Living and non-living things

Living things
A horse is alive.
A tree is alive.
You are alive!
People, animals and plants are living things.

Once-living things
A wooden spoon, a bone and a cotton shirt are not alive. But they were once. Wood, bone and cotton grew as parts of living things.

Non-living things
A rock and a coin were never alive. Stone and metal are non-living things.

Activity 1
Work in a group.
Talk about each of the things shown here.
Decide if each one is alive, was once-living or is non-living.
Copy and complete the table. Add more items if you can.

<table>
<thead>
<tr>
<th>Living</th>
<th>Once-living</th>
<th>Non-living</th>
</tr>
</thead>
<tbody>
<tr>
<td>dog</td>
<td>leather bag</td>
<td>tin can</td>
</tr>
</tbody>
</table>

Discuss what is special about living things.
Make a list of the things that living things do and that non-living things cannot do.
Life processes

We can tell when something is alive because of the things it does. These things are called **life processes**.

You can tell that a horse is alive because it:

- feeds – a horse eats grass
- moves – a horse moves its body
- grows – a foal grows into an adult horse
- senses – a horse sees, smells, tastes, hears and feels
- produces waste – a horse passes urine and faeces
- breathes – a horse breathes air through its nose and mouth
- reproduces – a male and female horse mate and have a foal.

You will learn more about life processes and the characteristics of life in the next lesson.

### Activity 2

Talk about each thing in this table. Tick the processes that each thing does. Some non-living things do some of the processes that living things do, but not all.

<table>
<thead>
<tr>
<th></th>
<th>Moves</th>
<th>Grows</th>
<th>Feeds</th>
<th>Senses</th>
<th>Respires (breathes)</th>
<th>Makes waste</th>
<th>Reproduces</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. fish</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. insect</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. car</td>
<td></td>
<td>✔</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. fire</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. river</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### What you have learnt

Plants and animals are **living** things. We can tell that they are alive because they move, grow, reproduce and perform other **life processes**. Stones, water and other **non-living** things do not have all the characteristics of life.

### Check your progress

1. Name three materials that were once alive but are not now alive.
2. List seven life processes that a living thing shows.
3. Your friend says that a car moves and makes waste, so it must be alive. Give your friend three reasons why a car is not alive.
The characteristics of life

What is life?

Scientists agree that all living things share seven basic characteristics. Living things:

- grow
- reproduce
- sense (respond to changes in the surroundings)
- move
- feed (eat or make their own food)
- respire
- excrete (get rid of waste)

Let us look at how an animal and a plant show each characteristic. Our animal is a parrot, our plant is a mango tree.

Growth

The parrot grew from a chick that hatched from an egg.

The mango tree grew from a seed.

Reproduction

The parrot has a mate. She lays eggs that hatch into chicks. The parrots’ offspring grow up to be like their parents.

The tree makes seeds. A seed may germinate (sprout) and grow into a new tree like its parents.
Excretion

Respiration produces waste and so do other life processes. Getting rid of waste from the body is called excretion. The parrot excretes waste from its body in its droppings. It breathes out waste gases from its mouth. The mango tree excretes waste gases into the air from its leaves. Harmful chemicals are stored in its leaves. They are excreted when the leaves fall from the tree.
Lesson 2: The characteristics of life

Activity 1

Why are the seven characteristics essential for life?

This table lists things that living things must do to survive. Copy the table. Complete it by filling in the life characteristic that allows organisms to do each thing. The first one has been done for you.

<table>
<thead>
<tr>
<th>To survive organisms must</th>
<th>Life characteristic required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. obtain energy and materials</td>
<td>nutrition</td>
</tr>
<tr>
<td>2. increase in size to become adults</td>
<td></td>
</tr>
<tr>
<td>3. produce young like themselves</td>
<td></td>
</tr>
<tr>
<td>4. get rid of waste from the body</td>
<td></td>
</tr>
<tr>
<td>5. release energy from food</td>
<td></td>
</tr>
<tr>
<td>6. detect changes in their surroundings</td>
<td></td>
</tr>
<tr>
<td>7. escape from danger</td>
<td></td>
</tr>
</tbody>
</table>

What you have learnt

All living things share the seven characteristics of life. When their bodies _____ they increase in size. They eat other organisms, or make their own food for _____. They _____ to get rid of waste. During ____ they produce offspring similar to themselves. They release energy from their food by _____. They show ____ to changes in their surroundings and are capable of ____ of their whole body or body parts.

