In this unit you will learn about...

- the Animal, Plant and Fungi kingdoms.
- invertebrate groups.
- vertebrate animals: respiration, nutrition and reproduction.
- plant nutrition and respiration.
- plant reproduction.

Living and non-living things are everywhere.

All living things are born, grow and die.

Experiment time!

Find out how potatoes reproduce!
1. **Listen and say which photo.**

2. **Think 🧠 Read and answer the questions in your notebook.**
   
   **a)** What’s the difference between living and non-living things?
   
   **b)** What are the three life processes of living things?
   
   **c)** Why is nutrition important for living things?
   
   **d)** What’s interaction?
   
   **e)** What’s reproduction?

3. **Do! 🎉 In your notebook, circle the animal words in orange and the plant words in green.**

   - backbone, leaves, roots, torso, tail, wings, fur, stem, legs
   - petals, fins, stamen, pistil, shell, scales
Living things in the different kingdoms carry out the three life processes of nutrition, interaction and reproduction in different ways.

**The Animal Kingdom**
- Animals can move around.
- They eat other living things.
- Vertebrates and invertebrates are different types of animals.

**The Plant Kingdom**
- Plants can’t move around.
- They make their own food.
- Grasses, bushes and trees are different types of plants.

**The Fungi Kingdom**
Like plants, fungi can’t move around. However, they don’t make their own food. Fungi eat the remains of dead living things or grow and feed on things that are still living. Mushrooms, mould and yeast are all fungi. We use yeast to make bread and we can eat some types of mushrooms, but some are poisonous.
The organization of living things

All living things are formed from cells. **Cells** form **tissues** that make up **organs**. Groups of organs form **systems**.

A **cell** is the smallest living unit.

- Cells work together to form **tissue**, such as **muscle tissue**. Each type of tissue has a specific function.
- Tissues work together to form **organs**, such as **lungs**.
- Groups of organs form **systems** that perform specific functions, such as the **circulatory system**.

### Activities

2. 🎧 Listen and repeat. 🎧 Now listen and say **Plant Kingdom**, **Animal Kingdom** or **Fungi Kingdom**.

3. Copy and complete the table in your notebook.

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Nutrition</th>
<th>Can interact with the environment by moving around</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>They eat other living things.</td>
<td></td>
</tr>
<tr>
<td>Plant</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>They can't move around.</td>
</tr>
</tbody>
</table>

4. 🧠 Think 🧠 In your notebook, answer the questions.
   a) Which kingdom do snails, octopuses and leopards all belong to?
   b) Why is it an advantage that animals can move around?
   c) What happens if you keep fruit too long after you buy it?
   d) Plants are called ‘producers’. Why do you think this is?

5. 📚 QUIZ 📚 Check your learning.
Invertebrates

97% of all animals are invertebrates. The most common groups are molluscs, jellyfish, sponges, echinoderms, annelids and arthropods.

Invertebrates live almost everywhere. Scientists are still finding new species.

Most invertebrates are small. Some are so small that they can only be seen with a microscope. A few invertebrates are very big, such as the colossal squid, that can be bigger than an elephant and has the biggest eyes in the Animal Kingdom.

**Molluscs**

They have a soft muscular body, often protected by a hard shell. Some, such as snails, live on land. But most, such as mussels and octopuses, live in the sea.

**Jellyfish**

They live in the sea. They have a soft body called the umbrella and often have long tentacles. There’s a hole under their umbrella that is both a mouth and an anus.

**Sponges**

They live in the sea. They have soft bodies covered with small holes. They stay on the seabed and take in oxygen and food through the holes. There are lots of known species of sponges.

**Echinoderms**

They live in the sea. They’re protected from predators by hard skin or spines and are often brightly coloured. Starfish are echinoderms. They usually have five arms but can have up to 40!

**Annelids**

Some of them live in the sea. They have a long, soft body divided into segments. A very important annelid is the earthworm. Earthworms help to get air and nutrients into the soil. Can you say how?
Arthropods

Almost all animals on Earth are arthropods. They live in water, on land, in the air and underground. They have a head, a thorax and abdomen, jointed legs and a hard protective exoskeleton. The biggest group of arthropods is insects. The other main groups are arachnids, crustaceans and myriapods.

Do you know how you can tell a spider is not an insect? Count the legs! An insect has six legs and an arachnid has eight.

Bees are insects.
Crabs are crustaceans.
Scorpions are arachnids.
Millipedes are myriapods.

