

CAMBRIDGE

Teacher's Book

Science

Path 4



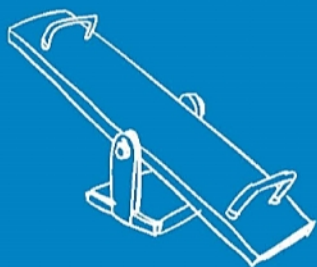
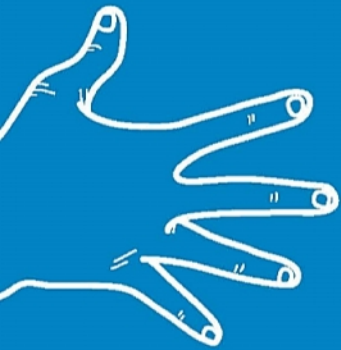
Better
Learning



WELCOME TO CAMBRIDGE SCIENCE PATH

Course objectives

- *Cambridge Science Path* takes learners on a journey as they discover the wonders of biology, chemistry and physics. Students are introduced to topics at a manageable pace, so that they can engage with, enjoy and fully assimilate the new concepts.
- Students learn about and cement their understanding of new concepts through **projects**. There is an *Investigate* project that runs through each unit, in which students review and expand upon the concepts presented in the unit. Each individual stage of the *Investigate* project feeds into the project finale, in which students present or produce something to demonstrate their understanding of the topic.
- Students also engage with Science in a **hands-on** way by conducting **experiments**. This practices **critical-thinking skills** and promotes collaborative learning.
- Students learn about new concepts through discovery. In *Cambridge Science Path*, **learner autonomy** is encouraged through the inclusion of interesting facts and thought-provoking questions. Our aim is for students to be inspired by the fun and wondrous world of Science.
- **Collaborative learning** is also encouraged through the *Investigate* projects which students carry out in pairs, in groups and as a class.
- The course provides students with the **linguistic support** that they require to study Science in a second language. The course helps students develop their speaking, listening, reading and writing skills. The unit projects give students practice of a range of skills and sub-skills.
- *Cambridge Science Path* provides students with practice of the **Cambridge English Qualifications for young learners**. Level 4 provides practice of *A2 Flyers* question types.
- **Mixed-ability assessment** provides teachers with support for students of different levels within the same class. They focus on lower- and higher-order thinking skills, as well as critical thinking.
- *Cambridge Science Path* aims to help students develop the following key competences: linguistic competence; mathematical competence and basic competences in science and technology; digital competence; learning to learn; social and civic competences; initiative and entrepreneurship; and cultural awareness and expression.





Course components

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



Class audio: provided through Presentation Plus, as well as being available to download online at www.cambridge.org/scienceaudio.



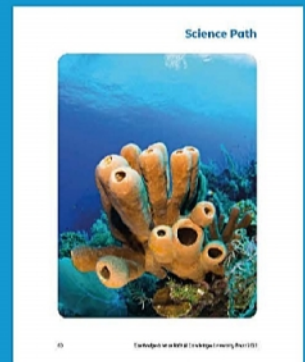
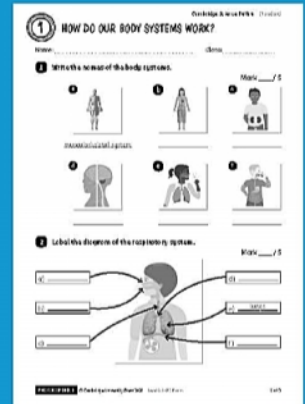
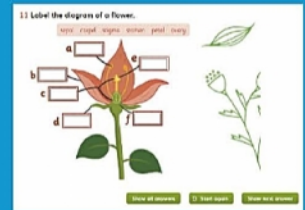
Teacher's Book: includes useful suggestions for activities at each stage of the lesson, answer keys, audio scripts and track numbers for the audio.



Science Path Presentation Plus includes an interactive, digital version of the Student's Book with a variety of features to help students cement their understanding of key concepts:

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

Classroom materials: include posters and a full bank of flashcards to be used across levels. The posters consolidate learning by helping students engage with Science vocabulary and concepts in the classroom.



