●●○○○ **Level 2 · Science** S2.3

Bones, muscles, teeth and food

How your body moves, and the food that keeps it strong.

Find the bones of the skeleton and its joints, feel muscles pull in pairs, learn how to keep teeth clean, sort food into groups, plan a balanced day of local food, count your pulse and keep food safe.

YOU ARE READY FOR THIS BOOK IF

You can point to your elbow, knee and jaw and move each one.

One step up	S3.3 Body systems
This book	**S2.3 Bones, muscles, teeth and food**
One step down	S1.3 My body, my senses, keeping well

Contents

S2.3.1 The skeleton

S2.3.2 Joints

S2.3.3 Muscles move bones

S2.3.4 Teeth

S2.3.5 Food groups

S2.3.6 A balanced diet

S2.3.7 Exercise and rest

S2.3.8 Keeping food safe

Key words, A to Z

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S2.3.1 CHAPTER 1

The skeleton

What is under my skin that holds me up?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** Only soft flesh holds me up.
- ☐ **B** Bones hold me up, keep soft parts safe and help me move.
- ☐ **C** My skin holds me up.

BY THE END YOU CAN

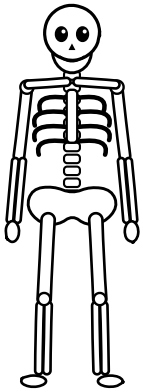
- Name the skull, ribs, backbone and the main arm and leg bones
- Explain three jobs of the skeleton: support, protect and move

Press your fingers on the top of your head. Feel the hard shape under your skin. Now press the side of your chest. You feel hard, curved bones.

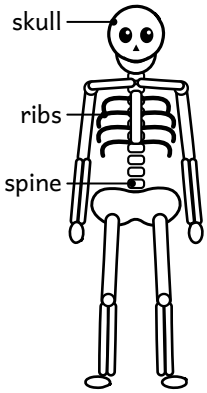
All your bones together make your **skeleton**. An adult has 206 bones. A baby is born with about 300. Some join together as the baby grows.

DRAW IT FIRST

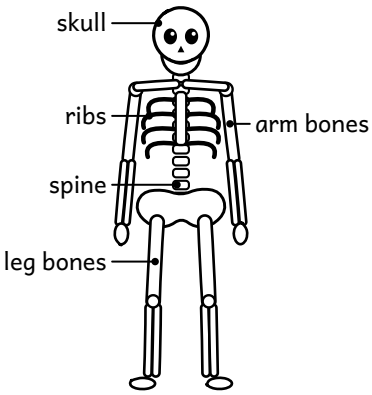
Draw the skeleton and name its bones



1 Draw a round head and a long back. Add a cage of ribs, arms and legs.

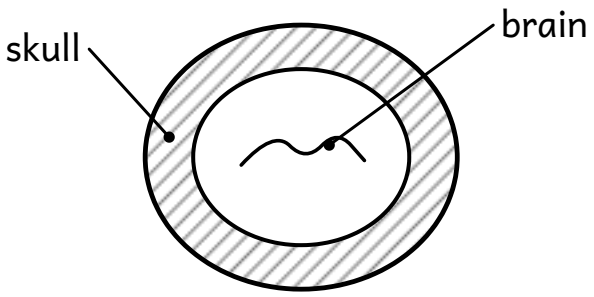


2 Write skull, ribs and spine. Draw a line from each word to its bones.

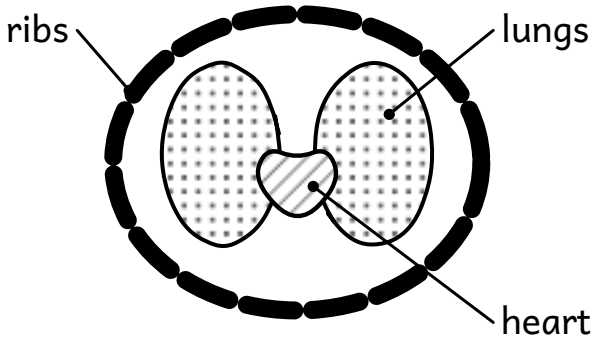


3 Write arm bones and leg bones. Draw a line to each.

The **skull** is a hard case round your head. Your brain is soft. The skull protects it.

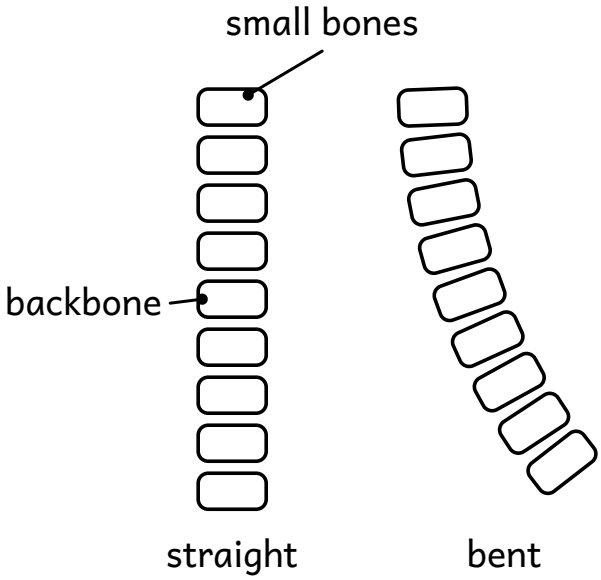


Your **ribs** are curved bones. They make a cage round your heart and lungs. They keep these soft parts safe. They move a little when you breathe.



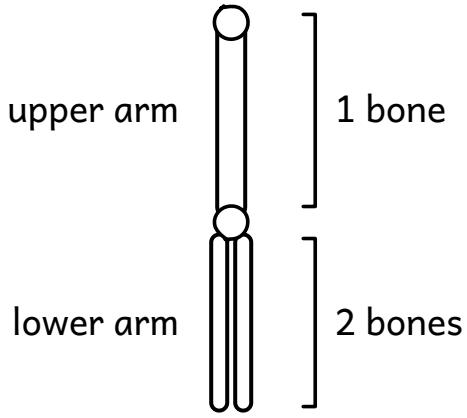
Your **backbone** runs down the middle of your back. It is also called the spine. It holds you up. The nerves that carry messages run down inside it. The backbone protects them.

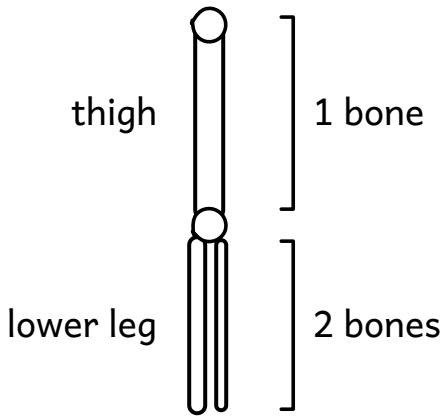
The backbone is not one long bone. It is a stack of small bones. This is why you can bend.



Your backbone has many small bones. Here are a few, drawn big.

Your upper arm has one bone. Your lower arm has two. Your thigh has one bone. It is the longest bone in your body. Your lower leg has two bones.





The thigh bone is the longest bone in your body.

Your skeleton has three jobs. It supports you: it holds you up and gives you your shape. It protects soft parts inside you. It helps you move.