Key words

excrete | grow | movement | nutrition | reproduction | respiration | sensitivity

Check your progress

1. List the seven characteristics of life.
2. What is the purpose of: (a) excretion? (b) respiration?
3. Explain two ways in which a tree excretes waste from its body.
4. Give three reasons why an animal must be able to sense its surroundings.
Nutrition

All living things need food. They need food to be able to:

- grow and move
- keep healthy
- repair damage to the body.

Plants make food in their leaves from sunlight, water and gas from the air. They obtain other nutrients from the soil through their roots. Animals eat plants and other animals for food.

Herbivores

Animals that just eat plants are called herbivores. Cattle, camels, goats, and caterpillars are herbivores.

Carnivores

Animals that mainly eat other animals are carnivores. Cheetahs, crocodiles, snakes and spiders are carnivores.

Omnivores

Animals that eat a mixture of plant and animal food are called omnivores. Chimpanzees, rats, bears and people are omnivores.

Lesson 3

When you have completed this lesson you will be able to:

- explain why all living things need nutrition
- describe how different animals obtain nutrition by eating plants and/or animals
Activity 1
Copy the table below.

Take it in turns to name an animal. Discuss what it eats. Decide if the animal is a herbivore, a carnivore or an omnivore. Write the name of the animal in the correct column in the table.

<table>
<thead>
<tr>
<th>Herbivores</th>
<th>Carnivores</th>
<th>Omnivores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Predators and prey
Animals that hunt other animals for food are called **predators**. The animals they hunt are their **prey**.

Food chain
A leaf grows on a tree. A caterpillar eats the leaf. A bird eats the caterpillar. A snake eats the bird. An eagle eats the snake. The food that the leaf made from sunlight, water and air has fed each of the animals in turn. Its energy passes along a chain.

This diagram shows how energy in the leaf is passed on to the caterpillar and then to the other animals. It is called a food chain.

The shark is a fierce predator with a streamlined body for speed and rows of razor-sharp teeth.
Activity 2

Copy and arrange the plants and animals in the circles to make two food chains. 
Draw arrows to connect each plant or animal to the animal that eats it. The arrows should show how energy and nutrients are passed on.

Good nutrition and poor nutrition

To stay healthy, human beings must eat a variety of foods to obtain all the different nutrients we need. If children or adults eat too much food they become overweight. If children have too little food, they do not grow and suffer from disease. We say they are underweight or malnourished.

Activity 3

Discuss these pictures:
1. Whose nutrition is healthy?
2. Who has too much to eat?
3. Who has too little to eat?
4. What is a healthy diet for human beings?

What you have learnt

_____ eat plants. _____ eat other animals. _____ eat both plants and animals.
_____ hunt other animals. The animals they hunt are their _____.
A _______ shows how energy passes from plants to animals. Animals eat plants and are then eaten by other animals.

Key words

- carnivores
- herbivores
- omnivores
- predators
- prey
- food chain

Check your progress

1. Name a herbivore, a carnivore, an omnivore, a predator and a prey animal.
2. What kind of living thing must be at the start of every food chain? Explain why.
3. Describe what happens if you eat: (a) too much food (b) too little food.
4. Why must human beings eat a mixture of different foods?
Respiration – how do plants and animals breathe?

Can you swim under water? It is wonderful to swim under water like a fish. But, unlike a fish, you must soon return to the surface to fill your lungs with air. Without air you will die in a few minutes. Air contains the gas **oxygen**, which your body needs to burn your food to release energy. Using oxygen to ‘burn’ food in your body is called **respiration**.

Humans and horses breathe in air through their noses and mouths. Air enters the **lungs**, where oxygen passes into the blood. The harder we work, the more oxygen we need.

### Activity 1
**How fast do you breathe?**

- Sit quietly. Put your hand on your chest. Feel how your chest rises and falls as you breathe in and out. Count the number of times you breathe in and out in one minute.
- Now run as fast as you can on the spot for 30 seconds. Are you breathing faster and more deeply? Count the number of times you breathe in one minute now.
- Record your results in a table.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number of breaths in one minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. sitting quietly</td>
<td></td>
</tr>
<tr>
<td>2. exercising hard</td>
<td></td>
</tr>
</tbody>
</table>

### How does a fish breathe?

Even a fish must have oxygen to breathe under water. Oxygen dissolves in water like sugar does in tea. Fish can breathe the dissolved oxygen using their **gills**. The gills take the oxygen from the air into the blood.
Plants respire too

Plants do not have mouths, noses, lungs or gills like animals, but they must take in oxygen from the air to burn their food. If a plant cannot take in oxygen, it cannot release the energy it needs to grow and stay healthy.