WELCOME UNIT

PAGES 4–5

Objective:

Students will become enthusiastic about the study of Science by discussing the pictures on these pages. They will be encouraged to predict the topics they will study this year and also to guess what projects they will work on.

Key vocabulary

awareness, boat, bicycle, campaign, float, giraffe, health, lever, machine, material, neighborhood, oxygen, plant, recycle, respiratory rate, sense, sink, sun, table quiz, park ranger, wildlife

Warm up

- Write these words up on the board: *3D model*, *awareness campaign* and *quiz*. First, elicit the meaning of each term. Then, ask students if they have ever prepared or taken part in any one of these things. Ask them to give examples, e.g. *Last year, I helped to prepare an awareness campaign about saving energy.*

WELCOME TO CAMBRIDGE SCIENCE PATH

Welcome to the amazing world of natural science. In this book, you will:



make a
3D model



become a wildlife park ranger



learn about recyclable materials



create a health awareness campaign

explore our world through maps



find machines in your neighborhood



You will also find out:

- what your respiratory rate is.
- how to detect oxygen.
- how to see the oxygen plants release.
- whether certain objects sink or float.
- how levers work.
- how to make a compass.
- what the highest mountain in the world is.

5

Main concepts

- Ask students to look at the pictures. Invite them to read the labels. For the 'make a 3D model' picture, tell students that they will be making a 3D model of some body systems. For the 'create a health awareness campaign' picture, ask: *Can you think of any healthy habits to include in the awareness campaign?* For the 'become a wildlife park ranger' picture, ask them: *What animals can you see? What group do they belong to?* For the 'organize a table quiz' picture, brainstorm ideas as to how a table quiz works. For the 'learn about recyclable materials' picture, ask students: *What materials do you recycle at home?* For the 'find machines in your neighborhood' picture, ask students: *What simple machines can you find in a bicycle?*

Learn more

- Draw students' attention to the box on page 5. Work through the list, clarifying any doubts students may have in relation to concepts and vocabulary.

Tip

Use this first lesson of the year to set out classroom rules for group work. Involve the students in deciding what the rules should be.

1

HOW DO OUR BODY SYSTEMS WORK?

Learning objectives

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

- body systems and how they work together
- the respiratory system and how we breathe
- the circulatory system and how it moves blood around the body

Competences

This unit covers the following competences:

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

Key vocabulary

Body systems: circulatory, digestive, excretory, musculoskeletal, nervous, respiratory

Respiratory system: alveoli, bronchi, bronchiole, carbon dioxide, diaphragm, lungs, oxygen, respiration, trachea

Circulatory system: arteries, atrium, blood, blood vessels, capillaries, circulation, heart, veins, ventricle





Cambridge English Qualifications practice

You will find **A2 Flyers** activity types in the following exercises:
Student's Book, Page 14, Activity 1 – Listening Part 1

Throughout this unit, you will find the following **A2 Flyers** vocabulary:
air, as, cut, each, feel, finger, paste, group, happen, high, hour, if, large, low, minute, once, other, remember, repeat, rich, through, time, until, use, way, will

Materials needed for *Hands on*

- pencil
- notebook
- digital thermometer
- clock or stopwatch

Investigate

The *Investigate* project that runs through this unit encourages students to find out more about body systems by making a 3D body systems mural. The different *Investigate* stages practice the following skills:

- giving descriptions through writing and speaking
- autonomous decision-making
- presentation of work
- working as a team

Other resources

- Interactive activities
- Flashcards: *The human body*
- Song: *Pumping and breathing*
- Video documentary: *Respiration and circulation*

UNIT 1

PAGES 6-7

Objective:

Students will review vocabulary and concepts relating to body systems studied in previous years.