Activities

2. Listen and repeat. Now listen and say the invertebrate group each word is related to.

3. In your notebook, match to make sentences.
   a) They have spines...
   b) They have shells...
   c) They have small holes...
   d) They have tentacles...

   1. to take in oxygen and food.
   2. to keep away predators.
   3. to capture animals to eat.
   4. to stop other animals eating them.

4. Make a mind map of the invertebrate groups including examples of animals, where they live (land, air, water) and their main characteristics.

5. Check your learning.

Molluscs
• Some live on land; snail
• Some live in the sea; octopus
• They have a soft muscular body and a hard shell.
Vertebrates

How do vertebrates that live in water breathe?

All vertebrates have a backbone, but how they breathe, how they reproduce, and what they eat can be different, even within a group.

Read and think

1. Read and find out:
   a) How are reptiles and fish similar?
   b) In what ways are mammals different to other vertebrates?

Respiration

All animals need oxygen to live. Mammals, reptiles and birds breathe with lungs. They use lungs to take oxygen from the air. Fish use gills to take oxygen from the water. Water enters the mouth and goes through the gills so they can get oxygen. Amphibians have gills when they are young and live in water, and later develop lungs to live on land.

Reproduction

All mammals are born directly from their mother. They are viviparous. Mammals also produce milk to feed their babies and look after them for a long time. All other groups reproduce by laying eggs. They are oviparous. Some eggs have a hard shell, such as chicken eggs and some are soft, such as frog and fish eggs.
Nutrition

Most vertebrates are **omnivores** (they eat plants and other animals) or **carnivores** (they only eat other animals). Some mammals and fish and a few birds are **herbivores** (they only eat plants), but almost all reptiles and amphibians are carnivores.

Lions are carnivores.

Giraffes are herbivores.

Hedgehogs are omnivores.

### Activities

2. 🎵 **Say the Vertebrates chant.**

3. **In your notebook, copy and complete the table.**

<table>
<thead>
<tr>
<th>Animal</th>
<th>Group</th>
<th>Respiration</th>
<th>Reproduction</th>
<th>Nutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>sheep</td>
<td></td>
<td>lungs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>crocodile</td>
<td></td>
<td></td>
<td>oviparous</td>
<td></td>
</tr>
<tr>
<td></td>
<td>amphibian</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>gills</td>
<td></td>
<td></td>
<td>omnivore</td>
</tr>
</tbody>
</table>

4. **Think 🎈 Choose the odd one out. In your notebook, write why.**

   a) tiger, spider, eagle, bee   d) pig, sheep, human, bear
   b) fish, frog, bear, lizard    e) dolphin, snake, crocodile, fish
   c) cow, tiger, butterfly, whale f) eagle, squirrel, hen, duck

5. **Create 💡 Draw and label a fish’s head with the gills to show how water goes through them so they can get oxygen.**

6. **Quiz 🎯 Check your learning.**
Plant nutrition and respiration

Read and think
1. Read and find out:
   a) What do plants need to make their own food?
   b) What do plants need for respiration?

Photosynthesis

Plants make their own **food**, called **glucose**, through a process called **photosynthesis**.

Photosynthesis takes place mainly in the **leaves**. **Water** is absorbed from the soil by the roots and goes up the stem to the leaves. Leaves contain a green chemical called **chlorophyll**. This absorbs energy from **sunlight**. Leaves absorb **carbon dioxide** from the air. During photosynthesis, plants release **oxygen** into the air. Plants also need **minerals** for nutrition. Minerals are absorbed in the water by the roots.

Respiration

**Respiration** gives the plant the **energy** it needs to **grow** and be healthy.

Plants use the **glucose** made through photosynthesis and **oxygen** for **respiration**. During respiration, carbon dioxide and water is released into the air.

An interesting thing about plants is how photosynthesis and respiration work together. During photosynthesis, plants produce **oxygen** and **glucose**. These are needed for **respiration**. During respiration, plants release **carbon dioxide** and **water**. These are needed for **photosynthesis**.
The importance of photosynthesis

All animals, including humans, need oxygen to live. Plants give our planet oxygen through photosynthesis. That is why trees and other plants are so important and we should look after them and not cut them down.

Thank you, plants!

Activities

2. 🎵 Sing the Photosynthesis song.

3. Copy and complete the sentences in your notebook.
   a) Plants use _______ and _______ and _______ to make _______.
   b) Leaves are green because of a chemical called _______. This absorbs _______.
   c) During photosynthesis, leaves absorb _______ and they release _______.
   d) During respiration, leaves absorb _______ and they release _______.

