CAMBRIDGE

Cambridge

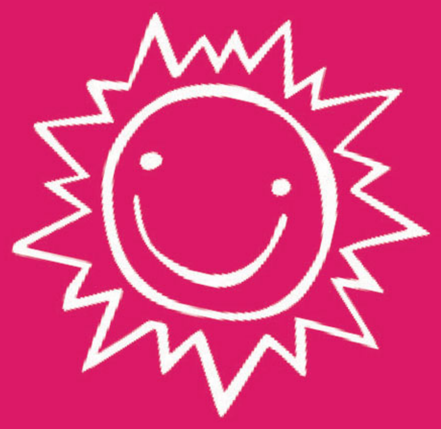
Natural Science

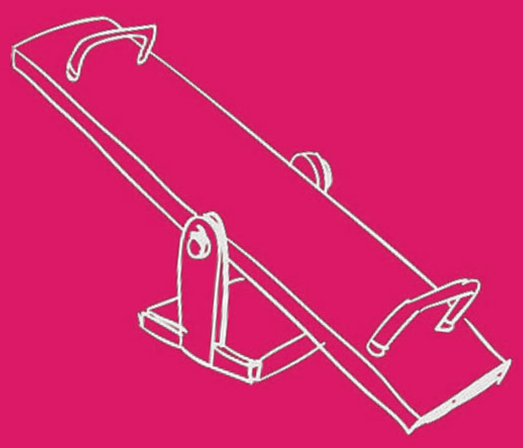
5

Teacher's Book

with Audio

Experience
Better
Learning





WELCOME TO CAMBRIDGE NATURAL SCIENCE

Course objectives

- The *Cambridge Natural Science* course has been designed specifically to follow the **LOMCE**. It takes learners on a journey as they discover the wonders of biology, chemistry and physics. Pupils are introduced to topics at a manageable pace, so they can engage with, enjoy and fully assimilate new concepts.
- Pupils learn about and cement their understanding of new concepts through **projects**. There is an *Explore* project that runs through each unit, in which pupils review and expand upon the concepts presented in the unit. Each individual stage of the *Explore* project feeds into the project finale, in which pupils present or produce something to demonstrate their understanding of the topic.
- Pupils also engage with Natural Science in a **hands-on** way by conducting **experiments**. This practices **critical-thinking skills** and collaborative learning.
- Pupils learn about new concepts through discovery. In *Cambridge Natural Science*, **learner autonomy** is encouraged through the inclusion of interesting facts and thought-provoking questions. Our aim is for pupils to be inspired by the fun and wondrous world of Science.
- **Collaborative learning** is also encouraged through the *Explore* projects, which pupils carry out in pairs, in groups and as a class.
- The course provides pupils with the **linguistic support** that they require to study Natural Science in a second language. The course helps pupils develop their speaking, listening, reading and writing skills. The unit projects give pupils practice of a range of skills and sub-skills.
- Pupils are also given the opportunity to **review the grammar structures** presented in ***Cambridge Life Adventures***. There are links between the two courses that allow pupils to review Science content in English class and grammar structures in Science class.
- *Cambridge Natural Science*, is further linked to *Cambridge Life Adventures* in that it provides pupils with practice of the **Cambridge English Qualifications for young learners**. Level 5 provides practice of *A2 Key for Schools* and *B1 Preliminary for Schools* question types.
- **Mixed-ability assessment** provides teachers with support for pupils of different levels within the same class. They focus on lower-and higher-order thinking skills, as well as critical thinking.
- *Cambridge Natural Science* has been developed around the key **competences** stipulated in the LOMCE. The course aims to help pupils develop the following key competences: linguistic competence; mathematical competence and basic competences in science and technology; digital competence; learning to learn; Natural and civic competencies; initiative and entrepreneurship; and cultural awareness and expression.

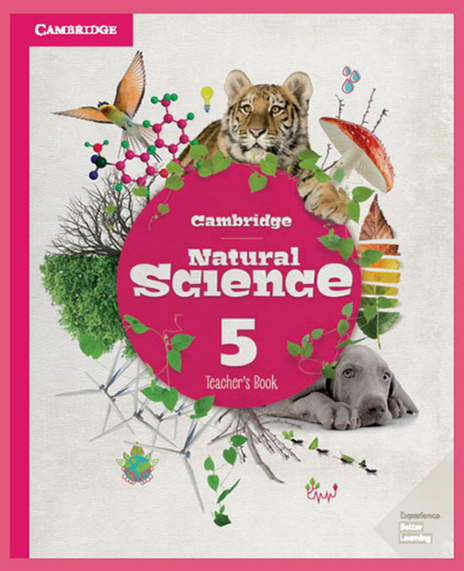
Course components

Pupil's Book: each unit includes a project, experiments, mixed ability assessment and practice of the Cambridge English Qualifications for young learners.

