

CAMBRIDGE PRIMARY Science

Learner's Book

6



Fiona Baxter, Liz Dilley, and Jon Board

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Cambridge resources
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SAMPLE

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NOTICE TO TEACHERS

References to Activities contained in these resources are provided 'as is' and information provided is on the understanding that teachers and technicians shall undertake a thorough and appropriate risk assessment before undertaking any of the Activities listed. Cambridge University Press makes no warranties, representations or claims of any kind concerning the Activities. To the extent permitted by law, Cambridge University Press will not be liable for any loss, injury, claim, liability or damage of any kind resulting from the use of the Activities.

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Introduction to teachers

The *Cambridge Primary Science* series has been developed to match the Cambridge International Examinations Primary Science curriculum framework. It is a fun, flexible and easy-to-use course that gives both learners and teachers the support they need. In keeping with the aims of the curriculum itself, it encourages learners to be actively engaged with the content, and develop enquiry skills as well as subject knowledge.

This Learner's Book for Stage 6 covers all the content from Stage 6 of the curriculum framework. The topics are covered in the order in which they are presented in the curriculum for easy navigation, but can be taught in any order that is appropriate to you.

Throughout the book you will find ideas for practical activities, which will help learners to develop their Scientific Enquiry skills as well as introduce them to the thrill of scientific discovery.

The 'Talk about it!' question in each topic can be used as a starting point for classroom discussion, encouraging learners to use the scientific vocabulary and develop their understanding.

'Check your progress' questions at the end of each unit can be used to assess learners' understanding. Learners who will be taking the Cambridge Primary Progression Test for Stage 6 will find these questions useful preparation.

We strongly advise you to use the Teacher's Resource for Stage 6, ISBN 978-1-107-66202-5, alongside this book. This resource contains extensive guidance on all the topics, ideas for classroom activities, and guidance notes on all the activities presented in this Learners' Book. You will also find a large collection of worksheets, and answers to all the questions from the Stage 6 products.

Also available is the Activity Book for Stage 6, ISBN 978-1-107-64375-8. This book offers a variety of exercises to help learners consolidate understanding, practise vocabulary, apply knowledge to new situations and develop enquiry skills. Learners can complete the exercises in class or be given them as homework.

We hope you enjoy using this series.

With best wishes,
the Cambridge Primary Science team.



