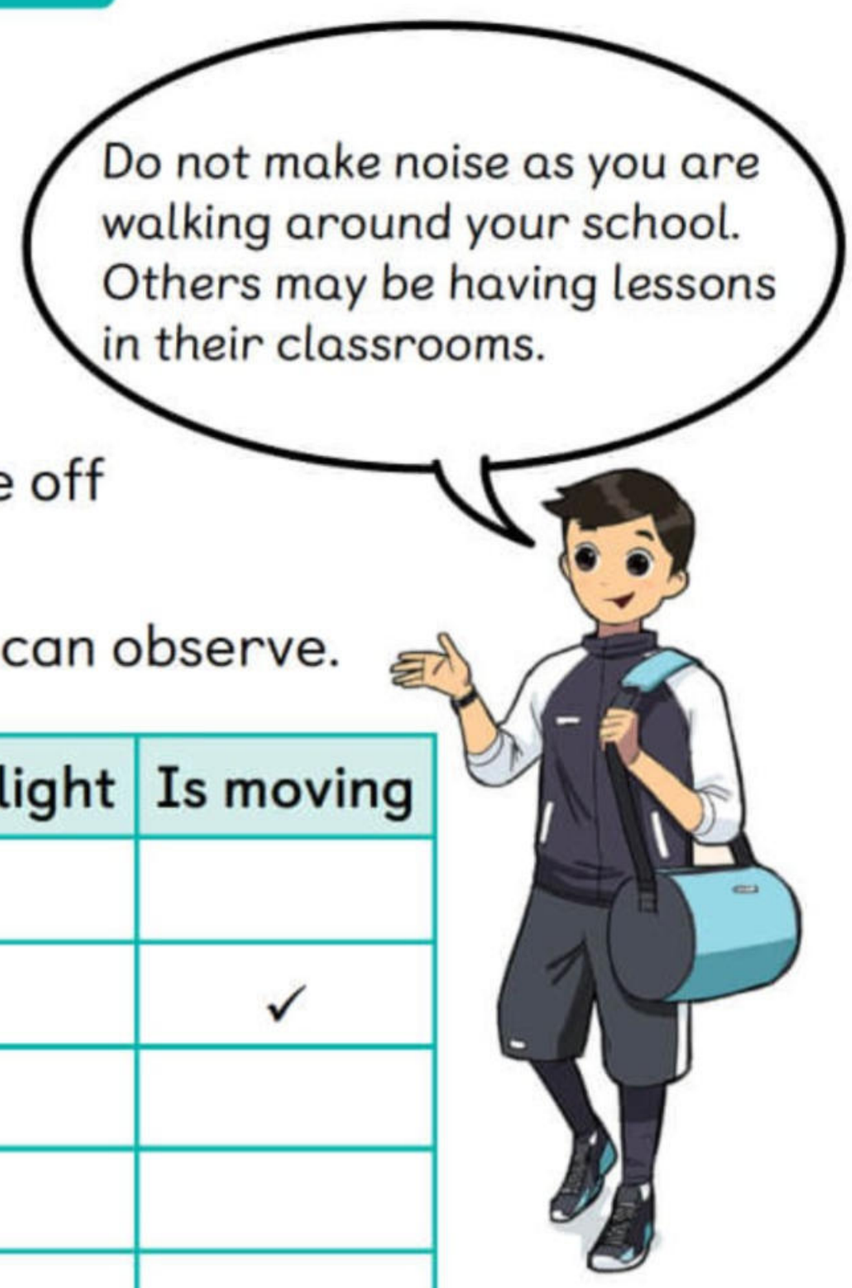
Thinking cap

I wonder why I feel warm when I stand near a lamp...

Let's Explore!

Energy in the school

1. In groups, walk around your school.
2. Look for things that feel warm, make sounds, give off light or are moving.
3. Use the table below to list as many things as you can observe.



Things	Feels warm	Makes sounds	Gives off light	Is moving
Sun	✓		✓	
fan		✓		✓

4. As a class, compare your tables to see the different things you have identified.

Let's Learn

Where Is Energy Present?

Recall what you have learnt in Chapter 5. All matter is made up of particles that are always moving. Energy is present in the moving particles, so energy is present in all matter. Thus, energy is present all around us.

Energy is present in **light**. The Earth gets energy from the light of the Sun. Light is the only energy we can see.

Energy is present in **heat**. The faster the particles move in an object, the more heat there is. A hotter object has more energy compared to a colder object. The energy in heat can be used to keep us warm or cook our food.

The Sun provides the Earth with energy present in light and heat.

Energy is present in **sound**. We can hear sounds all around us. When a sound is loud, there is more energy. When a sound is quiet, there is less energy.

Energy can make things move. When there is more energy, things will move faster and further.

Energy is needed to push the nail into the wall.

Energy is needed to make a ball roll.

Energy is needed to make a pinwheel turn.

Option

Watch!

Scan this page to watch a video that shows how energy is used in our lives.

Word Boost

further
pinwheel

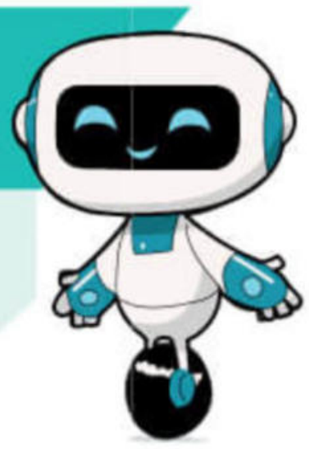
Energy is present in heat from a lamp that has been switched on, a kettle that is boiling water, a mug of warm milk and a burning flame.
Energy is present in sound from the ticking of the clock, the radio, the television and the whistling of the kettle.

Activity Book
Activity 6A, p. 53

Use the stickers at the back of the book and sort the objects to show the energy present in them.

Sound	
Light	
Heat	

Check Your Learning



Name three things around you where energy is present.

Tick (✓) to show what you can do.

- ☐ I can state that energy is present in all matter, and in sound, light and heat.
- ☐ I can state that energy is needed to make things move.
- ☐ I can create tables and diagrams to show observations.
- ☐ I can sort and classify things through observations.
- ☐ I can identify the five main types of scientific enquiry.

B Energy Transfer

In this section, I will

- learn that energy cannot be made, lost, used up or destroyed but it can be transferred
- learn that not all energy is transferred from one object to another, and some energy can be transferred to the environment
- learn to measure in standard units and explain why they are better than non-standard units
- create tables and diagrams to show measurements
- discuss the positive and negative effects of science and technology on the environment where I live
- do research to find the answer to a question
- analyse results to answer a scientific question

Thinking cap

Can energy be transferred from one object to another?

Let's Explore!

What causes the spinning?

1. Your teacher will show a demonstration using a tower.
2. Observe the tower when placed in an area without any wind. Is the propeller spinning?
3. Use a thermometer to measure the temperature of the air inside and outside the tower. Record the temperatures in a table.
4. Observe what happens to the propeller when the lamp is switched on for some time.
5. Measure and record the temperature of the air inside and outside the tower again.
6. Discuss with your classmates how the propeller moved without wind.
7. Why is it better to use a thermometer to measure the temperatures of the air instead of feeling it with your hands?

Activity Book
Activity 6B, p. 54

Let's Learn

Where Does Energy Go?

Energy cannot be made, lost, used up or destroyed. However, it can be transferred from one object to another. This is known as **energy transfer**.

You have learnt in Chapter 3 that green plants can make their own food when there is sunlight. The transfer of energy from sunlight to the plants helps them make food. The plant is an energy store. Energy from plants can also be transferred to animals when the animals eat the plants as food.

Energy from your legs is transferred to a ball when you kick the ball to make it roll.

Energy can be transferred from one moving object to another. When you hammer a nail into a wall, the energy is transferred from your moving arm to the hammer. The energy from the moving hammer is then transferred to the nail, making it move into the wall.

Heat can be transferred from a hotter object to a cooler object. When we burn wood during a campfire, energy is changed from a store in the wood into heat. When you sit by a campfire, the heat from the burning wood is transferred to your body and your body becomes warmer.

Heat from the fire is transferred to the bottom of the pan. The heat is then transferred from the pan to the food that is to be cooked.

Activity Book
Activity 6C, p. 57

Light can be transferred from the Sun to a **solar panel**. When light from the Sun reaches the solar panel on a toy car, the energy is transferred from the Sun to the solar panel. Energy is stored in the cells in the solar panels as electricity. Electricity from the cells is transferred to the toy car, making it move.

Light from the Sun is transferred to the solar panel in the calculator. The energy is then transferred to the calculator to make it work.

Not all energy is transferred from one object to another. Some energy can be transferred to the surrounding environment too.

Energy can be transferred to the surrounding environment as sound.

Have you watched an aeroplane take off? Do you hear a sound when someone is using a hairdryer? Why are they so loud?

Word Boost

take-off

When the wheels of an aeroplane move during take-off, energy from the moving wheels is also transferred to the surrounding environment as sound.

When a hairdryer is used to dry your hair, energy from the hairdryer is also transferred to the surrounding environment as sound.

Energy can be transferred to the surrounding environment as heat. This can be observed as an increase in temperature. Have you stood beside a washing machine while it is working? Why is it warm?

When we use appliances such as the washing machine, refrigerator and television, the temperature of their surroundings increases. This is because some energy is transferred from them to the surrounding environment as heat.

When a lamp is turned on, the temperature of its surroundings increases. This is because some energy is transferred from the lamp to the surrounding environment as heat.

Tech Talk!

Normal lamps or light bulbs use energy to give off light, but a lot of energy is also transferred to the surrounding environment as heat. LED lamps are energy-efficient. This means they use less energy to give off light compared to normal lamps. They lose very little heat to the surrounding environment so the temperature of the room does not increase by much when the lamps are switched on. They also last longer than normal lamps.

Appliances that are energy-efficient have labels to tell us how much energy they use. Find out from your friends and neighbours which energy-efficient appliances are used in your local area.

Word Boost

appliances
energy-efficient

Energy can be transferred to the surrounding environment as light. Have you been to a campfire? Why is it brighter near the fire?

When we burn wood, energy from the flames is also transferred to the surrounding environment as light.

Science at Work

Oil, natural gas and coal are called **fossil fuels**. These fuels are burned for energy. Fossil fuels take millions of years to form and will run out once they are used up. **Renewable** energy scientists focus on using energy that can be transferred from wind, moving water and the Sun. Wind, moving water and sunlight have renewable energy and they will not run out. Renewable energy is called "clean energy" because it does not release smoke, harmful gases and chemicals into the environment.

How does using fossil fuels for energy have a negative impact on the environment? How can renewable energy have a positive impact in the environment where you live?

Problem-based Learning

Can we cook food using energy from the Sun?

1. Work in groups.
2. Imagine that you are going camping but you do not have a portable stove. You need to make a solar oven that uses energy from the Sun to make some toast.
3. Use the Internet to research on the steps and materials required to make the solar oven.
4. Find out how the oven works.
5. Share your research with the class.

Check Your Learning

Identify two examples of energy transfer happening around you.

Tick (✓) to show what you can do.

- ☐ I can state that energy cannot be made, lost, used up or destroyed but it can be transferred.
- ☐ I can state that not all energy is transferred from one object to another, and that some energy can be transferred to the environment.
- ☐ I can measure in standard units and explain why they are better than non-standard units.
- ☐ I can create tables and diagrams to show measurements.
- ☐ I can discuss the positive and negative effects of science and technology on the environment where I live.
- ☐ I can do research to find the answer to a question.
- ☐ I can analyse results to answer a scientific question.

Practice Worksheet

1. Tick (✓) the correct box beside each sentence.

	True	False
Energy is present in light but not in sound.	☐	☐
Energy makes things move.	☐	☐
We can make and destroy energy during an activity.	☐	☐
Energy is used up by some things.	☐	☐
Energy can be transferred from one object to another.	☐	☐
Energy cannot be transferred to the surrounding environment.	☐	☐

2. Circle the objects that give off light.

basketball

lamp

racket

book

Sun

flower

smartphone

fire

3. The picture below shows a girl playing drums.

Fill in the blanks. Use words from the boxes.

louder	more	move	sound

Energy is needed to _____ the sticks. When the sticks hit the drums, there will be _____. If you hit the drums harder, there is _____ energy transferred, and the sound will be _____.

4. The picture below shows a kettle filled with water placed over a stove. Circle the **two** correct answers.

all the energy from the fire is transferred to the water

energy is transferred from the cooler object to the hotter object

energy is transferred from the fire to the kettle

some energy from the fire is transferred to the surrounding environment as light

Science Words

E

energy transfer
when energy moves from one place to another or changes from one form to another

F

fossil fuels
coal, oil and natural gas made of the remains of plants and animals that died millions of years ago; can be burned for energy

H

heat
energy that flows from a hotter object to a cooler object

L

light
energy that our eyes can see

R

renewable
can be used repeatedly and does not run out because it is naturally replaced

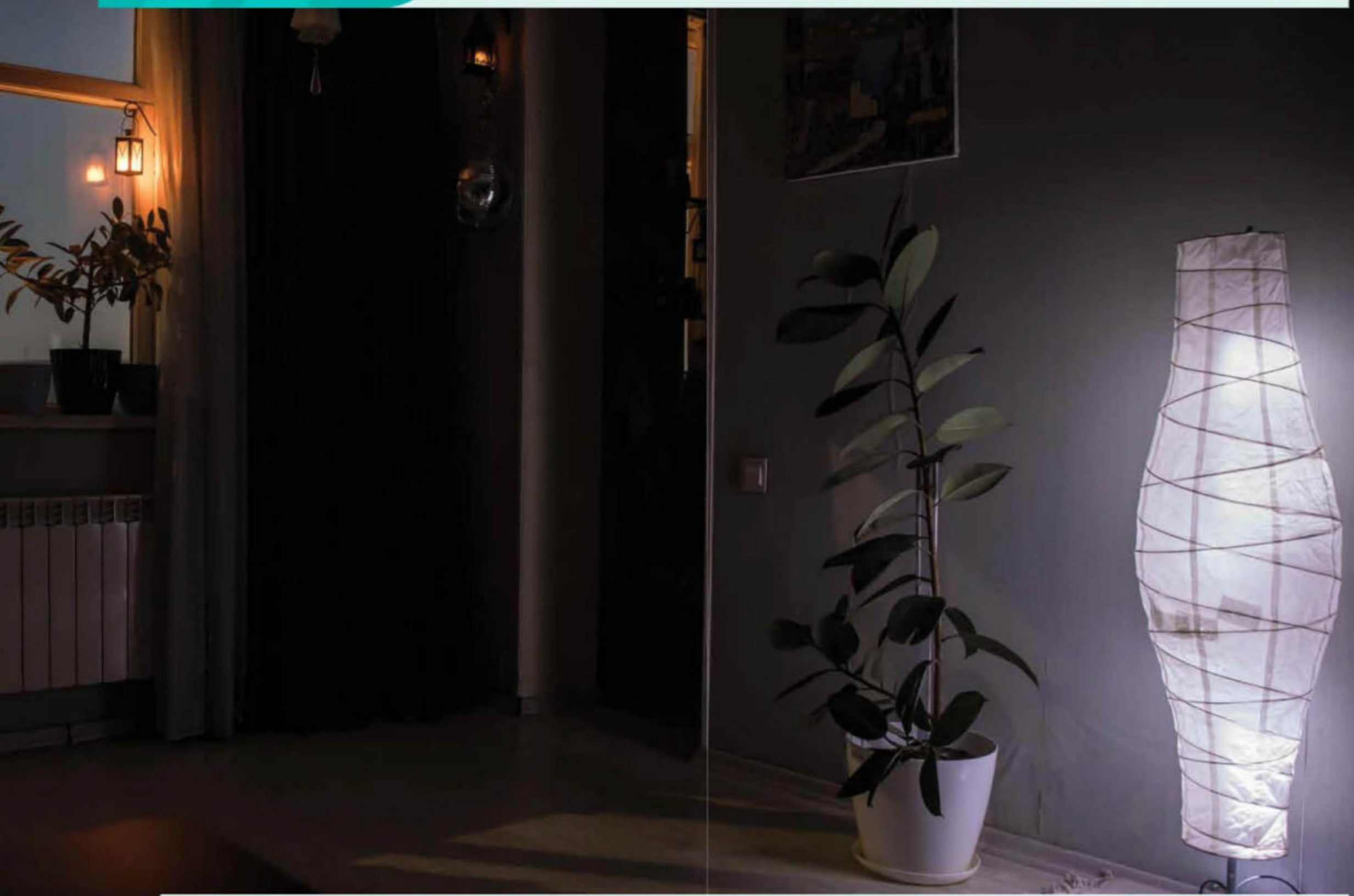
S

solar panels
devices that collect energy from the Sun and change it to other types of energy

sound
energy that we can hear

CHAPTER 7

Properties of Light



Look at the picture.

You have learnt in Stage 2 about light sources and darkness. What light sources can you see in the picture?

Write three objects that you can place in the room to make it brighter.

_____, _____, _____

A Light Travels

In this section, I will

- learn that light travels in straight lines
- show how a ray diagram represents light travelling in straight lines
- explain why models do not fully represent a situation
- learn to predict the possible results of a scientific activity
- explain that results are more reliable when the activity is done more than once

Thinking cap

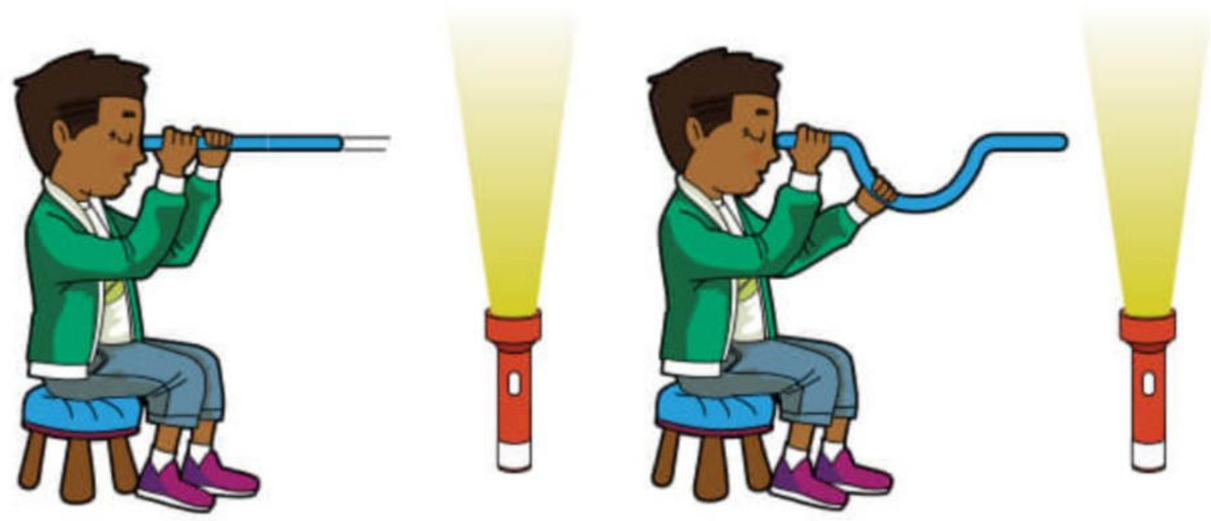
I wonder how a candle makes a dark room bright...

Let's Explore!

How light travels

You will need:

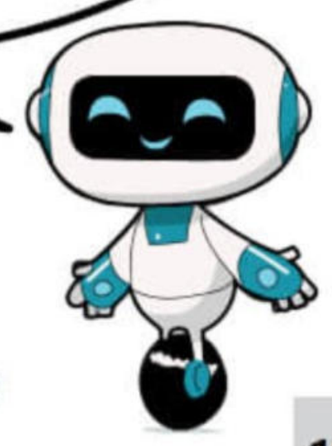
- Torch
- Rubber tube



Method:

1. Place a torch facing up and turn it on.
2. Look through the straight rubber tube. Can you see the light?
3. Bend the rubber tube.
4. Predict if you will be able to see the light through the bent tube.
5. Look through the bent tube.
6. Was your prediction correct? Does your result support your prediction?
7. Repeat the activity by bending the tube differently. Do you get the same results?

You can repeat your experiment to find out if your results are **reliable**. If your results are the same, they are reliable. What does it mean if your results are very different?



Let's Learn

How Does Light Travel?

In Chapter 6, you have learnt that energy is present in light. You see light when there is a fire, when a candle is lit and when you switch on a lamp.

What do you observe about the light in each picture?

Light travels in straight lines. We can show how light travels using a **ray diagram**. A ray diagram is made of straight lines with arrows. The arrows show the direction in which light travels.

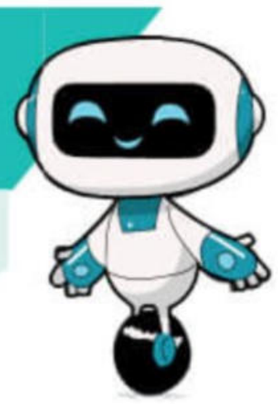
Word Boost

arrows
direction

We can draw a ray diagram to show how light travels from a light source to our eyes. The light is shown as straight lines from the source into our eyes. The arrows on the lines show the direction of travel of light.

A ray diagram is a model to show how light travels in a straight line. In what ways is a ray diagram different from how light travels in real life?

Check Your Learning



How does light travel?

Activity Book
Activity 7A p. 63

Tick (✓) to show what you can do.

- ☐ I can state that light travels in straight lines.
- ☐ I can show how a ray diagram represents light travelling in straight lines.
- ☐ I can explain why models do not fully represent a situation.
- ☐ I can predict the possible results of a scientific activity.
- ☐ I can explain that results are more reliable when the activity is done more than once.

B Reflection of Light

In this section, I will

- state how light reflects off surfaces
- describe how we see objects that are not light sources
- learn to identify risks and explain how to be safe during practical work
- do practical work safely
- create tables and diagrams to show observations
- draw a diagram to show a scientific idea
- learn to choose and use the right equipment
- identify people who use science around me and describe how they use it

Thinking cap

I wonder how we can see objects that are not sources of light...

Let's Explore!

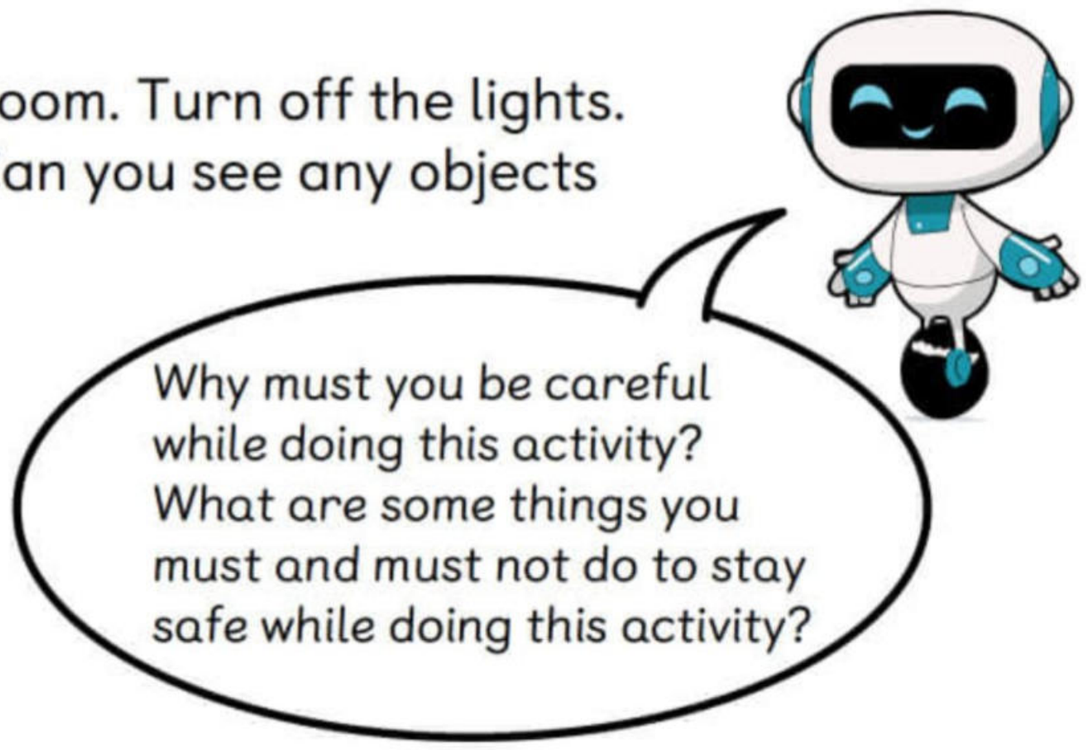
Can we see things without light?

You will need:

- Dark room
- Torch

Method:

1. Work as a class.
2. Close the doors and windows of the room. Turn off the lights. Make the room as dark as possible. Can you see any objects around you?
3. Switch on the torch and shine it around the room. Can you see any objects now?
4. Discuss why you can see objects when the torch is switched on.