Key vocabulary

blood, breathe, digestive system, musculoskeletal system, nervous system, pulse, respiratory system

Warm up

- Ask students to stand up and push their chairs under their desks. Tell them to do 25 jumping jacks on the spot, without bumping into the student next to them.
- Then, ask students to sit down and work with a partner. Tell students to brainstorm and write a list of all the body systems they used to do the jumping jacks.
- Ask volunteers to read out their ideas and collate them on the board.

Main concepts

- Students look at the pictures and predict what they are going to learn about in this unit. Review the names of some of the body systems.

Out of breath, sweaty, tired, etc.

The organs of each system work together to carry out our body's vital functions.

Oxygen

1

HOW DO OUR BODY SYSTEMS WORK?

Look and see ...

What do we get from the air that helps us live?

How do you feel after running around for a long time?




What body systems are the people in these pictures using?

6

Musculoskeletal, digestive, respiratory, circulatory, and nervous systems

A doctor is checking a patient's vital signs (blood pressure, breathing, temperature) to check their health.



Song  02
Pumping and breathing

What is happening
in each picture? Why?

DOCUMENTARY
Respiration and circulation

Investigate

In this unit, you will create a 3D body systems mural. To do this, you will:

- work in groups to create a mural.
- learn more about the respiratory system, including how we get oxygen from the air.
- learn more about the circulatory system, including how the heart pumps blood.
- present each part of the mural to the class as a group.

Unit 1 7

Learn more

- Tell students that you are going to test their observation skills. Ask them to look at the pictures for one minute. Tell students to close their books and ask them questions about the pictures: *What game was the boy playing? What was the girl eating? What was the boy doing with his dad?*

Tip

To help students recall the names of the body systems they have learned about in previous years, play a game of *Snowman*, an alternative version of the game *Hangman*. Every time a student gets a letter wrong, you add a part of the snowman: a circle for its body, a circle for its head, two sticks for arms, a top hat, two eyes, and a frown.

Song

This song focuses on how the respiratory and circulatory systems work together to bring a constant supply of oxygen to the whole body.

Documentary

The documentary focuses on two body systems: the circulatory system and the respiratory system. It shows how the circulatory system moves the blood around the body and how the respiratory system performs respiration.

UNIT 1

PAGE 8

Objective:

Students will review the concept of body systems, as well as the main body systems they have learned about in previous years.

Key vocabulary

circulatory, digestive, excretory, musculoskeletal, nervous, respiratory

Warm up

- Ask students: *When was the last time you worked in a group?* As this is likely to be the first unit students study this school year, it is likely that they will tell you about something they did on their summer holidays, for example at summer camp.
- Explain to students that inside our bodies, there are systems. These systems work together to keep our bodies working.

Main concepts

- Ask students to look at the pictures and names of the body systems. Then, ask students what each system does, one by one. Remind them that they studied these body systems in previous years.

Learn more

- Ask students to find out what the Latin word *vita* means and how it is related to the term *vital system*.

Because they keep us alive. The title is a play on the word *vital*.

Here's the hidden heart!

WHY ARE BODY SYSTEMS VITAL?

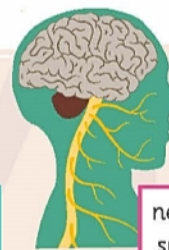


By the end of this lesson, you will know what the main body systems are.

Body systems are groups of organs that work together to perform a specific job. For example, the musculoskeletal system allows us to move around from one place to another. Do you remember what each one of these systems allows us to do?



musculoskeletal system



nervous system



digestive system



excretory system



circulatory system



respiratory system

Body systems are sometimes called "vital systems". In English, the word *vital* means "absolutely necessary" and "essential for life".

Investigate STAGE 1

- In groups of four, join four sheets of paper together. Lay out the sheets horizontally and stick them together from behind.
- One member of the group lies down on the long piece of paper with their arms, legs and fingers spread out.
- The other group members trace the outline of their body.

8



This stage of the *Investigate* project must be carried out in the classroom. Make sure that students understand that the four sheets of construction paper need to be laid out in such a way that they can comfortably draw the outline of one of the group members on them. Make sure they use tape on only one side and draw on the other.

VITAL SIGNS

Hands on!