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1 Humans and animals

1.1 Body organs

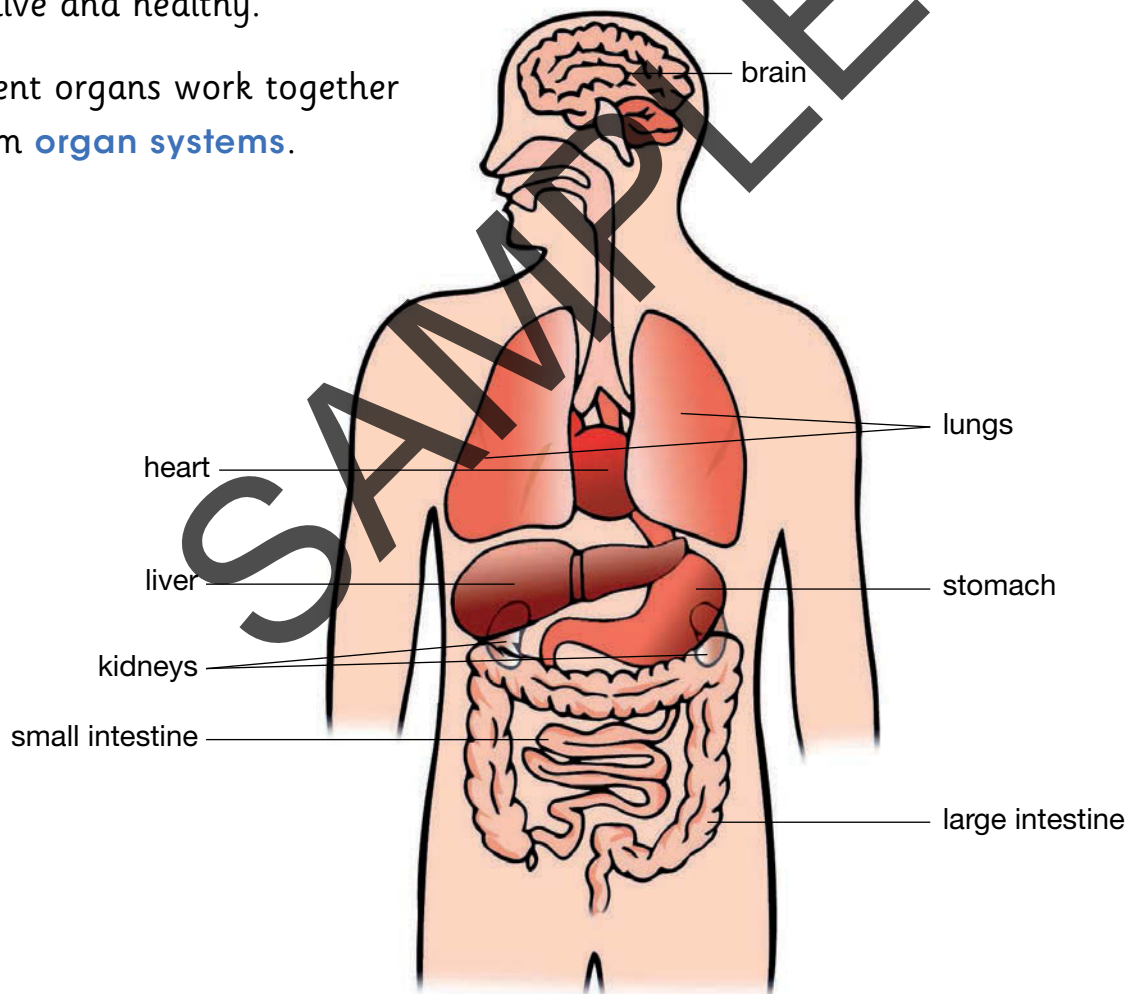
Words to learn
organs organ systems



You know what the outside of your body looks like. But what's inside your body? Think of as many inside parts as you can.

The parts inside your body are called **organs**. The body organs do different jobs to keep you alive and healthy.

Different organs work together to form **organ systems**.



The liver is an example of a body organ. We cannot live without a liver. Two of its main functions are to store energy and to break down harmful substances in the body.

Activity 1.1

Identifying the position of body organs

Lie down on the newspaper and ask your partner to draw the outline of your body.

Don't draw around the arms and legs.

Draw outlines of these body organs on the white paper:

- brain
- heart
- stomach
- lungs
- kidneys
- intestines.

Make sure each organ is the right size for the body outline you have drawn.

Label and colour each organ.

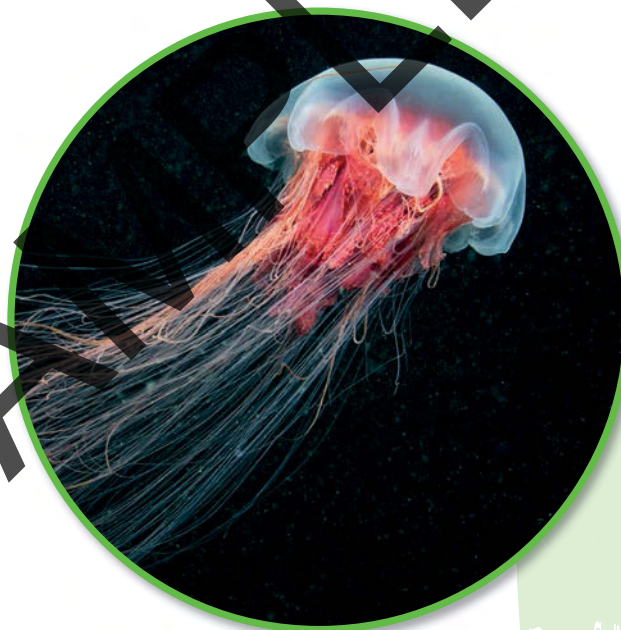
Cut out the organs and stick them in the right place on the body.

You will need:

a newspaper • white paper •
colouring pens • crayons •
glue • scissors

Questions

- 1 Which organ is found in the head?
- 2 Which organs are found in the chest?
- 3 Which organs are found in pairs?
- 4 Which organs are found in the chest?
- 5 What do you think is the function of each body organ?



Some animals, like the jellyfish, do not have proper body organs. They have more simple parts that carry out their body functions.

What you have learnt

- The parts inside your body are called organs.
- The major body organs are the heart, stomach and intestines, lungs, kidneys and brain.

Talk about it!

How are the body organs protected?

1.2 The heart

Put your hand on your chest. Can you feel your **heart** beating? Why does your heart beat?

Make a fist with your hand. That's how big your heart is. Your heart is found inside your chest, slightly to the left. It is protected by the ribs.

Your heart is a special muscle. Its job is to pump blood through your body.

