

CAMBRIDGE

Student's Book

# Science

## Path 5



Better  
Learning

# SCIENCE PATH 5



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**More hands on!**

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## Projects and experiments

## Documentaries

	Projects and experiments	Documentaries
	<ul style="list-style-type: none"><li>• Make a <i>Book of Life</i></li><li>• Discover why plants have a cell wall</li></ul>	<ul style="list-style-type: none"><li>• Living or non-living?</li></ul>
	<ul style="list-style-type: none"><li>• Do a presentation on an ecosystem</li><li>• Investigate how animals survive the cold of the Arctic tundra</li></ul>	<ul style="list-style-type: none"><li>• Amazing adaptations</li></ul>
	<ul style="list-style-type: none"><li>• Create and promote your own nature reserve</li><li>• Find out the best way to clean up an oil spill</li></ul>	<ul style="list-style-type: none"><li>• Cooperation is key</li></ul>
	<ul style="list-style-type: none"><li>• Create a plan to save energy at home</li><li>• Discover how important light is for plants</li></ul>	<ul style="list-style-type: none"><li>• Shine on sunny sun</li></ul>
	<ul style="list-style-type: none"><li>• Design a campaign warning about the risks of too much energy</li><li>• Investigate how sound travels and why telephones used to have cords</li></ul>	<ul style="list-style-type: none"><li>• Hear energy, see energy, feel energy</li></ul>
	<ul style="list-style-type: none"><li>• Design and build a light-up board game</li><li>• Find out what happens when you change components in an electrical circuit</li></ul>	<ul style="list-style-type: none"><li>• Electricity everywhere</li></ul>
	<ul style="list-style-type: none"><li>• Prepare a slide presentation about weather and climate</li><li>• Make a weather vane</li></ul>	<ul style="list-style-type: none"><li>• Weather and climate</li></ul>
	<ul style="list-style-type: none"><li>• Create a water pollution awareness campaign</li><li>• Find out how the water cycle works</li></ul>	<ul style="list-style-type: none"><li>• Bodies of water</li></ul>

**Glossary**



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# WHAT IS SCIENCE?

02

**Science** helps us understand how the world works. It helps us solve problems and can make life easier.



I wonder why / how ...?

How does ... work?

What would happen if ...?



Scientists use the **scientific method** to understand the world around us. It always starts with a **question**. Scientists then decide how to answer the question by thinking of an **experiment**. Before carrying out the experiment, they guess what will happen. This guess is called a **prediction** or a **hypothesis**.




Scientists draw **conclusions** from their observations and the **results** of their experiments. These conclusions help us to understand the world we live in.



How are the people in the photos using science?





Which picture is being  described? Listen and guess.

Look around you. Where is science being used?



**Welcome to the amazing world of science!**  
**In this book, you will:**

- do a presentation on an ecosystem.
- create and promote your own nature reserve.
- create a plan to save energy at home.
- design a campaign warning about the risks of too much energy.
- design and build a board game.

# 1

## LIVING THINGS

### Look and discuss ...

Which kingdom is each organism from?  
Which kingdom is missing?

Life has done extremely well here on Earth. Scientists estimate several million species live on our planet!

I think this organism belongs to ...