SEE IT THREE WAYS

As a picture

Job	Which bones
support	backbone, legs
protect	skull, ribs
move	arm, leg bones

In words

The backbone and leg bones hold you up. The skull and ribs protect soft parts. Muscles pull on arm bones and leg bones to make you move.

In symbols

An adult has 206 bones. A baby is born with about 300.

TRY IT

Feel your own skeleton

You need: your own body, a friend, if you like.

Be safe: Press gently. Stop if anything hurts.

1. Tap the top of your head with a finger. Is it hard or soft?
2. Reach behind you. Run a finger down the middle of your back. Feel the bumps.
3. Put your hands on the sides of your chest. Breathe in deeply. Feel the curved ribs move.
4. Run a finger down the front of your lower leg. Feel the long hard bone close under the skin.

What you will see: Your head is hard. Your back has a row of small bumps. These are bones of the backbone. Your ribs are curved and they move as you breathe. The bone in your lower leg is long and hard.

If you cannot try it, this is what happens.

Where	You feel
head	hard and round
back	bumps in a row
sides	curved bones
shin	hard and long

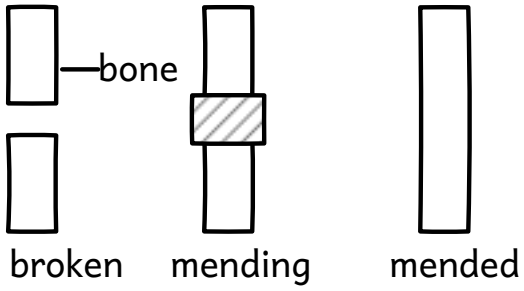
A WRONG IDEA MANY PEOPLE HAVE

~~Bones are dead and dry, like sticks.~~

Why it feels right: Old bones on the ground are white and dry. A bone feels as hard as a stick.

The test that breaks it: Think of a child who breaks an arm bone. In a few weeks the bone mends and joins again. A dead stick never mends. Or mark a growing child's height on a wall. Mark it again after some months. The child is taller because the bones grew.

What is true: Bones in your body are alive. They grow, they have blood, and a broken bone mends. The dry bones on the ground are from an animal that died.



A broken bone mends because the bone is alive.

KEY WORDS

skeleton
all the bones in your body.

skull
the hard bones of your head. They protect your brain.

ribs
curved bones that make a cage round your heart and lungs.

backbone
the stack of small bones down your back. It is also called the spine.

BACK TO YOUR GUESS

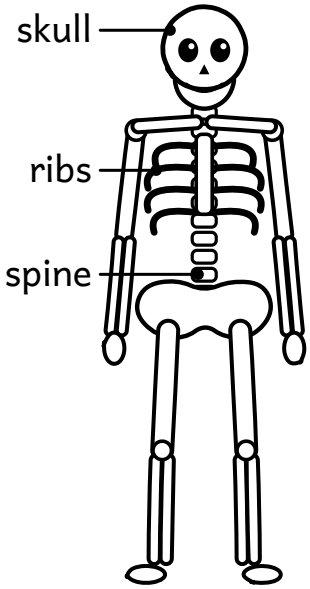
The answer is B: Bones hold me up, keep soft parts safe and help me move.

Your bones make a frame called a skeleton. It holds you up, keeps soft parts safe and helps you move.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Look at the picture. Which bones make a cage round the heart and lungs?



   A skull

   B ribs

   C spine

   Answer at the back of the book.

2. What are the three jobs of the skeleton?

   A It holds you up, protects soft parts and helps you move.

   B It keeps you warm, helps you see and makes you hungry.

   C It holds you up, but it cannot protect or help you move.

   Answer at the back of the book.

3. Why can you bend your back?

    A The backbone is one soft bone.

    B The ribs bend it.

    C The backbone is a stack of small bones.

    Answer at the back of the book.

4. Tariq says, "Bones are dead, like dry sticks." Is he right?

    A Yes. Bones are dry and cannot grow.

    B No. Bones in the body are alive. They grow and mend.

    C Only a baby has bones that are alive.

    Answer at the back of the book.

5. A baby is born with about 300 bones. An adult has 206. About how many more bones does a baby have?

    Answer at the back of the book.

6. Name the bones in your leg, from the top to the ankle.

    Answer at the back of the book.

7. Which sentence about your arm bones is true?

    A Both parts of the arm have one bone.

    B The upper arm has two bones and the lower arm has one.

    C The upper arm has one bone and the lower arm has two.

    Answer at the back of the book.

8. Sipho stands up straight. Which bones do most to hold him up?

    A The backbone and the leg bones

    B The skull and the ribs

    C The arm bones

    Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

The skeleton has three jobs. It supports you, protects soft parts and helps you move. The skull protects the brain. The ribs protect the heart and lungs. The backbone is a stack of small bones.

Draw: A skeleton. Label the skull, ribs, backbone, arm bones and leg bones.

S2.3.2 CHAPTER 2

Joints

Where does my body bend and turn?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** Soft skin lets me bend anywhere.
- ☐ **B** Every bone bends in the middle.
- ☐ **C** I bend where two bones meet.

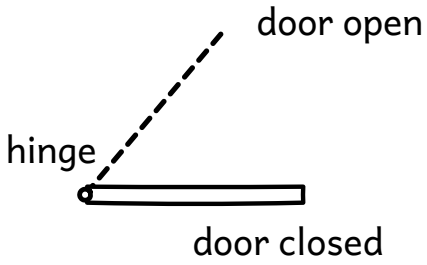
BY THE END YOU CAN

- Find joints in your body that bend and joints that turn
- Compare how the knee and the shoulder move

Bend your elbow. Bend your fingers. Bend your knee. Where does your body bend?

A **joint** is a place where two bones meet. You bend and turn at your joints.

A door swings open and shut on its hinge. It cannot swing sideways. Your elbow works the same way.



A door turns on its hinge. It swings one way and back.

A **hinge joint** bends one way, then straightens. Your elbows, knees and finger joints are hinge joints.

