



# FORMS OF LIFE

# FORMS OF LIFE

CONTENTS	EVALUATION CRITERIA Pupils will be able to:
Description of living organisms	Describe living organisms and their main characteristics.
Life processes: nutrition, interaction, reproduction	Identify the three main life processes of living organisms.
Organisation of living organisms	Identify types of specialised plant cells and animal cells. Describe how cells form tissues, tissues form organs, organs form systems and systems form organisms.
The five kingdoms of living things	Know the different groups living organisms belong to, describing their main characteristics.

## – OPENING PAGES

Pictures of orchids, a snail, unicellular protozoa and algae

## – REFLECT

Introduction to living and non-living things

## – WORK TOGETHER

Grow your own bacteria

## – CONTENT PAGES

Living organisms  
Life processes  
Organisation of living organisms  
The five kingdoms of living things

## – OUR WORLD

Life-changing inventions

## – STUDY SKILLS

How to do a jigsaw reading

## – REVIEW

## – UNIT SUMMARY

In this unit, pupils will learn about:

- differences between living and non-living things
- unicellular and multicellular organisms
- characteristics and life processes of living organisms
- differences between plant cells and animal cells
- how specialised cells form other structures
- classification of living things into kingdoms

## – LANGUAGE FOCUS

- Describing photos
- Making guesses
- Explaining a process
- Relative pronouns: *that* and *which*
- Discussing ability: can and can't
- Regular and irregular plurals
- Present passive voice

## – KEY STRUCTURES

- *Need* + infinitive
- *Allow* + object + infinitive
- Virus / viruses; fungus / fungi; bacterium / bacteria
- I can see... I can't see...
- I think... I don't think...

LEARNING STANDARDS Pupils are able to:	KEY COMPETENCES						
	LIN	MST	DIG	LTL	SOC	AUT	CUL
Identify unicellular and multicellular organisms.	●	●					
Identify and describe the main structures of the animal and plant cells.	●	●					
Learn about the main life processes and how each one is carried out.		●					
Identify specific organisms as living things based on the three main life processes.	●	●					
Describe specialised cells and their functions.	●	●					
Understand how cells form tissues, organs, systems and organisms.		●					
Classify living things into Whittaker’s five kingdoms, considering their main characteristics.	●	●		●			
Conduct an experiment to grow bacteria, making hypotheses and predictions.		●	●	●			

**LIN** Competence in linguistic communication

**MST** Competence in mathematics, science and technology

**DIG** Competence in the use of new technologies

**LTL** Competence in learning to learn

**SOC** Competence in social awareness and citizenship

**AUT** Competence in autonomous learning and personal initiative

**CUL** Competence in artistic and cultural awareness

**DIGITAL RESOURCES**

**PUPIL’S IWB**

**LEARNING KIT**

- Interactive content activities; Interactive language activities; Flashcards; Presentations; Multimedia

**TEACHER’S KIT**

- Teacher’s Book; Test generator; Methodology; Wordlists; Worksheets; Multimedia; 360° evaluations

**FAMILY CORNER**

- Presentations; Wordlist; Family guide

**UNIT TRACK LIST**

- Page 10 1.02 1.03
- Page 11 1.04 1.05 1.06 1.07 1.08
- Page 12 1.09 1.10
- Page 13 1.11 1.12
- Page 14 1.13 1.14 1.15 1.16 1.17
- Page 15 1.18
- Page 19 1.19

## 6 OPENING PAGES

### SUMMARY

The aim of the unit opener is to activate pupils' prior knowledge of the topic and stimulate their curiosity for what they are about to learn. These pages will introduce pupils to the differences between living and non-living things. Pupils will identify examples of living organisms and discuss the main life processes. They will also revise their understanding of unicellular and multicellular organisms and the kingdoms to which they belong.

### LANGUAGE

- Describing photos: I can see ...
- Making guesses: I think ... is ... It belongs to ...

### MATERIALS

Flashcards: multicellular organism, unicellular organism.  
Extra materials: a living plant and a plastic plant.

### GETTING STARTED

Show pupils two plants – one living and one made of plastic. Ask: *How are these two plants similar? How are they different?* Encourage a variety of responses: *They are both green. One of them grows, but the other one doesn't because it's plastic.*

### STEP BY STEP

PAGES 6–7

Invite a volunteer to read the question box at the top of page 7. Encourage pupils to brainstorm and compare their answers. Explain that they will learn the answers to this question during the lesson.

#### Activity 1

Pupils brainstorm ideas - write any useful vocabulary on the board (cells, organs, etc.).

#### Activity 2

Ask the class what the difference is between unicellular and multicellular organisms. Elicit examples of multicellular organisms in increasing order of size and complexity, such as insect, fish, frog, crocodile, eagle, bear and whale.

## 1 FORMS OF LIFE



6

#### Activity 3

Ask pupils to identify the things they can see in the photos. You can extend this by showing flashcards of living and non-living things.

#### Activity 4

Remind pupils that all living organisms perform certain life processes. Encourage pupils to share what they know about the three main processes: nutrition, interaction and reproduction. Invite a volunteer to write pupils' answers on the board.

#### Activity 5

Point out the Useful language box on page 7 and model the phrases for the class. Write pupils' ideas on the board. Pupils add the words *crab*, *orchid* and *bacteria* to their vocabulary lists. Then ask: *Which kingdoms do these living things belong to?* Explain that bacteria belong to a kingdom called monera.

### TARGETED QUESTIONS

☉ **Is it living or not?** Dictate the names of things that pupils may know and ask them to say which are living and which are non-living.

What were the first forms of life on the Earth?