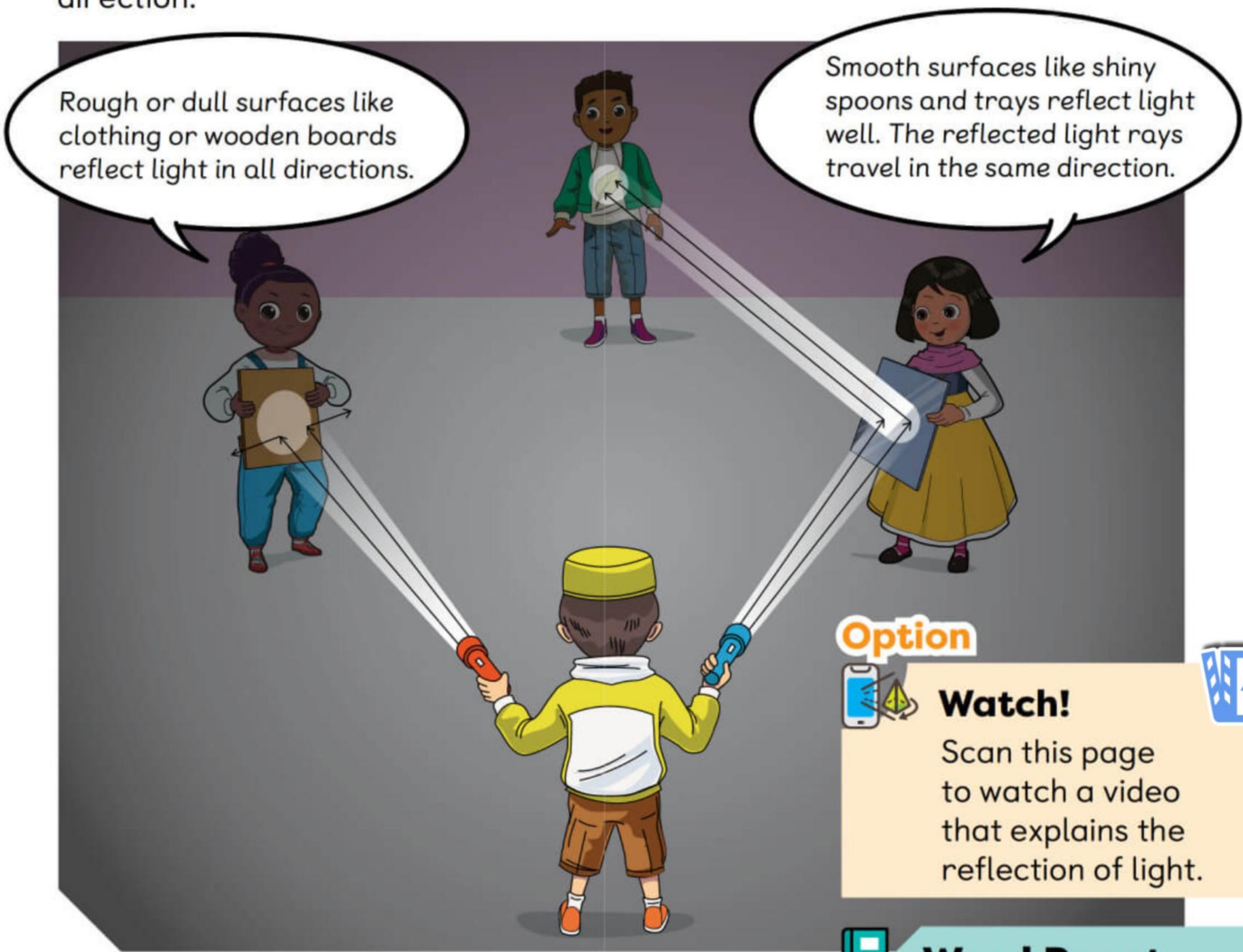


Let's Learn

What Is Reflection?

You have learnt that light travels away from a source of the light in straight lines. When the light reaches the surface of an object, it bounces off the surface. We call this **reflection**.

When light **reflects** off a surface, it still travels in straight lines, but in a new direction.



Option

Watch!

Scan this page to watch a video that explains the reflection of light.

Try this experiment with different objects you can find. Which objects reflect light well and which do not? Record your findings in a table and share it with your class.
Remember not to shine the light directly into your friend's eyes!

Word Boost

bounces
rough
dull

Activity Book
Activity 7B, p. 67

How Do We See Objects?

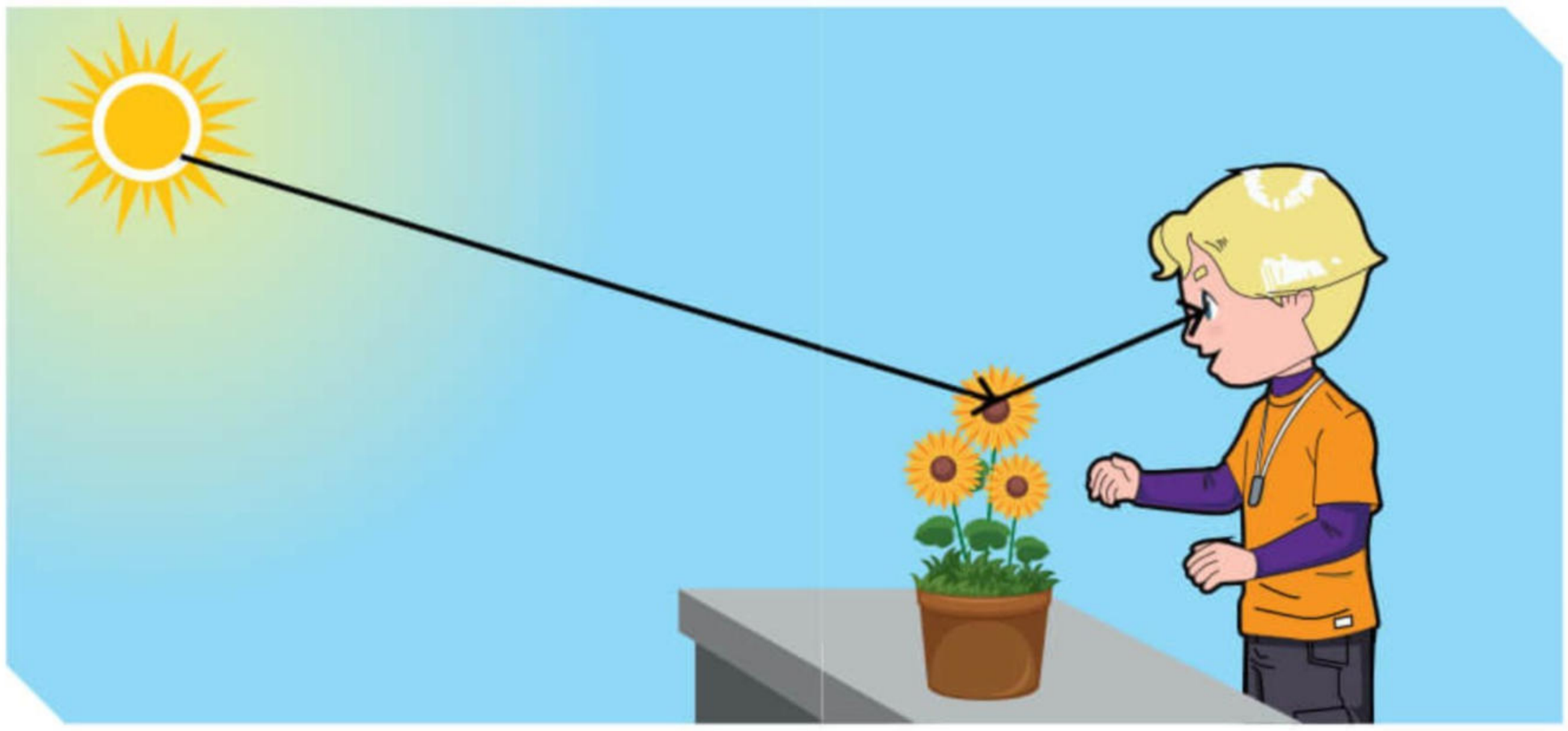
We need light to see. When light reaches our eyes, we are able to see objects.

We cannot see anything in a dark room because there is no light reaching our eyes. When we turn on the light, we can see the light source. That is because light from the light source travels to our eyes.

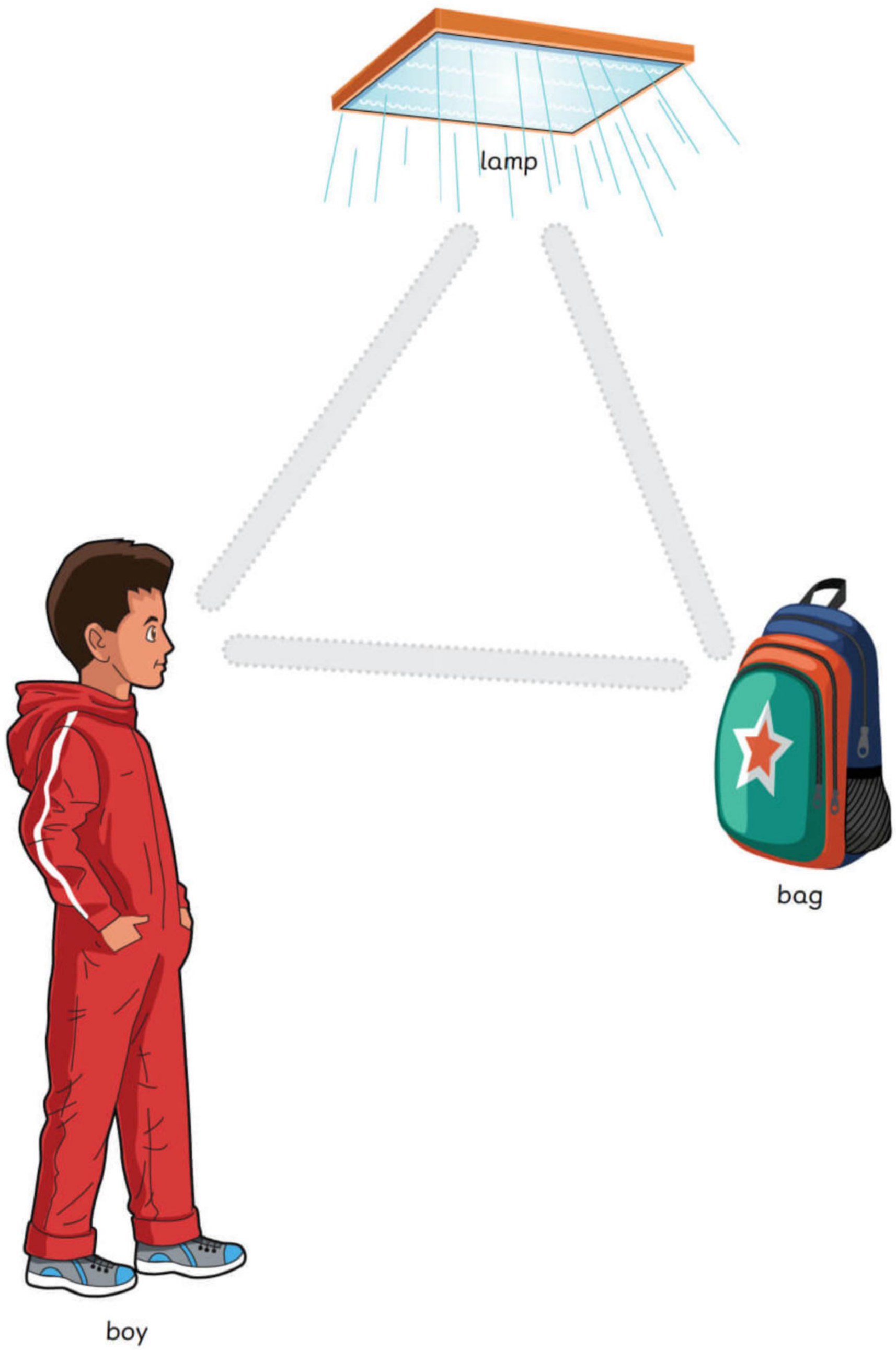
We can also see other objects in the room that are not sources of light, such as walls, doors, tables and books. We see these objects when light from the light source is reflected off them and reaches our eyes.

The book is not a light source. However, we can see it when light from the candle is reflected off the book into our eyes.

We can draw a ray diagram to show how we see objects that are not sources of light.



The boy can see the lamp and the bag. Choose stickers from the back of the book. Paste them to complete the ray diagrams to show how light from the lamp travels so the boy can see the lamp and the bag.



Tech Talk!

A capsule endoscopy camera is a tiny camera that doctors use to take pictures inside your body. The camera is the size of a vitamin pill. The patient is asked to swallow the camera. It travels down the body, taking thousands of pictures. It has lights to ensure that the pictures taken are bright and clear. Doctors use the pictures to find out if there are any problems in the body. The camera is passed out of the body with waste.

Can you think of other uses for such tiny cameras?

Science at Work

Optical engineers design and build things that make use of light to do something useful. They carry out research on light. They also design and test devices such as telescopes, lasers, microscopes and cameras.

Find out more about some devices in your home that make use of light to work.

Word Boost

capsule
endoscopy

Problem-based Learning

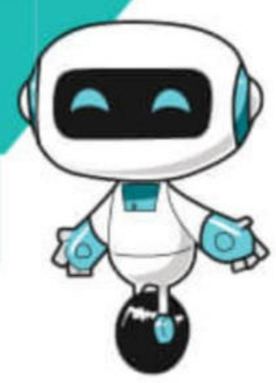
What can we do if there is no light?

Imagine that there is a power failure at night. You have homework to do, but there is only one torch at home. There are also materials such as aluminium foil, cloth, plastic, paper plates and metal trays.

1. Work in groups.
2. Ask yourselves the following questions. You can use the Internet for help with your research.
   - Which materials will you use to make the torch brighten up a larger area? Explain why you chose these materials.
   - What else can you do to light up more areas in the house?
3. Create a poster to show how you will use the materials and the torch to light up your entire room. Include ray diagrams in your poster.
4. Share your poster with the class.

Check Your Learning

Describe how you are able to see this page.



Tick (✓) to show what you can do.

- ☐ I can state how light reflects off surfaces.
- ☐ I can describe how we see objects that are not light sources.
- ☐ I can identify risks and explain how to be safe during practical work.
- ☐ I can do practical work safely.
- ☐ I can create tables and diagrams to show observations.
- ☐ I can draw a diagram to show a scientific idea.
- ☐ I can choose and use the right equipment.
- ☐ I can identify people who use science around me and describe how they use it.

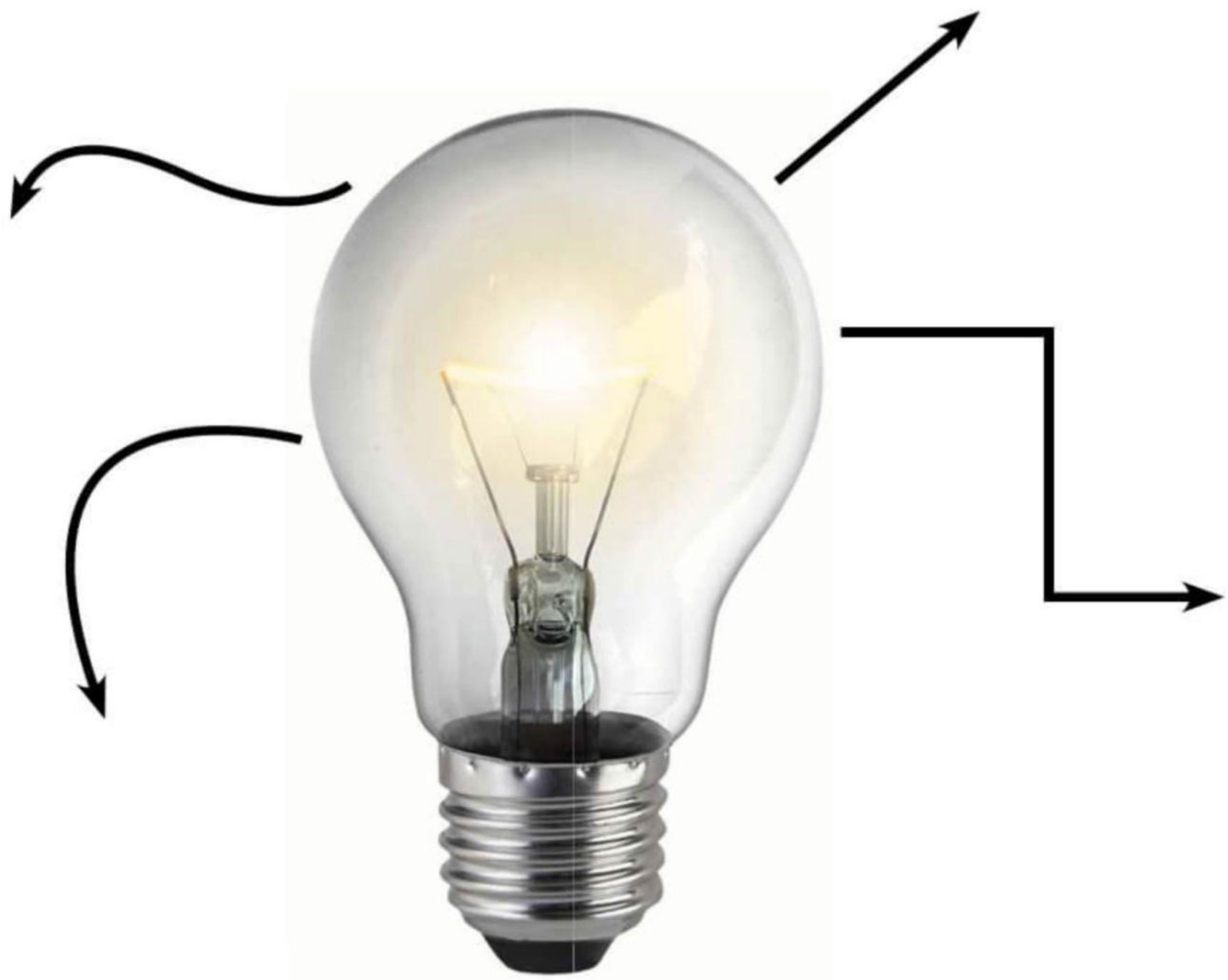
Practice Worksheet

1. Tick (✓) the correct box beside each sentence.

	True	False
Light travels in straight lines.	☐	☐
We can see objects that are not light sources.	☐	☐
We can see objects if light is not present.	☐	☐
A ray diagram shows how light travels from our eyes to an object.	☐	☐
When light reaches a surface, the light disappears.	☐	☐

2. How does light travel?

   Circle the correct arrow.



3. Suri is reading a book at night.

Draw light rays on the picture to show how light from the source is reflected off the surface of the book so that she can see it.

Science Words

R

ray diagram
a drawing that shows how light travels

reflection
the bouncing of light from a surface

reflects
bounces off

reliable
gives the same result when the experiment is repeated

CHAPTER 8

Electrical Circuits

You have learnt in Stage 2 about simple circuits and using electricity safely. Look at the picture. How would you turn the lamps on and off?

Name three objects that use electricity in your school.

_____, _____, _____

A Simple Circuits

In this section, I will

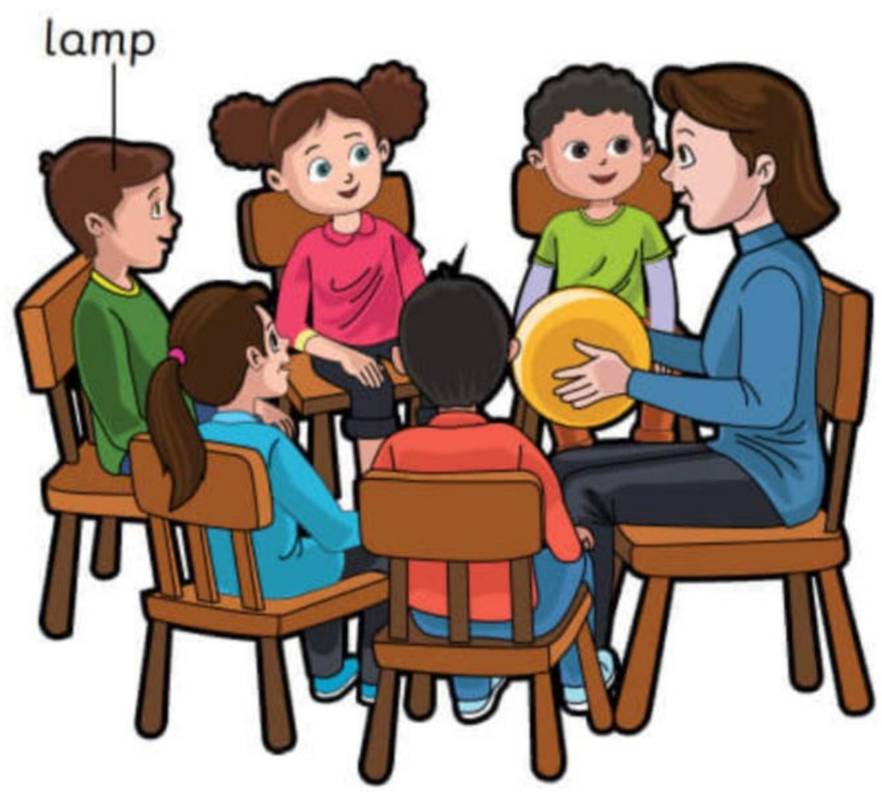
- explain that an electrical device will not work if there is a break in the circuit
- describe how a switch opens and closes a circuit
- explain why models do not fully represent an idea
- explain relationships and quantities through models
- describe the use of science where I live

Thinking cap

I wonder if a lamp can light up if the wires in a circuit are not connected properly...

Let's Explore!

Let's make a circuit!

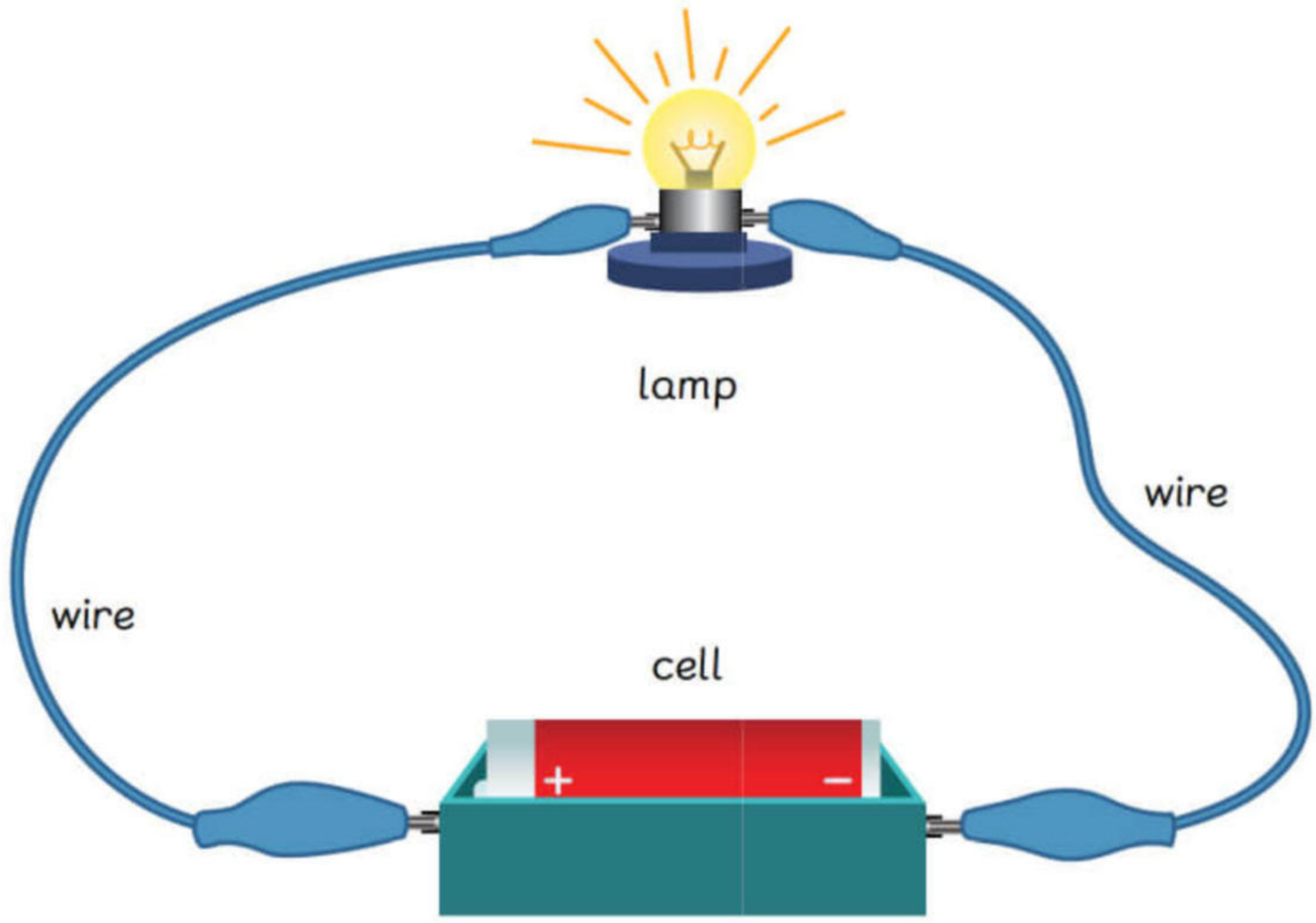


1. Sit in a circle with your chairs touching.
2. Your teacher will name someone the "lamp".
3. Your teacher will pass a ball to the student on her right.
4. You can only pass the ball to the person on your right whose chair is touching yours.
5. When the ball reaches the "lamp", the person should yell "Light!" before passing the ball to the right.
6. The teacher will name a different "lamp" in each round.
7. Predict what will happen if two of your classmates are taken away from the circle and there is a gap. Can the ball get passed all around to reach the "lamp"?
8. In what ways is the model of a circuit your class has acted out different from an actual circuit?