This process is called **circulation**.

Every time the heart muscle squeezes to pump blood, you can feel a heartbeat. It takes less than a minute to pump blood to every part of your body. The heart does this all the time and never stops.

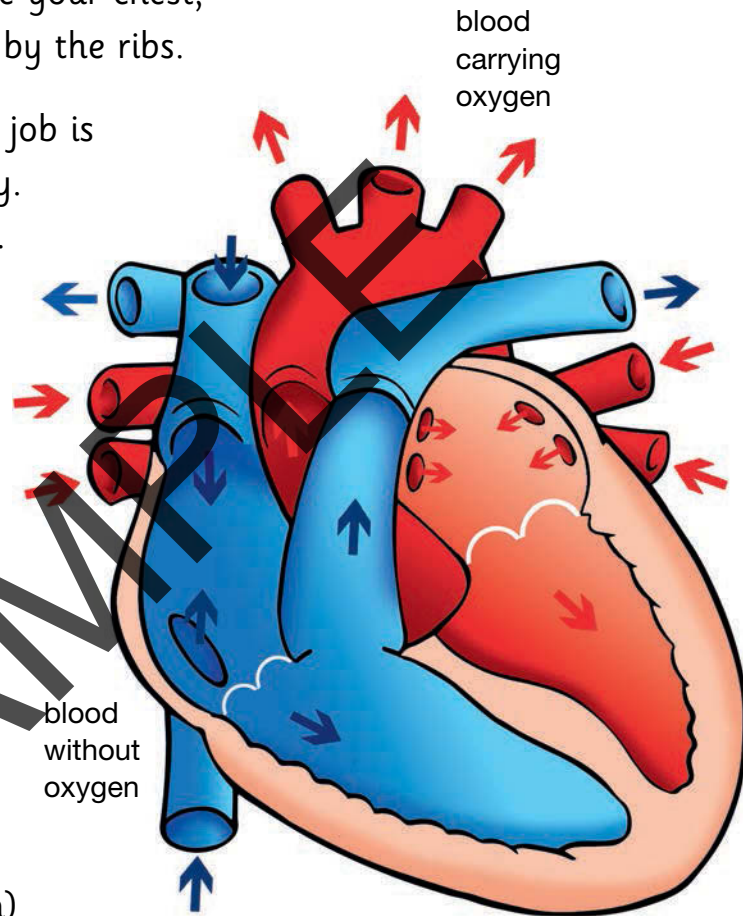
The heart has two sides. The left side (red in the diagram) pumps blood that contains **oxygen** all around the body. The right side (blue in the diagram) pumps blood without oxygen to the lungs only.



Why must the heart pump blood around the body?

Words to learn

heart circulation
blood vessels oxygen
circulatory system

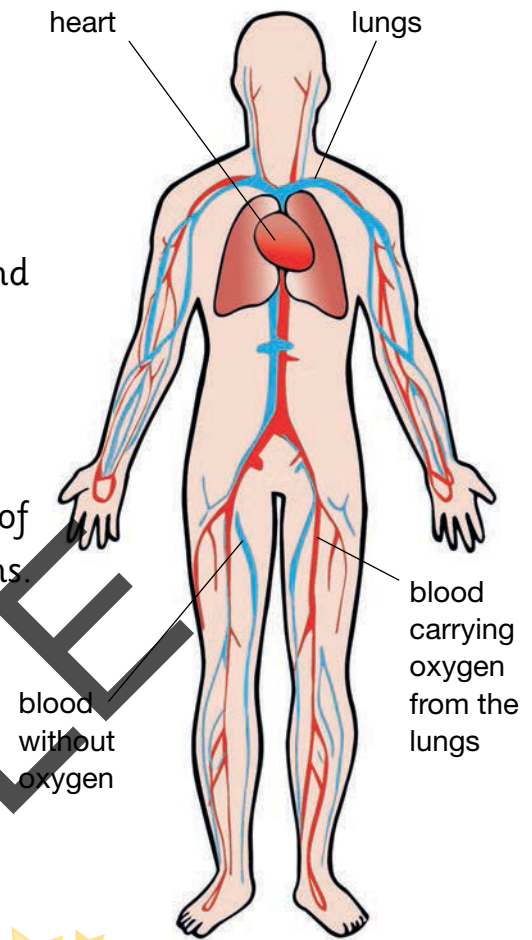


Blood is a red liquid that flows around the body in **blood vessels**. Look at the inside of your wrist. Sometimes you can see the blood vessels through your skin.