1



2

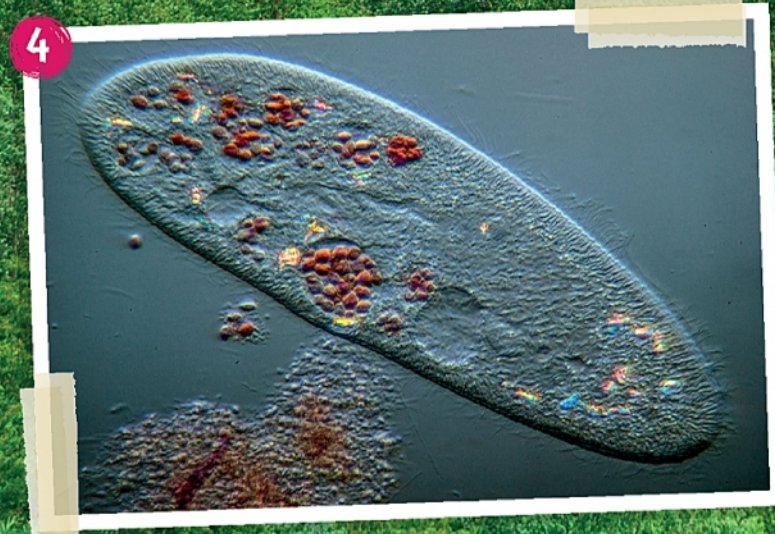


3



Yes, I think so, too. / I'm not sure about that.

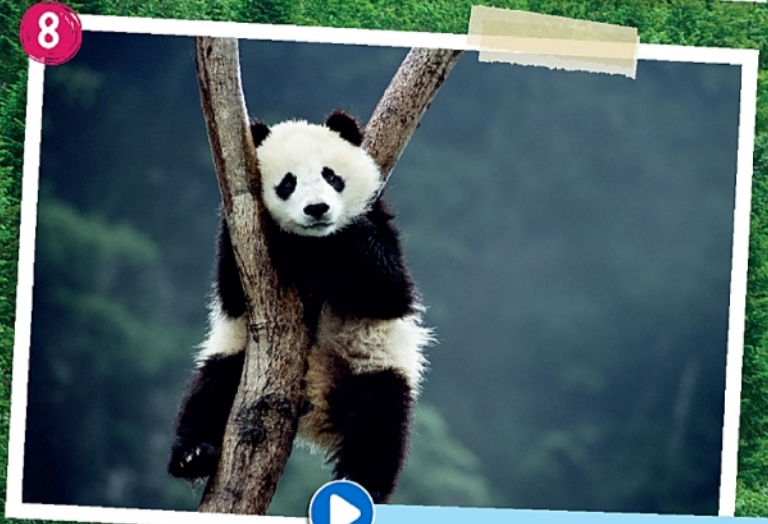
4



Plant 1, 7; Animal 2, 8, 6;  
Fungus 3, 5; Protist 4, 6;  
missing kingdom: Monera



**Song** 04  
Cells, tissues, organs, systems



Can you name the seven characteristics of living things?



**DOCUMENTARY**  
Living or non-living?

# Investigate

In this unit, you will make a *Book of Life*. To do this, you will:

- learn about different types of cells.
- research information and take notes about an interesting organism.
- organize facts and share information with others.
- present the information you have collected.

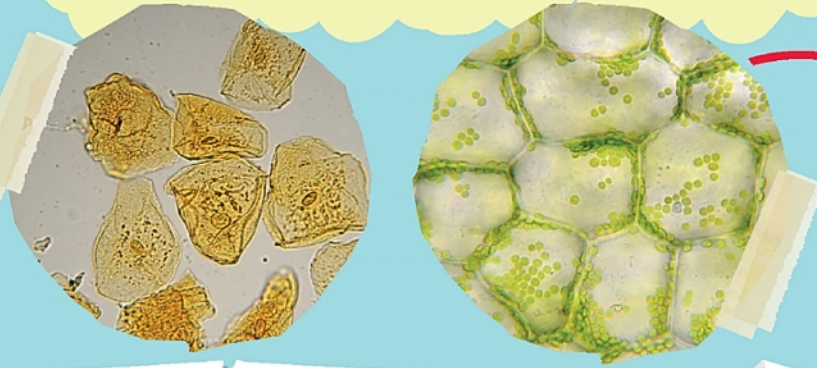
# WHAT ARE CELLS MADE UP OF?



All living things are made up of **cells**. Although we can only see them with a microscope, they are very important.

## Discover ...

what the jelly-like substance inside a cell is called.



The cells on the far left are human cheek cells. Can you guess what type of organism these cells belong to?