Let's Learn

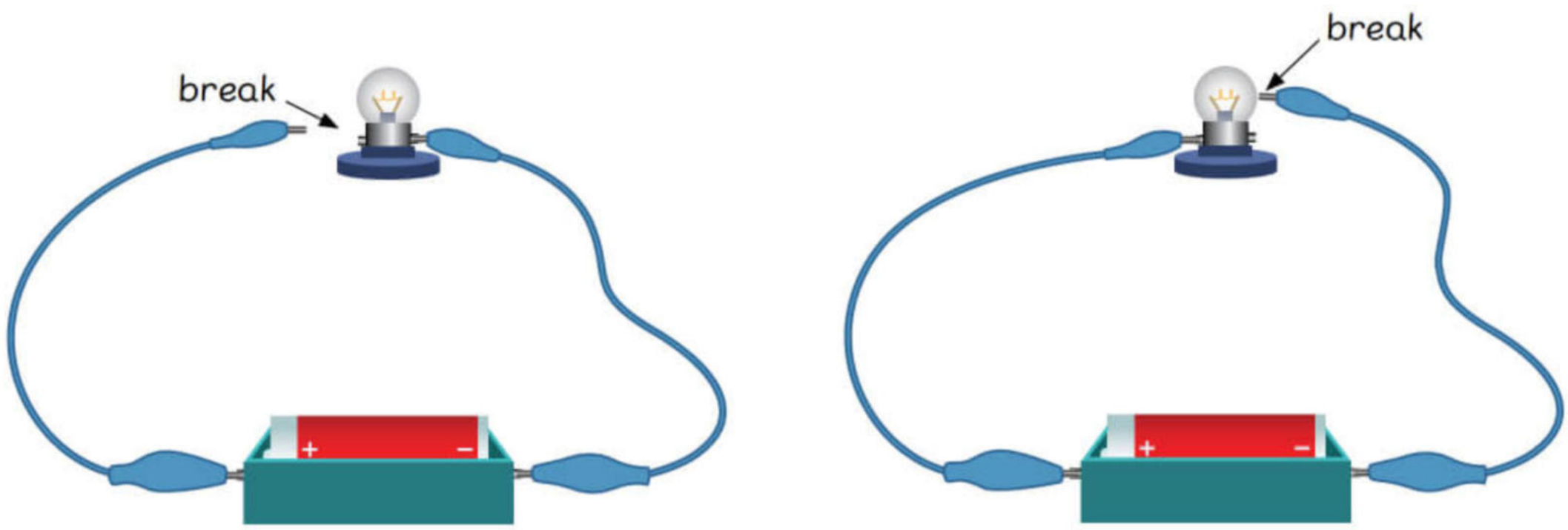
What Happens if There Is a Break in the Circuit?

Electricity travels from a power source such as a cell around the circuit through wires. The electric current flows through the wires around the circuit and back to the cell. If there is a lamp in the circuit that is connected properly, the lamp will light up.



closed circuit

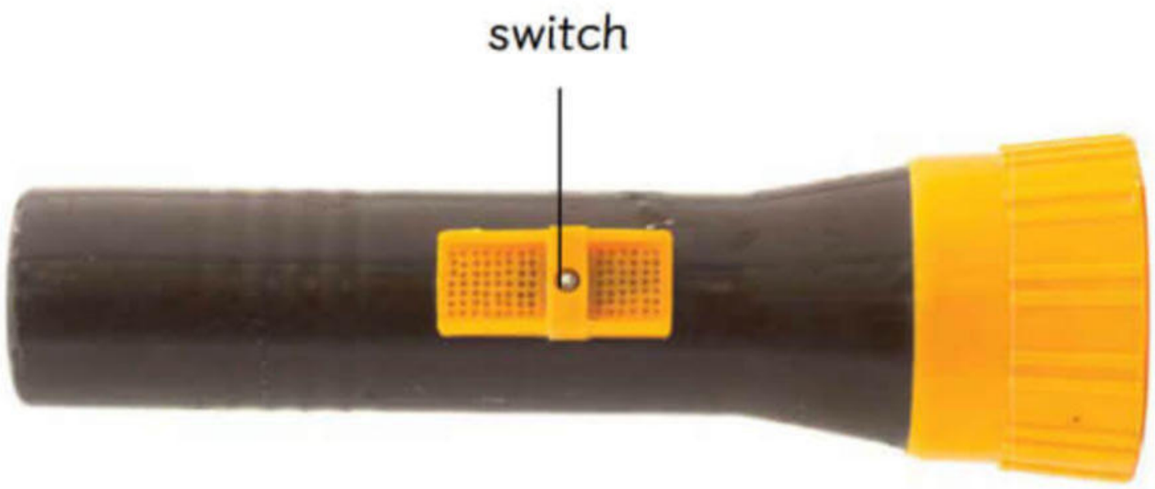
If the lamp and wires are not connected properly, the lamp will not light up. There is a break in the circuit and electric current cannot flow around the circuit.



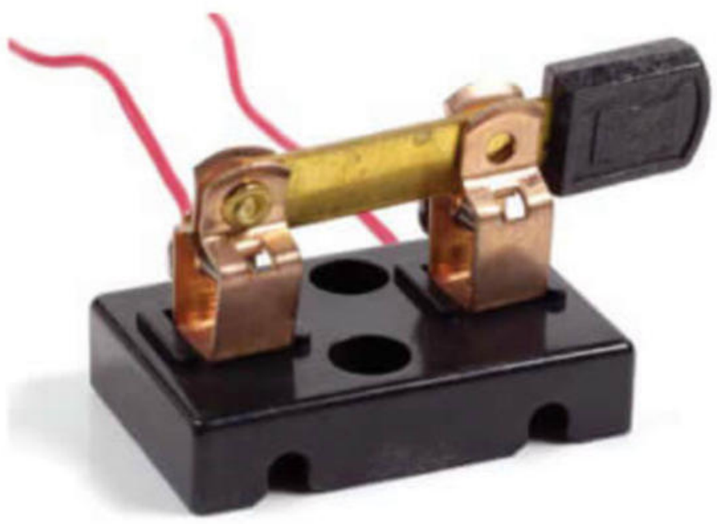
open circuits

What Is a Switch?

A **switch** is used to control the flow of electric current in a circuit. It can be used to turn an electrical device on or off.

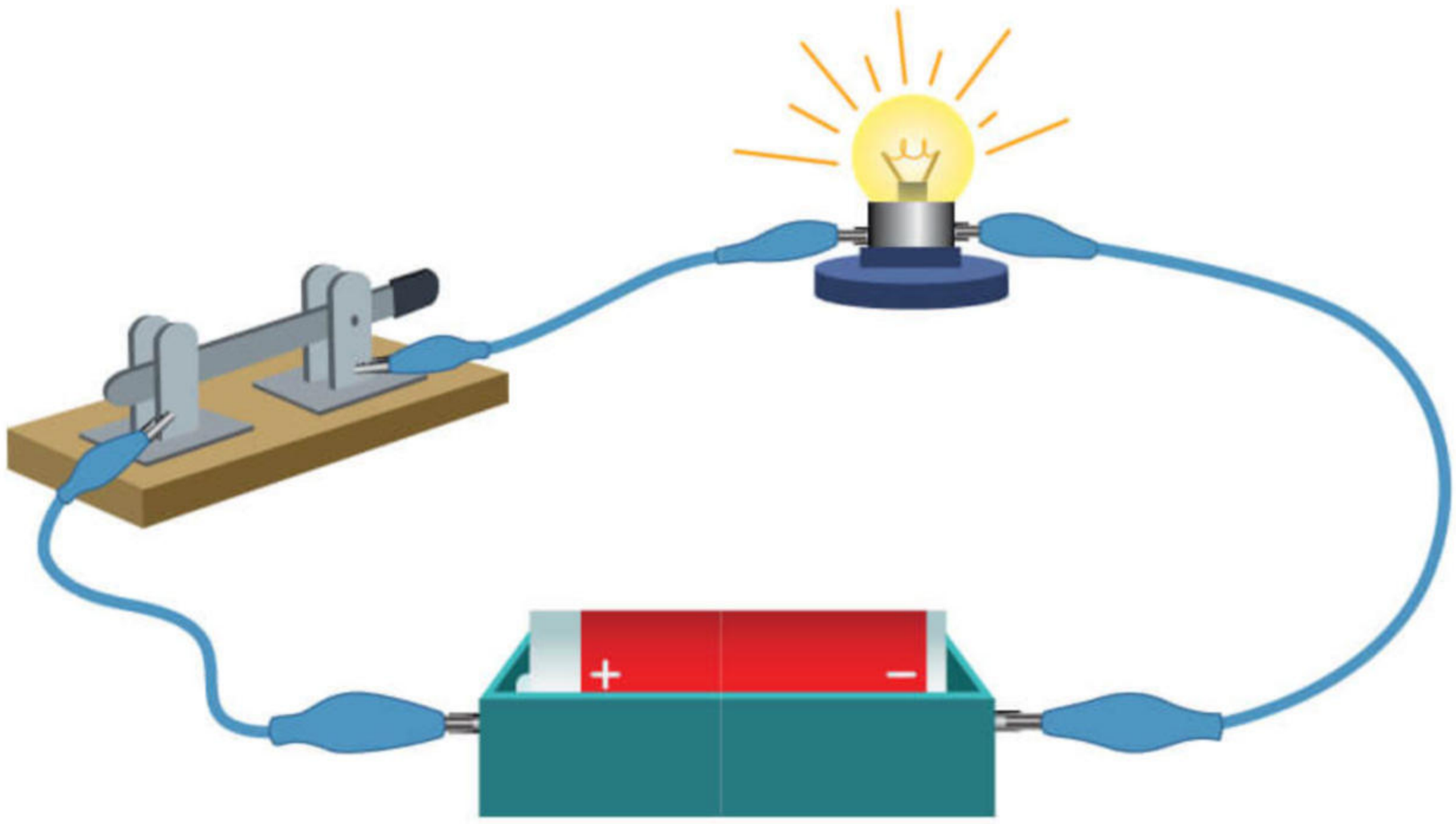


a torch with a switch



a closed switch

When we turn the switch on, the circuit is closed. There are no breaks in the circuit and electric current can flow through the circuit. The lamp in the torch will light up.



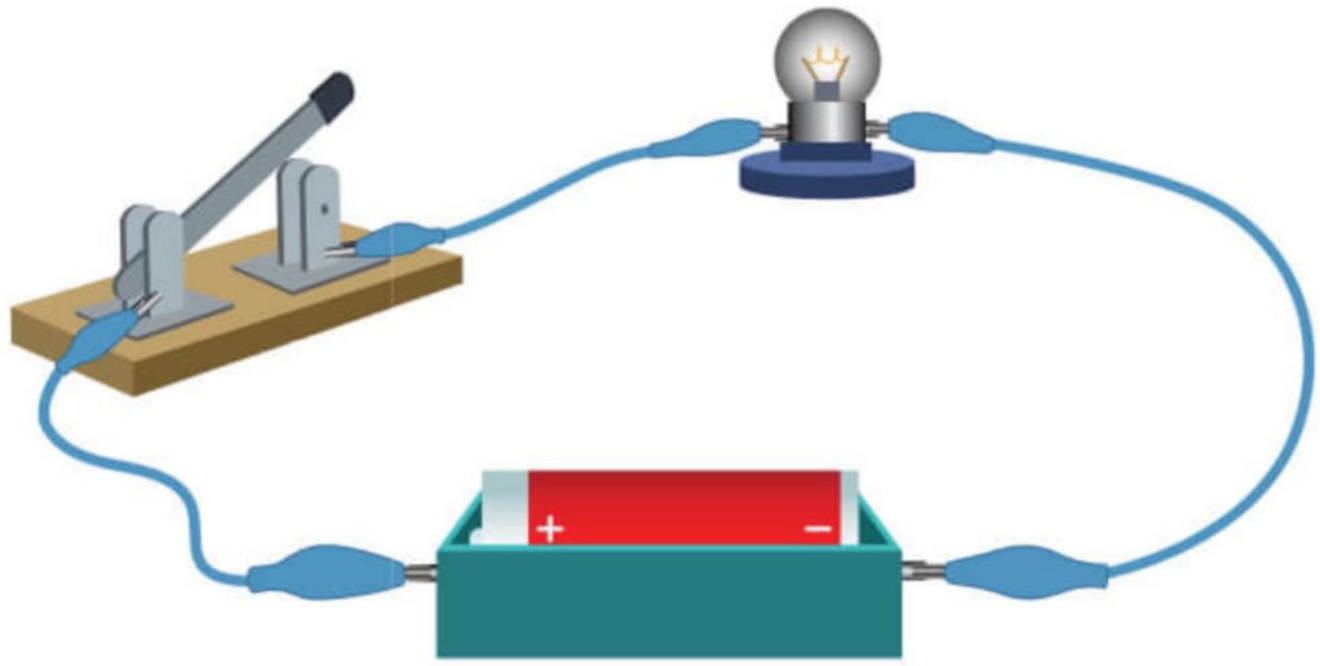
closed circuit

Word Boost

control

When we turn the switch off, the circuit is open. There is a break in the circuit and electric current cannot flow through the circuit. The lamp in the torch will not light up.

an open switch



open circuit

In a circuit with two switches, will a lamp light up if only one switch is closed? Try this experiment and share with your class what you observed.

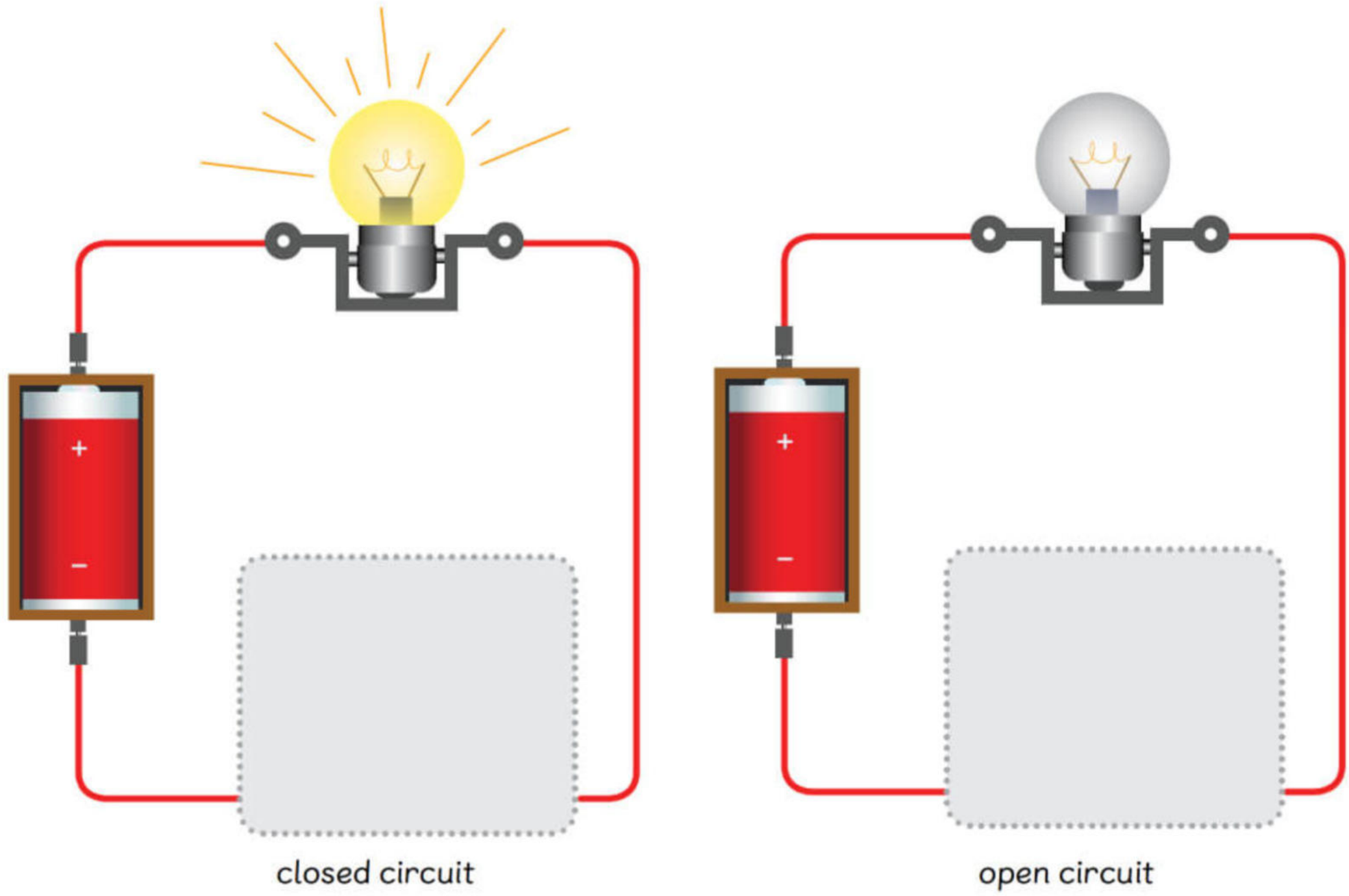
Tech Talk!

Solar-powered lamps use energy from the Sun to light up your garden. The cells get energy from sunlight in the daytime. A switch opens the circuit when there is sunlight to charge the cells. The switch will close the circuit when there is no sunlight, so the lamps will light up.

What are some other solar-powered devices? Find out how they work and share with your class.

Activity Book
Activity 8A, p. 73

Use the stickers at the back of the book to complete the circuits.



closed circuit

open circuit

Check Your Learning

What happens to the lamp if there is a break in the electrical circuit?

Tick (✓) to show what you can do.

- ☐ I can explain how circuits will not work if there is a break in the flow of electricity.
- ☐ I can describe the use of switches in an electrical circuit.
- ☐ I can explain why models do not fully represent a situation or idea.
- ☐ I can explain relationships and quantities through models.
- ☐ I can describe the use of science where I live.

B Brightness of a Lamp

In this section, I will

- explain how changing the number or type of components can make a lamp brighter or dimmer
- identify the five main types of scientific enquiry
- identify and explain patterns in results
- produce a table to explain results
- learn what the variables are when doing a fair test
- identify people who use science around me and describe how they use it

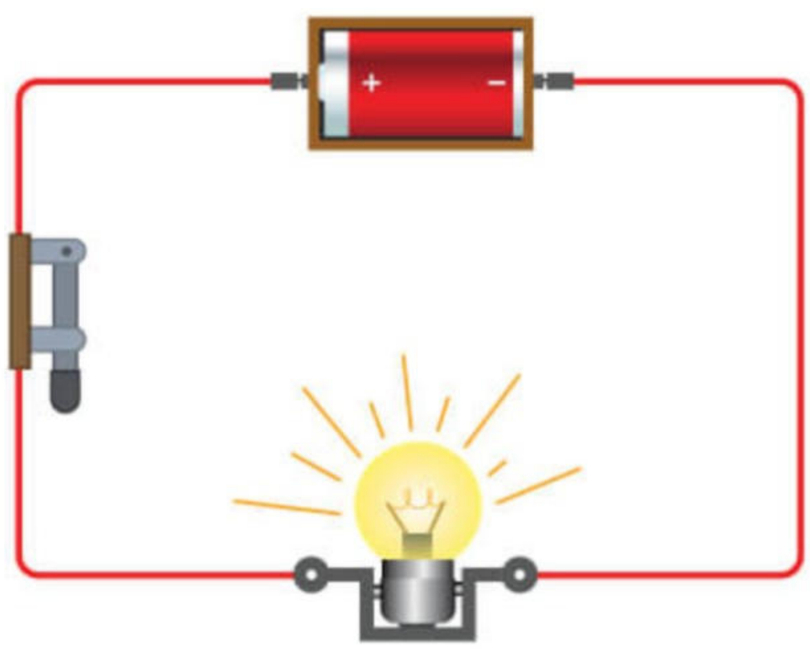
Thinking cap

I wonder if anything will change if I add more lamps to a circuit...

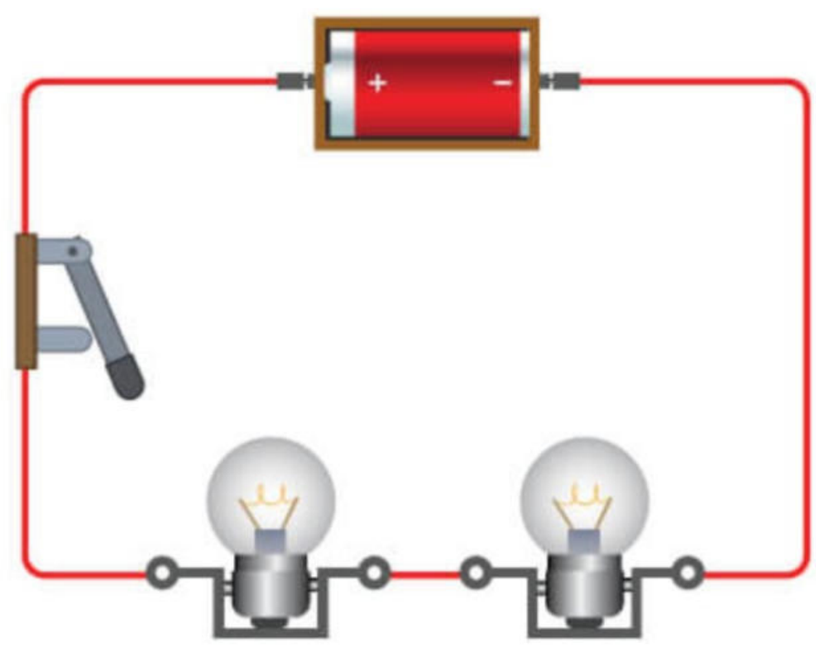
Let's Explore!

Spot the differences!

1. Look at the two pictures below.



circuit A



circuit B

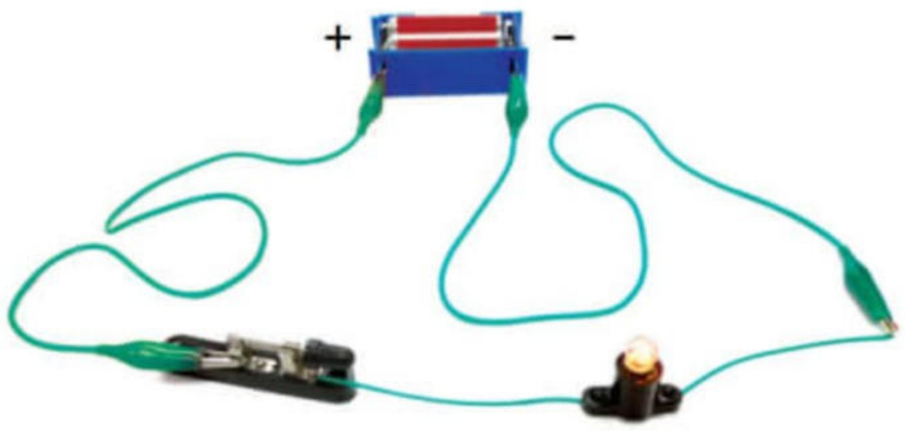
2. What are the differences between circuit A and circuit B?
3. In pairs, predict what you will observe about the lamps in circuit B when the switch is closed.

Let's Learn

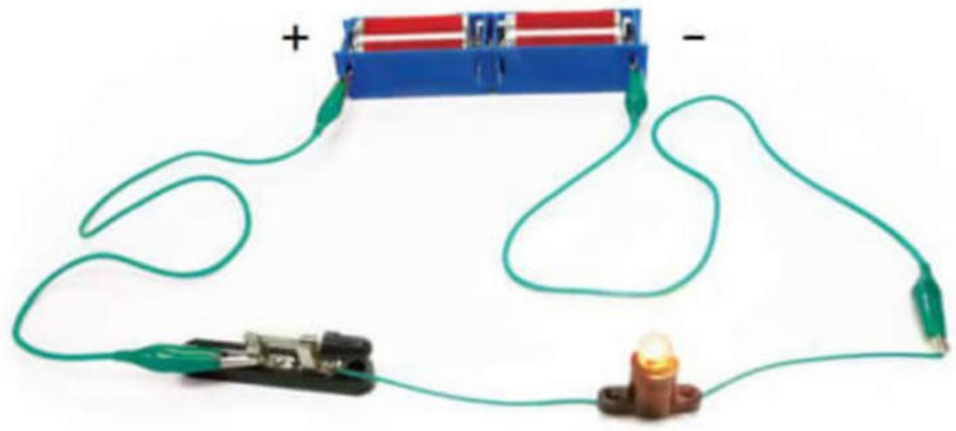
How Do Changes Affect Lamps in a Circuit?

Circuits can be made in many ways. You can use wires that are short or long. You can use different number of cells. You can use different number of lamps. You can also add buzzers or alarms.

What will happen to the lamp if you add more cells in a circuit?



circuit with one cell



circuit with two cells

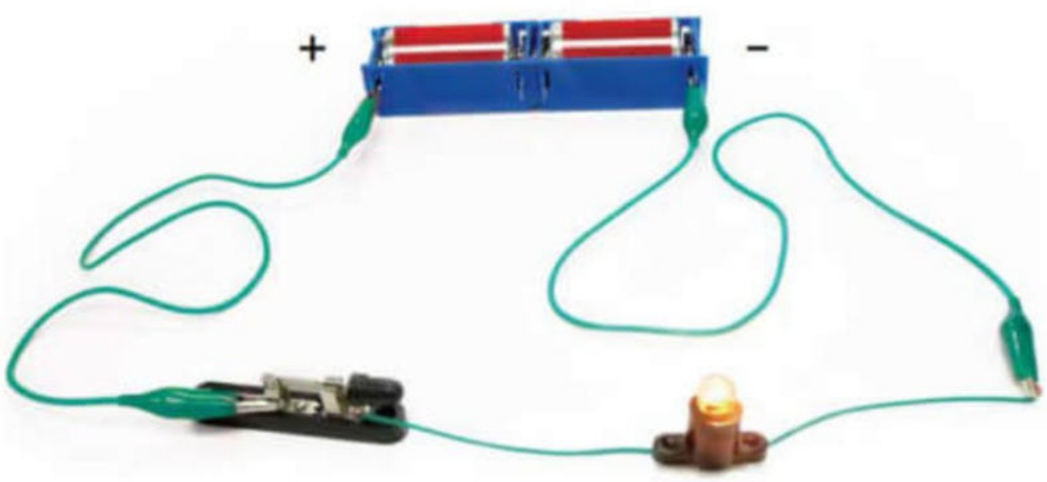
The more cells in a circuit, the **brighter** the lamp will be.

What will happen to the brightness of the lamp if you add more lamps in a circuit?

