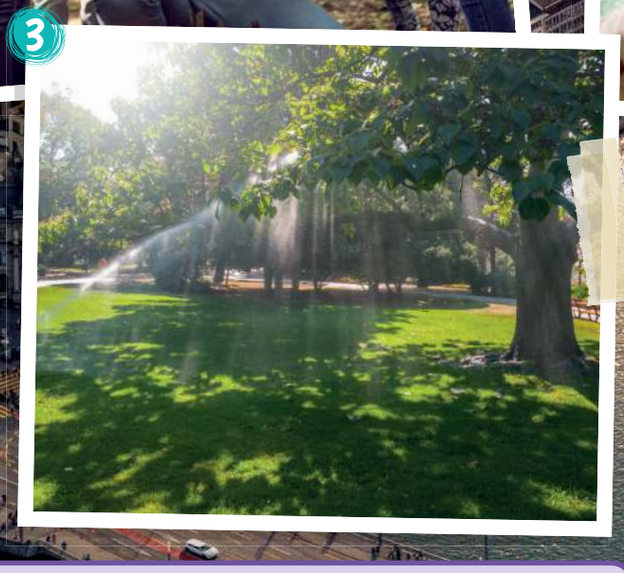
3 WE ARE NATURE

We often forget it, but humans are part of the natural environment. Just like other living things, we must interact with our surroundings to survive. However, unlike most living things, humans have managed to completely change the natural environment to meet their needs. How might this affect other living things?

Look and discuss...

What natural resources are being used and how?



Which kingdoms can you identify in these photos?

Other living things for food (1, 7, 8, 9) or entertainment (5, 8); water for entertainment (2, 8); water for growing plants (3, 7); water for drinking and electricity (6); plants for materials (4)

5

6

Song
We are nature

What non-living things do humans use from nature?

7

8

9

We use … for …

… allows us to …

Are all these places natural?

DOCUMENTARY
Sustainability is the future

Explore

Plan a sustainable city. You will:

- Find out about the organisms that live in your local area and how they use water.
- Discover where your drinking water comes from.
- Learn about sustainable development and how it can be applied to your local area.
- Persuade your classmates to be more sustainable.

TO WHICH KINGDOM DO HUMANS BELONG?

All living things are classified into five **kingdoms** that share certain characteristics, like nutrition and reproduction. Organisms from different kingdoms also interact with each another.

Discover...
the main characteristics of the five kingdoms.

Organisms that get nutrients by consuming other organisms.

One individual reproduces by copying its genetic material.

1 Monera kingdom

Nutrition: **heterotrophs**

Reproduction: **asexual**

Also known as bacteria, these are simple, unicellular organisms. Bacteria can live on any surface on Earth where there is liquid. Although we often think of them as dangerous, they're really important and can even be helpful!

What role do bacteria and fungi play in every ecosystem?

Genetic material from two organisms combines to produce a new living organism.

2 Fungi kingdom

Nutrition: heterotrophs

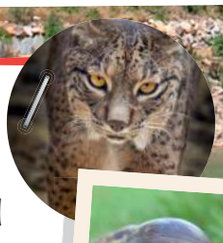
Reproduction: asexual and **sexual**

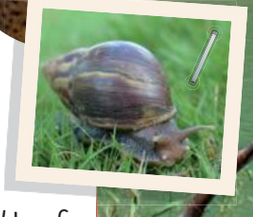
This kingdom includes **unicellular** yeasts and **multicellular** mushrooms, but the main thing fungi have in common is their ability to break down other organisms.

What does marine coral have in common with a bird?

Some animals are herbivores, some carnivores, and others omnivores. Give an example of each.

3 Animal kingdom





Nutrition: heterotrophs

Reproduction: mostly sexual; a few asexual

Ranging from simple to complex, all animals are multicellular. They consume other living things to survive. This kingdom is divided into two groups, **vertebrates** and **invertebrates**, both of which are divided into subgroups with similar traits.

What do these three kingdoms have in common?

Can you make a list of these with a partner?

What protists can you find at the beach?