DRAW IT FIRST

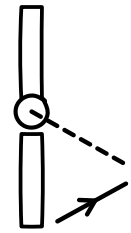
Draw two kinds of joint

hinge



1 Draw two bones that meet at a round joint. Write hinge.

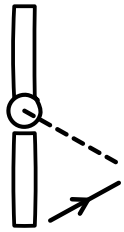
hinge



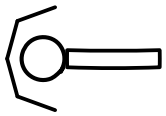
bends one way

2 Draw a dotted bone bent to one side. Draw an arrow. Write bends one way.

hinge



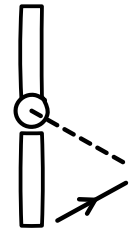
bends one way



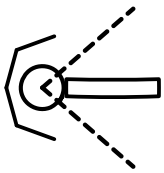
ball and socket

3 Draw a ball at the end of a bone, in a cup. Write ball and socket.

hinge



bends one way



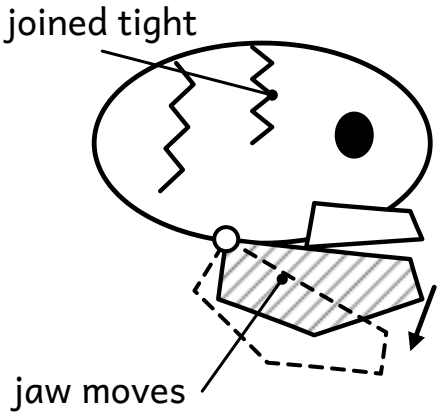
ball and socket

4 Draw dotted bones in two other directions.

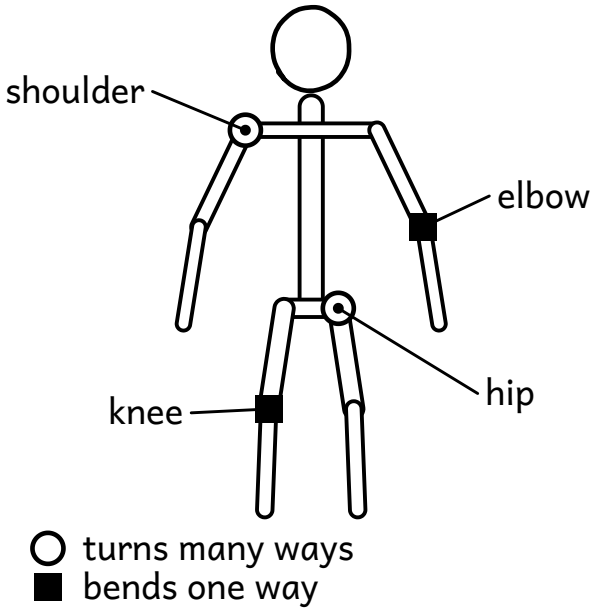
Your shoulder is different. A round bone end sits in a cup of another bone. This is a **ball and socket joint**.

A ball and socket joint turns in many directions. Swing your arm in a big circle. Your hip works the same way.

Some joints do not move. The bones of your skull are joined tight. Your jaw is a joint that does move. It lets you chew and talk.



Find four joints on the body. A ring marks a joint that turns many ways. A square marks a joint that bends one way.



SEE IT THREE WAYS

As a picture

Joint	How it moves
knee	bends one way
elbow	bends one way
shoulder	turns many ways
hip	turns many ways

In words

The knee is a hinge joint. It bends one way. The shoulder is a ball and socket joint. It turns many ways. Your arm swings in a circle. Your lower leg does not.

TRY IT

Compare your knee and your shoulder

You need: your own body, a chair, some clear space.

Be safe: Move slowly. Stop if anything hurts. Keep clear of other people.

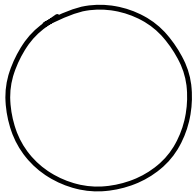
1. Sit on a chair. Hold your thigh still with both hands. Do not let it roll.
2. Swing your lower leg. Which ways can it go? Try to draw a circle in the air with it.
3. Stand up with room around you. Hold your arm straight.
4. Draw a big circle in the air with your whole arm.
5. Bend the middle joint of a finger. Does it bend one way or many ways?

What you will see: Your lower leg swings back and forth. It cannot draw a circle. Your whole arm draws a big circle. The middle joint of your finger bends one way, like a hinge.

If you cannot try it, this is what happens.



knee
back and forth



shoulder
a big circle

A WRONG IDEA MANY PEOPLE HAVE

~~The knee can move every way, like the shoulder.~~

Why it feels right: Your whole leg can swing in many ways. So it seems the knee does it.

The test that breaks it: Sit and hold your thigh still with both hands. Try to draw a circle in the air with your lower leg. You cannot. It only swings back and forth. Now draw a big circle with your whole arm. The shoulder can.

What is true: The knee is a hinge joint. It bends one way. The hip is a ball and socket joint. It lets the whole leg swing.

KEY WORDS

joint
a place where two bones meet.

hinge joint
a joint that bends one way, like a door. The knee is one.

ball and socket joint
a joint that turns in many directions. The shoulder is one.

BACK TO YOUR GUESS

The answer is C: I bend where two bones meet.

You bend where two bones meet. Those places are called joints. Each bone is stiff.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Which joint bends one way, like a door on its hinge?

   A The shoulder

   B The knee

   C The hip

   Answer at the back of the book.

2. Amina swings her whole arm in a big circle. Which joint lets her do it?

   A The elbow

   B The knee

   C The shoulder

   Answer at the back of the book.

3. What is a joint?

   A A place where two bones meet

   B A kind of muscle

   C The middle of one bone

   Answer at the back of the book.

4. Ravi says, "My knee moves every way." What do you tell him?

   A He is right. The knee is a ball and socket joint.

   B The knee bends one way. The hip lets the whole leg swing.

   C He is right, because every joint turns many ways.

   Answer at the back of the book.

5. **From an earlier chapter**

   Which bones make a cage round the heart and lungs?

   A The skull

   B The ribs

   C The thigh bone

   Answer at the back of the book.

6. Draw a hinge joint and a ball and socket joint. Write a name under each.

   Answer at the back of the book.

7. How are the bones of the skull joined?

   A The skull is one bone, so it has no joints.

   B The bones move a little, like a hinge.

   C The bones are joined tight and do not move.

   Answer at the back of the book.

8. Leila sits and swings her lower leg back and forth. Which joint is working?

   A The hip, a ball and socket joint

   B The thigh bone, which bends in the middle

   C The ankle, a hinge joint

   D The knee, a hinge joint

   Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

A joint is where two bones meet. A hinge joint bends one way, like the knee and elbow. A ball and socket joint turns many ways. The shoulder and hip are two.

Draw: A hinge joint with one arrow. A ball and socket joint with three arrows.

S2.3.3 CHAPTER 3

Muscles move bones

How does my arm bend and straighten?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** Muscles pull on the bones.
- ☐ **B** Muscles push on the bones.
- ☐ **C** The bones move by themselves.

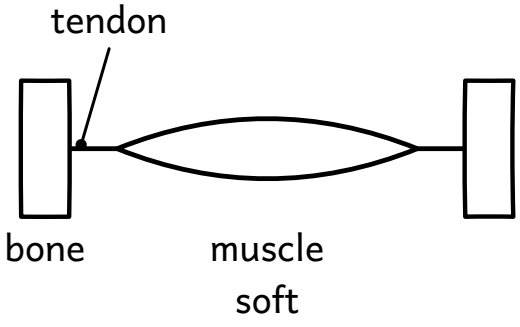
BY THE END YOU CAN

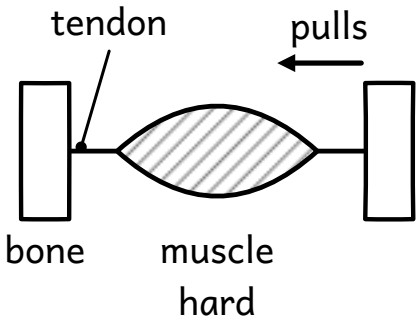
- Feel a muscle get hard as it pulls on a bone
- Explain why muscles work in pairs to bend and straighten an arm

Hold the front of one upper arm with your other hand. Now bend that arm, so your fist comes up to your shoulder. What do you feel?

A lump gets hard. That lump is a **muscle**. A muscle gets short and hard. It pulls on a bone.

A **tendon** is a strong cord. It joins a muscle to a bone. The muscle pulls, and the tendon pulls the bone.



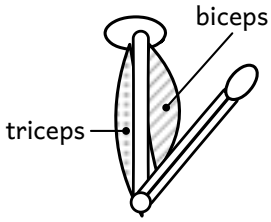


A muscle pulls by getting short and fat. It pulls the bone with it.

