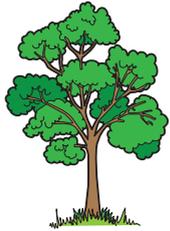




# Living and non-living things



## Living things

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

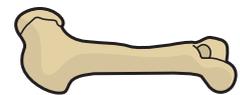
## Lesson 1

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

- classify the things around you as living, non-living or once-living
- begin to describe the processes of life

## 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.



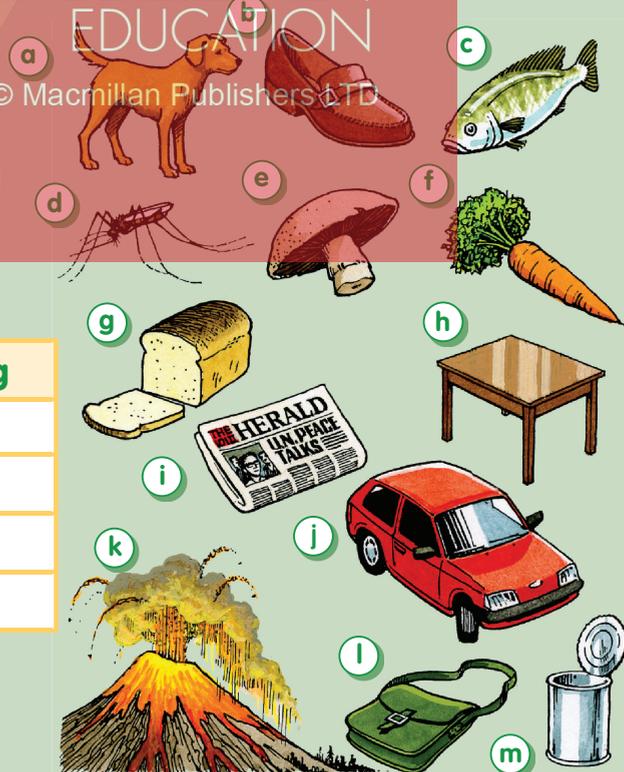
## Activity 1

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.

Living	Once-living	Non-living
dog	leather bag	tin can

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



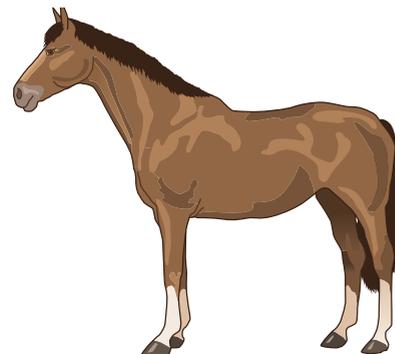


## Life processes

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.

	Moves	Grows	Feeds	Senses	Respires (breathes)	Makes waste	Reproduces
1. fish							
2. insect							
3. car							
4. fire							
5. river							

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### What you have learnt

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

#### Key words

life processes  
living  
non-living

### 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

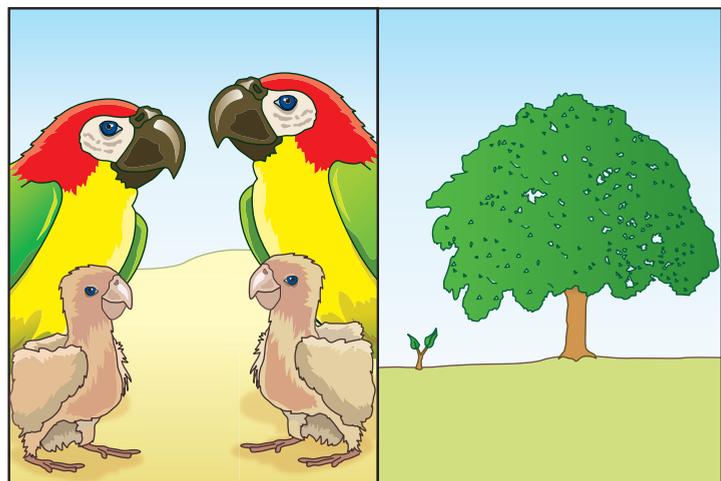
The parrot grew from a chick that hatched from an egg.

The mango tree grew from a seed.