**LET'S BEGIN**

- 1 What are living organisms made up of?
- 2 What is a unicellular organism? What is a multicellular organism? Give an example of each.
- 3 Look at the photos. What living things can you see? Can you see any non-living things?
- 4 Look at the photos again. Name some of the life processes that the living organisms perform.
- 5 Choose one of the living things in the photos and describe it to your partner. Does your partner know what kingdom it belongs to?

What do you know? Let's find out!

**Useful language**

- It lives in ...
- It has ... legs.
- It lives on (plants) and ...
- It is an expert in ...

⊙⊙ Letter lists. Have pupils work in groups. Write 10 random letters on the board. Pupils write the names of 10 living organisms that begin with those letters. Set a limit of three minutes.

⊙⊙⊙ FARM-B. Write the mnemonic FARM-B on the board. Explain that there is a letter for each type of vertebrate animal. Elicit the names (*fish, amphibian, reptile, mammal and bird*) and then ask pupils to write two or more examples for each type.

⊙⊙⊙⊙ What is more important? Ask pupils which life processes are the most important for living organisms. Tell them to rank the processes in order from the most to the least important and explain their ideas.

**WRAP IT UP**

Remind pupils of the question at the top of page 7. Ask if they have learned the answer in this lesson. Elicit: *single-celled organisms and microbes*. Then ask: *What other interesting facts did you learn? Did anything surprise you today? What facts did you already know? Do you have any questions or doubts?*

**360° EVALUATION**

Download, print and distribute the Diagnostic test and Self-evaluation for the pupils to complete.

**SOLUTIONS**

- 1 Living organisms made up of cells.
- 2 Model answer:  
A unicellular organism consists of a single cell, for example a bacterium and a paramecium. A multicellular organism consists of many cells, for example a flower and a ladybird.
- 3 Living: orchid, insect, crab, algae, protozoa.  
Non-living: sand, water
- 4 Nutrition, interaction and reproduction.
- 5 Pupils' own answers.

## 8 REFLECT

### SUMMARY

Pupils will distinguish between living and non-living things and learn about the characteristics that all living organisms share. Pupils will discuss microscopic life (bacteria and viruses) and the possibility of life on Mars, in order to develop critical and creative thinking skills.

### LANGUAGE

- Describing living and non-living things: Marbles are not living things. (Sunflowers) grow. (Bees) reproduce.
- Describing plant nutrition: Plants make their own food. They use sunlight. They need energy to live and grow.
- Describing scientific instruments: A microscope is used to observe tiny organisms.

### MATERIALS

Flashcards: chameleon, marbles.

Extra materials: diagram of the solar system with images of the eight planets.

### GETTING STARTED

Say names of living and non-living things. When pupils hear a living thing, they clap once. When they hear a non-living thing, they snap their fingers.

### STEP BY STEP

PAGE 8

#### Activity 1

Elicit examples and write them on the board. Then ask: *What are the differences between these two things?*

#### Activity 2

Elicit ideas and ask what each instrument is used for.

#### Activity 3

Pupils share ideas before completing the task.

#### Activity 4

Explain that all living organisms need energy to function well. Ask: *How do (we) get energy to grow?*

#### Activity 5

Ask pupils what they know about bacteria, viruses and kingdoms. Write their answers on the board.

**Reflect**

- In your notebook, make a list of six living things and six non-living things. Then choose one from each group and write about the main differences.
- What instruments do scientists use to observe tiny organisms?
 

**Useful language**

Scientists use a ... to observe (cells).  
A (biologist) uses a (Petri dish) to ...  
They use a (slide) to examine ... under a ...
- What are the characteristics of living things? Unscramble the words and write the answers in your notebook.
 

• nbro

• pdroneuc

• rrwog

• ide
- What is the process in which plants make their own food? Why is this process vital? Explain in your notebook.
- Bacteria and viruses are microscopic organisms. Read and answer the questions below.
 


• Do they have cells?

• What kingdom do they belong to?

• Are they hostile or friendly organisms?
- Use the words from the box to copy and complete the text in your notebook. There are some extra words.
 

mammal • swim • amphibian • land • water • animal  
 algae • animals • eggs • rivers • sleep • night

The platypus is a small (a) .... It belongs to the (b) .... kingdom. It is a very good swimmer. It spends most of the time in the (c) .... It lives in small streams and (d) .... in eastern Australia. It feeds on other (e) .... It lays (f) .... in a burrow near the water. It likes to (g) .... during the day and move during the (h) .... The bigger platypus lives in Tasmania.



Platypus are a protected species.
- Think about the planet Mars. Can plants grow in Martian soil?
 

• Name the main things plants need to grow.

• What non-living things do you think exist on Mars?

• Do you know another name for Mars?

8

### Activity 6

Pupils give examples of vertebrate animals.

### Activity 7

Ask pupils to imagine what things might live on Mars.

### WRAP IT UP

Draw a mind map on the board. Write *living organisms* in the centre and elicit characteristics.

### SOLUTIONS

- and 2 Pupils' own answers.
- a. born; b. grow; c. reproduce; d. die.
- Photosynthesis; Plants need energy to survive.
- a. Bacteria have cells but viruses do not; b. Bacteria belong to the monera kingdom. Viruses do not belong to any kingdom; c. Bacteria can be hostile but friendly, too. Viruses are hostile.
- a. mammal; b. animal; c. water; d. rivers; e. animals; f. eggs; g. sleep; h. night.
- Pupils' own answers.



WORK TOGETHER 9

Work together

Grow your own bacteria

Think first

You are going to do an experiment to see how bacteria grow.

First, read and answer the following questions with your group:

- Do all types of bacteria grow in a similar way?
- Why is it important to wash your hands?