4 Protist kingdom

Nutrition: **autotrophs** and heterotrophs

Reproduction: asexual and sexual

The organisms in this kingdom, which include **algae** and **protozoans**, don't have any unifying traits! Some are unicellular and make their own food, others are multicellular hunters. Most move using flagella or by amoeboid movement, but some are nonmotile.

What process do plants use to make their own food?

5 Plant kingdom

Nutrition: autotrophs

Reproduction: mainly sexual

Without this kingdom, most life on Earth couldn't survive. In any ecosystem, plants are the main **producers** because they make their own food. Plants are multicellular and have **cell walls** and vacuoles.

These are divided into flowering and non-flowering plants.

The kingdom is divided into two types: **non-vasuclar**, plants without xylem; and **vascular**, plants with xylem. Can you name an example of each?

Which of these **instruments** can you use to observe organisms from different kingdoms? Experiment with a partner!

It's fun to observe living things, but we should respect and care for them and their habitats. How can you do this?

Explore STAGE 1

- **Draw a map of your town or city, including the surroundings and waterways. Label the natural, industrial, agricultural and urban areas.**
- **What other organisms live in your area? Use the internet to make a list.**
- **How many of these organisms have you seen? Go on a walking tour and tick the organisms you see.**
- **Where did you see the most organisms?**

Like me, … live in an urban/rural ecosystem.

Most organisms in a city live near …

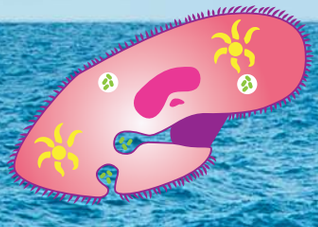
DO PLANTS DRINK WATER?

Discover...
how different living things use water.

Life on Earth depends on a vital substance: **water**. Without it, living things could not survive. Wherever you find water on Earth, from the deepest ocean to the top of the tallest mountain, you will find living things.

Different organisms use water in different ways:

- as a habitat
- to dissolve molecules
- to transport molecules
- to make energy
- to move around the environment
- for bodily functions
- to absorb food



Look back

How do organisms from the five different kingdoms use water?

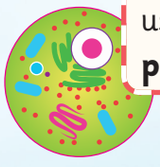
Try this ...

Collect a sample of water from a nearby pond, stream or puddle. Observe it under a **microscope** and draw the organisms you see. Which kingdoms do they belong to? Use the internet to help you.

Water is so important for life because it allows organisms to create the **energy** they need to carry out vital body functions.

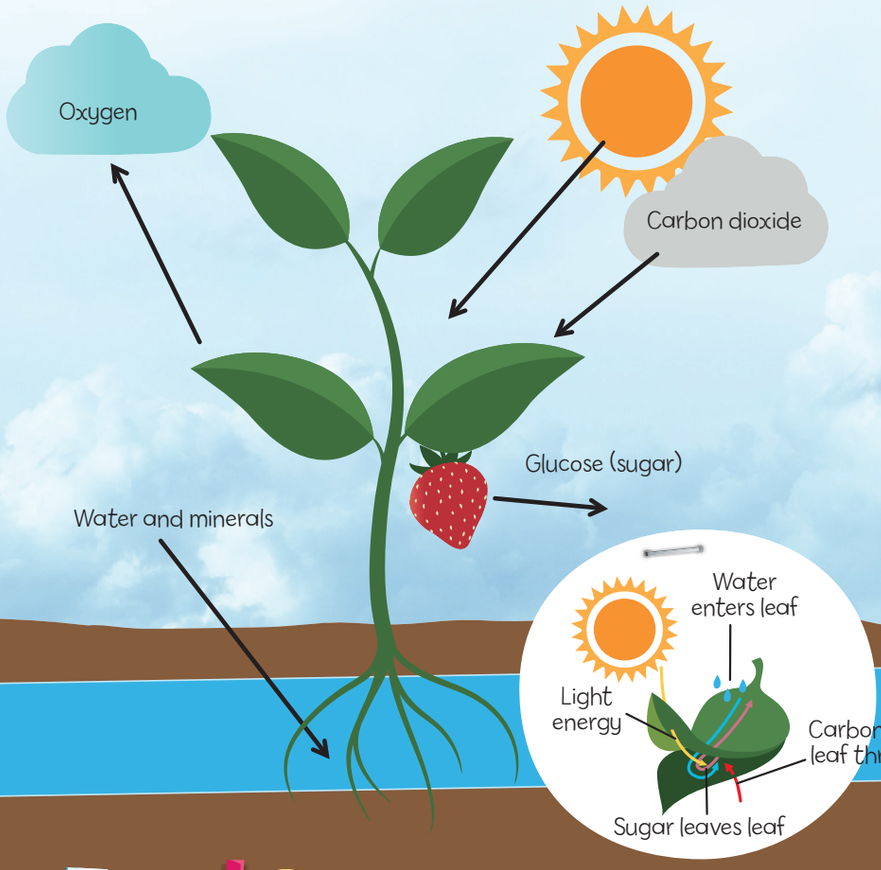
In each of their cells, heterotrophs use water to break down sugar and release energy.