## Reproduction

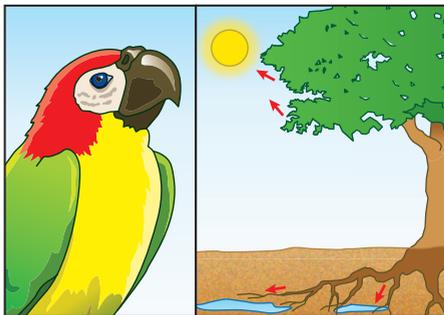
The parrot has a mate. She lays eggs that hatch into chicks. The parrots' offspring grow up to be like their parents.

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





## Lesson 2: The characteristics of life



### Sensitivity

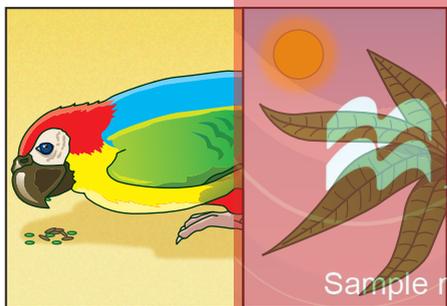
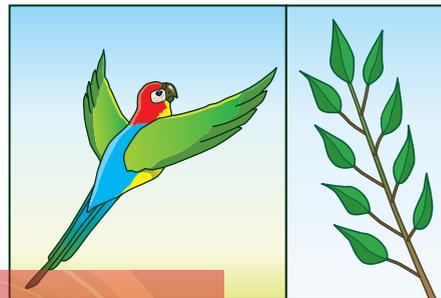
The parrot can see, hear, smell, taste and feel. It uses its senses to find food, choose a mate and to react to danger.

The tree cannot see or hear, but it is sensitive to sunlight and moisture. Its leaves grow towards the light; its roots grow down into the soil to find water.

### Movement

The parrot moves from place to place to find food, escape danger and find a mate.

The tree grows in one place, but its parts move. Its flowers open and close; its leaves grow towards the light.



### Nutrition (feeding)

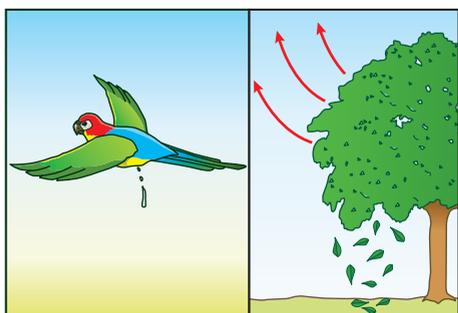
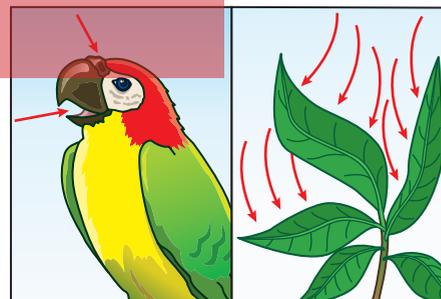
All living things need energy and nutrients (materials to build and maintain their bodies). The parrot eats seeds, fruits and other plant parts.

The mango tree makes food in its leaves. You will learn more about plant and animal **nutrition** in the 'Nutrition' and 'Plant parts and characteristics' lessons.

### Respiration

**Respiration** releases the energy stored in food. This needs oxygen from the air. The parrot breathes through its nostrils and mouth.

The mango tree takes in oxygen through its leaves, stems and roots. You will learn more about respiration on page 20.



### 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.



## 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.

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


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## 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.