Activity Book: each unit includes activities that consolidate and expand upon the concepts introduced in the Pupil's Book, practice of the Cambridge English Qualifications for young learners and a bilingual glossary.

Class audio: provided through the *Digital Lab*, as well as being available to download online at www.thecambridgeteacher.es.

Teacher's Book: includes useful suggestions for activities at each stage of the lesson, answer keys, audio scripts and track numbers for the audio.

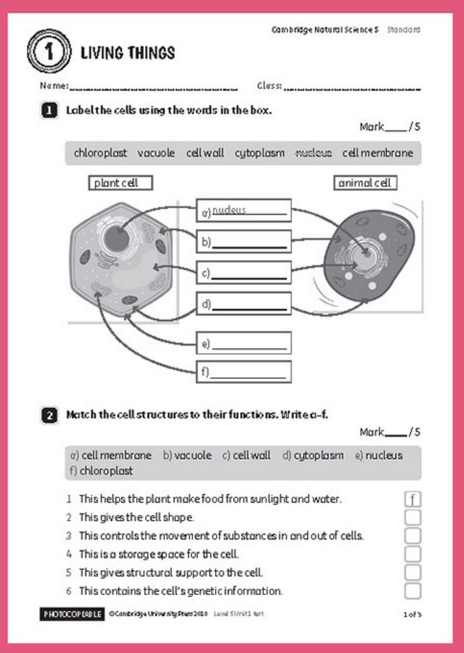


Test Generator: allows teachers to build their own tests for each unit, term and end of year assessment.

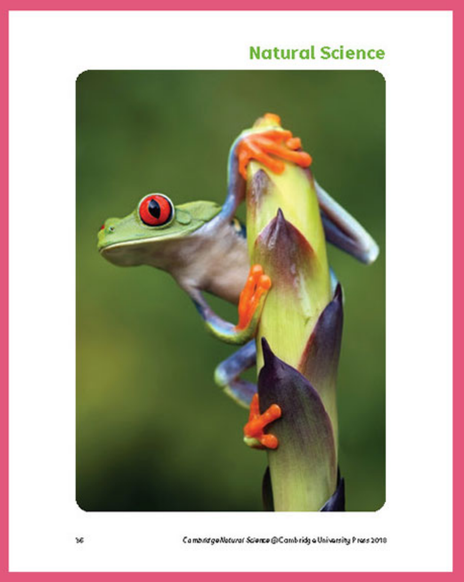
Digital Lab: includes an interactive, digital version of the Pupil's Book with a variety of features to help pupils cement their understanding of key concepts:

- flashcards in digital format
- answer keys
- audio with scripts available
- documentary videos for each unit to engage the pupils in a visual way and allow them to see Natural Science in action!

Digital Resource Bank: includes mixed-ability tests, project evaluation grids and curriculum evaluation grids. They are available online at www.thecambridgeteacher.es.



Classroom materials: include posters and a full bank of flashcards to be used across levels. Suggestions for flashcards to use in each unit are provided in the Teacher's Book. The posters consolidate learning by helping pupils engage with Natural Science vocabulary and concepts in the classroom.



WELCOME UNIT
PAGES 4–5

Objective

Pupils will be encouraged to ask questions about everyday surroundings, seek answers to those questions and understand the scientific method as a means of problem solving.

Key vocabulary

conclusion, experiment, hypothesis, prediction, problem, question, result, science, scientific method, scientist, solve

Warm up

- Elicit answers to the question: *What is Natural Science?* Create a word cloud on the board.

Main concepts

- Read about the scientific method. Elicit questions pupils wonder about. Question examples: *I wonder how we could keep the classroom warmer? How does an eraser work? What would happen if there was no sunlight?*
- Choose a question to work through the scientific method together, explaining each step.

Natural science is the study of the physical world, which helps us to understand the things around us.

A2 Key for Schools
Listening Part 1
Hairdresser

Pupils' own answers. Focus on classroom objects, activities and pupils' bodily functions.