Plants, and other autotrophs, use water for **photosynthesis**.



Why does NASA say 'follow the water' in the search for extra-terrestrial life?

1. Water and minerals are taken up by the **roots** of plants from the soil.
2. They move up the stem through the **xylem**, which act as the plant's veins.
3. The water and minerals reach the plant's **leaves**. This is where photosynthesis occurs. Carbon dioxide enters through the tiny **stomata**, while light energy is absorbed by **chlorophyll**, a green pigment.
4. Light energy is used to combine the carbon dioxide with the water and minerals, which produces **glucose**. Oxygen is also produced and released into the air.
5. **Phloem** transports the glucose to other parts of the plant where it can be used to grow.



How does dirty or polluted water affect plants?

Explore STAGE 2

- **Look at your list of local organisms and mark them on your map. How does each one use water?**
- **How do you use water? Make a water journal and record all the ways you use water in a day.**
- **Compare your list with a partner. Are they similar?**

… use water to …

I couldn't … without water.

CAN PLANTS GROW IN JUICE?

Find Out more...

Discover...
how plants react to different amounts of water.

Background: To carry out photosynthesis, plants need water. However, they are very **adaptable**. They can sometimes obtain water from other liquids that contain water.

Hypothesis: Can a plant still grow in liquids that are not water? Why? / Why not?

Materials: five carrots, five plates, water, milk, juice, sports drink, measuring cup, ruler

Step 1: Label each plate with numbers 1–5. Cut the top off each carrot and place on separate plates.

Step 2: Do not pour any liquid on plate 1. On each of the other plates, pour 150ml of either water, milk, juice and sports drink. You will need to repeat this step after a few days so that they don't dry out.

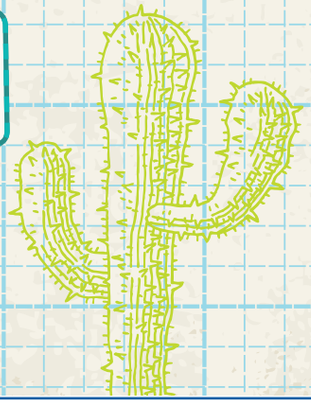
Step 3: Wait seven days. Does a new stem grow from each carrot? If so, measure it.

Step 4: Keep measuring every day for one more week.

Reflect 1
Which carrot is the control? Why?

Reflect 2
Which plant grows better?

Conclusion: How did each plant react to the different liquids?



This plant ... whereas this plant ...

I can conclude...

How do plants survive in places with little water?

WHERE DOES THE WATER IN A SWIMMING POOL COME FROM?

Find out more...

Discover...

how humans adapt the environment to fill their needs ... and wants!

On a hot day, have you ever wondered where all the cool water in a swimming pool comes from? Even though humans are part of the **natural environment**, we've become good at **transforming** it so that we can easily obtain water, food and protection. We even alter the environment for our entertainment!

Water is a limited **resource** because humans, like plants, need clean **freshwater** to survive. Once water is used up, we cannot produce more. It is also very difficult to clean polluted water. Therefore, we should prevent **water pollution** and never **waste** it.

Where does our drinking water come from?