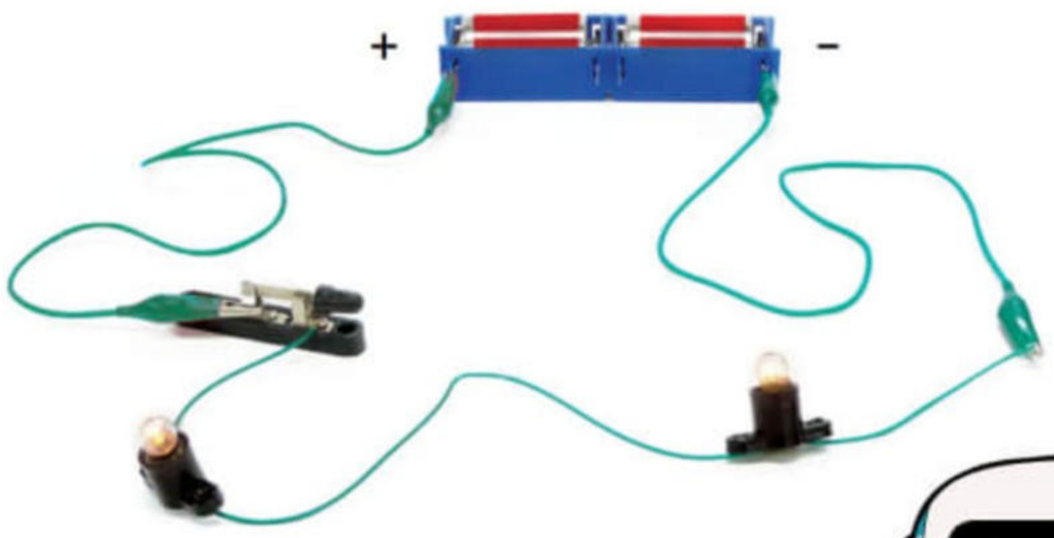
Option

Watch!

Scan this page to watch a video that shows how changing the number of components in a circuit affects the brightness of the lamps.

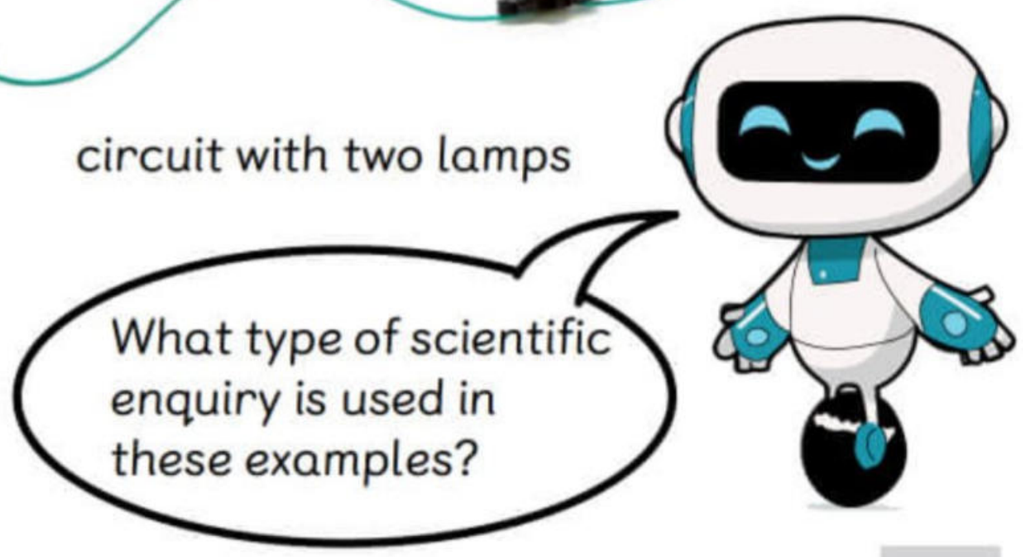


circuit with one lamp



circuit with two lamps

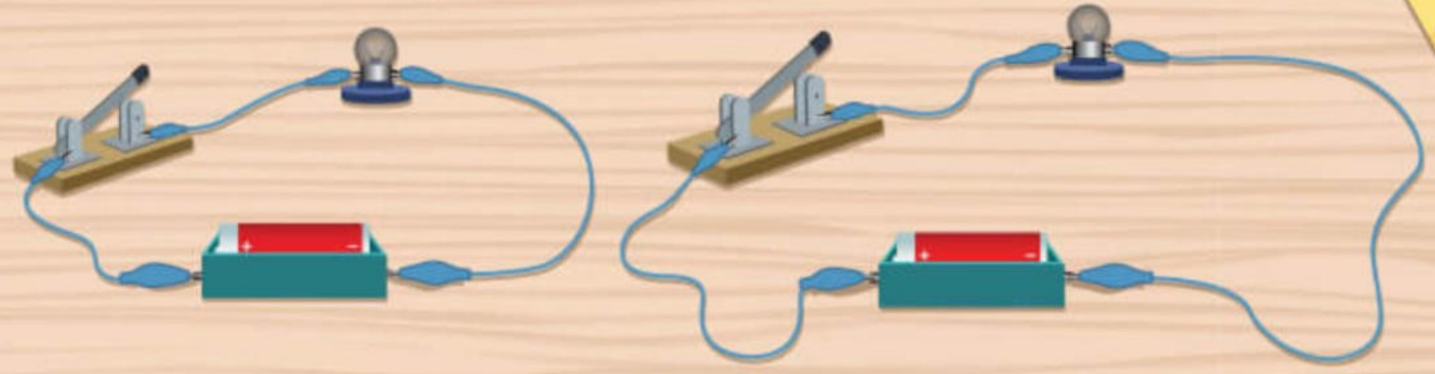
The more lamps in a circuit, the **dimmer** the lamps will be.



Investigations involve variables. Variables are things that can be changed, observed or kept the same in the investigation.
A **control set-up** is one where no variables are tested. It is used to compare the results of the experiment.
If we want to investigate how the length of wires affects a circuit, we must identify the variables to make it a fair test. We can conclude if the length of wires have affected the brightness of the lamp only if we conduct a fair test.
control set-up

The variable we change is the length of the wires. The variable we observe is the brightness of the lamp.

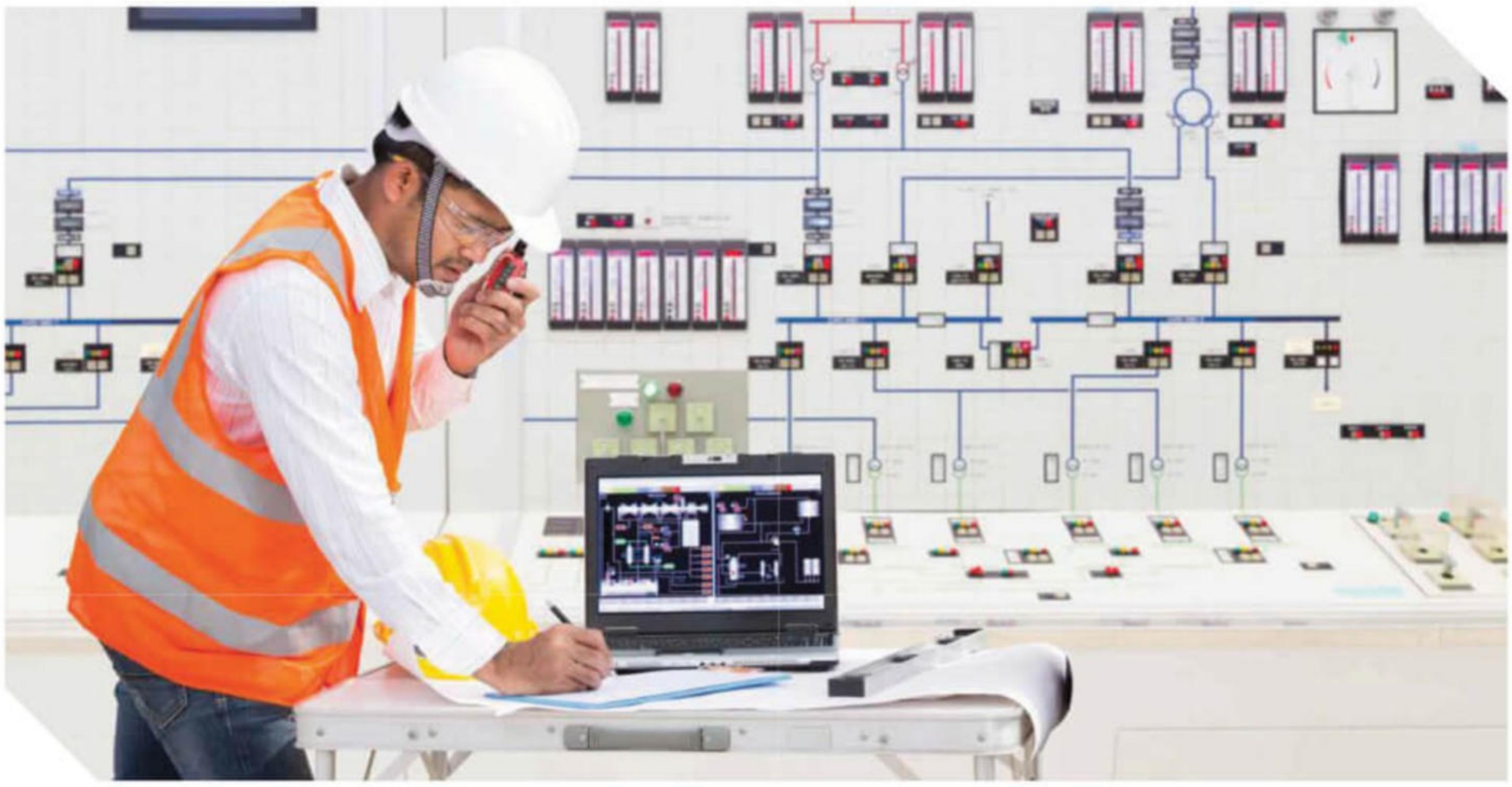
We must keep the number and type of lamp in each circuit the same. We must also keep the number and type of cell for each circuit the same.



Try out the experiment above. Make sure you do not touch the hot lamps during the experiment. Record your findings in a table. What is the pattern you observe? What can you conclude from the experiment?

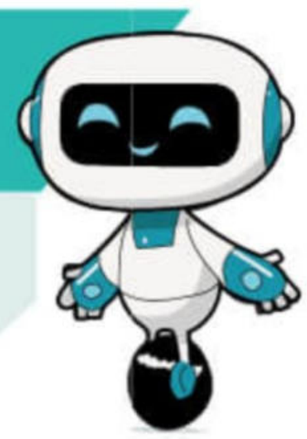
Activity Book
Activity 8B, p. 75

Science at Work



Electrical engineers design and build many things such as computers, robots and smartphones. The ideas and inventions of electrical engineers like Thomas Edison and Nikola Tesla led to many devices that we use today. Find out more about some of their inventions.

Check Your Learning



What are some ways to change the brightness of a lamp in a circuit?

Tick (✓) to show what you can do.

- ☐ I can explain how changing the number or type of components can make a lamp brighter or dimmer.
- ☐ I can identify the five main types of scientific enquiry.
- ☐ I can identify and explain patterns in results.
- ☐ I can produce a table to explain results.
- ☐ I can identify what the variables are when doing a fair test.
- ☐ I can identify people who use science around me and describe how they use it.

C Conductors and Insulators

In this section, I will

- state that some materials are good electrical conductors and some are good electrical insulators
- learn to choose and use the right equipment
- learn to identify risks and explain how to be safe during practical work
- draw a diagram to show a scientific idea

Thinking cap

I wonder why wires are usually covered in plastic...

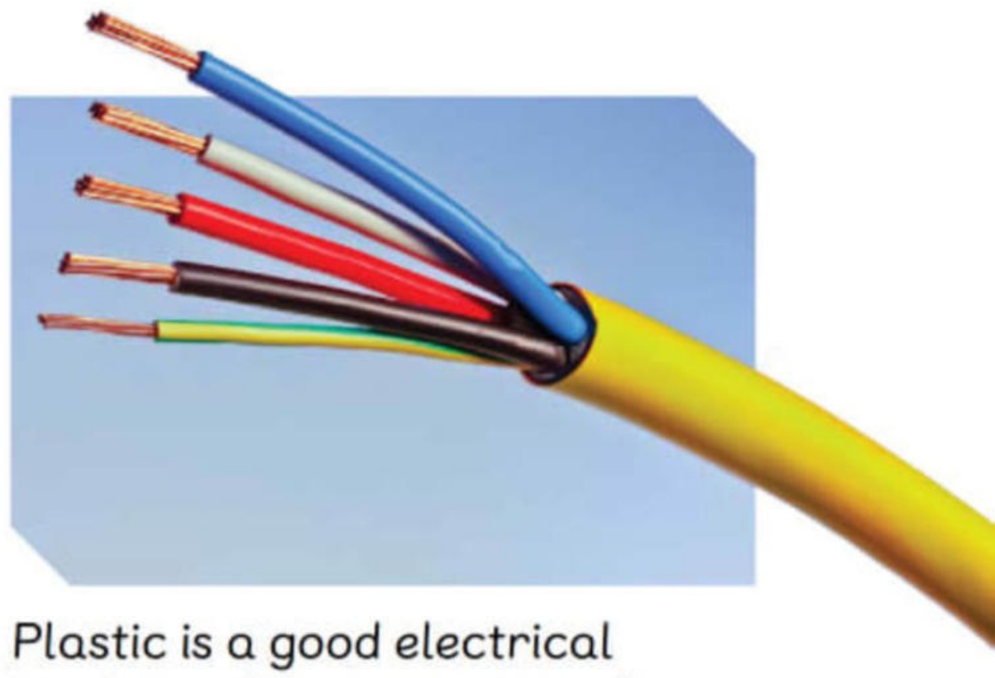
Let's Learn

What Are Conductors and Insulators?

Electrical conductors are materials which allow electric current to flow easily. Metals are good electrical conductors. Copper is the most common material used for electrical wires.

Electrical insulators are materials that do not allow electric current to flow easily. Non-metals such as plastic, rubber and wood are good electrical insulators.

Our body is a good conductor of electricity. If electric current flows through our body and into the Earth, we will get an electric shock. This is why wires of electrical appliances are covered in plastic.



Plastic is a good electrical insulator that protects us from electric shocks.

Word Boost

shock

Here are some examples of objects made from materials that are good electrical conductors and insulators.

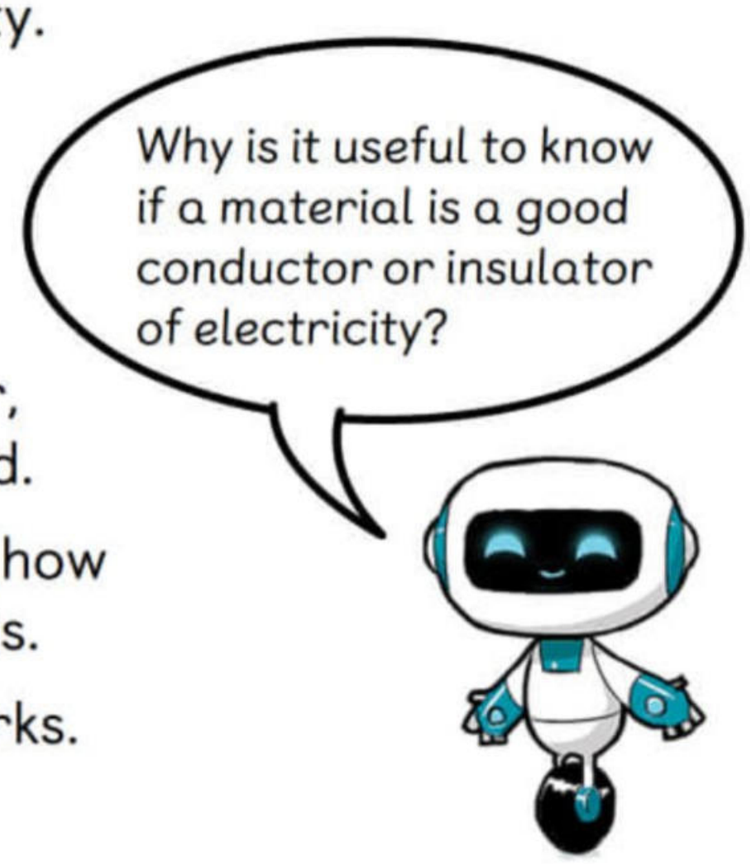
Electrical conductors	Electrical insulators
gold bracelet	paper plate
steel pan	cotton t-shirt
graphite pencil	wooden ruler
bronze medal	ceramic vase

Problem-based Learning

How can you find out?

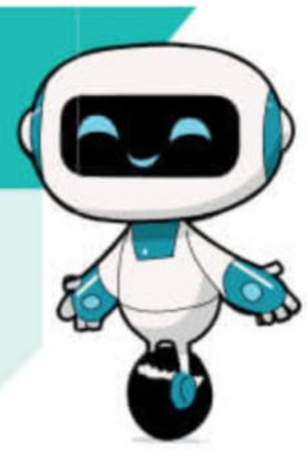
You found some objects made of unknown materials. Your task is to sort these objects according to their ability to conduct electricity.

1. Work in groups.
2. Make a device that can test whether a material is a conductor or an insulator. You can use these items: cells, wires, a switch, a lamp, a buzzer, a spoon, tape, paper clips, scissors and cardboard.
3. List down the risks when using the device. Explain how to stay safe when carrying out tests on the objects.
4. Make a poster to show your device and how it works.
5. Share your poster with the class.



Check Your Learning

What are some examples of good electrical conductors and good electrical insulators?



Tick (✓) to show what you can do.

- ☐ I can state that some materials are good electrical conductors and some are good electrical insulators.
- ☐ I can choose and use the right equipment.
- ☐ I can identify risks and explain how to be safe during practical work.
- ☐ I can draw a diagram to show a scientific idea.

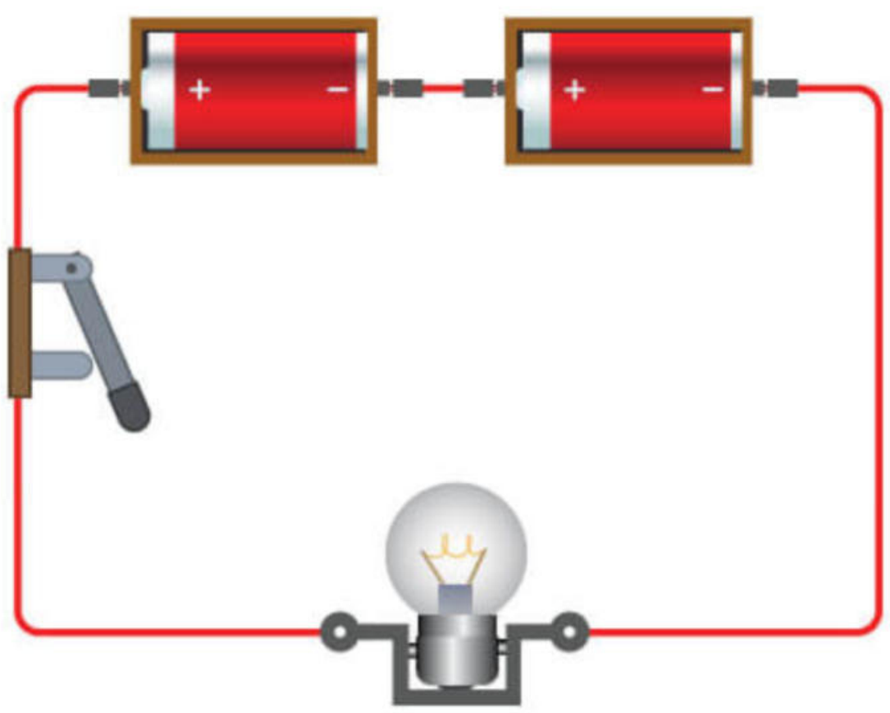
Activity Book
Activity 8C, p. 79

Practice Worksheet

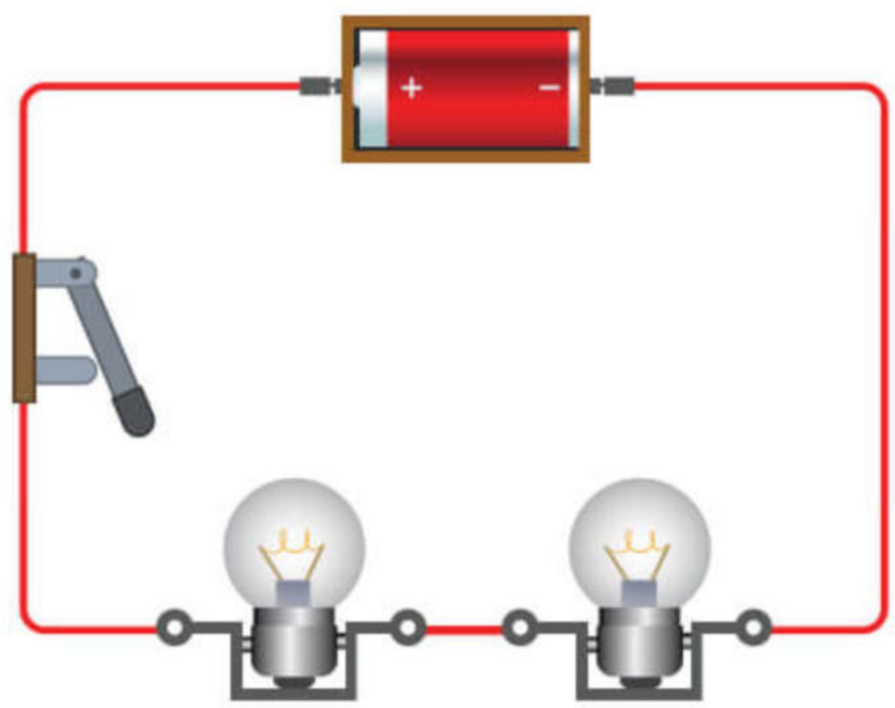
1. Tick (✓) the correct box beside each sentence.

	True	False
A lamp will light up if there is a break in the circuit.	☐	☐
A switch opens and closes a circuit.	☐	☐
Adding more cells makes a lamp in a circuit brighter.	☐	☐
Electrical wires are made of plastic.	☐	☐
Copper is a good electrical conductor.	☐	☐
Insulators are materials that do not allow the flow of electricity.	☐	☐

2. Wei Li made two circuits as shown below.
Tick (✓) the circuit where the lamp(s) will be brighter when the switch is closed.