Do you ever wonder how something works, why something happens or how changing something would make a difference? Scientists use the **scientific method** to understand the world around us. It always starts with a **question**.

I wonder why / how …?

How does … work?

What would happen if …?

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.

1. Bungee jumping – applying the laws of physics for safety
2. Rock band – using sound energy to entertain people
3. Architect – applying the laws of physics and engineering
4. Chef – using chemistry to make tasty food
5. Scientist – using knowledge of biology and ecosystems
6. Children playing – using mechanical energy and physics to score goals
7. TV set – using technological inventions to provide entertainment
8. Hairdresser – using chemistry to dye hair
9. Sailboat – using wind energy to move

Learn more

- Refer to the table of contents in the Pupil's Book. Pupils think of a question they want answered during the school year. They write it on a piece of paper and decorate it. Display the questions around the classroom. At the end of the year, allow pupils to reflect on their question and write the answer.

Tip

Introduce concepts over one or two lessons. Spend time getting pupils excited about science and the upcoming experiments. Emphasise the omnipresence of science in our daily lives.

Track 01

Page 4, *What is Natural Science?*

Track 02

Page 4, *What is Natural Science?*
Listening activity

1

LIVING THINGS

Learning objectives

By the end of this unit, pupils will have achieved a greater understanding of the following concepts:

- the characteristics of living things
- the internal organisation of living things
- how living things are classified into kingdoms.

Competences

This unit covers the following competences:

- Linguistic competence
- Mathematical and basic competences in science and technology
- Digital competence
- Learning to learn
- Social and civic competencies

Key vocabulary

Cell structure: animal cell, cell, cell membrane, cell wall, chloroplast, cytoplasm, nucleus, plant cell, rigid, structure, vacuole

Organisation: cell, function, individual, multicellular, organ, organism, structural, system, tissue, unicellular

Classification: alga, Animal, bacteria, bacterium, classify, dichotomous key, Fungus, living, identify, invertebrate, kingdom, Monera, Plant, Protist, protozoon, taxonomist, vertebrate

Other: hypothesis, nutrition, specialised

Cambridge English Qualifications practice

You will find ***A2 Key for Schools*** activity types in the following exercises:
Pupil's Book, Page 13 – Listening Part 2
Pupil's Book, Page 17, Activity 1 – Reading and Writing Part 4
Activity Book, Page 3, Activity 4 – Reading and Writing Part 4
Activity Book, Page 6, Activity 8 – Reading and Writing Part 1
Activity Book, Page 7, Activity 10 – Reading and Writing Part 5

Throughout this unit, you will find the following ***A2 Key for Schools*** vocabulary:
animal, believe, bird, belong, blood, body, collect, dangerous, heart, improve, interesting, scientist, wild, wonderful

Throughout this unit, you will find the following ***B1 Preliminary for Schools*** vocabulary:
avoid, disease, energy, exception, individual, ordinary, provide, support

Materials needed for *Find out more*

- balloons
- shoe boxes

Materials needed for other activities

- A4 card
- art materials for posters
- counters
- creative materials for cell structures
- dice
- examples / photos of living and non-living things
- plasticine
- non-living objects with characteristics of living things
- photos of different organisms from the five kingdoms
- pre-made body organisation game cards, one per pupil
- sticky notes

Explore

The *Explore* project encourages pupils to research an organism of their choice and to describe their chosen organism in detail. Pupils will present their research to their classmates and produce a page, which will contribute to a class book. The different *Explore* stages focus on the following skills:

- producing accurately labelled diagrams
- using bullet points to convey scientific facts succinctly
- autonomous research
- preparing an information poster
- giving a presentation.

Digital Lab 5 Natural Science

- Interactive activities
- Flashcards: *Living things*
- Song: *Cells, tissues, organs, systems*
- Video documentary: *Living or non-living?*

UNIT 1
PAGES 6–7

Objective

Pupils will be introduced to the five kingdoms of classification and prior knowledge of living and non-living things will be activated.

Key vocabulary

Animal, bacteria, Fungus, kingdom, living, Monera, organism, Plant, Protist

Warm up

- On the board write: *bread mould, elephant, grass, green algae* and *rock*. Compare and contrast these items as a class. Ask: *Which ones are living? Which ones are non-living? How do we know?*
- In teams of four, pupils list as many living and non-living things as they can in three minutes.