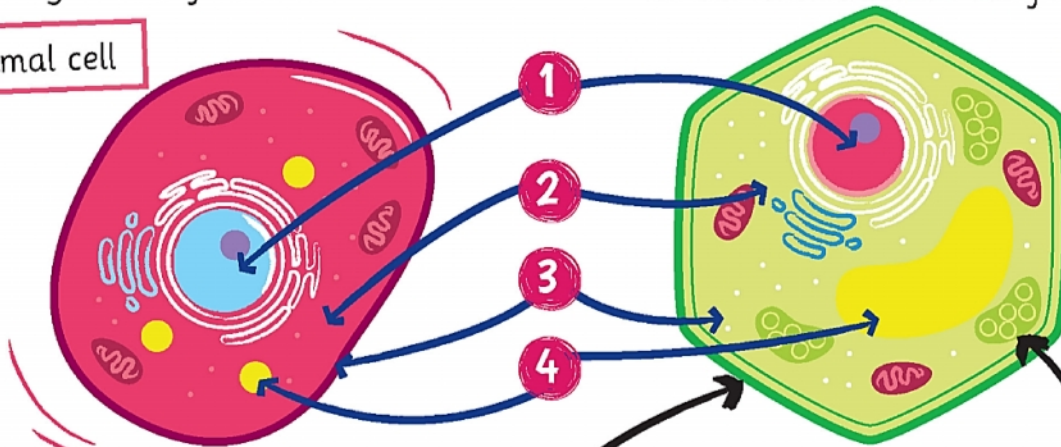
**Cells** may look very different from one another, but they have several similar characteristics and structures.

**1 Nucleus:** controls what happens inside the cell and contains all the genetic information.

**2 Cytoplasm:** jelly-like substance that helps give the cell shape and is where all the cell structures are found.

animal cell

plant cell



**3 Cell membrane:** controls the movement of substances in and out of cells.

**Cell wall:** gives structural support to the cell.

**4 Vacuole:** a storage space for the cell.

**Chloroplasts:** help the plant make food from sunlight and water.

Find out about other structures within a cell. What jobs do they do?

# WHY DO PLANT CELLS HAVE A RIGID WALL?

## Hands on!

By the end of this lesson, you will be able to describe the features of a cell and differentiate plant and animal cells.



### Background

There are some similar structures in animal and plant cells, but only plant cells have a cell wall.

### Hypothesis

Why do plant cells have a cell wall? Write your hypothesis in your notebook.

### Materials

eight balloons, four shoe boxes

### Method

- 1 Blow up the balloons (not too big). Put one balloon in each shoe box and leave the rest out.
- 2 Build two towers, one using only the balloons and the other using the shoe boxes with balloons inside.

### Conclusions

What is the function of a plant cell wall?



### Reflect 1

What do the balloons represent?  
What do the shoe boxes represent?

### Reflect 2

Which tower is easiest to build?

Animal cells don't have a cell wall. Compare the human body with a tree. What does the human body have to help with support that a tree doesn't?

# HOW DO CELLS COMBINE TO MAKE BIGGER THINGS?



## Discover ...

the structural hierarchy of an organism.

Cells are the structural units of life, but their function doesn't stop there!

**cell**



**system**

Organs work together to make **systems**.



Can you name any of the **systems** in the human body?

What organs are in a plant?

**tissue**

Most cells work with other similar cells to make layers, known as **tissues**. For example, individual muscle cells combine to form muscle tissue.



**organ**

Many tissues work together to make **organs**, like the heart, skin, or stomach. Each organ has a specific job.



What is the **biggest muscle** in the human body?

By the end of this lesson, you will have learned the main characteristics of cells, tissues, organs, and systems and what they do.



## organism

All the systems work together to ensure that we function properly as an **organism**. Other organisms, such as animals, plants, and fungi have the same organization. Only the basic structural units – the cells – are different from ours.

Some organisms, such as bacteria, are **unicellular**. They have one cell that does everything.

What do you call an organism with many cells?

## Investigate STAGE 1

- Choose an interesting organism.
- Find out if it is unicellular or multicellular. Investigate what types of cells, tissues, organs, or systems it has.
- Draw the organism on a piece of paper and add labels.