**Materials:** Cotton buds, Petri dish, permanent marker, camera, notebook, pen.

Step by step

- 1 In groups, make a list of objects and places where you can get bacteria samples. For example, your mobile phone, a door handle, your fingernails, the top of your desk. Discuss your ideas and vote for the best two.
- 2 Prepare your samples. Choose one object or place from your list. Swab it with a cotton bud. Open a Petri dish and rub the cotton bud on the agar. Close the Petri dish. Make sure it is completely closed. Write the name of the sample, the date and the time on the Petri dish. Choose a different object or place and repeat the process.
- 3 Answer this question individually: Which sample do you think will grow more quickly? Then share your answer with the rest of your team and agree on one answer together.
- 4 Put your Petri dishes in a warm place for three days. Each day, check the samples and draw or take a photo of what you see. Make notes about the changes. **Do not** open the Petri dishes!
- 5 At the end of the experiment, compare your notes and discuss these questions in your group:
  - Which sample grew more quickly?
  - Which samples did not grow very much?
  - Are the samples different? Why?
  - Which of the samples you tested had the most bacteria?
  - What do you now think about cleaning things or washing your hands?
- 6 After you finish the experiment, **do not** open the Petri dishes! Give them to your teacher.

Wrap it up

Compare your answers to the *Think first* questions with your discussion in step 5. Did your answers change after the experiment?

Evaluate your cooperative learning.

9

SUMMARY

Pupils will use the *Cooperative investigation* technique applied to an enquiry-based activity to encourage their curiosity about the world around them. First, pupils will discuss their ideas and then decide on one hypothesis for the group to work on. Next, they will do the experiment and they will develop their conclusions to share with the class. Finally, pupils will test their hypothesis by comparing their conclusion to their original hypothesis.

LANGUAGE

- Making suggestions: Let's take ... We can take samples from ... What about taking samples from ... ?
- Making comparisons: This / That sample grew more / less quickly. These / Those samples didn't grow as much.

MATERIALS

Petri dishes, pen, cotton buds, permanent marker, notebook, digital camera.

GETTING STARTED

Pupils describe what they see in the photo. Go through the list of materials, checking the groups have everything. Ask: *What do you know about bacteria? Are they harmful or beneficial?* Encourage a variety of responses and write pupils' answers on the board.

STEP BY STEP

PAGE 9

- **Step 1.** Explain the importance of taking samples from different places, in order to collect a variety of bacteria for the experiment. Encourage pupils to think carefully and create a long list before voting.
- **Step 2.** Go through the instructions before pupils begin, so they do not contaminate the Petri dishes. Explain that they should not touch the agar with their fingers. Tell them to label the dishes right away to avoid confusion.
- **Step 3.** Ask pupils to make a guess about which sample they think it will grow more quickly. Encourage them to decide together on one answer before they continue.

- **Step 4.** Ensure groups have stored their samples properly, and remind pupils to observe them and make notes every day.
- **Step 5.** Invite volunteers to present their findings.
- Tell pupils that answers for questions a–d will vary. For question e, pupils should conclude that there are lots of bacteria growing on everyday objects, so they need to wash their hands regularly.
- **Step 6.** Explain that the bacteria have grown a lot and could now be dangerous. Explain to pupils how to dispose of biological waste safely.

WRAP IT UP

Encourage pupils to compare their current knowledge to what they thought before doing the experiment.

360° EVALUATION

Download, print and distribute the Cooperative learning evaluation for the pupils to complete.

## 10 LIVING ORGANISMS

### SUMMARY

Pupils will learn that cells are the basic units of life and they will differentiate between unicellular and multicellular organisms. They will also learn about the basic structures of plant cells and animal cells. Pupils will learn that all cells perform three basic life processes: nutrition, interaction and reproduction.

### LANGUAGE

- Describing organisms
- Relative pronouns: *that* and *which*
- Verbs for cell functions: perform, carry out, contain, etc.
- Discussing ability: can / can't
- *Need* + infinitive: They need to reproduce.
- *Allow* + object + infinitive: It allows them to grow.

### MATERIALS

Flashcards: animal cell, chameleon, multicellular organism, mushrooms, plant cell, unicellular organism.

Extra materials: two microscopes, slides of plant and animal cells, onion skin cells, cells from the inside of your cheek.

### GETTING STARTED

- Hold up your hand and ask what it is made of: *skin, bone, muscles, blood*. Ask what those things contain. (*Cells*.) Ask if there is any living thing smaller than a cell. (*No, the cell is the smallest unit of life.*)
- Pupils brainstorm names of different living organisms. Write their answers on the board. Ask: *How is it born? What does it eat? How does it move around?*

### STEP BY STEP

PAGES 10–11

- Explain that the first forms of life on Earth were very simple, unicellular organisms. Ask pupils how we are different from those first single-cell organisms. Say: *We are multicellular because we have many cells.*
- Model and practise the pronunciation of new vocabulary: *nucleus, membrane, substances, cytoplasm, vacuoles, chloroplasts, chlorophyll*.
- Name the parts of cells and ask pupils to raise one hand if the part is only found in a plant cell and two hands if it is found in both plant and animal cells.

### Living organisms


What living organisms are there on Earth?

**The cell**

Our planet is home to different types of living organisms, including plants, animals, fungi, algae and bacteria. All living organisms consist of tiny units called **cells**.

Living organisms can be **unicellular** or **multicellular**.

- In a unicellular organism, the **single cell** performs all of the life processes.
- In a multicellular organism, **many different cells** perform different functions.



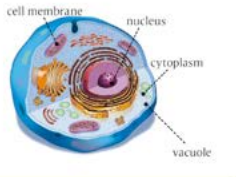
Closterium, a unicellular green alga

Animal and plant cells have some structures in common:

**Animal cell structure**

Animal cells have:

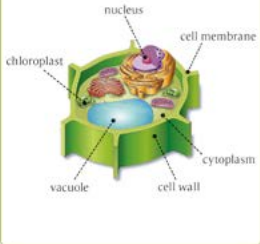
- a **nucleus**. It controls the functions of the cell, such as reproduction.
- a **cell membrane**. It controls the substances that enter and leave the cell.
- **cytoplasm**. It is a jelly-like substance between the cell membrane and the nucleus. It contains various chemicals and structures.
- **vacuoles**. They are storage bubbles. They contain water and minerals which the organism needs to grow. Not all animal cells have vacuoles.