Although some of the water we drink is pumped up from **groundwater**, most comes from lakes and rivers. We build dams in rivers to create **reservoirs**. These are large sources of freshwater and electricity, but how do they affect local organisms?

Talk with a partner. How do these affect our drinking water, as well as the habitats of other living things?

What does the word runoff mean?

Despite only drinking freshwater, humans use salt water in many ways. How might this affect salt water habitats?

Explore STAGE 3

- Where does the water you use every day come from? Where does it go, as **waste water**, after it has been used? Use the internet or find out by contacting your local council.
- Record this information on your map by adding more drawings.

Water from the tap comes from ...

After it is used, the waste water goes ...

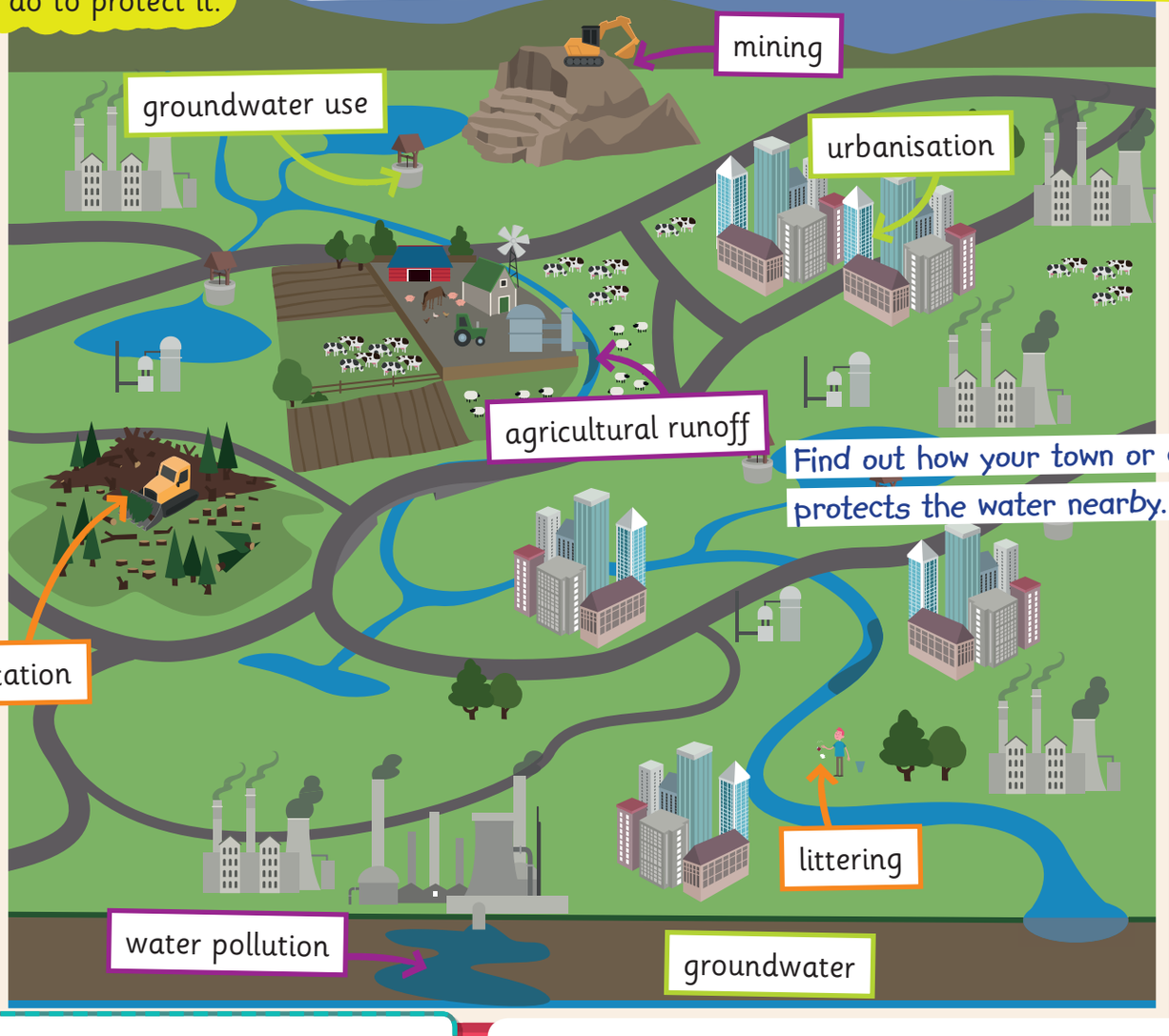
IS IT TOO LATE TO SAVE THE ENVIRONMENT?