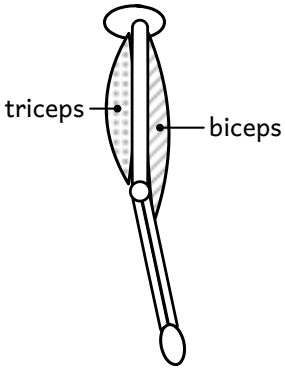
The muscle at the front of your upper arm is the **biceps**. The muscle at the back is the **triceps**.

DRAW IT FIRST

Draw an arm and its two muscles

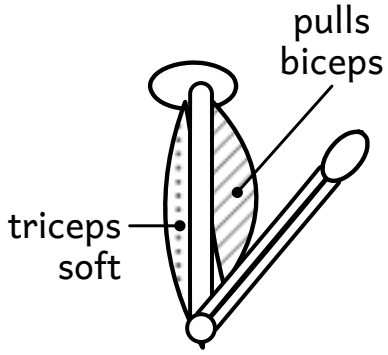


1 Draw a bent arm. Write biceps at the front and triceps at the back. The biceps is short and fat.

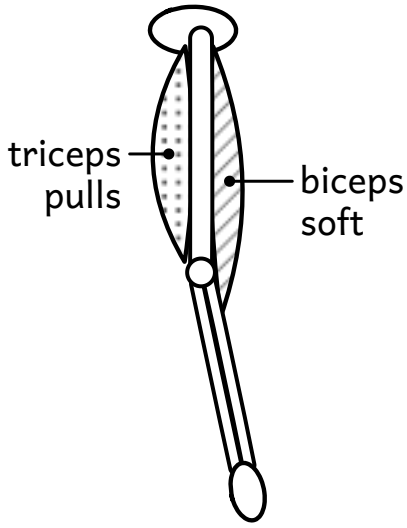


2 Draw the arm straight. Now the biceps is long and thin. The triceps pulled the arm straight.

To bend your arm, the biceps gets short and hard. It pulls your lower arm up. The triceps goes soft.



To straighten your arm, the triceps gets short and hard. It pulls your lower arm back down. The biceps goes soft.



A muscle can only pull. It can never push. When it stops pulling, it goes soft and long again. It does not push the bone back.

So muscles work in pairs. Each one pulls one way. Its partner pulls the other way.

SEE IT THREE WAYS

As a picture

You	Front	Back
bend	hard	soft
push down	soft	hard

In words

Front and back mean the front and back of your upper arm. When you bend your arm, the front muscle is hard. When you push down and straighten it, the back muscle is hard. The other one goes soft.

TRY IT

Feel the pair of muscles

You need: your own arm, a table.

Be safe: Press down only as hard as feels comfortable. Stop if anything hurts.

1. Sit at a table. Rest your right hand flat on the table top.
2. Hold the front of your right upper arm with your left hand.
3. Lift your right fist toward your shoulder. Feel the front of the arm. Is it hard or soft?
4. Put your right hand flat on the table again. Press it down hard, as if to straighten your arm. Feel the front. Is it hard or soft?
5. Move your left hand to the back of the upper arm. Press down again. Feel the back.

What you will see: When you lift your fist, the front muscle goes hard. When you press down, the front goes soft. The back goes hard. Each muscle only pulls. Its partner pulls the other way.

If you cannot try it, this is what happens.

You	Front	Back
lift fist	hard	soft
press down	soft	hard

A WRONG IDEA MANY PEOPLE HAVE

~~A muscle pushes your arm straight.~~

Why it feels right: Pressing on a table feels like pushing with your whole arm.

The test that breaks it: Hold the front of your upper arm. Press your hand hard on a table. Your arm tries to straighten. The front muscle goes soft. It is not pushing. Now feel the back of the arm. That muscle is hard. It is pulling.

What is true: A muscle can only pull. The back muscle pulls your arm straight. The front muscle goes soft.

KEY WORDS

muscle
it gets short and hard, and pulls on a bone.

tendon
a strong cord that joins a muscle to a bone.

biceps
the muscle at the front of your upper arm. It bends your arm.

triceps
the muscle at the back of your upper arm. It straightens your arm.

BACK TO YOUR GUESS

The answer is A: Muscles pull on the bones.

Muscles pull on bones. A muscle can only pull. It gets shorter and harder.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. What can a muscle do?

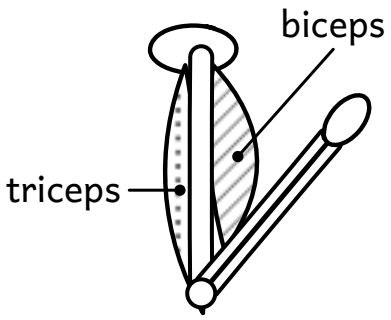
   A It can push and pull.

   B It can only push.

   C It can only pull.

   Answer at the back of the book.

2. Look at the picture. The arm is bent. Which muscle is hard and pulling?



   A triceps

   B biceps

   C both

   Answer at the back of the book.

3. What joins a muscle to a bone?

   A A tendon

   B A joint

   C A rib

   Answer at the back of the book.

4. Why do muscles work in pairs?

   A One muscle pushes and its partner pulls.

   B Each muscle can only pull one way, so a partner pulls back.

   C Two muscles are stronger than one.

   Answer at the back of the book.

5. **From an earlier chapter**

   Your elbow bends one way, like a door. What kind of joint is it?

   A A ball and socket joint

   B A joint that does not move

   C A hinge joint

   Answer at the back of the book.

6. Draw a straight arm. Label the muscle that pulled it straight.

   Answer at the back of the book.

7. Your arm is bent. You straighten it. What does the biceps do?

   A It pushes the arm straight.

   B It gets short and hard.

   C It pulls the arm straight.

   D It goes soft and long.

   Answer at the back of the book.

8. You bend your arm. What do you feel at the front of your upper arm?

   A A hard lump. The biceps is pulling.

   B A soft lump. The biceps is pushing.

   C Nothing. The bones move by themselves.

   Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

A muscle can only pull. It gets short and hard. A tendon joins it to a bone. The biceps bends your arm. The triceps straightens it. Muscles work in pairs.

Draw: A bent arm. Label the biceps and triceps. Colour the hard one.

S2.3.4 CHAPTER 4

Teeth

Why are my teeth not all the same shape?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** All teeth do the same job.
- ☐ **B** Only the front teeth matter.
- ☐ **C** Different teeth do different jobs.

BY THE END YOU CAN

- Name incisors, canines and molars and the job of each
- Explain how sugar and poor cleaning cause tooth decay
- Show how to clean teeth with a brush or a chewing stick

Run your tongue along your teeth. The front ones are thin and flat. Next to them are pointed ones. The back ones are wide and bumpy.

Your teeth are not all the same. Each kind has its own job.

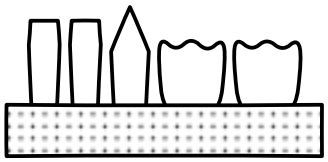
Incisors are at the front. They have flat edges. They cut and bite.

Canines are the pointed teeth beside the incisors. They grip and tear food.

Molars are the wide teeth at the back. They are bumpy. They grind food.