**Plant cell structure**

Plant cells have a nucleus, a cell membrane, cytoplasm and vacuoles as well, but they also have:

- a **cell wall**. It gives the cell its shape and protects it.
- **chloroplasts**. They contain chlorophyll, so the plant can carry out the process of photosynthesis.



10

- Pupils read the text in pairs and look for verbs related to cell functions: *perform, contain, protect*, etc.
- Invite pupils to ask questions in pairs about the parts of cells. *What part of a cell controls the functions of the cell?*
- Ask pupils to name one characteristic of each life process. A volunteer writes pupils' ideas on the board.

### Activity 1

Ask pupils to try to remember the names of the parts of a cell. Write their answers on the board. Use these words to elicit the answer to the question.

### Activity 2

Pupils brainstorm ideas and feedback to the class. A volunteer writes pupils' ideas on the board.

### Activity 3

Stop after each definition and ask pupils to compare their ideas. Write the correct answers on the board.



LIFE PROCESSES 11

**Life processes**

Every living organism performs three main life processes: **nutrition**, **interaction** and **reproduction**. Depending on the organism, each of these three functions occur differently.

**Nutrition**

All living organisms take in **nutrients** from their environment to obtain **energy**. This energy allows them to grow and function.



**Plants** use sunlight to make their own food through photosynthesis.



**Animals** cannot make their own food, so they take in nutrients from other living organisms.



**Decomposers** feed on the remains of dead organisms. Fungi and bacteria are decomposers.

**Interaction**

All living organisms react to **stimuli**. A **stimulus** is a change in the environment. It produces a reaction in an organism. Any reaction to stimuli is a **response**. Animals respond quicker to stimuli, but plants respond slower.

**Reproduction**

Living organisms need to reproduce for their species to survive. Most plants grow from seeds. Most animals lay eggs or have babies.

Reproduction can be:

- **asexual**, which involves one organism. It is common in unicellular organisms, such as bacteria.
- **sexual**, which involves a male and a female of the same species.



A lioness with her cub.

- 1 How is a plant cell different from an animal cell?
- 2 How do living organisms obtain energy to grow and function? How do we obtain energy to grow?
- 3 Listen to the definitions and write the words in your notebook.
- 4 How do animals and plants react to stimuli? Give examples.

- 1.02 Living organisms: the cell
- 1.03 Animal cell and plant cell structure
- 1.04 Life processes
- 1.05 Nutrition
- 1.06 Interaction
- 1.07 Reproduction
- 1.08 Activity 3

**Activity 4**

Invite a volunteer to give a definition of what a stimulus is. Then say: *Think of your pet or a friend's pet. How does it react to stimuli?* Write pupils' answers on the board.

**WRAP IT UP**

- If you have access to the school's science lab and equipment, set up two microscopes and samples of onion skin cells and cells from your cheek. Invite pupils to come up and observe the cells. Ask them to describe what they saw in each sample. Ask: *How are the samples different?* (The onion cells are more rigid and geometric because they have a cell wall.)
- Pupils describe the similarities and differences in each of the life processes for different living organisms.

**SOLUTIONS**

- 1 The plant cell has a cell wall and chloroplasts.
- 2 Model answer:  
It depends on the living organism. Plants use sunlight to produce their own food. Animals and fungi feed on other organisms. We obtain energy to grow from food.
- 3 a. unicellular; b. multicellular; c. vacuole; d. decomposers; e. stimulus; f. response

## 12 ORGANISATION OF LIVING ORGANISMS

### SUMMARY

Pupils will learn about the characteristics of specialised cells and how they function. They will also learn how cells form larger structures, which in turn form organs that function within systems. In this way, they will discover how cells can form complex organisms.

### LANGUAGE

- Verbs for specific functions: carry (out), absorb, contain, protect, receive, form, perform, etc.
- Infinitive of purpose: Scientists use microscopes to observe cells. They work together to perform a function.

### MATERIALS

Flashcards: leaf cells, nerve cells, red blood cells, white blood cells.

Extra materials: a microscope.

### GETTING STARTED

Play 'Simon says', using commands such as *jump*, *run in place*, *touch your (head)*. Ask: *What holds up your body and allows you to move? (Bones and muscles.) What allows you to breathe in oxygen? (Lungs.) What transports the oxygen around your body? (Blood cells.)* Brainstorm more parts of the body and their functions.

### STEP BY STEP

PAGES 12–13

- Ask: *What equipment do you think scientists use to observe cells? (Microscopes.)* Ask: *What does a microscope do? (It magnifies tiny organisms so we can see them better.)* Explain that the photos show what certain cells look like under a powerful microscope. Volunteers describe what the cells look like.
- Explain new vocabulary, such as *haemoglobin*, *protein*, *bodyguards* and *root*. Model the pronunciation of any words that may be difficult for pupils.

### Organisation of living organisms

What is the study of living things called?

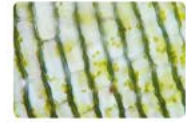
A **cell** is the smallest living unit in a living organism. Cells in most multicellular organisms, such as plants and animals, are **specialised**. This means different cells perform different functions. Specialised cells form a variety of tissues and organs.

#### Specialised cells

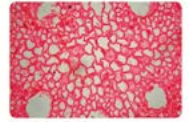
Animals and plants have many specialised cells.