A plant ‘breathes’ through tiny holes in its leaves called pores. Gases enter and leave the plant through these pores.

Fascinating fact
Whales and dolphins have lungs like people, not gills like fish. They must come to the water surface every few minutes to breathe.

Activity 2
To show that a plant ‘breathes’ through its leaves
• Coat the leaves of one plant with a thin layer of vaseline.
• Stand both plants in a sunny place and keep them watered.
• Observe the plants over several days. Record any changes you see. Did the leaves that had been coated with vaseline droop and turn yellow?

What you have learnt
All living things must take ____ from the air to release energy from their food. This is called ____. Humans, horses and other large animals breathe air into their ____. Fish have ____ to absorb oxygen dissolved in water. A plant can take oxygen into its body through tiny holes called ____ in its leaves.

Key words
- gills
- lungs
- oxygen
- pores
- respiration

Check your progress
1. What is respiration?
2. Why do you breathe more quickly when you exercise?
3. How does a fish obtain the oxygen it needs?
4. A plant does not have a mouth, so how does oxygen enter its body?
Movement and growth

Movement

Animals move their bodies to find food, seek shelter or to escape from danger. Sometimes they move just for fun – dancing or playing games.

Animals have many different ways to move. Look at these examples.

Dolphins leap from the water and ride on waves.

Fish, turtles and dolphins swim with fins and flippers.

Humans and birds walk and run on two legs.

Birds, bats and insects fly with wings.

Horses, cats and dogs walk and run on four legs.

Crabs have ten legs, eight for walking and two with pincers for picking up food.

Snakes don’t have any legs but slither by bending their bodies.

Activity 1

Copy and complete the table with as many animals as you can.

<table>
<thead>
<tr>
<th>Animal</th>
<th>Number of legs</th>
<th>How it moves</th>
</tr>
</thead>
<tbody>
<tr>
<td>human</td>
<td>2</td>
<td>walks and runs</td>
</tr>
<tr>
<td>fish</td>
<td>0</td>
<td>swims with fins</td>
</tr>
<tr>
<td>bird</td>
<td>2</td>
<td>walks on two legs, flies with two wings</td>
</tr>
</tbody>
</table>

Lesson 5

When you have completed this lesson you will be able to:

• explain why animals move
• describe some different ways in which animals move
• state that all living things grow
• describe how animals and plants change as they grow
Lesson 5: Movement and growth

Animal legs have **joints**. These allow them to swing and bend so movement is possible. Animal movement is powered by **muscles**.

The cheetah is the fastest land animal of all. Its powerful muscles bend and straighten its legs to reach speeds of 100 kph.

Birds and humans have two legs, horses have four, insects have six, spiders eight, crabs ten, and some millipedes have more than 100!

**Growth**

All living things **grow**.

Human beings are living things. We breathe, feed, grow up and have babies that grow to be like us. It takes about 18 years for a human baby to grow to adult size.

A new-born horse is called a foal. A foal takes about 4 years to grow to be an adult horse.

Plants start as tiny seeds. A seed can grow into a huge tree, taller than a house.

Things that are not alive do not grow like animals and plants. A car is made in a factory. It always stays the same size.
Lesson 5: Movement and growth

Check your progress

1. Draw four animals moving in different ways. Label your drawings.
2. Explain why legs have joints.
3. Describe two ways in which animals can move without using legs.
4. Find out how long it takes these animals to grow to adult size: elephant, chicken, mouse, whale.

Activity 2

Study these pictures of young and adult living things. Match them in pairs of the young living thing and the adult into which it grows.

What you have learnt

Animals move in a variety of ways. Birds use wings to fly. Fish and dolphins swim in the ocean. Humans can walk and run on their legs. Legs have joints so they can bend and swing. Movement is powered by muscles. All living things grow until they reach adult size.

Key words

adult
fly
grow
joints
muscles
run
swim
walk

Fascinating fact

An ostrich egg weighs about 1 kilogram. The ostrich chick grows into an adult ostrich that weighs 150 kg – twice as much as a man! The ostrich is the biggest bird in the world.

Living things: Life processes