### 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

## 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.



## 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.

Herbivores	Carnivores	Omnivores

## Predators and prey

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

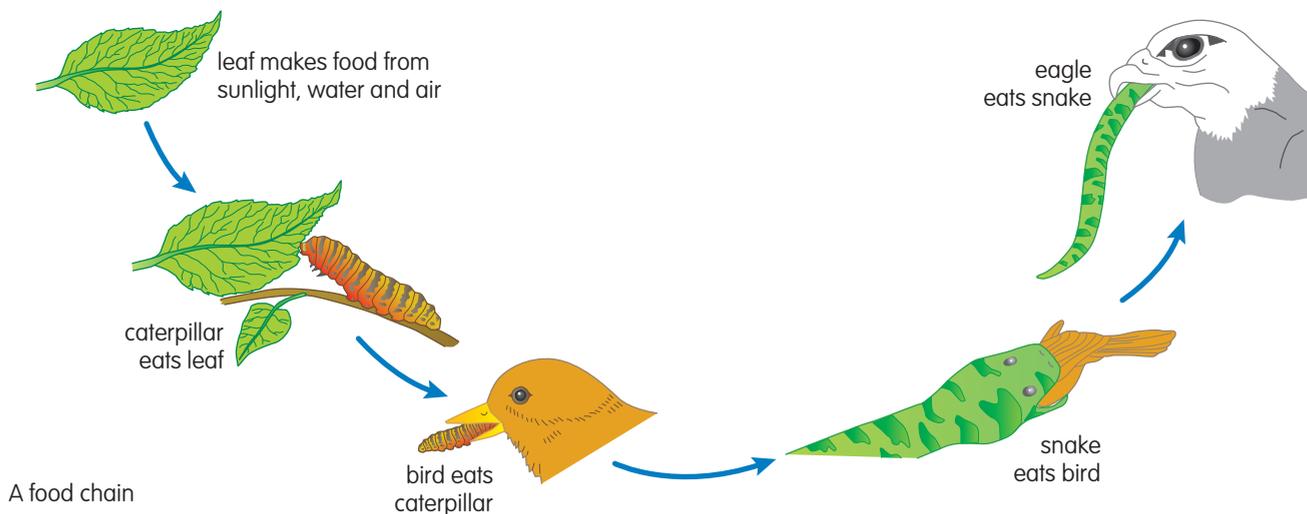
## Food chain

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.

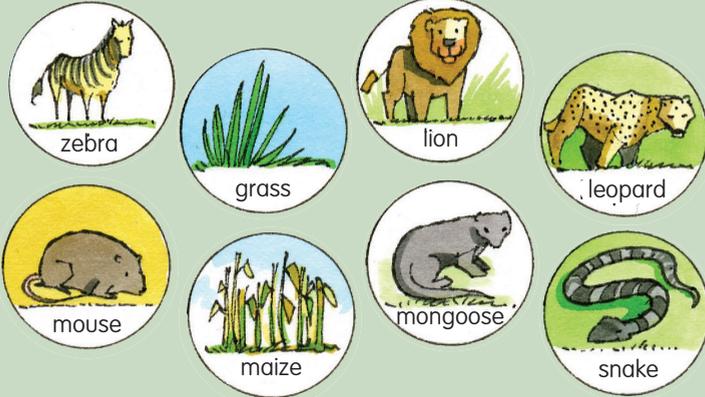




## Activity 2

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	food chain
herbivores	omnivores
predators	prey

## 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?



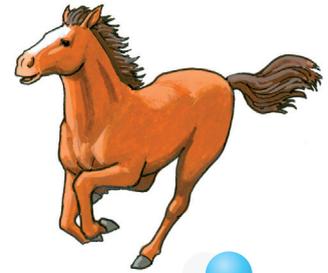
# Respiration – how do plants and animals breathe?

## Lesson 4

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

- explain the purpose of respiration
- describe how humans, fish and plants obtain oxygen for respiration

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.

**You will need:**  
a stopwatch.

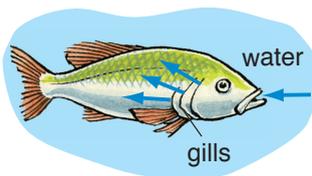
### Activity 1

**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.



Activity	Number of breaths in one minute
1. sitting quietly	
2. exercising hard	



## 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.

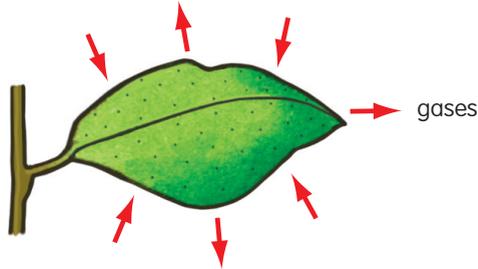


## Lesson 4: Respiration – how do plants and animals breathe?

### 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.

#### You will need:

two similar pot plants,  
vaseline (petroleum jelly).