#### Examples of plant cells

- **Leaf cells.** These cells absorb sunlight so the plants can perform photosynthesis.
- **Root hair cells.** They absorb water and minerals from the soil.



Leaf cells



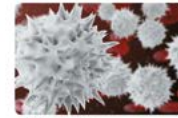
Root hair cells of corn

#### Examples of animal cells

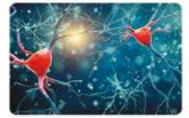
- **Red blood cells.** They are red because they carry haemoglobin. Haemoglobin is a bright, red protein that contains iron. The red blood cells carry oxygen around the body.
- **White blood cells.** They are the bodyguards of the organism. They protect the body from bacteria, viruses and other foreign intruders.
- **Nerve cells.** They carry information from the brain to the rest of the body. The sensory organs also send information to the brain using nerve cells.



Red blood cells



White blood cells



Nerve cells

1 Choose a specialised cell and describe its main function.

2 There are different types of blood. With a partner, find out how many blood groups there are. Which is the most common group and the least common group?

12

- Pupils describe what they see in the illustration. Ask: *What organ can you see in the last picture? What is its function?*

### Activity 1

Pupils describe some specialised cells. Ask: *Do they all carry out the same function?* This can be extended by asking: *What happens if people don't have enough iron in their diet? (They won't have enough iron to make haemoglobin.) What does your body produce when you have an infection? (More white blood cells.)*

### Activity 2

Ask pupils if they know the name of any blood groups and if they know their own blood group.

### Activity 3

Say: *What does a neuroscientist study?* Write the word on the board.

**Cells, tissues, organs and systems**

In all multicellular organisms cells join together to form complex structures.

- **Tissues.** Cells with similar characteristics and functions work together to form tissues. An example of tissues in plants are xylems that transport nutrients and water. People and animals have muscle tissue that helps them move.
- **Organs.** Tissues form organs. The cells in an organ work together to carry out a particular function. Examples of organs in people and animals are: the heart, the brain, the lungs and the stomach.
- **Systems.** Organs working together to perform the same function form systems. They are the most complex structures in a living organism. An example of a system which people and animals have is the nervous system.



- Listen to a neuroscientist talking about nerve cells. Make notes. Then write a short summary in your notebook.
- How do cells form an organism?
- In pairs, think of an animal or a plant system. Name its parts and its main functions. Then draw the system, starting from the simplest structure.
- Can all living organisms form tissues? Search online and share the information you find with the class.

**Useful language**

This is the ... system.  
The ... and ... are the main parts of this system.  
It moves ... around ...

- 1.09 Organisation of living organisms
- 1.10 Specialised cells
- 1.11 Cells, tissues, organs and systems
- 1.12 Activity 3

**Activity 4**

Ask: *What does a group of cells form in our body?* Focus on the illustrations to help pupils talk about the purpose of cells and what they form.

**Activity 5**

Say: *What's your favourite animal? Do you have a favourite plant?* Invite pupils to make notes individually before they pair up.

**Activity 6**

Invite pupils to give a definition for a single-celled organism and a multicellular organism. Say: *How are they different?*

**WRAP IT UP**

Invite pupils to revise the texts on both pages. Ask them to find verbs and write them in their notebooks. Then a volunteer says a verb aloud (*absorb*). Another volunteer must then use the verb in a sentence about the topic: *Root cells absorb water and minerals.*

**SOLUTIONS**

- Their main role is to carry out a specific function. For example, red blood cells carry oxygen. Nerve cells carry information. Leaf cells absorb sunlight.
- Pupils' own answers.
- Pupils' own answers.
- Cells join together to form tissues, tissues form organs and organs that work together form systems. Systems keep a complex organism healthy.
- Pupils' own answers.
- Pupils' own answers.

## 14 THE FIVE KINGDOMS OF LIVING THINGS

### SUMMARY

Pupils will learn about the five kingdoms of living things and the main characteristics of each kingdom. They will compare and contrast living organisms and discuss the importance of photosynthesis to plants. Pupils will also learn about viruses and yeasts.

### LANGUAGE

- Regular and irregular plurals: virus / viruses, fungus / fungi, bacterium / bacteria
- Comparing and contrasting: Plants have roots, but fungi do not. Plants can make their own food, but fungi cannot.

### MATERIALS

Flashcards: amoeba, bacteria, chameleon, mushrooms, multicellular organism, unicellular organism.

### GETTING STARTED

Tell pupils that scientists classify living things into different groups by looking at their characteristics. This helps them distinguish how similar or different living things are to each other. Scientists can classify organisms according to their appearance, movement or reproduction.

### STEP BY STEP

PAGES 14–15

- Read aloud the question in the box at the top of the page. Encourage pupils to give a reason for their answers. Say: *Mushrooms are also called toadstools. Ask: Do you know what the largest and most complex algae are? (Marine algae.)*
- A volunteer reads aloud the first paragraph. Then write on the board the five main headings, which are the names of the five kingdoms. This will help pupils navigate the organisation of the text.
- Ask pupils what else they know about the living things mentioned in the texts. Give some examples: *Algae live in water. Seaweed is a type of algae. Yeast is what makes bread rise. Some mushrooms are good to eat, while others are poisonous.*

### The five kingdoms of living things

Are algae plants? How about mushrooms?

Scientists classify living things into five groups based on their distinctive characteristics and similarities. These five groups are called **kingdoms**.

#### Animal kingdom

This kingdom is the largest of the five kingdoms. Animals are multicellular organisms. They get the energy they need by feeding on other living organisms. Animals can move, respond to stimuli and reproduce.



Kangaroos feed on grasses and flowers.

#### Plant kingdom

Plants are multicellular organisms. They use photosynthesis to collect energy from the Sun to make their own food. Plants cannot move like animals, but they can reproduce and respond to stimuli.