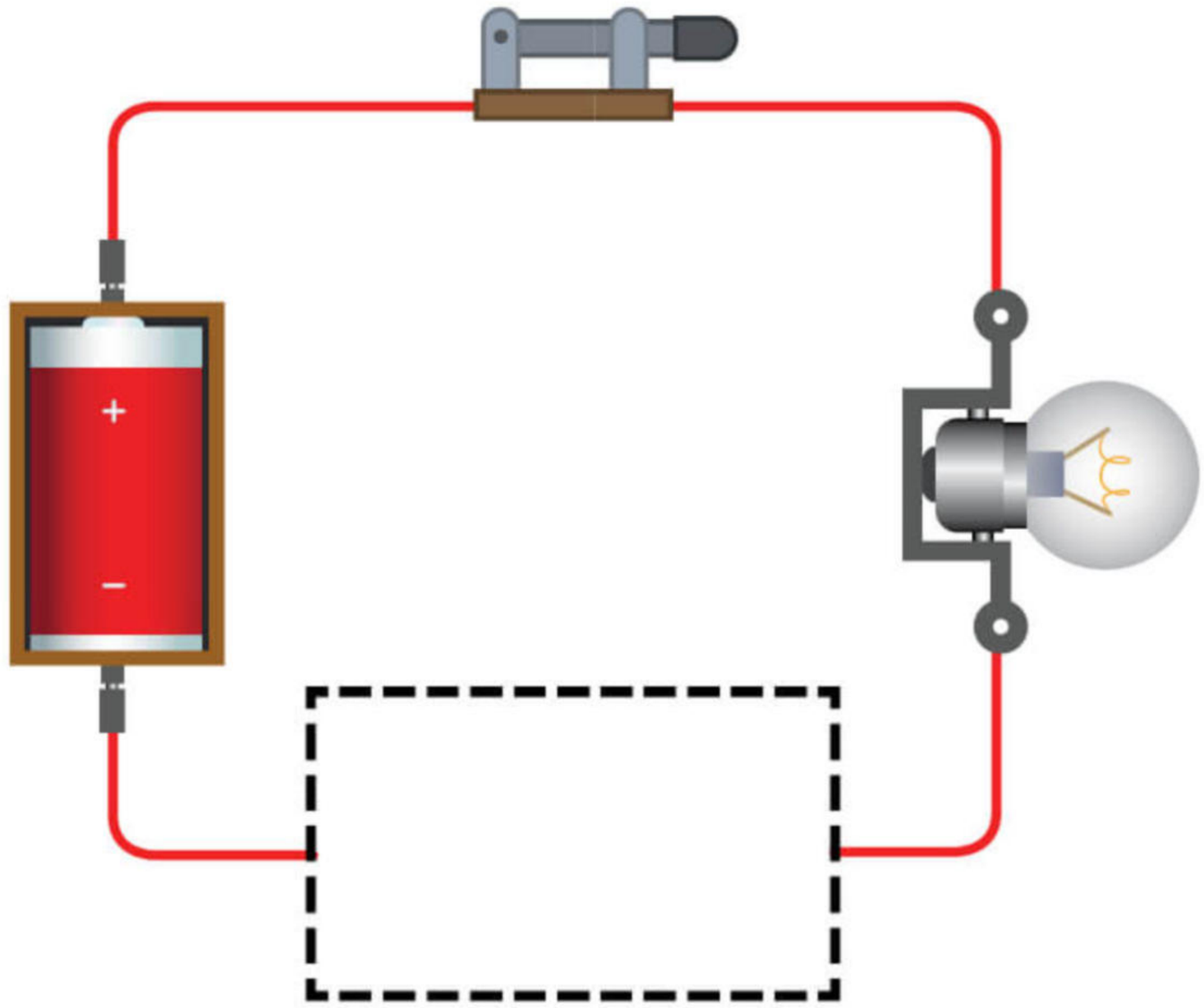


☐



☐

3. Bala and Putri made the circuit below. There is a break in the circuit.



Which of the following items will close the circuit so the lamp will light up?
Circle the **two** correct answers.

iron nail

rubber band

plastic straw

wooden toothpick

glass lens

silver coin

Science Words

B

brighter
shining with more light

C

control set-up
set-up with no variables tested

D

dimmer
shining with less light

E

electrical conductors
materials that allow electrical current to flow through easily

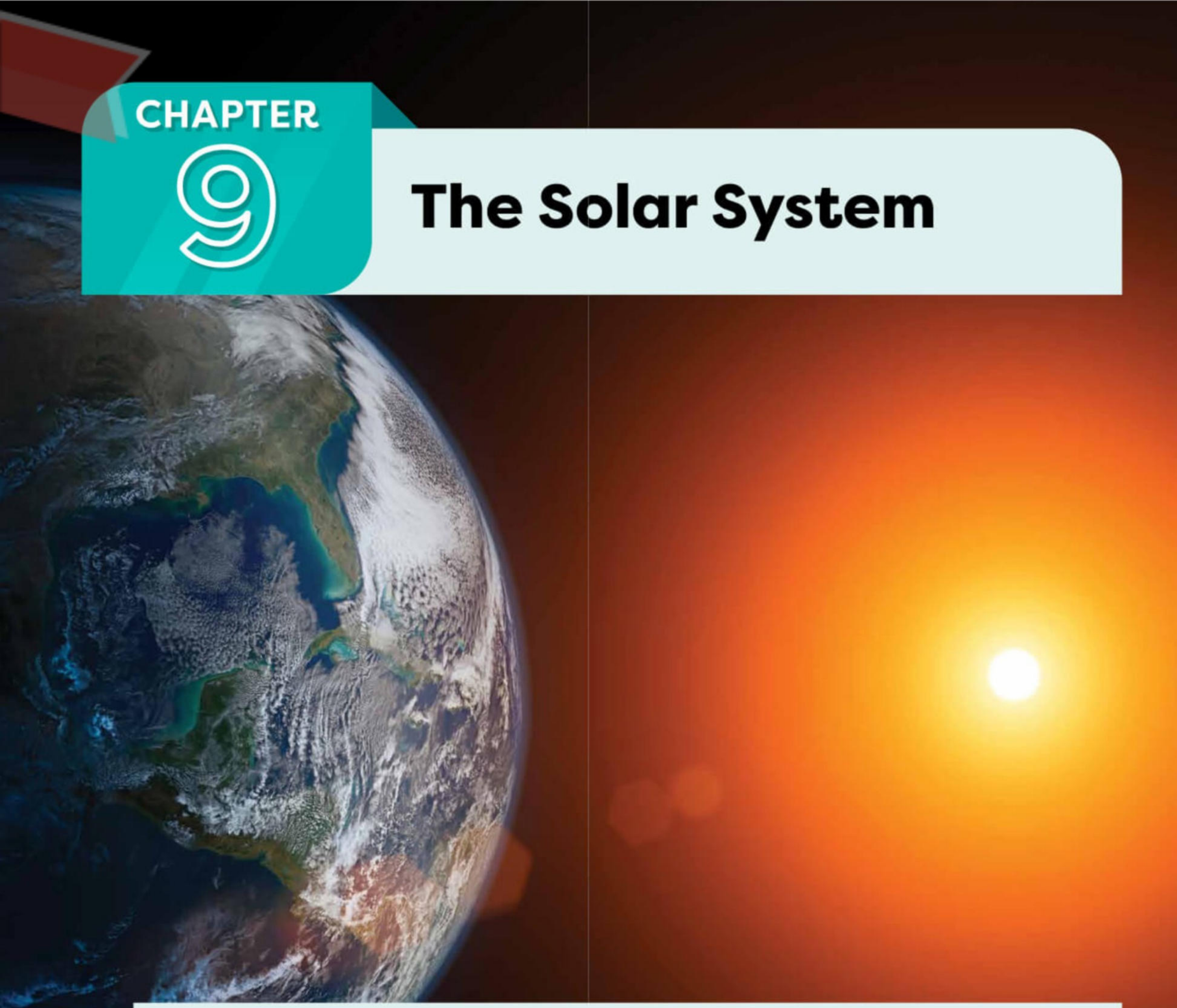
electrical insulators
materials that do not allow electric current to flow through easily

S

switch
an object that can open or close a circuit

CHAPTER 9

The Solar System



You have learnt that the Earth is the planet on which we live. The picture shows our planet Earth and the Sun. We can see the Sun in the sky during the day.

Why do we not see it at night?

Write three words you think of when you see the Sun.

_____, _____, _____

A The Solar System

In this section, I will

- learn that the Sun is at the centre of the Solar System
- name the planets in the Solar System
- learn that planetary systems contain stars, planets, asteroids and comets
- explain relationships, quantities or scale through models
- explain why models do not fully represent a situation
- use science to help me support my points of view or actions
- describe how evidence obtained through enquiry has changed scientific knowledge and understanding over time
- identify people who use science around me and describe how they use it

Thinking cap

I know that Earth is a planet. I wonder if there are any other planets like Earth...

Let's Explore!

What planets are there?

1. Use the stickers of planets at the back of the book. Paste two of them below.
2. Find out about the two planets that you have chosen. Write two things about each of them.

1. _____
2. _____

1. _____
2. _____

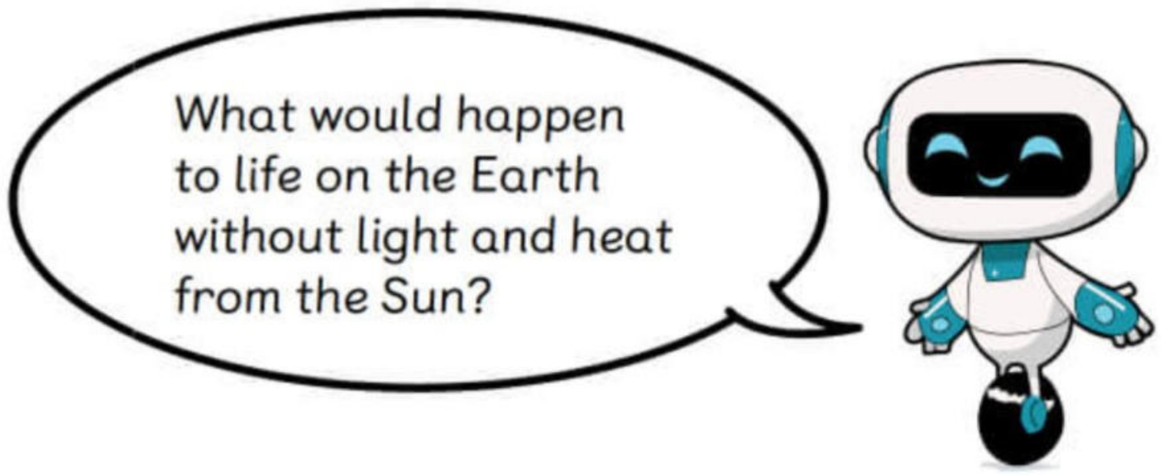
Let's Learn

What Makes Up the Solar System?

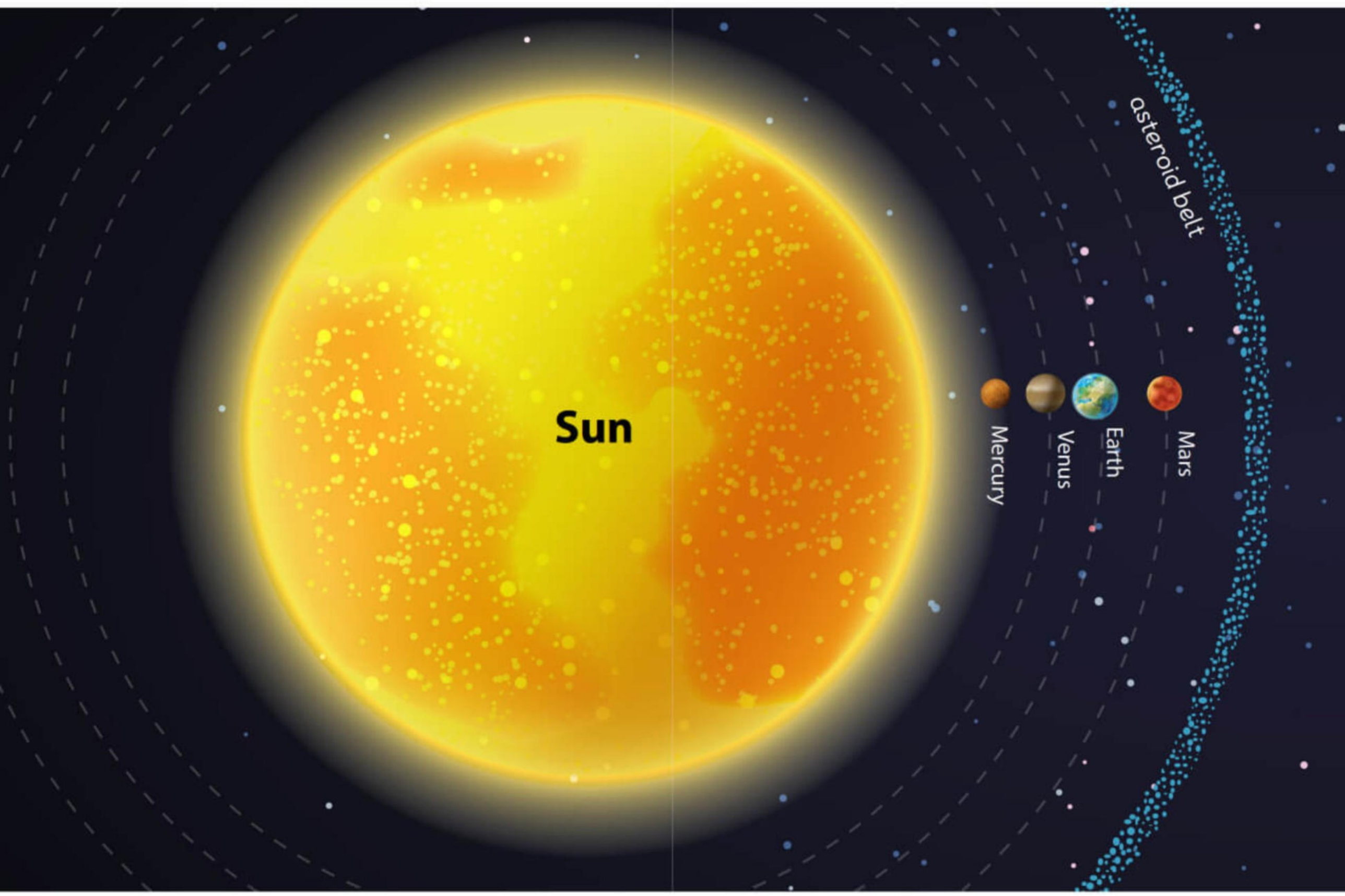
The **Solar System** is made up of the Sun and objects that move around the Sun. It includes eight planets and other smaller objects.

The Sun is at the centre of the Solar System. The Sun is a star. It is a huge ball of very hot gases. It provides us with light and heat.

The surface of the Sun is very hot, but it is even hotter inside!



Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune are the planets in the Solar System. All the planets move around the Sun in a certain path.



The model of the Solar System shows us the order of the planets. It also gives us the scale of the sizes of the planets compared to the Sun.

There are other objects in the Solar System, such as asteroids and comets. They are much smaller than the planets.

Asteroids are small, rocky objects that move around the Sun. Most are found in a region called the asteroid belt. The asteroid belt lies between Mars and Jupiter.

Most asteroids have uneven shapes.

Jupiter

Saturn

Uranus

Neptune

comet

The model of the Solar System shows the positions of all the planets and the Sun. Can you explain how the model is different from the actual Solar System?

Comets have long tails made of gas and dust.

Comets are lumps of ice, dust and rock. They usually move around the Sun in the outer regions of the Solar System. As comets get closer to the Sun, they form bright tails.

Activity Book
Activity 9A, p. 85

Word Boost

path
rocky
region
lumps

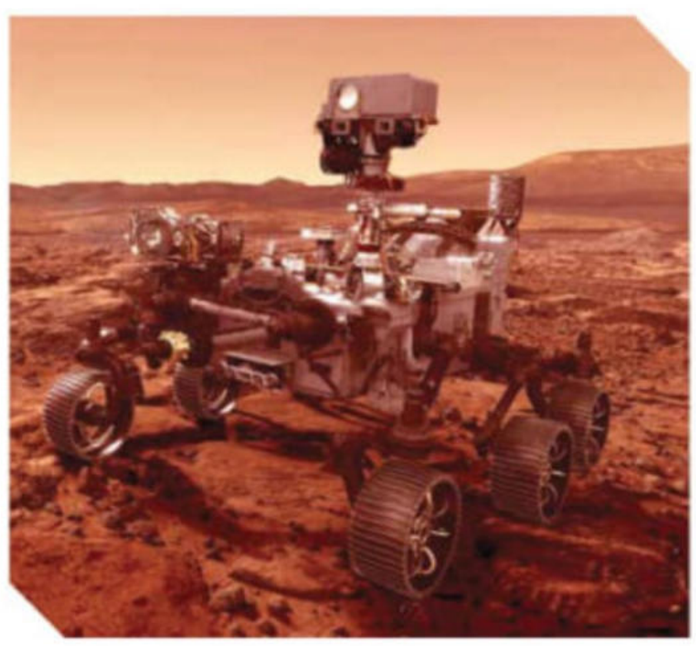
Are There Other Planetary Systems Like the Solar System?

Everything that exists makes up the universe. There are billions of galaxies in the universe. Each galaxy is a huge group of stars.

The Solar System is part of a galaxy called the Milky Way. You have learnt that the Sun is a star. Within the galaxy, there are billions more stars. Most have planets moving around them. They can also contain asteroids and comets. There are many other **planetary systems** like our Solar System!

In very dark places, we can see the Milky Way as a band of light in the night sky.

Tech Talk!



Mars is very dry and cold. Scientists have used robots called rovers to explore the surface of Mars. From the evidence gathered, they believe that Mars once had water and was much warmer. Some of them also believe that once there may have been living things on Mars.

In 2021, a rover called Perseverance landed on Mars. It will help scientists look for evidence of whether life ever existed on Mars. Why do you think scientists are interested to find out if living things can live on Mars?

How Has Our Understanding of the Solar System Changed Over Time?

Scientists have been studying space for thousands of years. Here are some of the scientists.

During the 2nd century, Ptolemy developed a model to predict the movement of the planets. In his model, Earth was at the centre of the Solar System, and the Sun and the planets moved around it.

During the 16th century, Copernicus proposed that the centre of the Solar System was not Earth, but the Sun. He developed a model that showed Earth and other planets moving around the Sun.

In 1610, Galileo used his own telescope to study objects in space. He observed that Venus moved around the Sun. This proved that Copernicus' model was correct.

Ideas about the Solar System have changed over time. This is possible because scientists gathered new evidence and made new observations over the years.

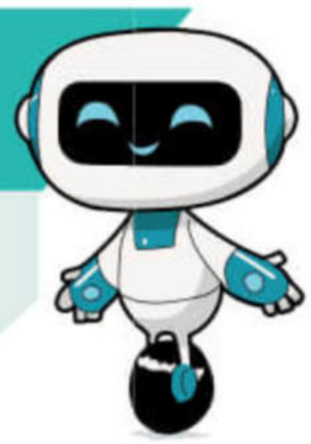
Use books or the Internet to find out how our understanding of the planets in the Solar System has changed since the 1990s.

Science at Work

Rocket scientists design and build rockets and spacecrafts. Rockets and spacecrafts are vehicles that send humans into space. Spacecrafts are also used to explore places in space that humans cannot reach. Rocket scientists help make sure that humans travel safely into space and back.

Find out what scientific knowledge rocket scientists use when developing new rockets and spacecrafts.

Check Your Learning



What are the planets in the Solar System?

Tick (✓) to show what you can do.

- ☐ I can name the planets in the Solar System.
- ☐ I can state that the Sun is at the centre of the Solar System.
- ☐ I can state that planetary systems contain stars, planets, asteroids and comets.
- ☐ I can explain relationships, quantities or scale through models.
- ☐ I can explain why models do not fully represent a situation.
- ☐ I can use science to help me support my points of view or actions.
- ☐ I can describe how evidence obtained through enquiry has changed scientific knowledge and understanding over time.
- ☐ I can identify people who use science around me and describe how they use it.

B Spinning of Earth

In this section, I will

- explain why the Sun appears to move across the sky
- explain why the spinning of Earth causes day and night and changes in shadows
- explain relationships, quantities or scale through models
- explain why models do not fully represent an idea
- identify the five main types of scientific enquiry

Thinking cap

I wonder why my shadow changes throughout the day...

Let's Explore!

How Does Earth Move?

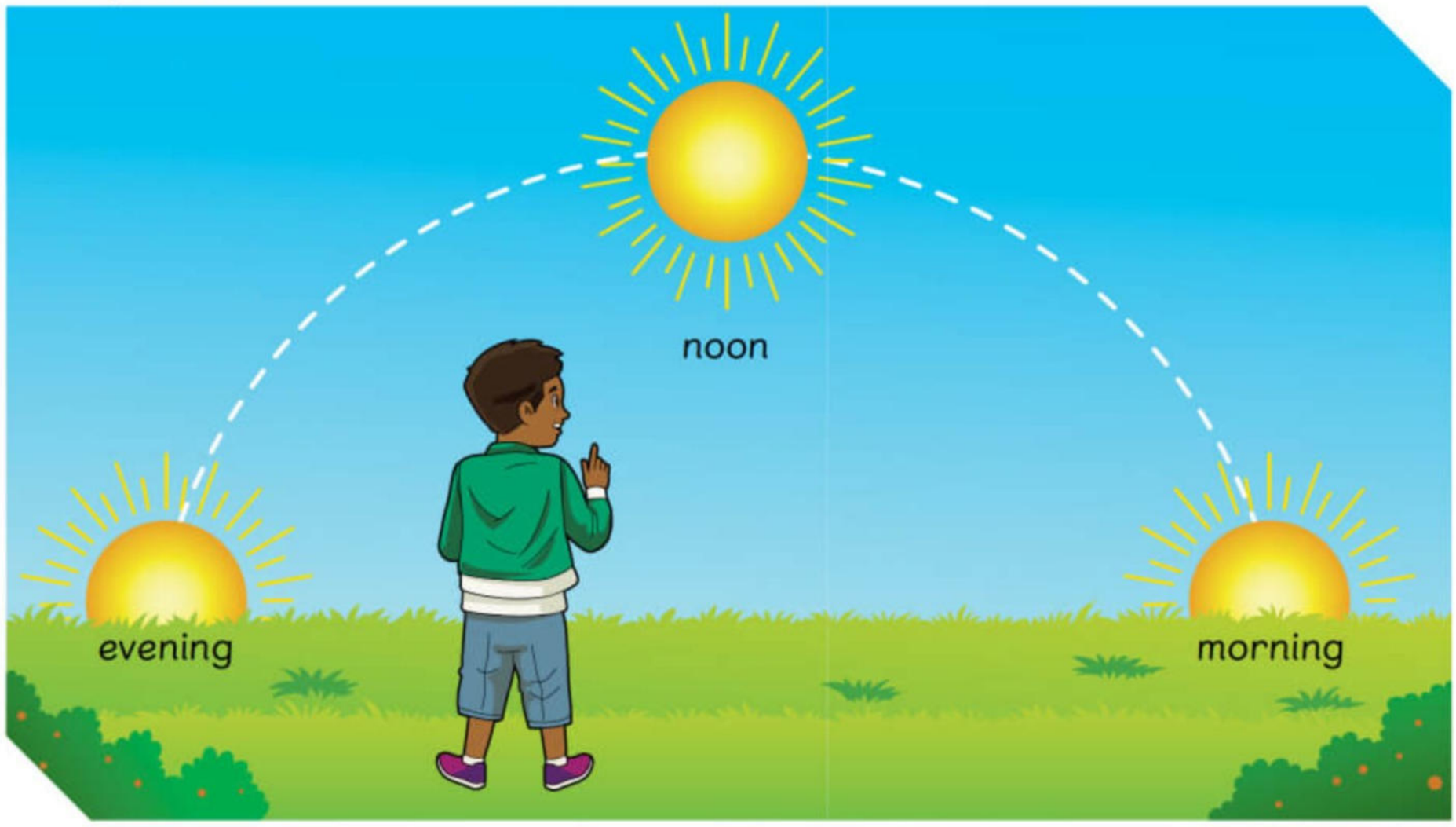
You will need:
- Table lamp

1. Place a lamp on a table and switch it on.
2. In groups, stand in a circle facing outwards. Link arms with the classmates beside you. Make sure one of you is facing the lamp.
3. Move to the left slowly so that the next person is facing the lamp. Keep doing this until you are back where you were at the beginning.
4. You have just used a model to show that Earth spins. The circle represents Earth. The lamp represents the Sun. Discuss these questions:
   (a) Is it brighter or darker when you are facing the 'Sun'? What happens when you turn away from the 'Sun'?
   (b) This model does not fully represent how Earth moves. Why?

Let's Learn

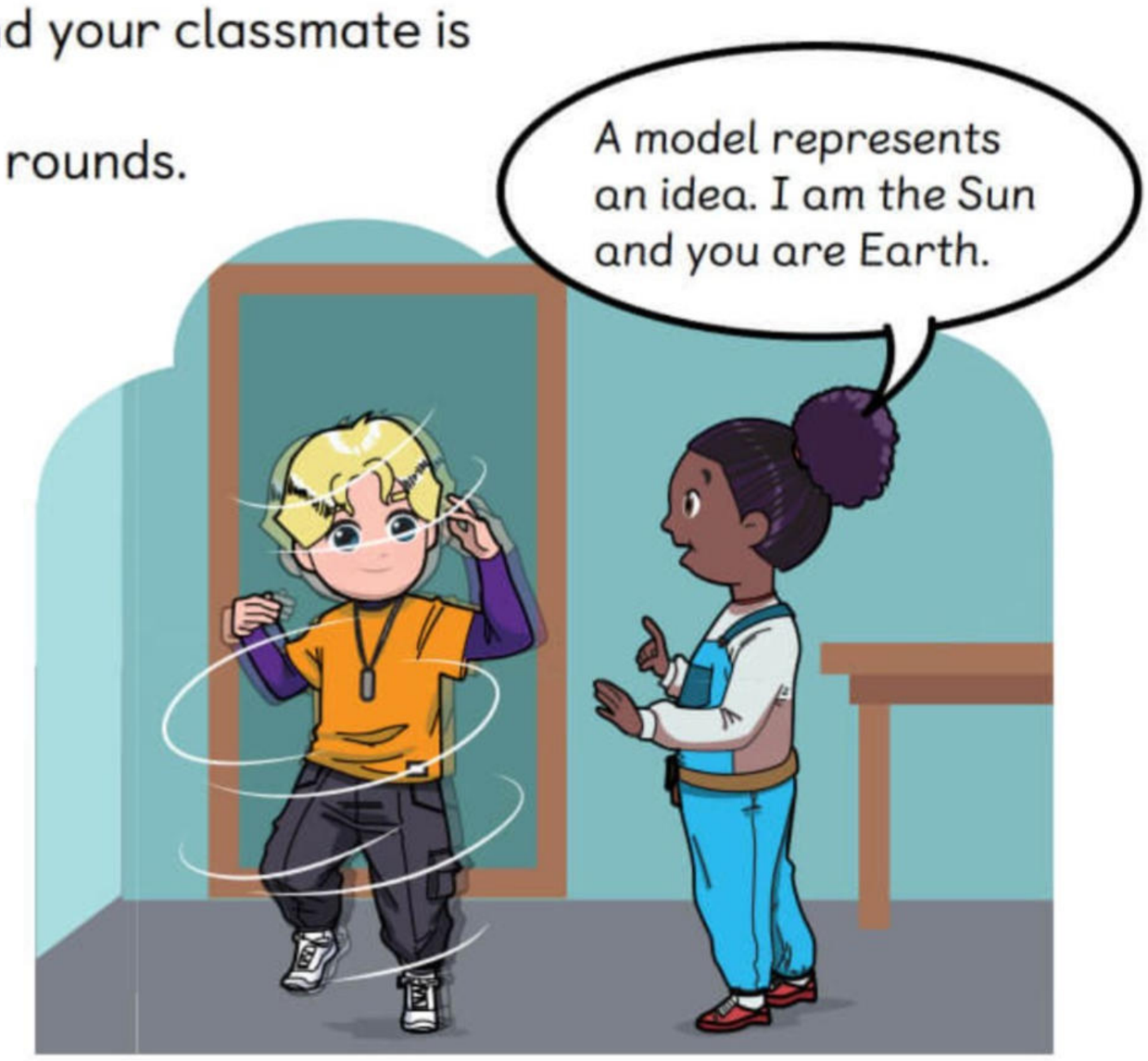
Does the Sun Move Across the Sky?

During the day, it looks as if the Sun is moving across the sky. Does the Sun really move?