### 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?

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### 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

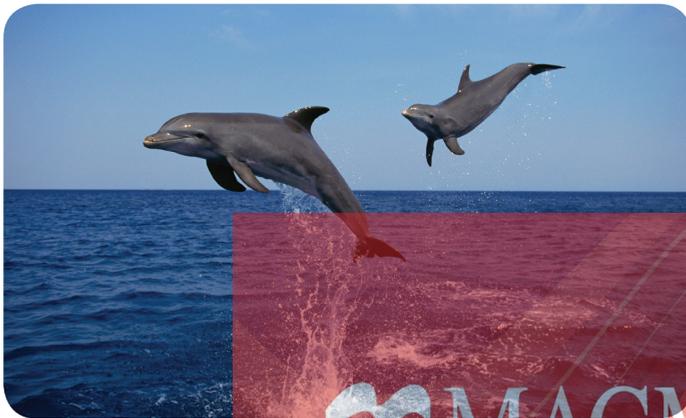
Animals move their bodies to find food, seek shelter or to escape from danger. Sometimes they move just for fun – dancing or playing games.

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

### 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



Dolphins leap from the water and ride on waves.



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



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



Fish, turtles and dolphins **swim** with fins and flippers.



Human and birds walk and **run** on two legs.



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



Birds, bats and insects **fly** with wings.

## Activity 1

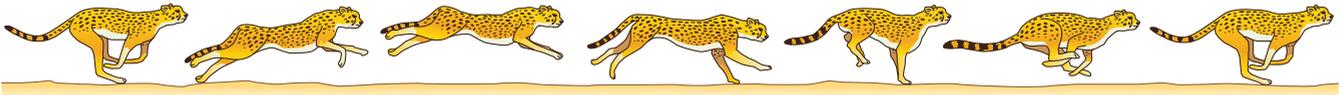
Copy and complete the table with as many animals as you can.

Animal	Number of legs	How it moves
human	2	walks and runs
fish	0	swims with fins
bird	2	walks on two legs, flies with two wings



## 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.

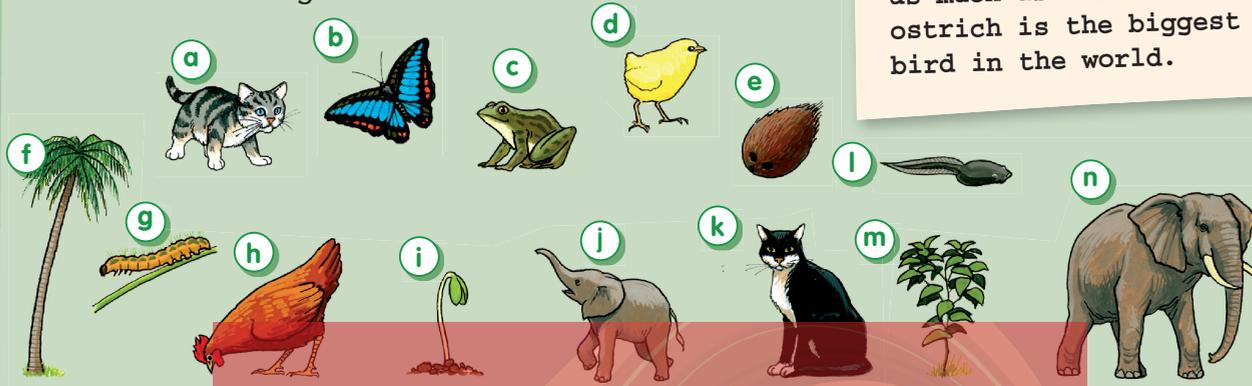


Things that are not alive do not grow like animals and plants. A car is made in a factory. It always stays the same size.



## 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.



### 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.

Answer the questions.

1. Which young and adults look alike?
2. Which change most as they grow?
3. How do they change?

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## What you have learnt

Animals move in a variety of ways. Birds use wings to \_\_\_\_\_. Fish and dolphins \_\_\_\_\_ in the ocean. Humans can \_\_\_\_\_ and \_\_\_\_\_ on their legs. Legs have \_\_\_\_\_ so they can bend and swing. Movement is powered by \_\_\_\_\_. All living things \_\_\_\_\_. Young animals grow until they reach \_\_\_\_\_ size.

### Key words

adult	fly
grow	joints
muscles	run
swim	walk

## 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.