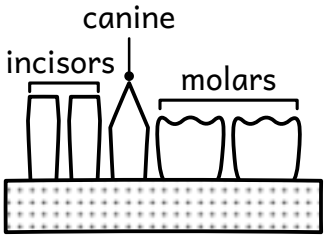
DRAW IT FIRST

Draw your teeth and their jobs

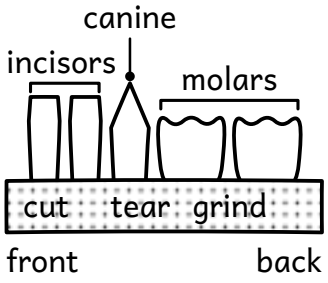


front back

1 Draw a row of teeth on a line of gum. Write front and back.

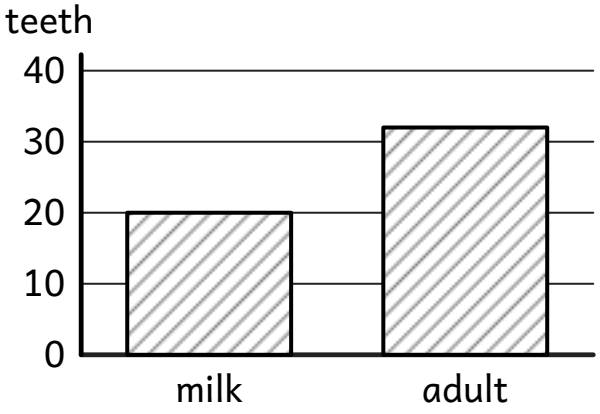


2 Draw flat incisors, a pointed canine and wide molars. Write their names.



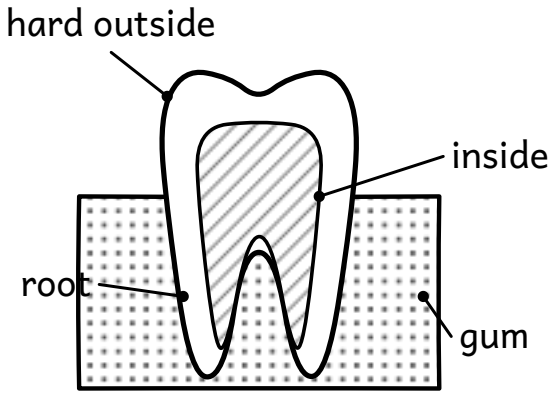
3 Under each kind, write its job: cut, tear, grind.

A child has 20 milk teeth. They fall out, and adult teeth grow in. An adult has up to 32 teeth. Some adults have fewer.



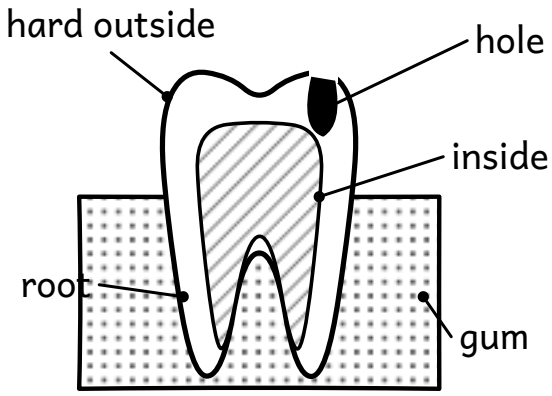
A child has 20 milk teeth. An adult has up to 32 teeth.

Look inside a tooth. The outside is very hard. The inside is softer. The root holds the tooth in the gum.



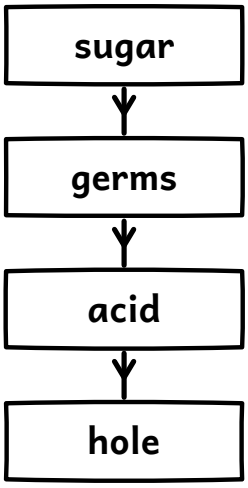
Tiny germs live on your teeth, in a sticky layer. Germs are living things too small to see. They feed on sugar. They make acid.

The acid makes holes in the hard outside of a tooth. These holes are **tooth decay**.



SEE IT THREE WAYS

As a picture



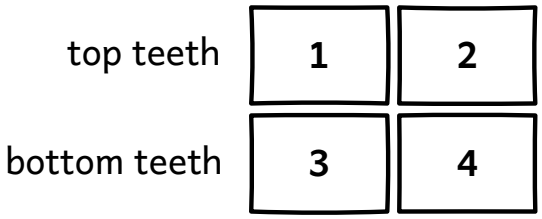
In words

Sugar feeds the germs. The germs make acid. The acid makes a hole in the tooth.

In symbols

A child has 20 milk teeth. An adult has up to 32 teeth.

Cleaning takes the sticky layer away. Brush your teeth twice a day. Brush for two minutes. Brush every side of every tooth.



30 seconds each part

Four parts, 30 seconds each, make two minutes.

No brush? Use a chewing stick. Chew one end until it is soft, like a brush. Then rub your teeth with it. Use a fresh end each day.

Be safe. Use a stick from a safe tree, such as neem. Ask your family. Only a grown up cuts a stick with a knife. Never use a dirty stick.

Rinse your mouth with clean water after sweet food. Eat sweet food less often.

TRY IT

What does acid do to a shell?

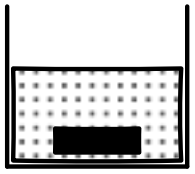
You need: a clean eggshell from a cooked egg, two clean cups, water, vinegar, a spoon.

Be safe: Never taste or drink anything in this activity. Throw the shell and the liquid away. Wash your hands.

1. Break the shell into two bits. Wash your hands afterwards.
2. Put one bit in a cup of water.
3. Put the other bit in a cup of vinegar.
4. Leave both cups for a day or two.
5. Lift each bit out with the spoon. Press each one gently.

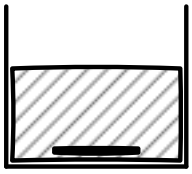
What you will see: The bit in water is still hard. The bit in vinegar is soft and thin. Vinegar is an acid. Eggshell is hard like a tooth. Acid wears it away. Acid from germs wears away teeth in the same way.

If you cannot try it, this is what happens.



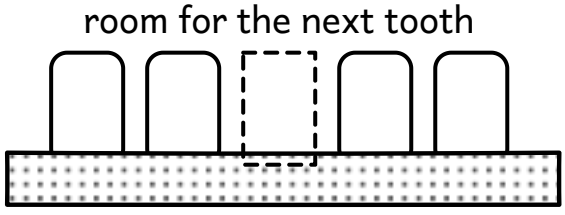
water

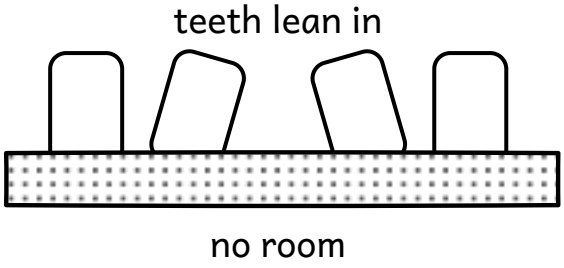
shell stays hard



vinegar

soft and thin





A milk tooth lost too soon leaves less room.

A WRONG IDEA MANY PEOPLE HAVE

~~**Milk teeth do not matter, because they fall out.**~~

Why it feels right: Milk teeth are only used for a while. New teeth come later.