Blood vessels run from the heart to the lungs, around the body and back to the heart.

The blood carries food and oxygen to all parts of the body. It also picks up waste products from the body and carries them to organs which can get rid of them. The kidneys and lungs are two of these organs.

The heart, blood vessels and blood form the **circulatory system**.



Questions

- What does the heart do?
 - Why does it do this?
- What is a heartbeat?
- Why does the heart pump blood to the lungs before it pumps blood to the rest of the body?

Challenge

What is a heart attack and how is it caused?

What you have learnt

- The left side of the heart pumps blood that contains oxygen to the rest of the body.
- The right side pumps blood without oxygen to the lungs.
- The blood carries food and oxygen to all parts of the body and carries away waste products from the different parts of the body.

Talk about it!

How can you tell that your heart is beating without putting a hand on your chest?

1.3 Heartbeat and pulse

Your heart beats about 90 times a minute. When you are grown up it will beat about 70 times a minute. When you run around, your body needs a lot more food and oxygen. The more active you are, the more often your heart needs to beat to supply enough food and oxygen from the blood.

You can count your heartbeats by feeling your **pulse**. Your pulse is caused by the **pressure** of the blood as the heart pumps it to the rest of the body.

Two good places to find your pulse are on the side of your neck and the inside of your wrist. You will know you've found your pulse when you feel a small beat under your skin. Each beat is caused by the squeezing of your heart muscle.

Words to learn

pulse pressure



Exercise makes your heart beat faster.

Activity 1.3

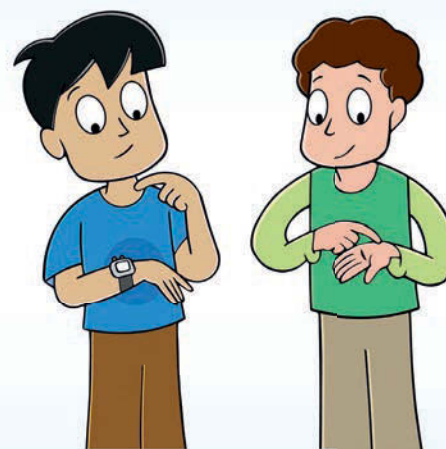
Measuring your pulse

Find your pulse on your wrist or neck. Do not use your thumb to take your pulse – it has a pulse of its own. Count how many beats you feel in one minute. Repeat this three times. Record the results in a table. Is the number of beats the same each time? Compare your measurements with others in your class.

Measure your pulse rate at other times during the day, such as after lunch break and just before you go to bed. What trends can you identify?

You will need:

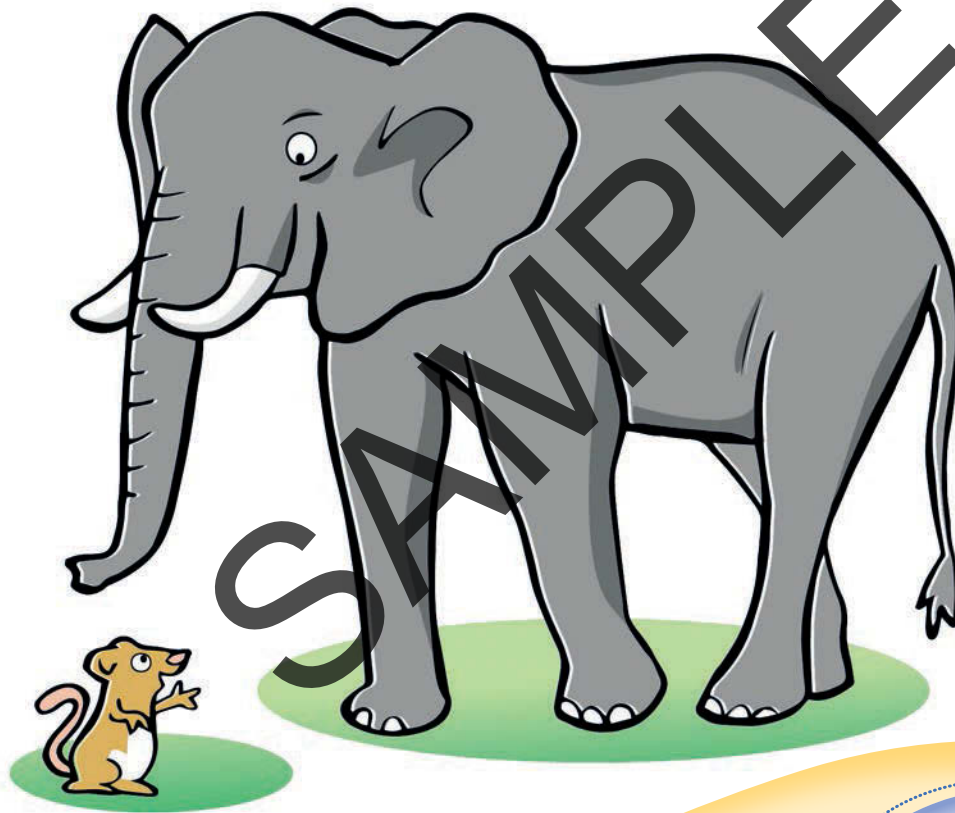
a watch with a second hand



Questions

- 1 What is the difference between heartbeat and pulse?
- 2 Did everyone in your group have the same pulse rate?
- 3
 - a Is your pulse rate always the same?
 - b Why do you think this is?
 - c How can you work out what your actual pulse rate is?
- 4 Suggest any factors you think make your pulse rate change.

The elephant has a very low pulse rate of 30 beats per minute.
The mouse has very high pulse rate of 500 beats per minute.



What you have learnt

- 🌀 You can count your heartbeats by feeling your pulse.
- 🌀 Your pulse feels like a small beat under the skin.
- 🌀 Your pulse rate increases when you exercise.

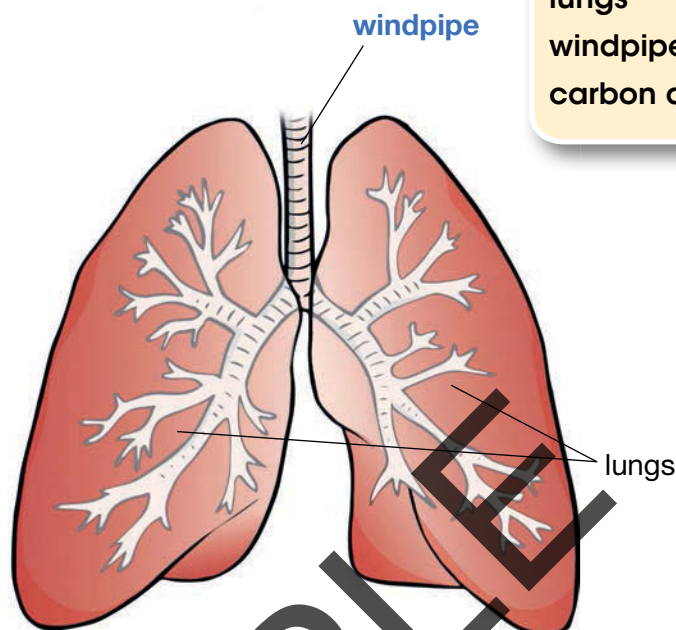
Talk about it!

Why is it dangerous to have a very low pulse rate?

1.4 The lungs and breathing

We use our **lungs** for **breathing**. We need to breathe to stay alive. We breathe in and breathe out.

The lungs are found in the chest. They are protected by the ribs. The lungs are like stretchy sponges that fill up with air.



Words to learn

lungs breathing
windpipe
carbon dioxide



Activity 1.4

Investigating breathing

Put your hands on your ribcage.
Breathe in. What do you feel?
Now breathe out. What do you feel?
Breathe in again. Hold the balloon to your mouth and breathe out. What happens to the balloon?
What does this show you?

You will need:

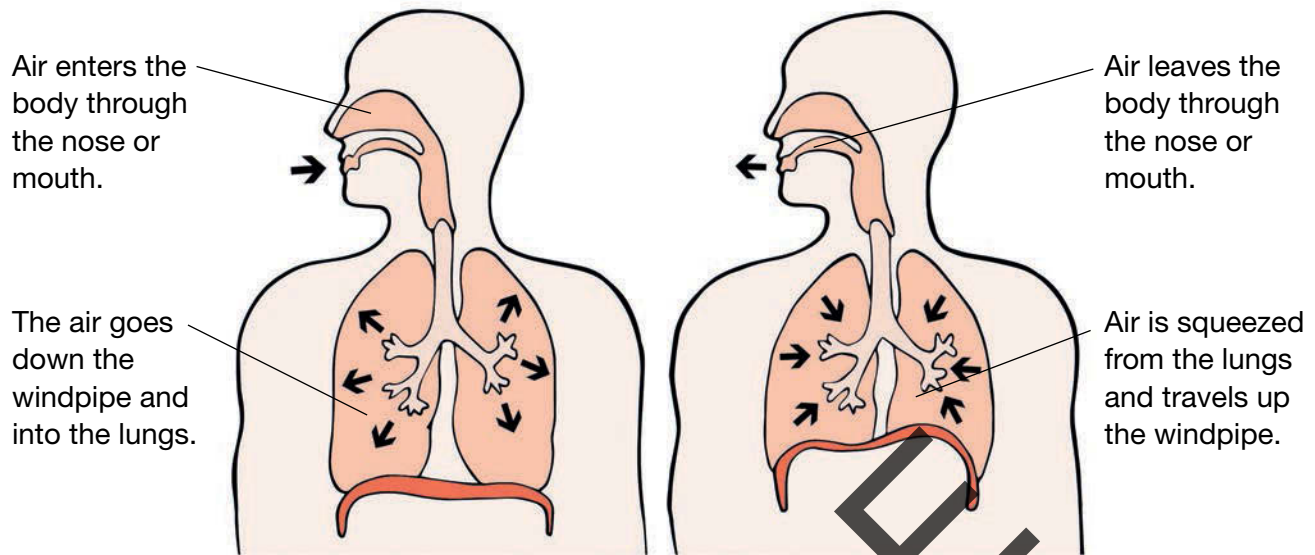
a balloon



Questions

- 1 When you breathe in, does your chest get bigger or smaller?
Why do you think this is so?
- 2 When you breathe out, does your chest get bigger or smaller?
Why do you think this is so?
- 3 Explain how we are able to blow up a balloon.
- 4 Why do you think we breathe faster when we exercise?

Breathing



When we breathe in, oxygen from the air moves into the blood vessels in the lungs. Blood carries the oxygen to the heart and then to the other parts of the body. We need oxygen to live.

As your body uses up oxygen, it makes **carbon dioxide**. Carbon dioxide is a waste gas that the body must get rid of. The blood carries the carbon dioxide back to the lungs. We get rid of carbon dioxide in the air we breathe out.

Talk about it!

How do divers breathe underwater?

What you have learnt

- ☞ We use our lungs for breathing.
- ☞ Our lungs get bigger and fill with air when we breathe in.
- ☞ Our lungs get smaller and push out air when we breathe out.
- ☞ We breathe in oxygen from the air.
- ☞ We breathe out carbon dioxide.

1.5 The digestive system

Your body needs food to help it grow. Food also gives you energy. But your body cannot use the food you eat just as it is. Food has to be changed so that it can be used by the body.

The **digestive system** changes food by breaking it down into tiny particles. This process is called **digestion**.

The **stomach** and the **intestines** digest the food. They are the main organs of the digestive system. Digested food particles pass from the intestine into the blood and are carried to all parts of the body.

The food we eat must be digested so that the body can use it.



Words to learn

digestive system

digestion stomach

intestines saliva



Questions

- 1 Why do we need food?
- 2 Why must food be digested?
- 3 How does the stomach help digestion?
- 4 What happens to food in the intestines?
- 5 How does the digested food reach all parts of the body?

1 Your teeth chew and chop up the food into smaller pieces that we can swallow. Digestive juices in **saliva** start digesting food.

2 The food we swallow is pushed down a tube called the gullet and into the stomach.

3 Inside the stomach the food mixes with digestive juices that turn the food into a thick liquid similar to porridge.

5 Any undigested bits of food that your body can't use are pushed out of the end of the intestines when you go to the toilet.

4 The intestines break down the food even more until the food particles are small enough to move into the blood.

What you have learnt

- ☞ The body needs food to help it to grow and have energy to work properly.
- ☞ Food is broken down into small particles by the process of digestion.
- ☞ The stomach and the intestines digest food.
- ☞ Digested food is carried in the blood to all parts of the body.

Talk about it!

Why is baby food soft and mushy?

1.6 What do the kidneys do?

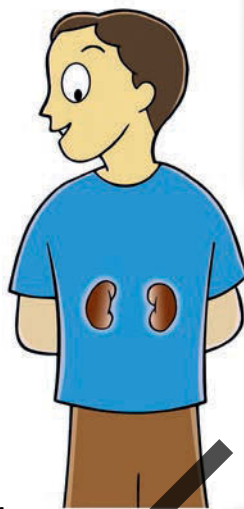
The **kidneys** are found below the rib cage at the back of the body.

They are a pair of bean-shaped organs, in an adult about the size of a computer mouse. Healthy adult. Healthy kidneys filter the blood to remove waste products and excess water from the body.