Before you start

The doctor checks our vital signs to make sure that our body systems are working properly. You can also check some of the vital signs of your classmates.

Materials

pencil, notebook, digital thermometer, clock or stopwatch

Method

1 Work with a partner. Copy and complete the table in your notebook:

	Body temperature	Pulse (beats per minute)	Respiratory rate (breaths per minute)
Your name °C bpm bpm
Your partner's name °C bpm bpm

- 2 Measure your partner's body temperature using the thermometer. Write it in your notebook.
- 3 Measure your partner's pulse. Place your forefinger and middle finger on your partner's wrist and count the pulsations for one minute. Write it down.
- 4 Finally, measure your partner's respiratory rate. Using the clock, count how many times they breathe in and out in one minute.
- 5 Then, it is your turn to be the patient.
- 6 Run once around the schoolyard and repeat the process.

Conclusions

Are your results very different from your partner's?
How have the results changed after you ran?



My partner had a higher / lower body temperature than me.

My pulse was quicker / slower than my partner's.

Unit 1 9

Objective:

Students will do a practical investigation into how to measure some of their vital signs.

Key vocabulary

body system, pulse, respiratory rate, vital sign

Warm up

- Ask students: *How do you know if someone is alive?* Elicit responses such as: *You check to see if they are breathing. You check their pulse. You touch their body to see if it is warm.* If students are having difficulty expressing themselves, help them to remember the relevant vocabulary and language structures.

Main concepts

- Create three groups of pairs: one group measures body temperature; one measures pulse; one measures respiratory rate. This makes it easier to share thermometers and stopwatches.
- If resources are scant, do the investigation with half of the class during the previous or next lesson.

Learn more

- Ask students to find out what the fourth primary vital sign is and how it is measured. *Blood pressure is measured using a sphygmomanometer.*

It is unlikely that students will have the same results.

Body temperature, pulse, and respiratory rate should all increase after running.

UNIT 1

PAGES 10–11

Objective:

Students will review what they already know about the respiratory system, while at the same time learning how oxygen and carbon dioxide are exchanged in the lungs. They will also have the opportunity to do a hands-on investigation into their lung capacities.

Key vocabulary

alveoli, bronchi, bronchiole, carbon dioxide, diaphragm, lungs, oxygen, respiration, trachea

Warm up

- Display a simple diagram of the respiratory system on the interactive whiteboard (IWB) or draw a simple outline if you do not have access to an IWB.
- Ask students to name the different parts of the respiratory system. If a student calls out a correct part, invite them to come up to the board and label it.

It passes to the blood in the alveoli.

The left lung is a little smaller than the right lung because it shares space with the heart.

HOW DO YOU GET OXYGEN FROM THE AIR?



The **respiratory system** is a group of organs that perform respiration. **Respiration** is another way of saying 'breathing'. In respiration, we breathe in air that contains oxygen and we breathe out carbon dioxide. Our body needs oxygen to process food that gives us energy.

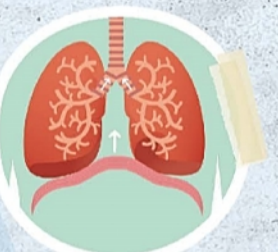
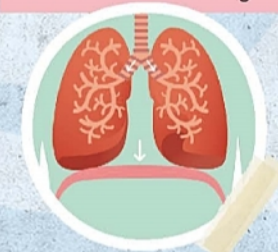
Do you know that one of your lungs is smaller than the other? Find out why!

1 Air enters our body through the **mouth** and the **nose**.

2 The air passes through a tube called the **trachea**, to two large tubes called the **bronchi**.

3 The bronchi lead to two large organs that are responsible for breathing: the **lungs**.

4 Below the lungs, there is a muscle called the **diaphragm**. This muscle helps the lungs to perform respiration. When it **contracts**, air is drawn into our lungs.



5 When the diaphragm **relaxes**, air is expelled from our lungs.

On average, a child of your age takes about 1,200 breaths per hour. So, how many times do you breathe in a day?

Around 28,800