Main concepts

- Stimulate previous knowledge by asking pupils to name the five kingdoms of living things, if they can, and give examples. Write the kingdoms on the board. Pupils ask and answer the questions in pairs. Refer to the linguistic support in the speech bubbles and explain that they will be looking at kingdoms later in the unit.
- Discuss and identify the characteristics of living things. Check understanding by asking pupils to classify photos and give reasons for choices.

Movement; respiration; reproduction; growth; sensitivity (or response); nutrition (or use of energy); excretion

For next lesson... modelling clay, creative materials for cell structures

Learn more

- *The Search for Life* game: Pupils are extra-terrestrials who must find living food to eat. Pupils move in small groups through different stations, correctly identifying living things from non-living things. They should review the seven characteristics and focus on properly forming questions with the auxiliary verb *do* / *does*.
- Refer back to the warm-up activity and the list of living and non-living things on the board. Did pupils classify them correctly? Can they classify them into kingdoms?

Song

This song focuses on body organisation. It can be used on page 11. You could try using an action activity with the song.

Documentary

The documentary explores the characteristics of living and non-living things. It can be used after discussing the seven characteristics of living things. You could try having pupils call out *living* or *non-living*, and the characteristic with the video.

Tip

Show different non-living objects that have characteristics of living things and discuss these as a class (for example, melting ice and moving toys).

UNIT 1
PAGE 8

Objective

Pupils will learn to identify and describe the structural features of a cell and the difference between animal and plant cells.

Key vocabulary

cell, cell membrane, cell wall, chloroplast, cytoplasm, nucleus, vacuole

Warm up

- Pupils identify the objects in the pictures. Read the introduction. Explain that they will now focus on cells within living things.

Main concepts

- Pupils imagine a cell is an individual organism. Ask: *What functions must a cell carry out to survive?* Write ideas on the board. Pupils match the functions to cell structures.
- Pupils copy the cell illustrations and label them. To revise, they cover the labels with sticky notes.

Learn more

- Pupils build a cell model using modelling clay and creative materials. They should add labels and present their model to a partner.
- Pupils play a guessing game in pairs. They take turns to describe cell structures while their partner guesses the name of the structure.

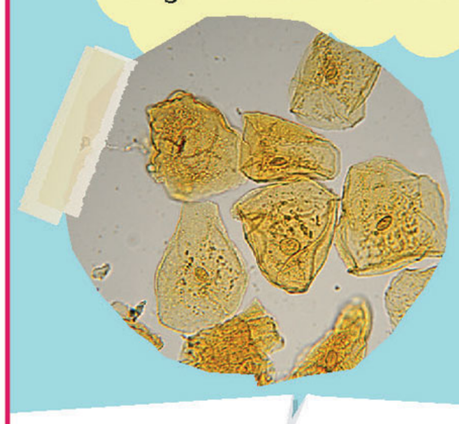
Cells are made up of many different components including: nucleus, cell wall, cell membrane, vacuole, cytoplasm, chloroplast.

A plant

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.

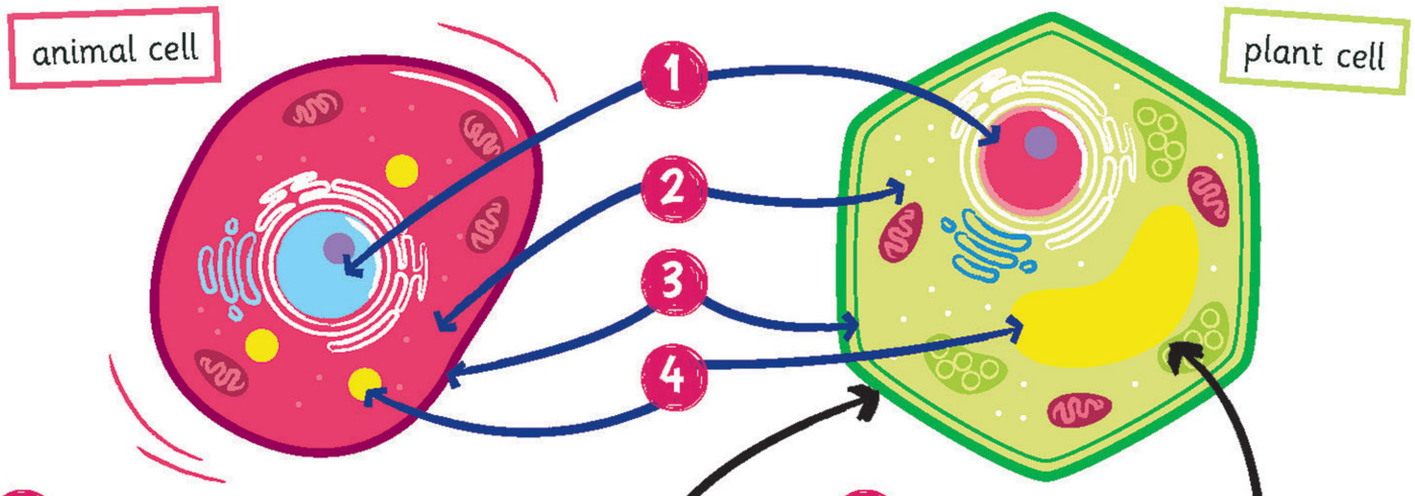
Discover... what the jelly-like substance inside a cell is called.