The test that breaks it: Stand some books in a row, close together. Take one book out and leave a gap. The books beside it lean into the gap. Teeth do the same. If a milk tooth goes too soon, the next teeth lean in. The adult tooth has no room.

What is true: Milk teeth keep the space for adult teeth. A bad milk tooth also hurts and can make you ill. Clean them too.

KEY WORDS

incisors
flat teeth at the front. They cut and bite.

canines
pointed teeth. They grip and tear.

molars
wide teeth at the back. They grind food.

tooth decay
holes in a tooth, made by acid from germs.

BACK TO YOUR GUESS

The answer is C: Different teeth do different jobs.

Different teeth do different jobs. Some cut, some tear and some grind.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Which teeth are pointed and tear food?

   A Incisors

   B Canines

   C Molars

   Answer at the back of the book.

2. Joseph chews a hard bit of cooked cassava. Which teeth grind it?

   A The incisors at the front

   B The canines

   C The molars at the back

   Answer at the back of the book.

3. What do germs on your teeth make from sugar?

   A Acid

   B Water

   C A new tooth

   Answer at the back of the book.

4. Mei brushes four parts of her mouth. She brushes each part for 30 seconds. How long does she brush in all?

   Answer at the back of the book.

5. **From an earlier chapter**

   Which muscle pulls to straighten your arm?

   A The muscle at the front of the upper arm

   B The muscle at the back of the upper arm

   C The tendon

   Answer at the back of the book.

6. Show how to clean your teeth with a chewing stick. Write the steps.

   Answer at the back of the book.

7. Hana has no toothbrush. What can she use to clean her teeth?

   A A chewing stick, chewed soft at one end

   B Nothing. Only a toothbrush can clean teeth.

   C A sharp stick to dig out the food

   Answer at the back of the book.

8. Ravi says, "I need not clean milk teeth." What is true?

   A He is right. Only adult teeth matter.

   B Milk teeth have no germs, so they stay clean.

   C Only the front milk teeth need cleaning.

   D Clean them too. They keep the space for adult teeth.

   Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

Incisors cut. Canines tear. Molars grind. Germs on teeth feed on sugar and make acid. Acid makes holes. Brush twice a day for two minutes, or use a chewing stick.

Draw: A row of teeth. Label the incisors, canine and molars.

S2.3.5 CHAPTER 5

Food groups

Why do we need so many different foods?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** Each kind of food does a different job.
- ☐ **B** One kind of food gives the body everything.
- ☐ **C** Only meat helps you grow.

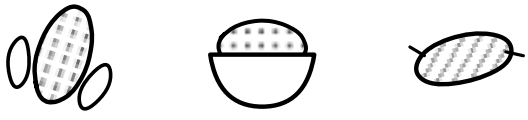
BY THE END YOU CAN

- Name foods rich in starch, protein, fat, vitamins and minerals
- Sort foods eaten at home into food groups

Your body is always working. It needs food to run, to grow and to mend. Foods fall into groups, and each group does a job.

Starch is food that gives you energy. Rice, maize, cassava, yam, bread, potatoes and millet are rich in starch.

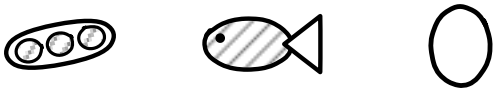
starch: gives energy



maize rice yam

Protein is food that helps you grow and mend. Beans, lentils, groundnuts, eggs, fish, milk and meat are rich in protein.

protein: helps you grow



beans fish eggs

Fat is food that stores energy. Oil, butter, nuts and seeds are rich in fat.

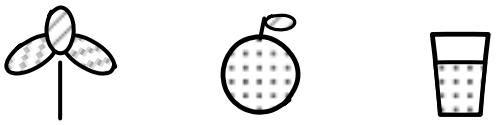
fat: stores energy



oil groundnuts

Vitamins and minerals keep you healthy. You need only small amounts. Fruit, vegetables, green leaves and milk are rich in them.

vitamins and minerals



greens fruit milk

DRAW IT FIRST

Draw the food groups

starch gives energy

1 Draw a box. Write starch in it. Beside it write gives energy.

starch gives energy

protein helps you grow

2 Draw a box for protein. Beside it write helps you grow.

starch gives energy

protein helps you grow

fat stores energy

3 Draw a box for fat. Beside it write stores energy.

starch gives energy

protein helps you grow

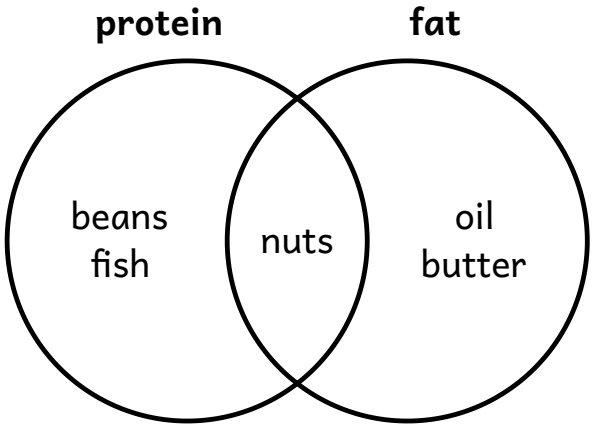
fat stores energy

vitamins keeps you healthy

minerals keeps you healthy

4 Draw two boxes, vitamins and minerals. Beside each write keeps you healthy.

Some foods belong to two groups. Milk gives protein, vitamins and minerals. Groundnuts give protein and fat. Beans give protein and some starch.



SEE IT THREE WAYS

As a picture

Group	Some foods
starch	rice, maize, yam
protein	beans, fish, eggs
fat	oil, nuts, seeds
vitamins	fruit, greens
minerals	greens, milk

In words

Look at a meal. Find the starch first. Then find the protein, the fat, and the fruit or greens. A good meal has more than one group.

TRY IT

Sort a meal into groups

You need: paper and a pencil, or a stick and soft ground, scraps of paper, or flat stones, the meals you ate yesterday.

Be safe: Use food names on paper. Do not use real food, so none is wasted or made dirty.

1. Think of one meal you ate yesterday. Write each food on a scrap of paper.
2. Make four patches on a table or the ground. Name them starch, protein, fat and vitamins and minerals.
3. Put each food on the patch where it fits best.
4. A food that fits two patches goes on the best one. Write its other group in small letters.
5. Look at the patches. Which one has the most foods? Is one empty?

What you will see: Every food finds a place. Some foods fit two groups. Many meals have a lot of starch. A meal with an empty patch is missing a job. Add a food from that group to the next meal.

If you cannot try it, this is what happens.

Food	Group
rice	starch
beans	protein
greens	vitamins, minerals
oil	fat

A WRONG IDEA MANY PEOPLE HAVE

~~Only meat gives protein.~~

Why it feels right: Many people name meat first when they think of strong bodies.

The test that breaks it: Find a packet or tin of lentils, beans or groundnuts. Read the label. Look for the word protein and a number. No packet? Ask a health worker. Many families eat little or no meat. They still grow strong on beans, lentils and groundnuts.

What is true: Beans, lentils and groundnuts are rich in protein. So are eggs, fish and milk.

KEY WORDS

starch
food that gives you energy, such as rice, maize and yam.

protein
food that helps you grow and mend, such as beans and fish.

fat
food that stores energy, such as oil and nuts.

vitamins and minerals
small amounts of things in food that keep you healthy.