#### Fungus kingdom

Most fungi live on trees or in the soil. They can be unicellular or multicellular. Fungi get their nutrients from the remains of dead plants and animals, or working with other living organisms. This kingdom includes various types of yeast and mushrooms.



**Mushrooms.** They consist of many cells. Some mushrooms are poisonous. Some are edible. They are almost 90% water.



**Yeast.** We can find yeast almost everywhere in nature. Yeast consists of a single cell. Some yeast can be harmful, but other yeast can be beneficial. We use yeast to make bread and pizza.

#### Protist kingdom

Protists are usually unicellular, but some are multicellular. Most protists are aquatic. This kingdom includes algae and protozoa.

- **Algae.** They can consist of a single cell or many cells. Algae use sunlight to produce their own food.
- **Protozoa.** They are unicellular organisms. They get their nutrients through the cell membrane.



Euglena is a unicellular protist.

14

- Volunteers read aloud the text about Whittaker's kingdoms. Model and practise any new vocabulary and pronunciation. Pupils complete the task in their notebook.
- **true:** b and c; **false:** a, d and e

### Activity 1

Pupils brainstorm characteristics of each kingdom. Ask: *Do any kingdoms share the same characteristics? Did anything surprise you about any of the kingdoms?*

### Activity 2

Pupils revise the texts about fungi and plants, making notes about their differences. Encourage them to add more facts. (*Fungi don't need sunlight to live and grow, but plants do. Fungi don't have roots. Fungi don't perform photosynthesis.*)

### Activity 3

- Ask: *Which kingdom do bacteria belong to? What can they do to other organisms?*
- Brainstorm some keywords and write them on the board to help pupils with their research (*beneficial bacteria, bacteria health, common bacteria*). Remind pupils of tricks for an effective search.

**Monera kingdom**

This kingdom consists of microscopic unicellular organisms. We can find them in the air, in water, on land, in animals and in people. All organisms in the monera kingdom are **bacteria**. Some bacteria can cause illnesses. Some decompose dead matter and some are beneficial for our health.



*Helicobacter pylori* bacterium

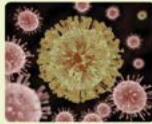
**True or false**

Read the text and decide if the statements below are true or false. Correct the false statements in your notebook.

R.H. Whittaker was an ecologist who developed the five-kingdom classification in 1969. Each group is based on the characteristics of an organism's cells and on how it obtains its nutrients.

Some organisms, like viruses, are not included in this system of classification.

Most scientists believe viruses are non-living things because they have no cells. Viruses do not take in nutrients and do not produce waste products. They do not grow or respond to stimuli. They must always be inside another living organism to survive and reproduce.



Zika virus

- 1 R.H. Whittaker was a famous biochemist.
- 2 Scientists use five sizes to classify living things.
- 3 Viruses do not belong to any of the five kingdoms.
- 4 A virus has no cells and cannot make its own food.
- 5 Viruses can grow with the help of another living organism.

1 Which kingdom(s) do these sentences refer to?

- 1 They can never be unicellular.
- 2 These organisms feed on dead plants and animals.
- 3 They cannot move but they can reproduce.
- 4 Most of these organisms are aquatic.

2 How are fungi different from plants?

- 3 With a partner, search online for beneficial bacteria.
- 4 What are the names of the two most common friendly bacteria?
- 5 Where can we find them? How do these beneficial bacteria help us stay healthy?

- 1.13 The five kingdoms of living things
- 1.14 Animal kingdom
- 1.15 Plant kingdom
- 1.16 Fungus kingdom
- 1.17 Protist kingdom
- 1.18 Monera kingdom

**WRAP IT UP**

Tell pupils to invent two *odd one out* lists. Explain that for each list they have to write four organisms: three that belong to the same kingdom and one that belongs to another kingdom. When everyone has finished, they exchange lists with a partner and try to guess the odd ones out. They can repeat this with other partners.

**SOLUTIONS**

- 1 a. the animal kingdom and the plant kingdom.  
b. the fungus kingdom and the monera kingdom because some bacteria decompose dead matter.  
c. the plant kingdom.
- 2 Model answer:  
Fungi can be unicellular or multicellular. Plants are only multicellular. Fungi do not need sunlight to produce their own food. They feed on dead matter. Fungi are decomposers, whereas plants are producers. They do not have roots, stems, leaves or seeds.
- 3 Pupils' own answers.



## 16 OUR WORLD

### SUMMARY

Pupils will learn about life-changing inventions in healthcare that have taken place in recent centuries. They will learn how medical advances have improved people's lives. They will also discuss how healthcare could be improved in developing countries.

### LANGUAGE

- Healthcare vocabulary: vaccine, medicine, X-ray images, thermometer, illness, infection, antibiotic, pneumonia, etc.
- Describing changes, forming comparative adjectives: People live longer and are healthier than in the past.

### MATERIALS

X-ray pictures of different body parts.

### GETTING STARTED

Write the following questions on the board and ask pupils to copy them into their notebooks: *What do you do when you feel ill? Have you ever broken any bones? How do doctors prevent or cure diseases?* Encourage a variety of responses.

### STEP BY STEP

PAGE 16

A volunteer reads aloud the introductory text. Ask: *How long we can expect to live?*

#### Activity 1

- Explain the task to pupils and invite them to read their assigned text. Model and practise any new vocabulary and pronunciation.
- Pupils work with a partner who reads text B. They can take turns guessing which of the sentences refer to each text. Encourage them to explain their reasons with reference to the texts.
- This can be extended by having pupils talk to another person who reads the same text and checks their understanding.

**Our world**

### Life-changing inventions

Science helps us make people's lives better. People live longer and are healthier than in the past because medical equipment, vaccines and medicines have improved.