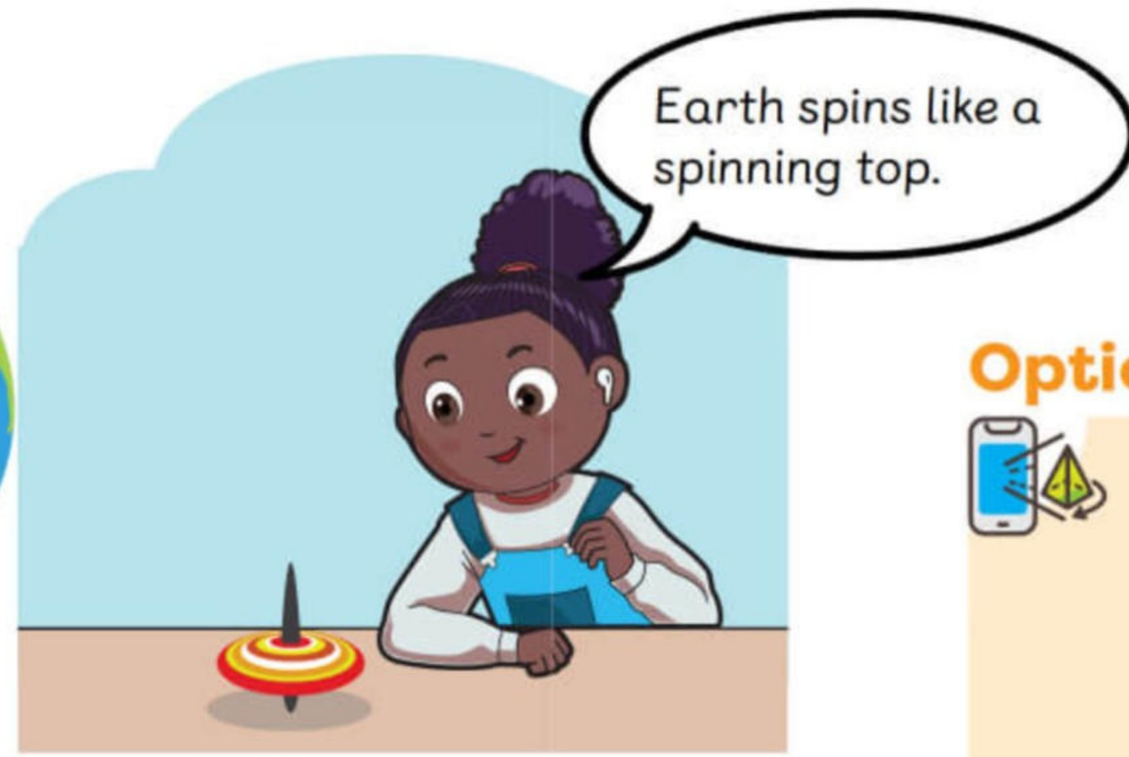
Let's find out why the Sun appears to move.

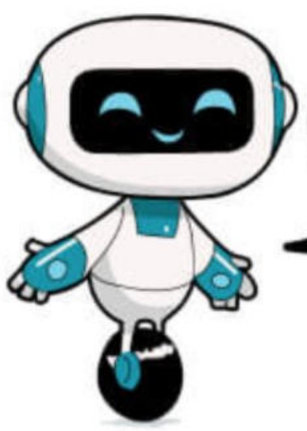
1. Carry out this activity in pairs.
2. Imagine that you are Earth and your classmate is the Sun.
   Slowly spin on the spot for ten rounds.
3. After spinning, look at your classmate and your surroundings. Think about these questions:
   - Does your classmate and your surroundings seem like they are moving?
   - If so, why do you think that happens?



Actually, the Sun does not move. It appears to move because Earth is spinning.

Earth spins or rotates all the time. It spins on its axis. The **axis** is an imaginary line that goes through the centre of Earth.





Option

Watch!

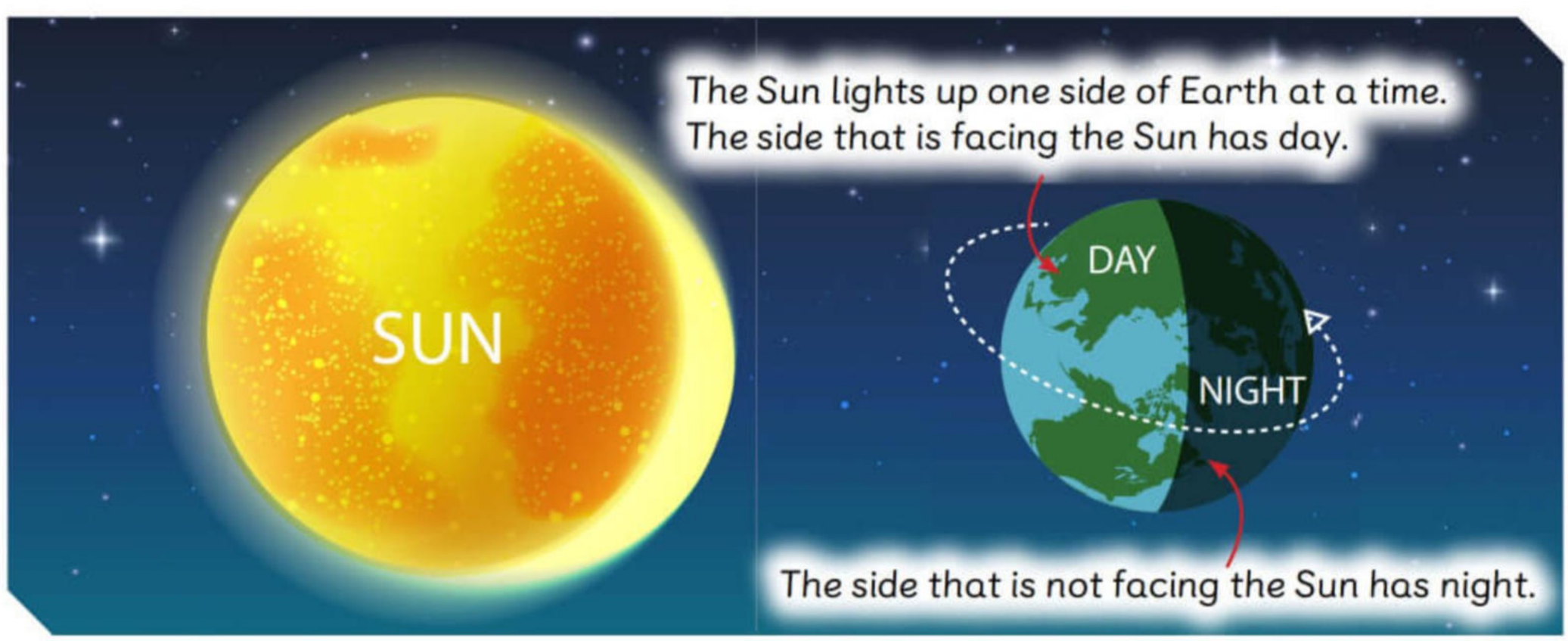
Scan this page to watch a video that explains rotation of Earth.

Word Boost

appears
rotates

What Causes Day and Night?

We get day and night because of the spinning of Earth on its axis.



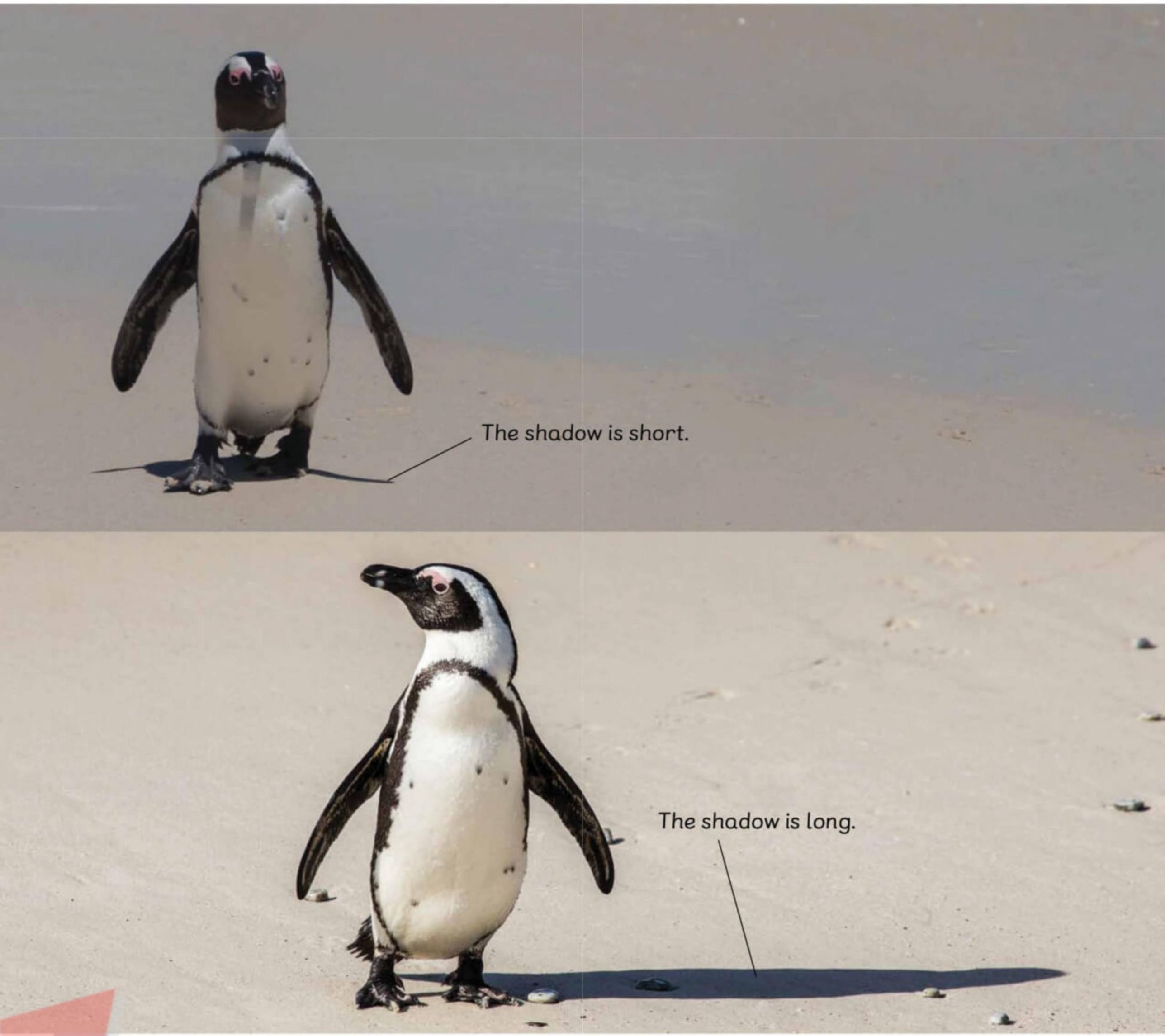
It takes Earth 24 hours to complete one spin. So, there are 24 hours in a day on Earth.

Activity Book
Activity 9B, p. 88

How Do Shadows Change During the Day?

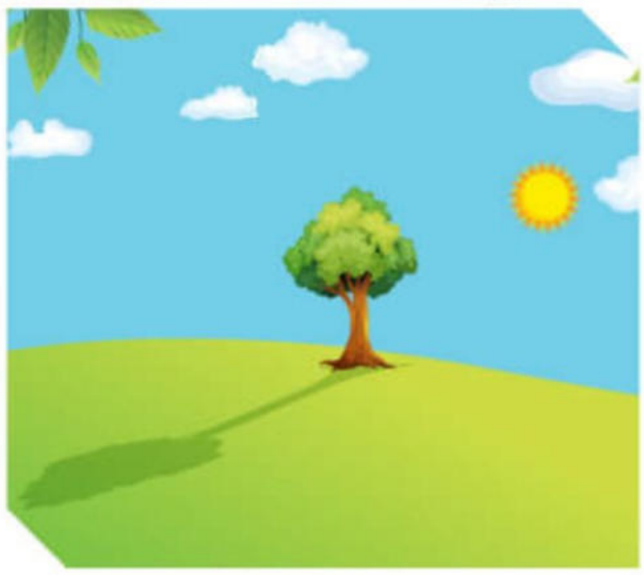
In Stage 3, you have learnt that shadows are dark areas formed when light is blocked. When an object is under the Sun, it forms a shadow.

Have you noticed that your shadow looks different at different times of the day? Compare the shadows in the two pictures. Do you think it is evening or noon in each picture?



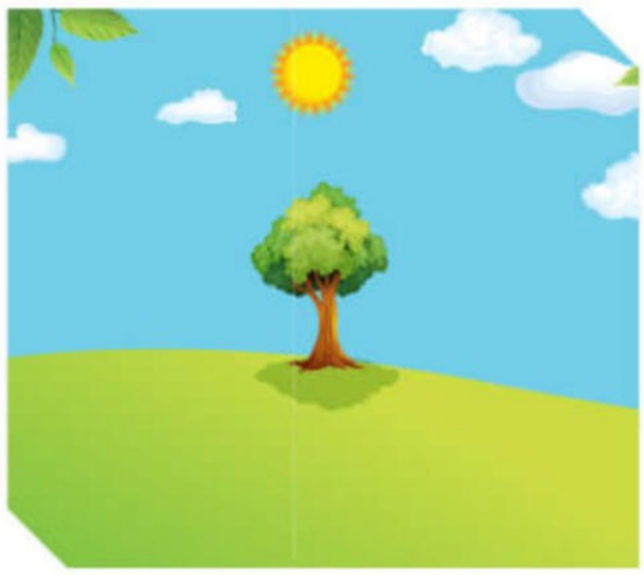
The pictures show a tree at different times of the day. Its shadow changes in length and position. This is because the position of the Sun in the sky changes during the day.

In the morning



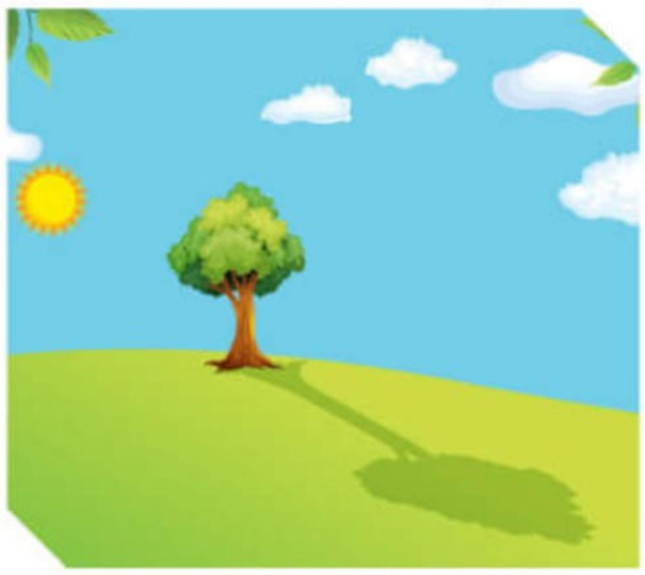
The Sun is low in the sky and the shadow is long.

At noon



The Sun is high in the sky and the shadow is short. The shadow is in a different position from the shadow seen in the morning.

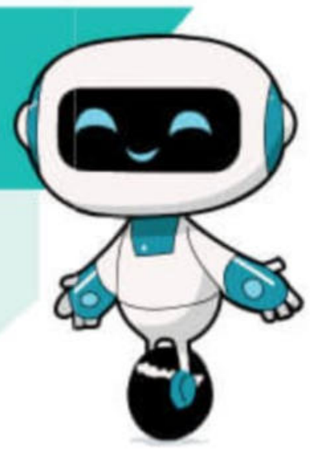
In the evening



The Sun is low in the sky and the shadow is long. The shadow is on the opposite side of the shadow seen in the morning.

Observing over time is one of the five main types of enquiry. Try and observe the shadows of things outdoors at different times of the day. Record the position of their shadows and share your observations with your class.

Check Your Learning



Why does the Sun appear to move across the sky?

Word Boost

length
position
opposite

Tick (✓) to show what you can do.

- ☐ I can explain why the Sun appears to move across the sky.
- ☐ I can explain why the spinning of Earth causes day and night and changes in shadows.
- ☐ I can explain relationships, quantities or scale through models.
- ☐ I can explain why models do not fully represent an idea.
- ☐ I can identify the five main types of scientific enquiry.

Practice Worksheet

1. Tick (✓) the correct box beside each sentence.

	True	False
Earth is at the centre of the Solar System.	☐	☐
There are eight planets in the Solar System.	☐	☐
Asteroids and comets move around the Sun.	☐	☐
Earth moves around the Sun. This is why the Sun seems to move across the sky.	☐	☐
The spinning of Earth causes changes in shadows during the day.	☐	☐

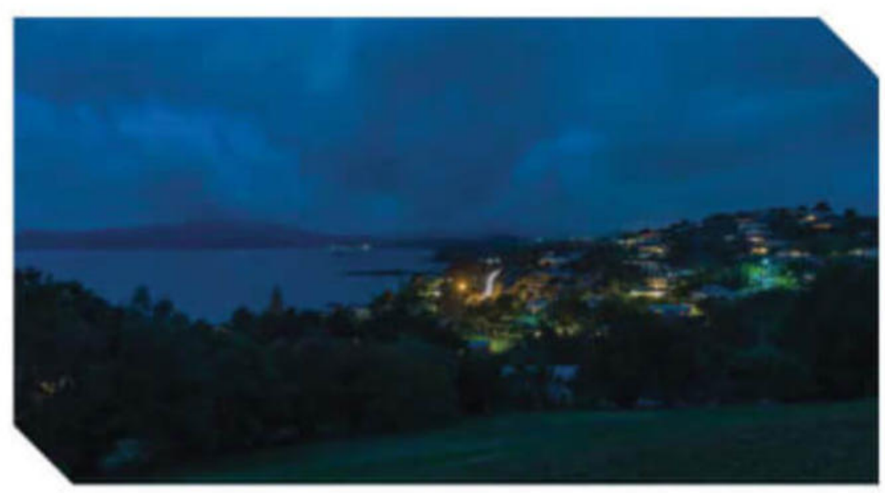
2. Earth is a planet in the Solar System.

   (a) Name the other planets in the Solar System.

   _____

   _____

   (b) We have day and night on Earth.



Which of these explains why there are day and night? Circle the correct answer.

Earth moves around the Sun

Earth spins on its axis

the Sun spins on its axis

3. The diagram shows Yasmin's shadow at 8 o'clock in the morning.

Yasmin stands at the same spot at noon. What happens to her shadow and the position of the Sun at noon? Complete the sentence. Choose the words from the following list.

higher	longer	lower	shorter

At noon, the Sun is _____ in the sky and Yasmin's shadow becomes _____.

Science Words

A

asteroids
small, rocky objects that move around the Sun

axis
imaginary line that goes through the centre of an object, about which the object spins

C

comets
lumps of ice, dust and rock that move around the Sun

P

planetary systems
systems that contain a star and objects like planets, asteroids and comets moving around it

planets
large objects that move around a star

S

Solar System
planetary system made up of the Sun and objects that move around it

CHAPTER 10

Structure of the Earth

Look at the picture.

You have learnt in Stage 3 that the Earth is the source of many useful materials such as oil, metals and natural gas. Many of these materials are found in rocks. Recall the three main types of rocks.

Have you ever wondered what is beneath these rocks?

Write a sentence to describe some of the Earth's rocks.

_____.

A The Earth's Structure

In this section, I will

- describe the structure of the Earth
- do research to find the answer to a question
- explain scale through models
- explain why models do not fully represent a situation

Thinking cap

I wonder what is inside the Earth...

Let's Explore!

The inside of the Earth

Have you ever wondered what you would find if you dug deep into the Earth?

1. Work in pairs.
2. Using the Internet or books, find out **two** things related to the inside of the Earth. Write about them in the box below.

3. Share your findings with your classmates.

Let's Learn

What Is the Structure of the Earth?

The Earth is made up of four different layers — the **crust**, the **mantle**, the **outer core** and the **inner core**. The inner layers are hotter than the outer layers.

Inner core

The centre of the Earth is a huge metal ball, made up mainly of iron. The temperature here is the highest, ranging from 5,000° C to 6,000° C.

Outer core

The temperature at the outer core ranges from 4,000° C to 5,000° C. This layer is made of melted metals such as iron and nickel.

Option

Watch!

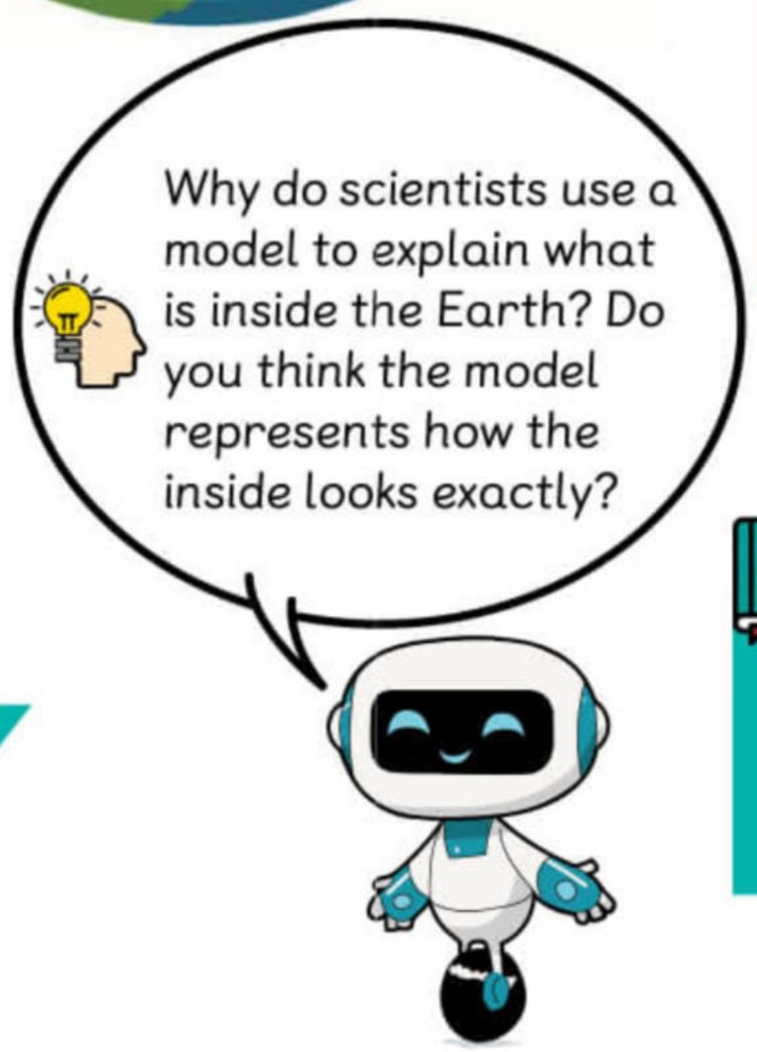
Scan this page to watch a video to learn how to make a model of the Earth.

Mantle

The mantle is the layer beneath the crust. Its temperature ranges from 1,000° C to 3,700° C. It contains **magma**. Magma is made of melted rocks.

Crust

The Earth's surface is made up of a thin layer called the crust. It is the thinnest among the four layers. The crust is the layer that we live on.

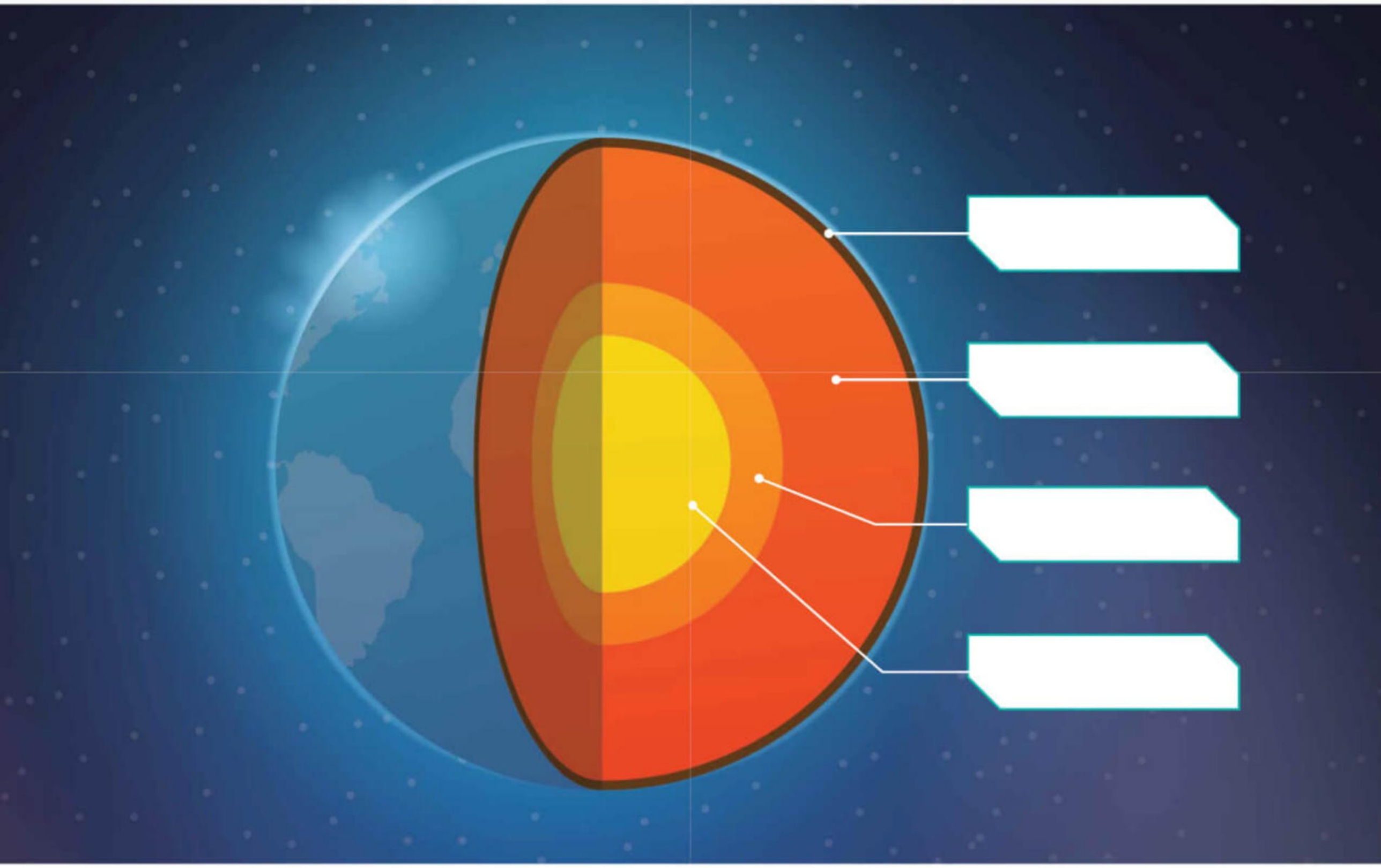


Activity Book
Activity 10A, p. 93

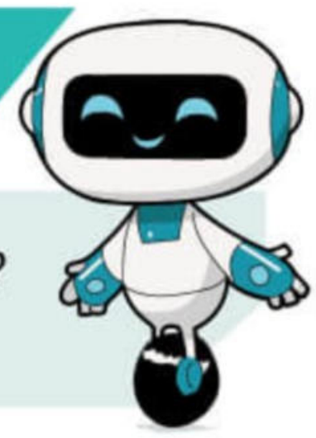
Word Boost

layer
temperature
beneath

Using the stickers at the back of the book, label the diagram of the Earth's structure in the diagram below.