BACK TO YOUR GUESS

The answer is A: Each kind of food does a different job.

Each kind of food does a different job. Starch gives energy. Protein helps you grow and mend.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Which food is rich in starch?

    A Fish

    B Oil

    C Spinach

    D Cassava

    Answer at the back of the book.

2. Which of these is not meat, but is rich in protein?

    A Rice

    B Oil

    C Lentils

    Answer at the back of the book.

3. Which food group helps you grow and mend a cut?

    A Starch

    B Protein

    C Fat

    Answer at the back of the book.

4. Groundnuts are rich in protein and in fat. What does this tell you?

    A Some foods belong to two groups.

    B The groundnuts were sorted wrongly.

    C Fat and protein are the same thing.

    Answer at the back of the book.

5. Sort these foods into groups: cassava, groundnut oil, fish, spinach.

    Answer at the back of the book.

6. **From an earlier chapter**

   Ana bites a piece off a mango, then chews it. Which teeth grind it small?

   A Incisors

   B Canines

   C Molars

   Answer at the back of the book.

7. Tariq says, "Fat is bad. Nobody should eat it." What is true?

   A He is right. Only starch is good for you.

   B Each group does a job. Fat stores energy, and the body needs some.

   C Fat is the only group a body needs.

   Answer at the back of the book.

8. Which list has only foods rich in starch?

   A Rice, fish and oil

   B Beans, eggs and fish

   C Oil, nuts and seeds

   D Rice, maize and yam

   Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

Starch gives energy. Protein helps you grow and mend. Fat stores energy. Vitamins and minerals keep you healthy. Beans and lentils give protein, not only meat. Some foods are in two groups.

Draw: Draw four boxes: starch, protein, fat, vitamins and minerals. Write one food in each.

S2.3.6 CHAPTER 6

A balanced diet

What should I eat in a day to stay healthy?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** Only the food I like best.
- ☐ **B** Some of every food group each day.
- ☐ **C** As much starch as I can, and nothing else.

BY THE END YOU CAN

- Plan a day of meals from foods found locally
- Explain why clean water and fibre belong in a healthy diet

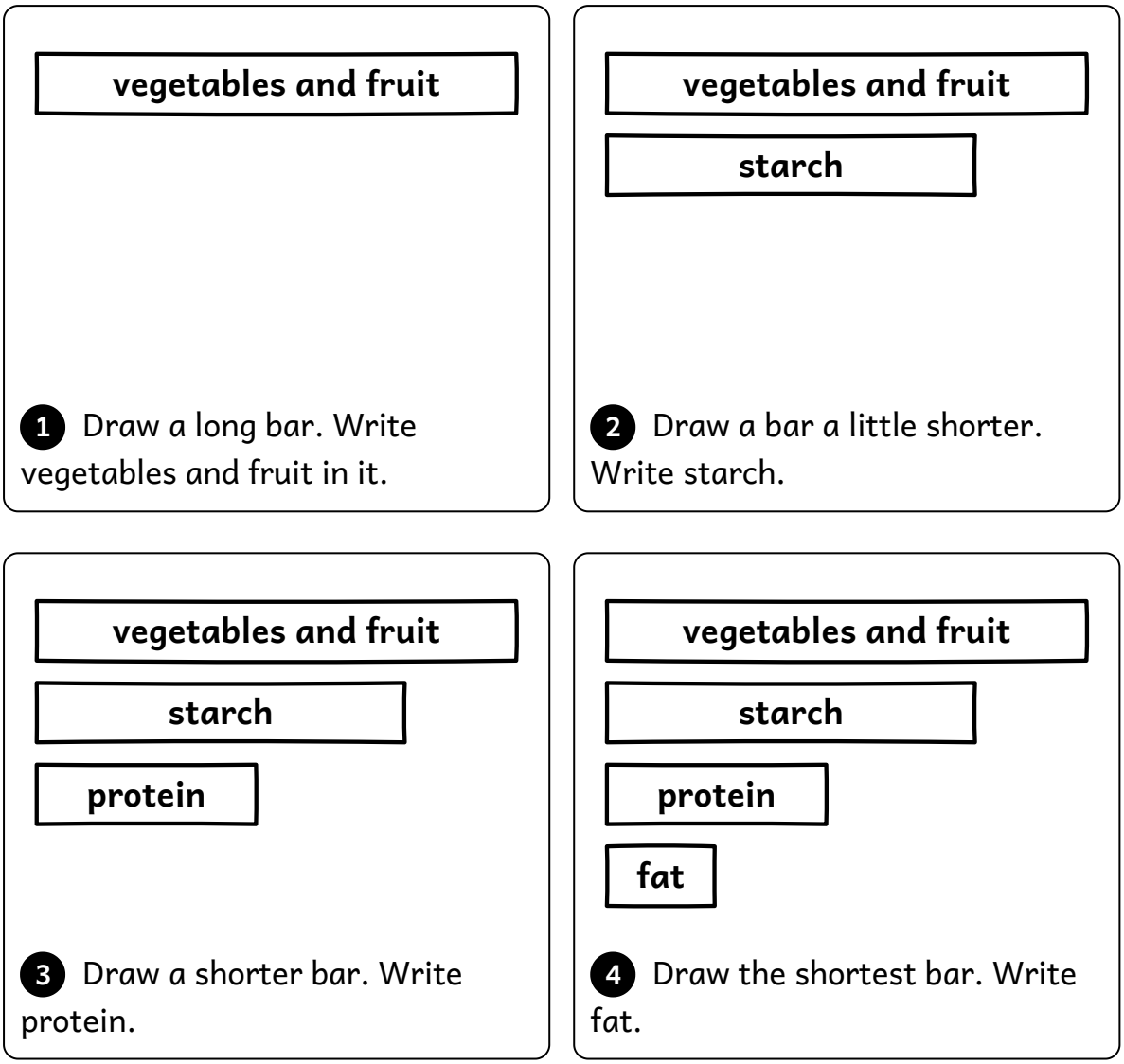
One food group alone is not enough. Each group does a job. Your body needs all the jobs done every day.

A **balanced diet** has some of every food group each day. It has more of some and less of others.

Eat lots of vegetables and fruit. Eat starch for energy. Eat some protein. Eat a little fat.

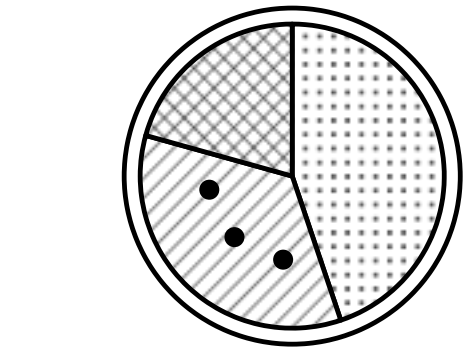
DRAW IT FIRST

Draw a balanced day



These bars are a guide. Needs differ from person to person. The idea is to have some of every group.

A plate can show the same guide. The biggest part is vegetables and fruit. Starch is next. Protein is the smallest part. A little oil goes on the food.



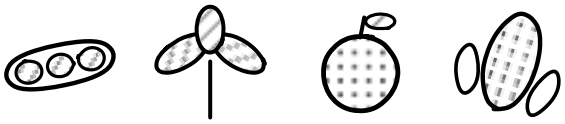
vegetables and fruit
starch
protein
a little oil

Use foods from your own place. For starch, think of maize, rice, cassava, millet, yam or bread. For protein, think of beans, lentils, groundnuts, eggs or fish.