Find your kidneys. Put your hands on your hips with your thumbs on your back pointing backwards. Slide your hands up until you can feel your ribs. Your kidneys are just under your thumbs.

The process of removing of waste products from the body is called **excretion**. The kidneys excrete a liquid waste product called **urine**. The urine leaves our body when we go to the toilet.

Every day our blood passes through the kidneys about 40 times to produce about one litre of urine.



Words to learn

kidneys excretion
urine disease
dialysis



Drink six to eight glasses of water each day to keep your kidneys healthy.

Activity 1.6

Find out about the kidneys

Your body produces about one litre of urine each day. How much is one litre? Pour what you think is one litre of water into the container. How can you check?

You will need:

a large container
a measuring cylinder • water

When the kidneys don't work

If one kidney stops working because of **disease**, doctors can remove it. Your body can still work well with one healthy kidney.

Some people don't have healthy kidneys and their kidneys stop working. They need to go on a machine that acts like a kidney to filter and clean the blood. This is called **dialysis** (we say di-al-i-siss).

Sometimes people have a kidney transplant. This means that they get a kidney from another person, often someone in their family.



Dialysis machines are very expensive and dialysis takes several hours a day for three days a week.

Questions

- 1 Where are your kidneys found in the body?
- 2 What size are the kidneys?
- 3 **a** What is the name of the main process carried out by the kidneys?
b Explain how the kidneys carry out this process.
- 4 Name **three** things doctors can do if your kidneys don't work.

What you have learnt

- ☞ The kidneys are pair of organs found at the back of the body, below the ribs.
- ☞ The main function of the kidneys is to remove waste from the body as urine. This is called excretion.

Talk about it!

Why do you produce less urine in hot weather than in cold weather?

1.7 What does the brain do?

How do you remember your way home from school?
Why do you breathe without thinking about it?
How do you know when you are hungry or thirsty?
Where do dreams come from?

Words to learn

brain images
nerves
nervous system
tumours



The **brain** is a soft, grey, wrinkly organ inside your skull. It does all your learning and thinking and also controls all your muscles and senses.

The brain is connected to all parts of the body by **nerves**. Nerves send messages to and from the brain very quickly all the time. The brain and nerves work together to form the **nervous system**.

Different parts of the brain have different jobs.

Controls your speech
and lets you talk.

Controls your
balance.

Sends nerve messages
to your muscles to
make them move.

Make sense of nerve messages
from your ears and tells you
what you are hearing.

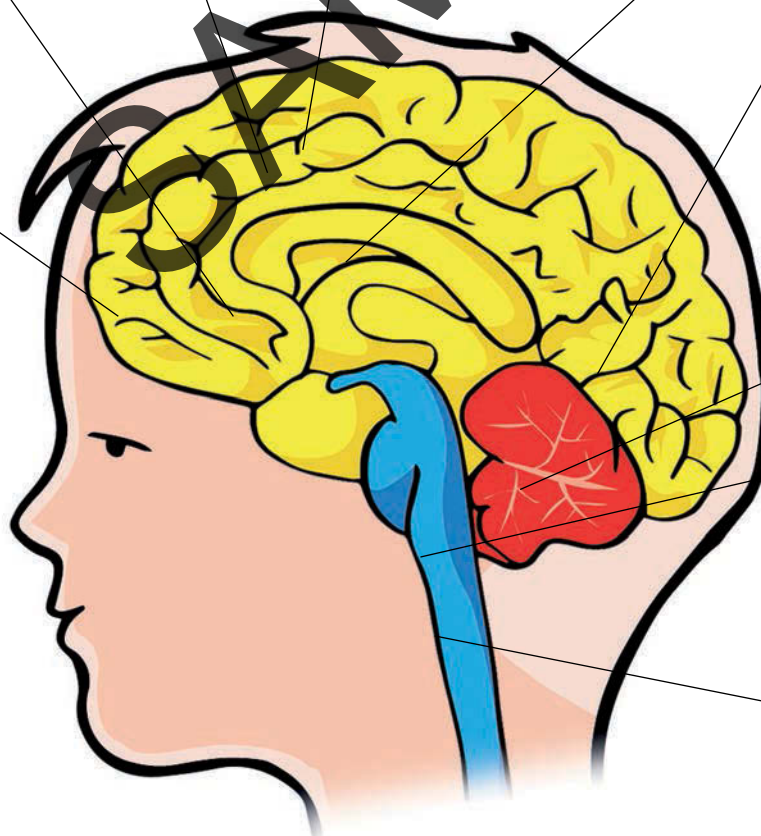
Changes nerve
messages from your
eyes into **images**
that you see.

cerebrum

cerebellum

Controls things you
don't think about
such as breathing,
heartbeat, blinking
and sneezing.

brain stem



What happens if your brain is damaged?