4. Do! 🌿 Observe the oxygen!

   1. Put a leaf in water in a sunny place. Check after an hour.
   2. What are the little bubbles on the leaf (especially on the underside) and on the sides of the glass?
   3. Now put one leaf in water in a sunny place and one leaf in water in a dark place. Is there any difference?

5. 📚 QUIZ Check your learning.
Plant reproduction

Why do plant need bees?

Read and think

1. Read and find out.
   a) What’s the difference between sexual and asexual reproduction?
   b) How do animals help plants to reproduce?

We can classify plants into flowering plants and non-flowering plants. Flowering plants develop flowers that have sexual organs (the stamen and the pistil) to help them reproduce. Non-flowering plants don’t use flowers for reproduction.

Sexual reproduction

Most flowering plants reproduce by sexual reproduction. Pollen goes from the stamen of one flower to the pistil of a different, or the same flower. This is called pollination. This happens in different ways.

- **insect pollination**
  - Here I go!

- **wind pollination**
  - Here I go!

- **self-pollination**
  - Here I go!

The pollen joins an ovule to make a seed. This is called fertilisation. The pistil grows around the seed into a fruit. The seed is dispersed in different ways: by gravity (it falls to the ground in the fruit), by wind, or by animals. The seed then grows into a plant.

Asexual reproduction

In asexual reproduction there are no flowers or fertilisation.

- **Runners** are stems which grow along the ground. Buds grow from the stems and develop into new plants.
- **Tubers** are swollen stems which grow under the ground. Buds grow from the tubers and develop into new plants.
- Some flowering plants, such as the strawberry, use sexual AND asexual reproduction!
Looking after living things

We should respect and protect living things and their habitats. Look at the photos.
Which of these things should we do? Which shouldn’t we do?

Activities

2. Listen and repeat. Listen and put your hands on your head for sexual reproduction. Touch your nose for asexual reproduction.

3. In your notebook, copy the true sentences and correct the false ones.
   a) In sexual reproduction, pollen is produced by the pistil and carried to the stamen.
   b) Pollination is helped by animals, especially insects, and by the wind.
   c) In asexual reproduction, the plant doesn’t have reproductive organs.
   d) No plants use both sexual and asexual reproduction

4. Use a magnifying glass to look at flowers growing around your school. Take photos. Use the Internet to look at images of sexual reproduction in flowering plants and identify the stamen and pistil in your flowers. Draw and label diagrams.

5. Check your learning.
Experiment time!

An example of asexual reproduction

**DO RESEARCH**
- Find out how potatoes reproduce.
- Ask family and friends.
- Read page 16 in this book.
- Look for pictures.
- Watch a video

**MAKE HYPOTHESES**

**Think, pair, share!** Complete and discuss these hypotheses with a classmate. Then write your hypotheses in your lab report (template 1.1).

1. The [ ] on the potato grow [ ], and a [ ] and [ ].
2. The potato makes more [ ] under the ground.
3. The [ ] under the ground grow [ ], a [ ] and [ ] and make new plants.

**TEST YOUR HYPOTHESES**

**MATERIALS**
- template 1.1
- 2 potatoes
- toothpicks
- plastic cup
- large plant pot
- potting soil
- water
PROCEDURE

1. Write your name on a plastic cup and stick the toothpicks in a circle around the middle of a potato.

2. Pour some water into the plastic cup. Put in your potato. Make sure the water is touching the bottom of the potato. Observe the potato every week and record your data in your lab report.

3. Write your name on the plant pot. Add soil and put in a potato. Put the plant pot in a bright place. Make sure the soil stays moist.

4. Gently dig the soil each week to observe what’s happening to the potato. Record your data in your lab report.

ANALYSE YOUR DATA AND MAKE CONCLUSIONS

1. Look at your data and complete the sentences in My analysis on your lab report.

2. Think, pair, share! First check your hypotheses. Then write your conclusions on your lab report.

EVALUATE YOUR EXPERIMENT

Think, pair, share! How can you improve the experiment for next time? Discuss with a classmate.

DON’T FORGET TO WATCH THE VIDEO!
An ecosystem includes all the living and non-living things in an area and the interaction between them. An ecosystem can be as small as a puddle or a pond, or as big as a woodland or enormous like a desert or tropical rainforest.

Living things of the same species which live in the same place are called a population. For example, in a temperate forest you can find a snail population, a fox population and an oak tree population. All the different populations that live in the same place are a community. The place they naturally live is called a habitat. A habitat is defined by the amount of light and water, the temperature and the type of soil.