Check Your Learning



What are the different layers of the Earth?
How are they different from one another?

Tick (✓) to show what you can do.

- ☐ I can describe the structure of the Earth.
- ☐ I can do research to find the answer to a question.
- ☐ I can explain scale through models.
- ☐ I can explain why models do not fully represent a situation.

B Volcanoes

In this section, I will

- know what volcanoes are and describe their common features
- do research to find the answer to a question

Thinking cap

I have heard about volcanoes.
What is a volcano?

Let's Explore!

Volcanoes

1. Work in groups.
2. Study the picture below.

3. Discuss the following questions.
   (a) What is happening in the picture?
   (b) What do you think caused this to happen?
4. Research using the Internet, a map or a globe to find out where most volcanoes are found on the Earth. What do you notice about where the volcanoes are found on the Earth's surface?

Let's Learn

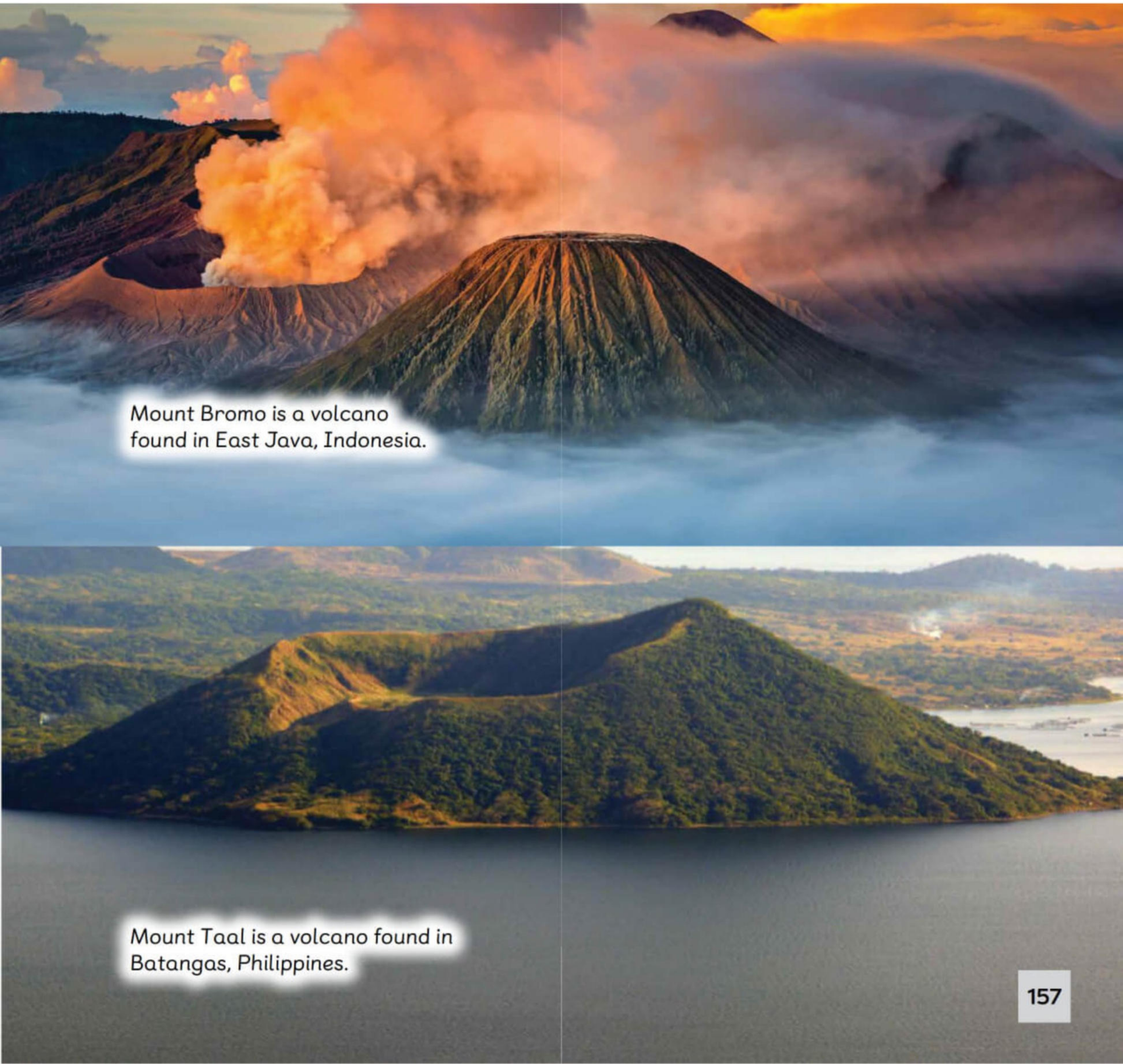
What Is a Volcano?

A **volcano** is a mountain that has an opening for magma and gas beneath the Earth to escape.

Volcanoes are usually found in breaks in the Earth's crust. Volcanoes can be of different sizes and shapes.

Word Boost

opening
escape
breaks

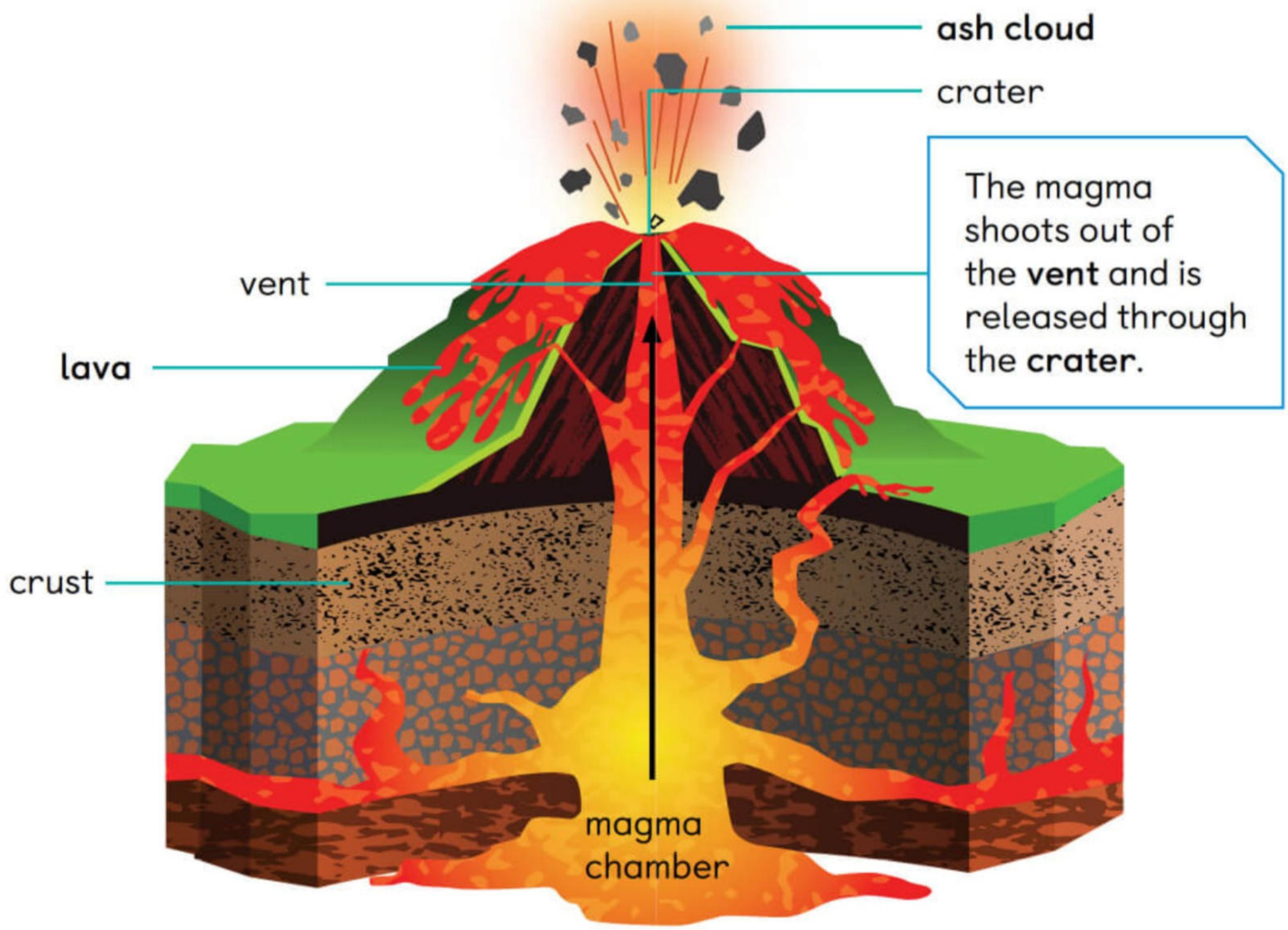


Mount Bromo is a volcano found in East Java, Indonesia.

Mount Taal is a volcano found in Batangas, Philippines.

What Are the Features of a Volcano?

A **volcanic eruption** occurs when the pressure and temperature in the Earth's mantle become too high. Magma from inside the Earth is thrown out.



common features of a volcano

Check Your Learning

What are the common features of a volcano?

Tick (✓) to show what you can do.

- [ ] I can state what volcanoes are and describe their common features.
- [ ] I can do research to find the answer to a question.

Word Boost

pressure
released

Activity Book
Activity 10B, p. 96

C Earthquakes

In this section, I will

- learn how an earthquake occurs
- use science to help me support my points of view or actions
- ask meaningful scientific questions
- do research to find the answer to a question
- identify the five main types of scientific enquiry
- identify people who use science around me and describe how they use it

Thinking cap

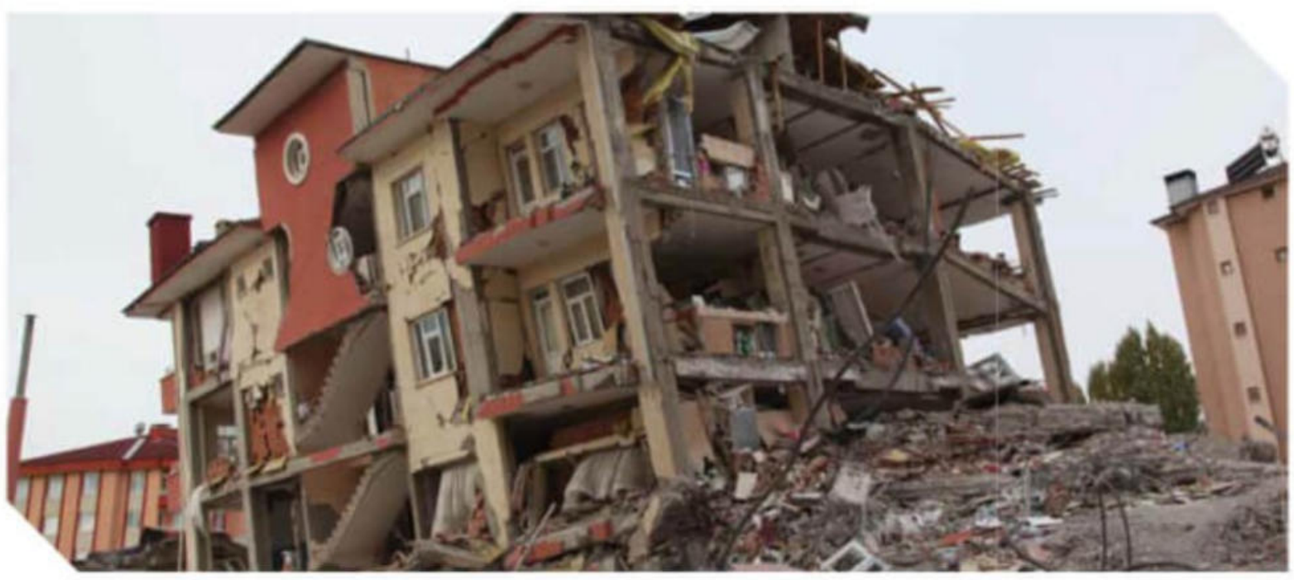
What causes earthquakes to happen?

Let's Learn

How Does an Earthquake Occur?

The Earth's crust is made up of large pieces known as **tectonic plates**. These tectonic plates do not stay in one place, but move about slowly. The movement of the tectonic plates can cause the ground to shake suddenly and violently. This is known as an **earthquake**.

An earthquake can cause great damage to homes and buildings. It can also cause deaths.

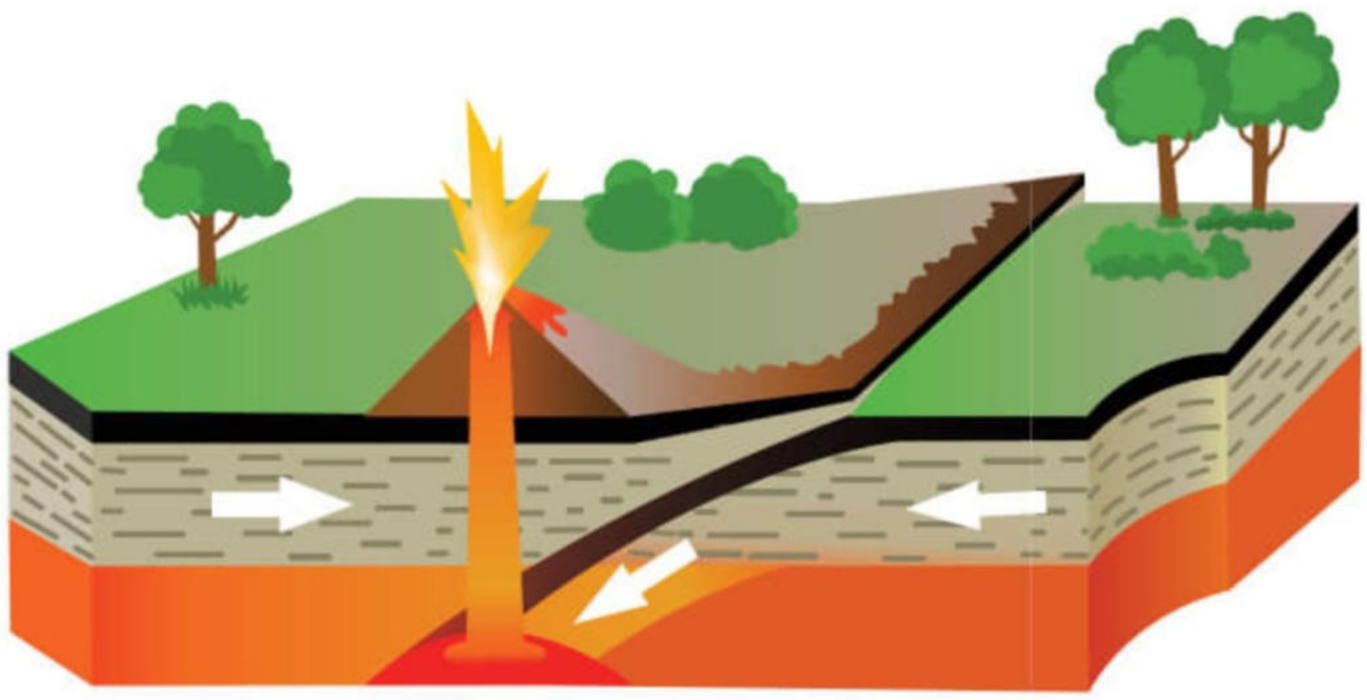


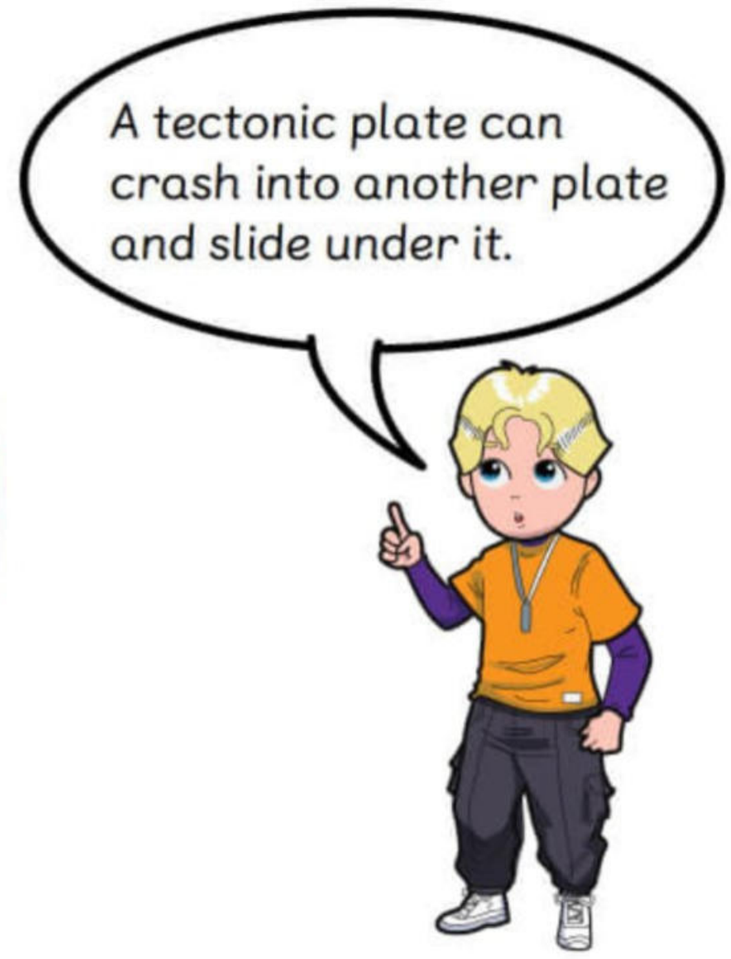
How else do you think people are affected by earthquakes?

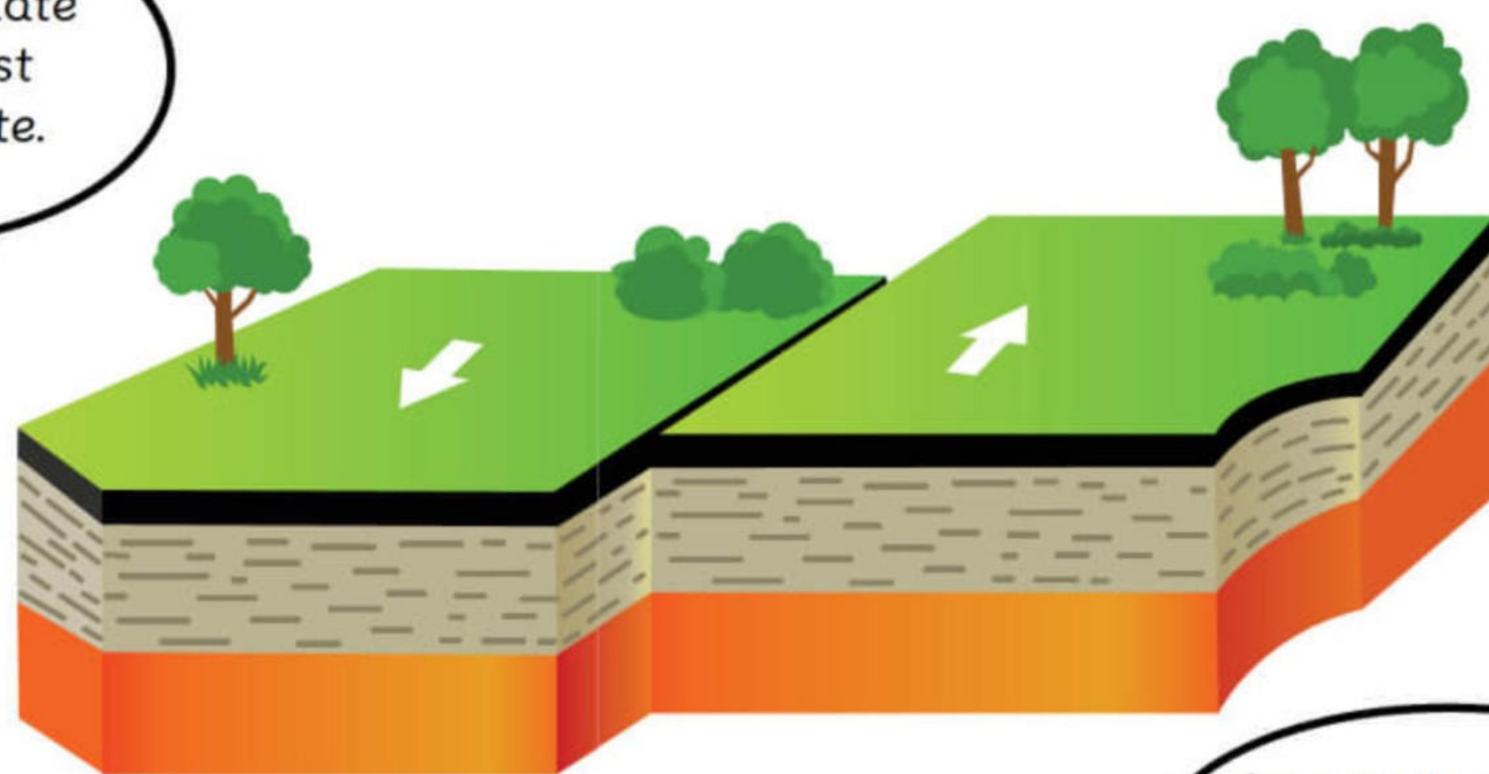
Word Boost

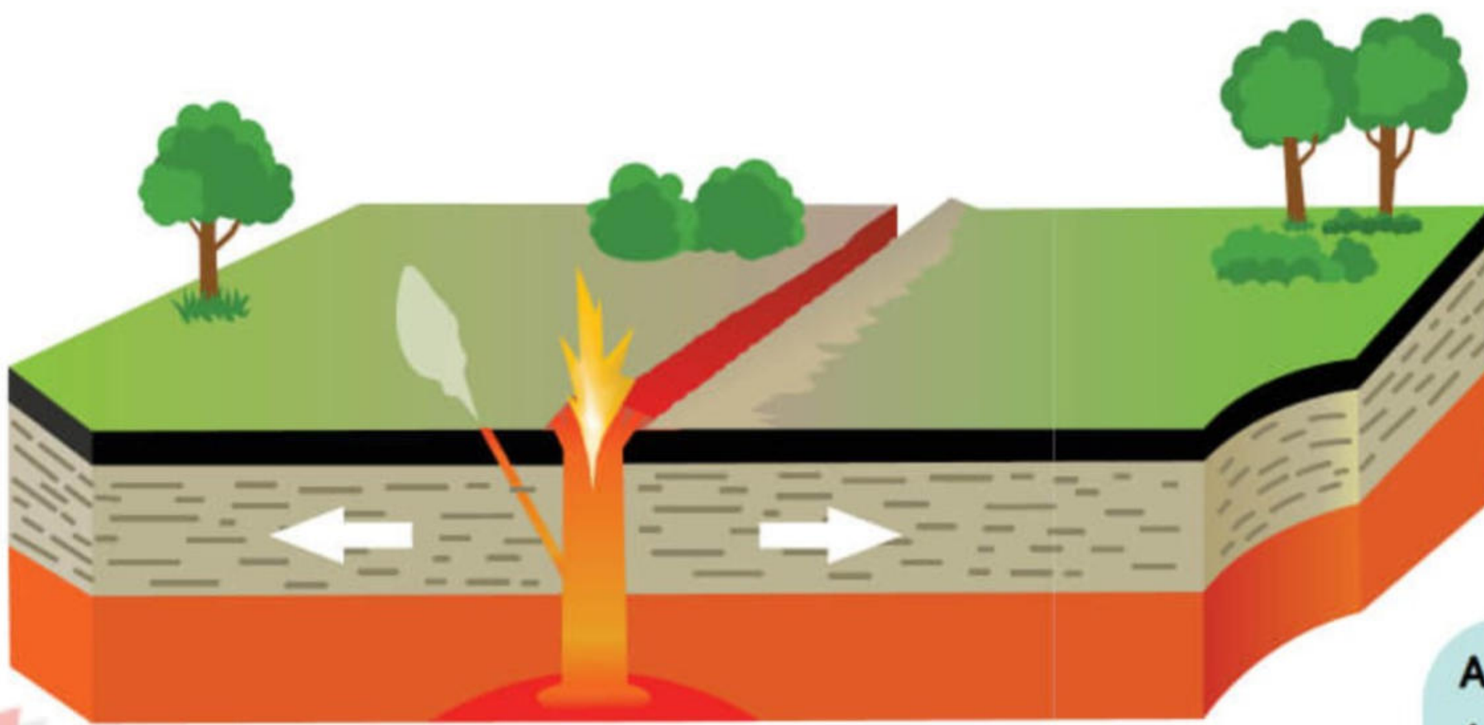
suddenly
violently
damage

The tectonic plates move in different ways, causing earthquakes.