When the brain is damaged it is serious because the brain controls everything we do. Some body organs can repair themselves, others can't. The brain usually cannot repair itself.

Some things that affect the brain are germs that cause infections, growths on the brain called **tumours**, lack of oxygen and head injuries.



Questions

- 1 **a** How is the brain protected?
b Why is it important to protect the brain?
- 2 **a** How does the brain send messages to, and receive messages from, other parts of the body?
b Why is it important that these messages travel very quickly? Think about this situation: you are crossing the road when suddenly you see a car speeding towards you.
- 3 Explain how your brain allows you to make a phone call to a friend.

Dreams are the thoughts, images and sounds formed by our brains while we are asleep. Dreams can be about anything and often don't make any sense when we remember them. We have several dreams every night but we don't remember most of them.

Challenge

What is concussion?

What you have learnt

- 🌀 The brain is protected by the skull.
- 🌀 The brain controls everything – our body movements, senses, speech, heartbeat and breathing.
- 🌀 Brain injuries are serious because the brain controls everything and cannot repair itself.

Talk about it!

Does your brain still work when you are asleep?
How do we know this?

Check your progress

- 1** Match each organ in column A with its main function in column B.

A	B
heart	excretion
stomach and intestines	breathing
lungs	control
kidneys	digestion
brain	circulation

- 2** State whether each of the following statements is true or false. Correct the false statements.

- a The heart pumps air around the body.
- b Your heart beats faster when you exercise.
- c Your pulse rate tells you how fast you are exercising.
- d Blood moves around the body in special tubes called blood vessels.
- e The blood picks up carbon dioxide in the lungs.

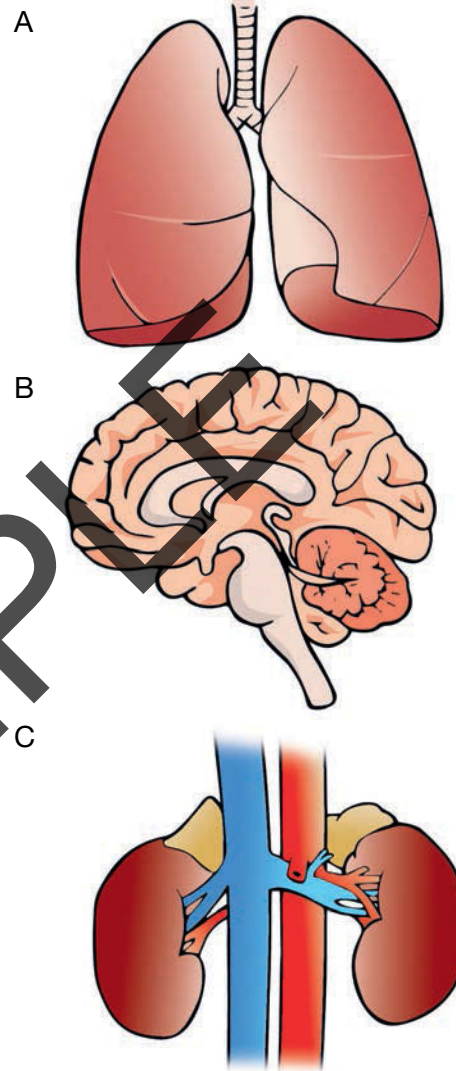
- 3** Use the words in the box to complete the sentences about digestion.

mouth stomach intestines gullet

- a Food is pushed down the _____ into the stomach.
- b In the _____, the food is broken down into very small particles.
- c The food is mixed with digestive juices in the _____.
- d Undigested food is pushed out of the body through the end of the _____.
- e The food is chewed in the _____.

- 4** The sentences in **3** are in the wrong order. Sort them into the correct order of the stages of digestion.

- 5**
- a** Name the organs shown in the pictures.
 - b** Which organ removes wastes and excess water from the body?
 - c** What is the waste from this organ called?
 - d** Which organ allows us to think, talk and move?
 - e** How does B make sure that A does its job?
 - f** How does playing a game of soccer affect A's function?
 - g** How is A protected from damage?
 - h** How is B protected from damage?



- 6**
- a** Name the waste gas that we breathe out of the lungs.
 - b** Name the gas we breathe into the lungs.