**1** Get into pairs. Person A reads text A below. Person B reads text B on page 116. Together, decide if the sentences below refer to text A, B or both.

**Unit 1, text A**

Nowadays, we use many modern inventions to look after our health. Examples are X-ray images and digital thermometers. Scientists built the first microscopes in the 16th and 17th centuries. The invention of the microscope was a very important development and led to the discovery of new things about living organisms.

In the past, medical procedures were often dangerous. Nowadays, they are safer and less invasive. Doctors use X-ray imaging to see inside the human body and decide what is wrong. Clean water and sanitation have also saved many lives.

Advances in healthcare and medicine help people live longer and enjoy a better quality of life. People today can be healthier, more productive and more independent.



Doctors use a CT scan or an MRI scan to see inside a person's body.

- This instrument helped scientists make new discoveries.
- Thanks to this discovery, doctors can stop infections.
- Nowadays, medical procedures are safer.
- People have a better quality of life because of medical discoveries.
- It was the world's first antibiotic.

**2** Think of some countries that do not have many resources. Describe how improvements in healthcare could help people to have a better quality of life. Think about the following:

- medical equipment
- medicines
- clean water in schools and homes
- nutrition
- vaccines
- healthy eyesight

**Useful language**

Today, it is much (easier) to diagnose an illness with ...  
Medicines like ... can help people ...

### Activity 2

Tell pupils that developing countries have limited resources. Ask clarifying questions, such as *How could safe water improve people's lives? What about better nutrition?* Pupils make notes and compare their ideas.

### WRAP IT UP

Ask pupils to revise both texts and make a list of adjectives in their notebooks: *modern, digital, important, scientific, invasive, productive*, etc. They can use them to write sentences about medical inventions.

### SOLUTIONS

- 1** a. text A; b. text B; c. text A; d. both texts; e. text B
- 2** Model answer:
- Safe water helps to prevent disease. Good nutrition helps people to stay healthy. Vaccines protect us from diseases, like flu. Children with healthy eyesight can do better at school.

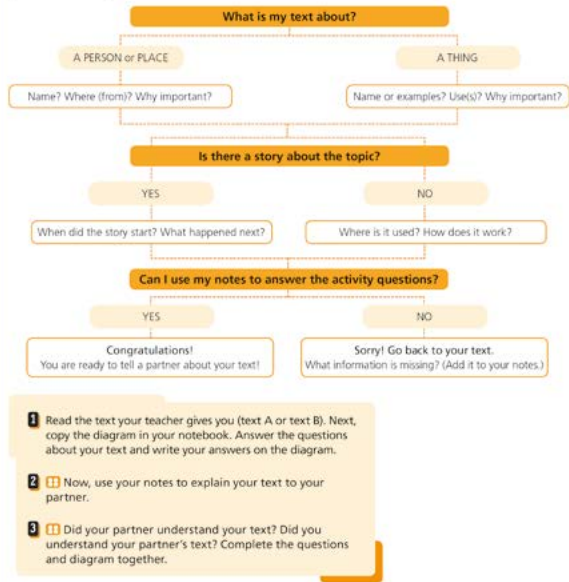
STUDY SKILLS 17

Study skills

How to do a jigsaw reading

A jigsaw reading is when you have two different texts that share the same topic or theme. You read these texts with a partner.

Jigsaw readings are a fun way for you to work with a partner and get a better understanding of a topic without the help of your teacher. Because you cannot use the original text, HOW you make notes is important if you want to explain your text well. To make notes about your text, use a diagram like this below:



- 1 Read the text your teacher gives you (text A or text B). Next, copy the diagram in your notebook. Answer the questions about your text and write your answers on the diagram.
- 2 Now, use your notes to explain your text to your partner.
- 3 Did your partner understand your text? Did you understand your partner's text? Complete the questions and diagram together.

SUMMARY

Pupils will learn about jigsaw reading and how it is a great way to improve their speaking skills. They will learn useful tips for making notes while reading an assigned text so as to explain their text more clearly. After completing a diagram, pupils will practice the task with two texts they have already read.

LANGUAGE

- Question forms: What is your text about? Is there a story about the topic? When did the story start? Can I use my notes to answer the activity questions?

MATERIALS

A simple jigsaw puzzle.

GETTING STARTED

- Show pupils the pieces of a jigsaw puzzle and ask: *Do you know what this is called? (A jigsaw puzzle.) How do you complete it? (By putting together the pieces.) And what will you have when you're finished? (A complete picture.) What happens if you're missing some of the pieces? (You won't see the full picture.) What would you have to do if you had half the pieces and a friend had the other half? (Share the pieces.)*
- Explain to pupils that this is what happens when they do a jigsaw-reading task. Each person has different pieces, but they share them to have a clearer idea of the topic.

STEP BY STEP

A volunteer reads aloud the introductory text. Explain that, in jigsaw activities, they will read their own text and then make notes to explain the text to a partner. They won't be able to read aloud from the original text. They will have to use their notes.

Activities 1 to 3

Assign text A to half the class and text B to the other half. You can use the texts from the *Our world* pages of Unit 1. Alternatively, you could use two other texts that you find about a topic from Unit 1. In that case, you will need to write questions about the texts.

WRAP IT UP

- Assign each pupil one of the following pages from Unit 1, which have a good amount of text: 10, 11, 12 or 13. Then pupils write five quiz questions about that page for a partner to answer.
- When they have finished, they find someone who wrote questions about a different page. Then they exchange questions and try to answer them.

SOLUTIONS

- 1 to 3 Pupils' own answers.

## 18 REVIEW

### SUMMARY

Pupils review key concepts from the unit content and take an end-of-unit test.