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 got several similar characteristics and structures.

1. **Nucleus:** controls what happens inside the cell and contains all the genetic information.
2. **Cytoplasm:** jelly-like substance which helps give the cell shape and is where all the cell structures are found.



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?

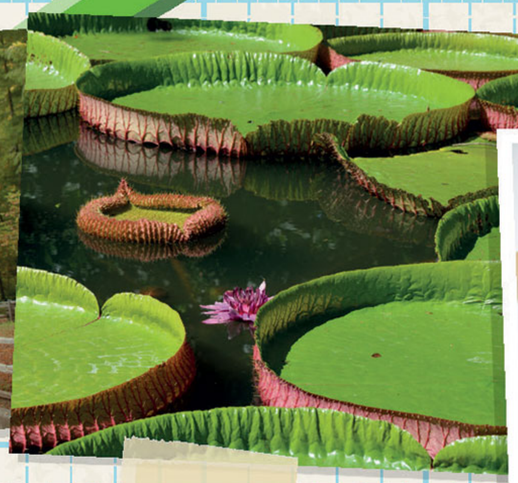
Example answers:
mitochondria – provides energy; ribosome – makes proteins; vesicle – small compartments that help with nutrition and excretion; rough endoplasmic reticulum – creates enzymes for the cell; Golgi apparatus – packages proteins into vesicles; smooth endoplasmic reticulum – where lipids are made; lysosome – where digestion takes place; nucleolus – where ribosomes are made

For next lesson... shoe boxes

For support. They do not have an internal skeleton like some other living things, so the cell wall enables them to grow taller.

Balloons represent cell membranes. Shoe boxes represent cell walls.

WHY HAVE PLANT CELLS GOT A RIGID WALL?



Find out more...

Discover...

the differences between plant and animal cells.

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

Hypothesis: Why have plants cells got a cell wall? Write your hypothesis in your notebook.

Materials: eight balloons, four shoe boxes

Step 1: Blow up the balloons (not too big). Put one balloon in each shoe box and leave the rest out.

Step 2: Build two towers, one using only the balloons and the other using the shoe boxes with balloons inside.

Reflect 1

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

Reflect 2

Which tower is easiest to build?

Conclusion: What is the function of a plant cell wall?

Cell walls provide ...

The human body has got ... , whereas a tree ...

Animal cells haven't got a cell wall. Compare the human body with a tree. What has the human body got to help with support that a tree hasn't?

Structure and support

A skeleton
(Remind pupils to use the linguistic support feature when phrasing answers.)

The shoe box tower
(plant cells with a cell wall)

UNIT 1
PAGE 9

Objective

Pupils will learn about the function and importance of cell walls through experimentation, using the scientific method.

Key vocabulary

animal cell, cell wall, hypothesis, plant cell, provide, rigid, structure, support

Warm up

- Pupils read the background information and then discuss the possible functions of a cell wall.

Main concepts

- Ask: *What is the opposite of rigid?* Elicit *flexible*. Discuss if it is easier to build with rigid materials or flexible ones, giving examples like houses and bridges.
- Remind pupils that a hypothesis is a guess. They should not worry about a right or wrong answer.

Learn more

- Pupils find out about the tallest trees on Earth, Giant sequoias. Alternatively, they can find out about the tallest animals and make comparisons with the Giant sequoia.
- Pupils learn a chant: *Cell walls, cell walls, what do they do? Cell walls, cell walls, support is what they do!*