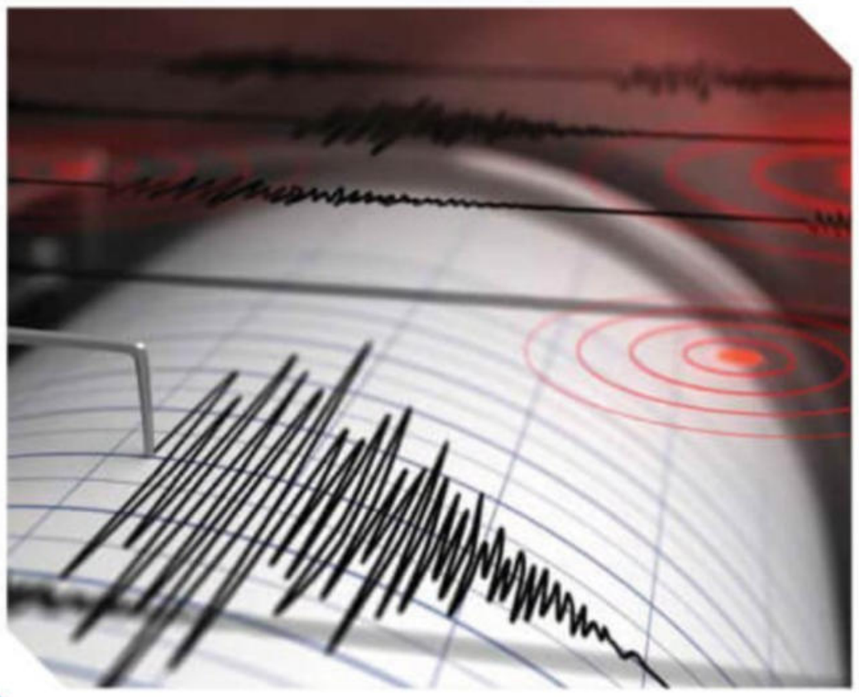






Activity Book
Activity 10C, p. 98

Tech Talk!



A seismograph is an instrument that measures the movements of the Earth's surface, especially those caused by earthquakes and volcanoes. A seismograph measures waves caused by the movement or shaking of the ground. Seismographs can record earthquakes, but not predict them. How would a machine that can predict earthquakes be useful?

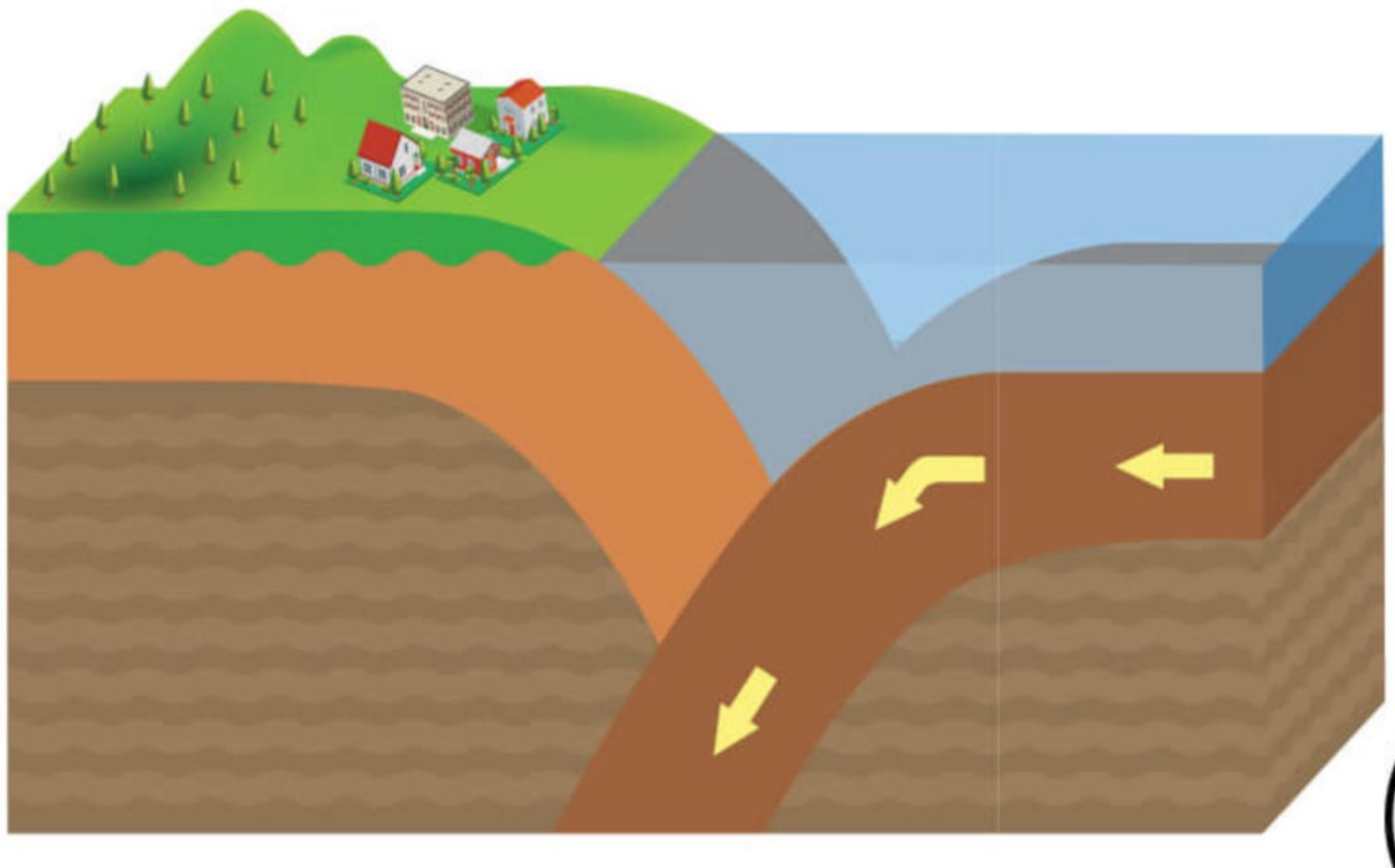
Science at Work

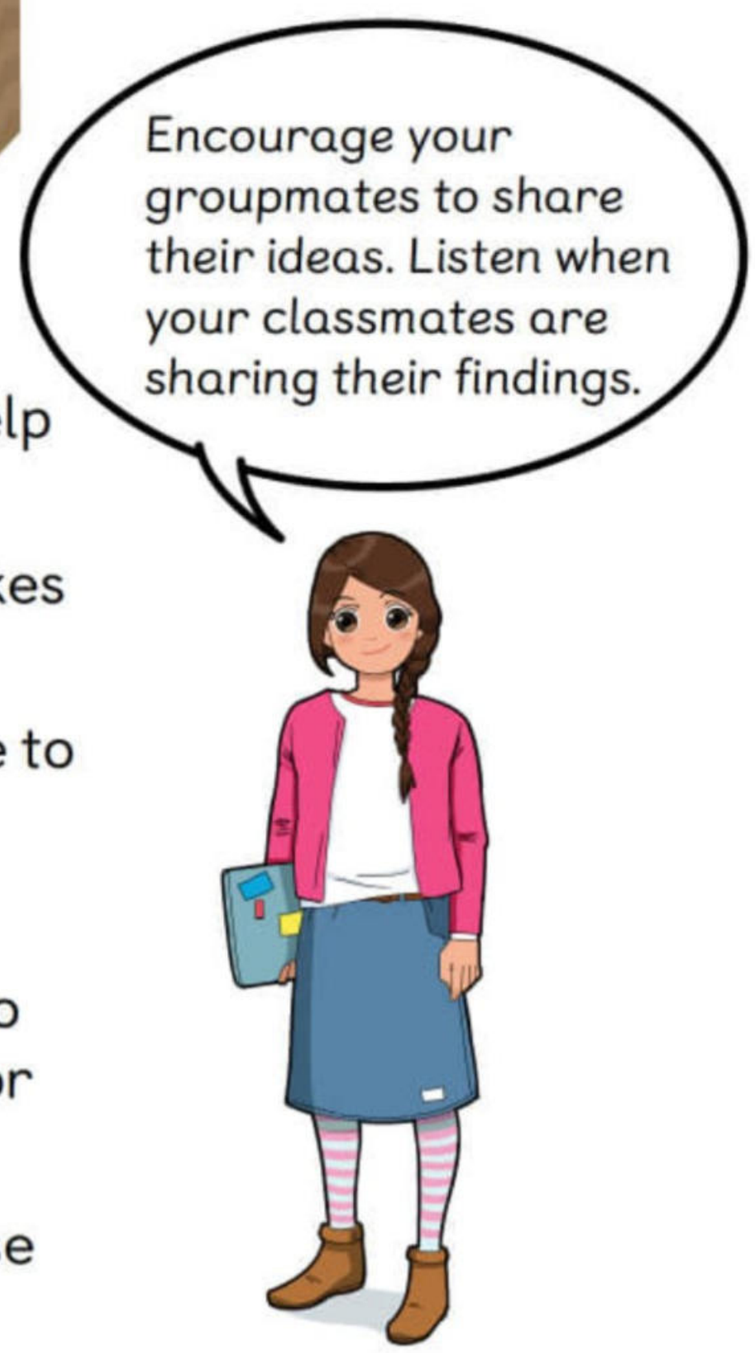
Seismologists study the movements on and under the Earth's surface. They use devices to find out where earthquakes occur and measure vibrations on the Earth's surface during earthquakes. This helps them understand the effects of earthquakes. Why is it important to understand the effects of earthquakes?

Problem-based Learning

How can you help make a place safe?

Some people live in areas where earthquakes or volcanic eruptions occur very often. You have been tasked to help make things safer for the people in these areas.





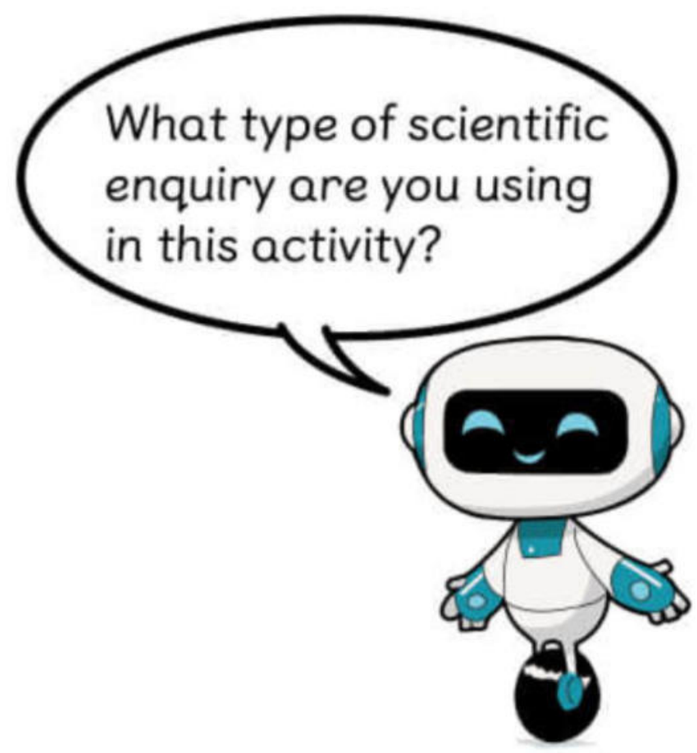
1. Work in groups. Use the box on the next page to help you complete this task.
2. Come up with a scientific question about earthquakes or volcanic eruptions that you can investigate.
3. Plan your investigation by listing down steps to take to get answers to the question.
4. Carry out your plan and record your findings.
5. Use your findings to come up with an idea on how to make things safer for people during earthquakes or volcanic eruptions.
6. Present the results of your enquiry to the class. Use science to discuss and support your ideas.

Our scientific question: _____

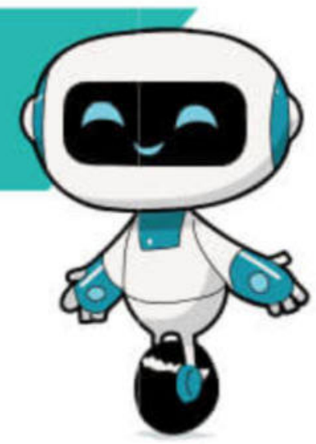
Our plan for the investigation:

Our findings:

Our idea:



Check Your Learning



How do earthquakes occur?

Tick (✓) to show what you can do.

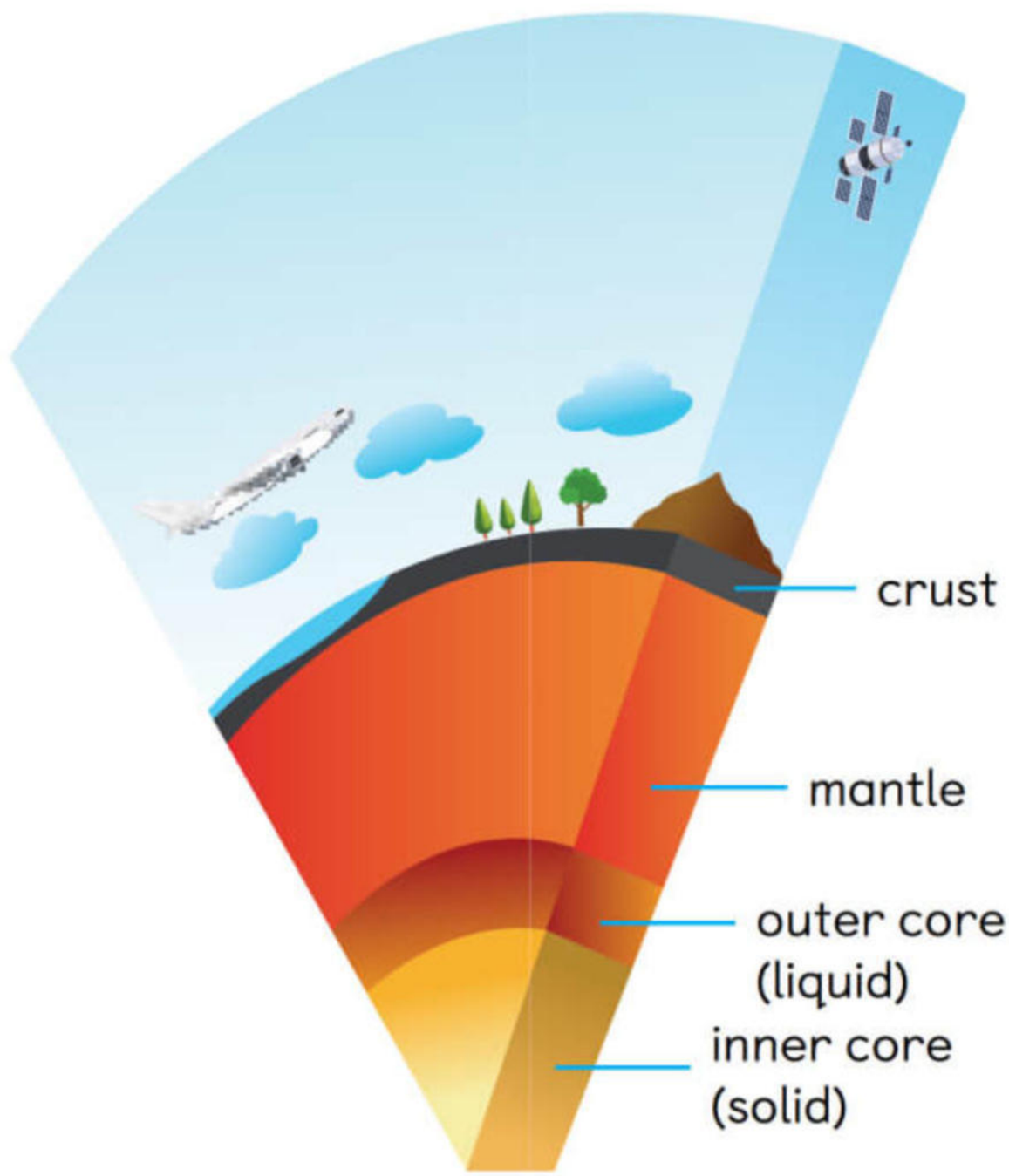
- ☐ I can explain how an earthquake occurs.
- ☐ I can use science to help me support my points of view or actions.
- ☐ I can ask meaningful scientific questions.
- ☐ I can do research to find the answer to a question.
- ☐ I can identify the five main types of scientific enquiry.
- ☐ I can identify people who use science around me and describe how they use it.

Practice Worksheet

1. Tick (✓) the correct box beside each sentence.

	True	False
The outer core of the Earth is cooler than the mantle.	☐	☐
When magma is above the ground, it is known as lava.	☐	☐
Volcanoes are usually found at breaks in the Earth's crust.	☐	☐
An earthquake occurs only when two tectonic plates crash into each other.	☐	☐

2. The diagram below shows the Earth's structure.



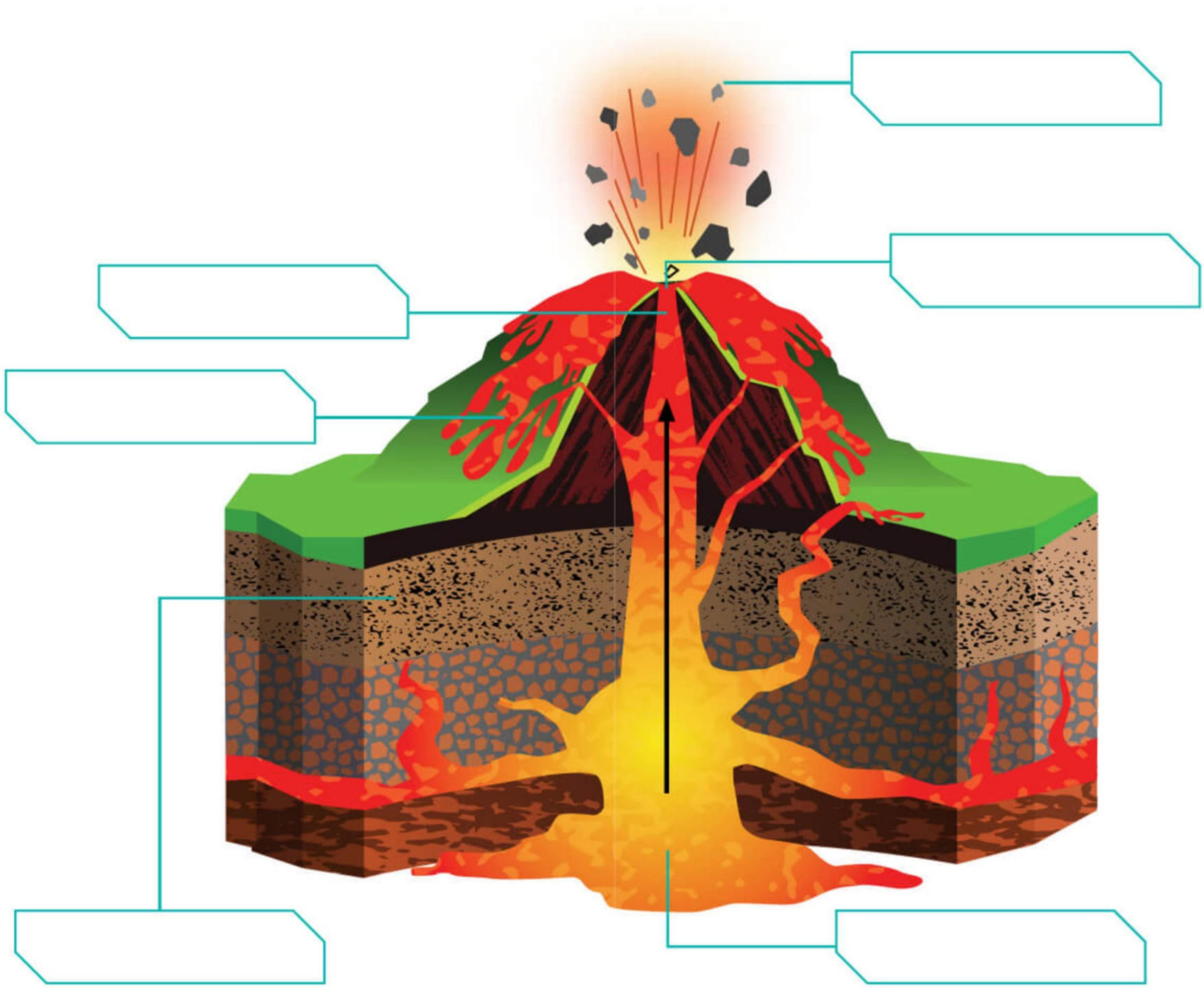
Based on the diagram above, circle the correct answer.

(a) The crust is the **thinnest / thicker** layer of the Earth.

(b) The mantle is found between the outer core and the **crust / inner core** of the Earth.

3. Fill in the blanks with the correct words to show the common features of a volcano. Use the words below.

ash cloud	**crater**	**crust**
magma chamber	**lava**	**vent**



Science Words

A

ash cloud
a cloud formed when gases found in magma escape into the air

C

crater
a large hole at the top of a volcano

crust
outermost layer of the Earth

E

earthquake
the sudden and violent shaking of the ground

I

inner core
innermost layer of the Earth

L

lava
magma that is released to the surface of the Earth

M

magma
molten rock found beneath the Earth's surface

mantle
the layer of the Earth between the outer core and the crust

O

outer core
the layer of the Earth between the mantle and the inner core

T

tectonic plates
moving pieces of the Earth's crust

V

vent
an opening in the Earth's surface through which magma flows out

volcano
a mountain with an opening for magma and gas beneath the Earth to escape

volcanic eruption
the violent release of magma from a volcano

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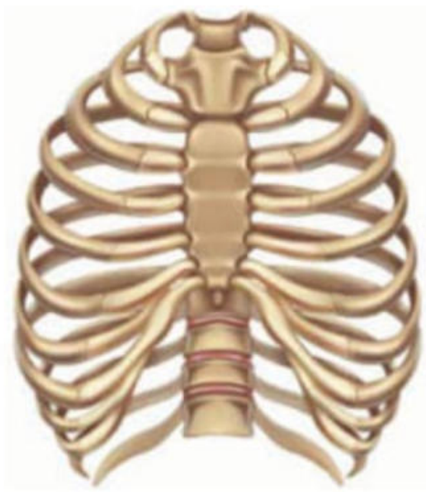
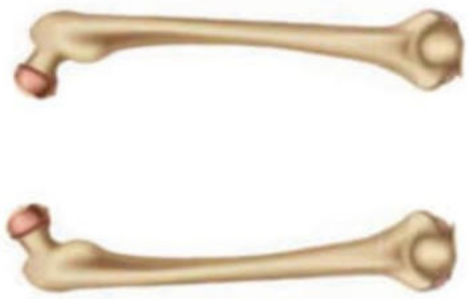

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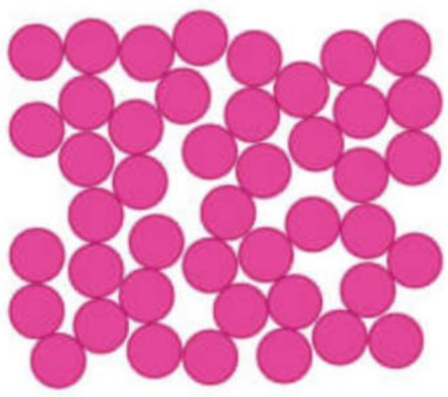
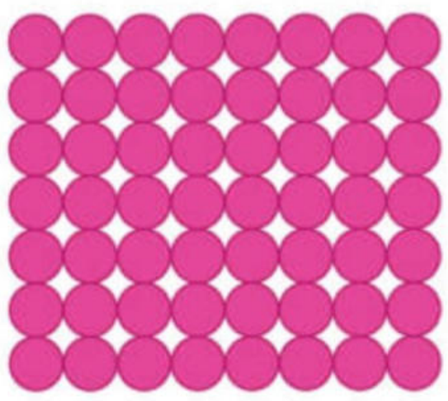

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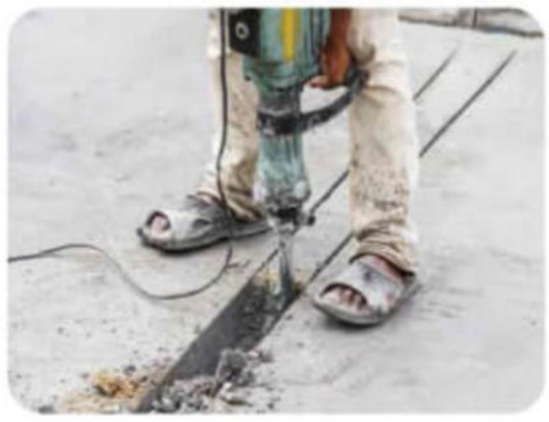

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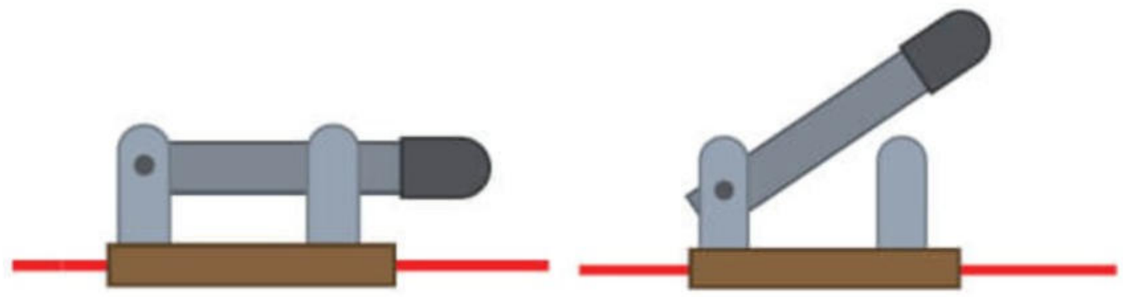

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Jupiter

Saturn

Uranus

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crust

mantle

outer core

inner core

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