Discover...
how to care for other living things.

Although human beings can have a negative impact on the environment, it is important to remember that there are many things we can do to protect it.

1 Find and count the natural landscapes in each picture. Which has more?
2 List the ways humans have transformed the natural environment.
3 Why have humans made each of these transformations?
4 How are organisms from the five kingdoms affected in each picture?
5 List the ways that the environment is protected in picture 2.

1



Find out how your town or city protects the water nearby.

Can we clean water once it's been polluted? Listen and list the steps.

Cities produce a lot of **waste water**. If a city is near a river, all the waste will run into it unless the waste first passes through a **sewage treatment plant**.

By making a few changes, we can restore **ecological equilibrium.**

Forests and mountains give us **raw materials**. Like water, these resources must be used **sustainably** to protect them for future generations.

Find a way to save water hidden in the unit.

2 How can we prevent their depletion?

Did you know there are organisms that show us when an ecosystem is unbalanced? Find out about **bioindicators** in your local ecosystem.

Nature is good at balancing itself. However, humans can upset that **balance**.

It is important to support organisations that protect **biodiversity**. These include **natural parks** and **nature reserves**.

With a partner, make a list of how you can protect the environment.

Explore STAGE 4

- **What is sustainable development? Write a definition.**
- **Look at the information you've gathered. How could you improve your area so it is more sustainable?**
- **Re-design your local area so that it is more sustainable.**

Our area would be more sustainable if …

If … , then living things in our area would …

Language Review

1 **In your notebook, rewrite the sentences in passive form.**

a Roots take up water from the soil.
Water is taken up from the soil through roots.

b Sewage treatment plants clean water.

c People use rivers for drinking water, as well as for boating and water sports.

d Flowering and non-flowering plants make up the plant kingdom.

e Humans transform natural areas to obtain food, water and other resources.

f Chlorophyll absorbs light energy.

2 **Read the conversation. Complete the sentences using the verbs in brackets.**

Jenny: … you … (water) the plants yet?
John: No, I … (have), but Sam … (do) it last night.
Jenny: … you … (help) her?
John: No, I … (be) too busy with supper. I … (make) a salad with fresh vegetables I … (pick) from the garden.
Jenny: … you … (finish) building the fountain you … (tell) me about?
John: Yes, I … (have). I'm going to surprise Sam when she gets home later.

3 **Your English teacher has asked you to write a story.**

Your story must begin with this sentence:

Since humans began transforming it, the natural environment has changed a lot.

Write about 100 words in your notebook.

Content Review

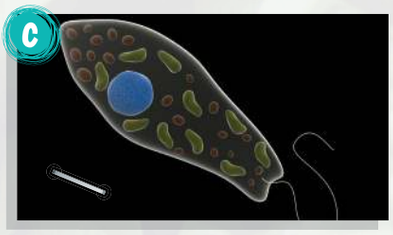
Assessment link
For more Unit 3 activities, go to page 82.

1 Look at the photos. Write 2–3 sentences about each kingdom using the words from the box.

asexual sexual autotroph heterotroph multicellular unicellular

a 

b 

c 

d 

e 

2 These photos show people in nature. Take turns to describe each one with a partner.

Explore FINALE

- Compare your old map and your new map with a partner. Write sentences.
- Your local council (your class) is asking for applications on how to make your area more sustainable. Prepare to present your map with your sustainable development ideas.
- Convince the class to vote for your map. Use persuasive language.
- Vote on the most sustainable idea!

As you can see, my map shows … , which is more sustainable because …

This is the most sustainable way because …