Each ecosystem is a delicate balance between the habitat and its community of living things. Every ecosystem has many food chains, in which living things depend on each other for nutrition. Here is an example of a food chain.

When the lynx dies, bacteria and fungi break down the lynx's remains and turn them into nutrients.

An ecosystem is the combination of a habitat and its community of living things.
Listen and sing *The ecosystem* song.

Look at the food chain. What kind of ecosystem does it come from? With a classmate, think of another food chain from the same ecosystem. Draw and label it in your notebook.

How can we protect ecosystems? Match and write *We should* or *We shouldn’t*.

- a) collect dogs on a lead.
- b) pick butterflies.
- c) keep wild flowers.

Circle the animals you find in a temperate forest. Write the ecosystem you think the other animals are from (*tropical rainforest*, *desert* or *ocean*).

- crocodile
- jellyfish
- camel
- fly
- sponge
- ant
- starfish
- butterfly
- spider
- lizard
- monkey
- scorpion
- ladybird
- parrot
- octopus
- jaguar

I think/know the ... lives in a/an ... ecosystem.

Check your learning.
Let's revise!

1. In your notebook, circle the animal words in orange and the plant words in green.

   tentacles  shell  runners  arthropods  tuber  gills  pollination  viviparous  exoskeleton  photosynthesis  chlorophyll  carnivore  pistil  molluscs  bud

2. **Think:** Which is the odd one out? Write why.
   
a) herbivore  viviparous  carnivore  omnivore
   b) carbon dioxide  oxygen  water  pollen
   c) arthropod  annelid  amphibian  mollusc
   d) stamen  ovule  tuber  pistil

   Now write some yourself and test your partner.

3. **Listen and say the name of the living things.**

4. **Think:** Answer the questions with a partner.
   
a) Fill in the missing words:
   
   photosynthesis = water + [ ] + [ ] = [ ] + [ ]
   
b) Write what plants need for respiration.
   
c) Write the functions of the following parts of a plant in nutrition: the roots, the stem and the leaves.
5. Correct the crazy sentences.
   a) All plants use asexual reproduction.
   b) In self-pollination, the pollen goes from the pistil of a flower to the stamen of the same flower.
   c) The stamen grows around the seed into an ovule.
   d) Runners are roots that grow along the ground.

6. Complete the sentences with systems, tissues, cells and organs.
   ______ form ______ that make up ______. Organs form ______.

7. Choose words to write correct sentences in your notebook. Write sentences with the extra words.

   soft  exoskeleton  viviparous  three  hard  spines  carnivores  ecosystem  herbivores  producers  oviparous

   1. Some molluscs have a ______ shell for protection.
   2. Arthropods have ______ main body parts.
   3. Annelids have ______ bodies divided into segments.
   4. All mammals are ______.
   5. Almost all amphibians are ______.
   6. Plants are ______.
   7. An ______ is the combination of a habitat and its community of living things.

   My work in this unit is...
   OK   good   excellent

   Ask a classmate.
Study skills!

1. Copy and complete the concept map in your notebook. Use the word bank.

   pollination  photosynthesis  gills  tubers  small holes
   tentacles  viviparous  insect pollination  carnivore  yeast  lungs  molluscs

2. **Collaborate** Revise with a classmate using the concept map.
   
   a) Add these categories to the concept map: the structure of living things and ecosystems.
   
   b) Compare your concept map with a classmate. Are they the same?
   
   c) Use your concept map to ask each other questions. For example:

   - How many invertebrate groups can you remember?
   - Can you draw a diagram for self-pollination?
   - What do plants need for photosynthesis?
   - What's a habitat?
**bud**: small growth on a plant can grow into a new plant, for example a potato bud.

**mould**: type of soft fungus that grows on old food or wet objects.

**exoskeleton**: hard external covering for the body of many invertebrates.

**food chain**: the feeding relationships between living things in an ecosystem.

**gills**: organs that fish use to get oxygen from the water.

**photosynthesis**: process by which plants use sunlight to convert carbon dioxide and water into glucose.

**pollination**: process by which pollen goes from the stamen of a flower to the pistil of a different or the same flower.

**runner**: long stem of a plant that grows along the ground to form new plants.

**self-pollination**: transfer of pollen from a flower to the pistil of the same flower.

**tuber**: swollen stem that grows under the ground to form a new plant.

**yeast**: a type of fungus. There are many types of yeast. Some are used to make bread.

**habitat**: the place where living things naturally live.

**insect-pollination**: process of pollination when pollen is transferred from one flower to another by insects.

**kingdoms**: main groups that all living things are classified into, for example, the Animal Kingdom.