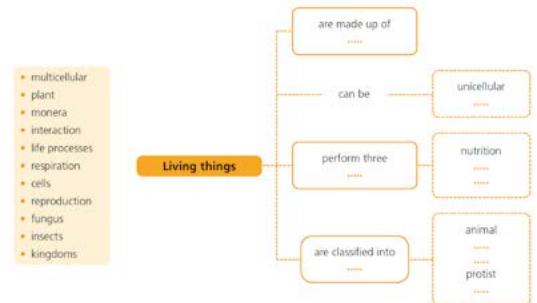
### LANGUAGE

- Describing living organisms: (They) are made up of / contain / perform / belong to ... / get energy from...
- Comparing and contrasting: A tree can reproduce but a rock cannot.

### 1.19 Activity 5

### REVIEW

1 In your notebook, copy and complete the graphic organiser about living things. Use the words from the box. There are some extra words.



2 Sometimes cells are called the *building blocks of life*. Write your own definition of a cell and share it with the class.

3 Guess which parts of a cell the following descriptions refer to:

- the cell gate
- control centre
- protector
- storage tanks
- food producers
- jelly filling

4 Look at the insect in the photo. In your notebook, write a description answering the following questions:

- What characteristics does it have?
- What kingdom does it belong to?
- Where do you think it lives?
- Where does it get its energy from?
- Does it share any characteristics with organisms from other kingdoms?
- What do you want to name it?



18

### GETTING STARTED

Pupils look back through the unit and think about which lessons they found easy, difficult or interesting.

### STEP BY STEP

PAGES 18–19

#### Activity 1

- Remind pupils that when we organise new information it is easier to understand and remember it.
- From left to right: cells, multicellular, life processes, interaction, reproduction, kingdoms, plant, fungus, monera.

#### Activity 2

- Ask pupils if they have ever played with building blocks. Then ask why they are comparable to cells.
- They are the basic units that compose all living organisms.

#### Activity 3

- Explain that other parts of cells can also be compared to objects, such as those in the list. Allow pupils time to guess on their own or in small groups.
- a. membrane; b. vacuoles; c. nucleus; d. chloroplasts; e. cell wall; f. cytoplasm

#### Activity 4

- Explain that a fact file is a description that includes key information, often in point form. Call attention to the keywords that would be headings: *characteristics, kingdom, home / habitat, name*, etc.
- Pupils' own answers.

#### Activity 5

- Remind pupils that they need to read all of the sentences before listening and completing the task.
- a. cells; b. multicellular; c. nucleus; d. specialised; e. monera; f. stimuli.

#### Activity 6

- a. a collection of specialised cells (nerve cells); b. a collection of tissues (muscle tissues); c. a group of organs (the heart); d. a group of systems (a tiger).

#### Activity 7

- In pairs, pupils share what they have learned about the different kingdoms.
- a. do not take; b. protist; c. Animals cannot; d. Some yeasts are aquatic. All yeasts are unicellular. Yeast is a unicellular fungus; e. A virus has no cells; f. Some bacteria are harmful.

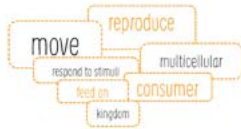
- 5** Listen and complete the sentences in your notebook.
- The small units that make up living organisms are called ....
  - Organisms made up of many cells are called .... organisms.
  - The .... controls the functions of a cell.
  - Cells in most animals and plants are ....
  - All organisms in the .... kingdom are bacteria.
  - All living organisms react to ....
- 6** In your notebook, define the following words and give an example of each.
- a tissue
  - an organ
  - a system
  - an organism
- 7** Correct the statements in your notebook.
- Fungi take in nutrients through photosynthesis.
  - Algae belong to the monera kingdom.
  - Some animals can make their own food.
  - Yeast is a multicellular protist.
  - A virus is a unicellular organism.
  - All bacteria are harmful.
- 8** Read the sentences below. Which part of a cell do they refer to?
- They contain chlorophyll and only plant cells have them.
  - It controls what enters and leaves the cell.
  - It controls all the functions of the cell.
  - It contains various chemicals.
  - It gives plant cells their shape.
  - These storage bubbles contain water and minerals.



**10** Why do you think a tree is a living thing and a rock is not? Give at least two reasons.

**11** Both bacteria and animals consist of cells. What is the main difference between bacteria and animals? Do they have anything in common?

**12** Talk about the animal kingdom. Then describe your favourite animal. Use the word cloud below to help you.



What do you know now?  
Check your progress!

**Activity 8**

- Volunteers share what they know about cell structure. Write their answers on the board.
- a. chloroplasts; b. membrane; c. nucleus; d. cytoplasm; e. cell wall; f. vacuoles.

**Activity 9**

- Ask: *Can you name the three main life processes? Why are they important?* A volunteer writes keywords on the board.
- Model answer:
  - a. I can see a butterfly coming out of its cocoon; b. The animal kingdom; c. It is related to reproduction. This function is vital for reaching adulthood and for the survival of the species.

**Activity 10**

- Ask: *What life processes does a tree perform? Is a rock a living organism?*
- A tree consists of many cells. It grows, reproduces and dies. It performs all three main life processes. A rock is not made up of cells. It cannot perform any of the main life processes.

**Activity 11**

- Ask: *What tool do we need to see bacteria?*
- Bacteria are unicellular. Both animals and bacteria are living organisms. Neither can make their own food.

**Activity 12**

- Tell pupils to make notes about what they want to say. Pupils can then circulate and talk to several people, describing the animal they have chosen.
- Pupils' own answers.

**WRAP IT UP**

Encourage pupils to note which activities they found more difficult and then dedicate more study time to those parts of the unit before the test.

**360° EVALUATION**

Download, print and hand out the End-of-unit test. Compare the End-of-unit test with the test the pupils did at the beginning of the unit. Ask pupils to then complete the Self-evaluation again to see what they have learnt.