For vitamins and minerals, think of green leaves, pumpkin, mango or banana.

Fibre is the tough part of plants. Whole grains, beans, vegetables and fruit have fibre.

foods with fibre

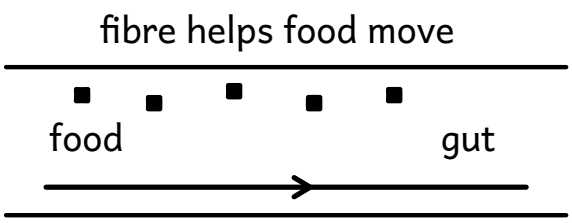


beans greens fruit maize

Most fibre passes right through you. It helps food move through your **gut**. The gut is the long tube that food travels through.

SEE IT THREE WAYS

As a picture



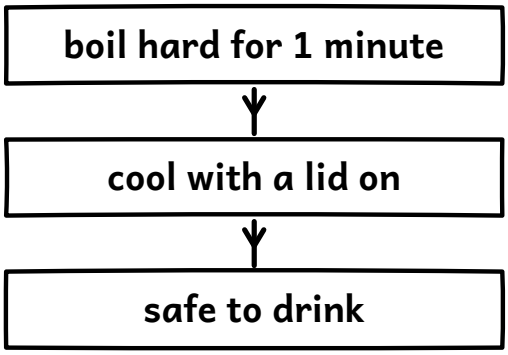
In words

Fibre helps food move through your gut. Whole grains, beans, vegetables and fruit have fibre.

Water is part of a healthy day too. Your body needs water all day. Drink clean water.

Clean water comes from a safe source. A tap or a covered well can be one. If you are not sure, a grown up boils it. It must boil hard for one minute. High in the mountains, boil it for three minutes. Boiling kills the germs in it. Let it cool with a lid on.

Be safe. Only a grown up boils water. Hot water burns. Never touch a hot pot.



TRY IT

Plan a balanced day

You need: paper and a pencil, a list of foods you can find near your home.

1. List the foods you can find near home. Think of your market, farm or garden.
2. Draw three boxes: morning, midday and evening.
3. Choose foods for each box. Aim for starch, protein, and vegetables or fruit in the day.
4. Add a little fat, such as oil. Add clean water for the whole day.
5. Check each group. Is one missing? Swap a food to fix it.

What you will see: You can fill every group with foods from near your home. The plan uses plain foods. If a group is missing, add one food from it.

If you cannot try it, this is what happens.

Meal	Foods
Morning	millet, mango
Midday	beans, rice, greens
Evening	fish, yam, oil
All day	clean water

A WRONG IDEA MANY PEOPLE HAVE

~~A healthy diet needs special food from far away.~~

Why it feels right: Foods from far away often seem special. So they seem better for you.

The test that breaks it: Plan a day with only beans, greens and maize. Check each group. Maize gives starch. Beans give protein. Greens give vitamins and minerals. Cook them in a little oil. Every group is there.

What is true: Beans, greens, and maize or rice can make a balanced day. Foods from near home work well.

KEY WORDS

balanced diet
some of every food group each day.

fibre
the tough part of plants. It helps food move through the gut.

gut
the long tube that food travels through inside you.

BACK TO YOUR GUESS

The answer is B: Some of every food group each day.

Some of every food group each day. A balanced day also has fibre and clean water.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. What is a balanced diet?

   A Only the foods you like best

   B A lot of starch and nothing else

   C Some of every food group each day

   Answer at the back of the book.

2. Which day of food is balanced?

   A Rice at every meal and nothing else

   B Maize, beans, greens, a little oil and clean water

   C Beans and oil only

   Answer at the back of the book.

3. Which of these has fibre?

   A Cooking oil

   B White sugar

   C Fish

   D Beans

   Answer at the back of the book.

4. Ravi has no tap. Which water is safest to drink?

   A Water a grown up boiled hard for one minute, then cooled

   B Water from a muddy puddle

   C Water from a pond that looks clear

   Answer at the back of the book.

5. **From an earlier chapter**

   Sweet food stays on a tooth. Germs feed on the sugar. What do the germs make?

   A A new tooth

   B Acid

   C Nothing, because germs cannot use sugar

   Answer at the back of the book.

6. Plan one meal from foods near your home. Name the group of each food.

   Answer at the back of the book.

7. Leila says, "I eat plenty. I need no water." What is true?

   A She is right. Food gives all the water the body needs.

   B She needs water only when she is hot.

   C The body needs clean water all day, even when you eat well.

   Answer at the back of the book.

8. Amina lives far from any market. How can she eat a balanced day?

   A She cannot. A balanced day needs food from far away.

   B She can eat only starch, because there is plenty of it.

   C She can eat only fruit, because it is fresh.

   D She can choose foods that grow near her, from every group.

Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

Eat some of every food group each day. Eat lots of vegetables and fruit. Fibre moves food through your gut. Drink clean water. Beans, greens and maize can make a good day.

Draw: Draw four bars: vegetables and fruit, starch, protein, fat. Draw a cup of clean water beside them.

S2.3.7 CHAPTER 7

Exercise and rest

Why does my heart beat faster when I run?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** Because the air round me is warm.
- ☐ **B** Because my heart is getting weaker.
- ☐ **C** Because my muscles need more blood.

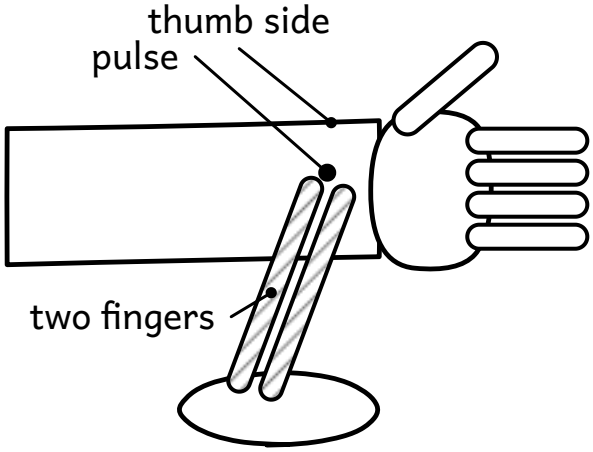
BY THE END YOU CAN

- Count your pulse before and after running
- Explain how exercise and sleep keep bones and muscles strong

Your heart pumps blood round your body. Each beat pushes blood along.

Your **pulse** is the beat you can feel in your wrist. It shows how fast your heart is beating.

Lay two fingers on the inside of your wrist. Use the thumb side. Press a little. Never use your thumb. It has a beat of its own.

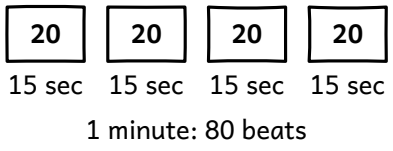


Cannot find it? Move your fingers a little. Press a little harder or softer.

Count the beats for 15 seconds. Then multiply by 4. That gives the beats in one minute.

SEE IT THREE WAYS

As a picture



In words

You count 20 beats in 15 seconds. Four times 15 seconds is one minute. So you multiply 20 by 4.

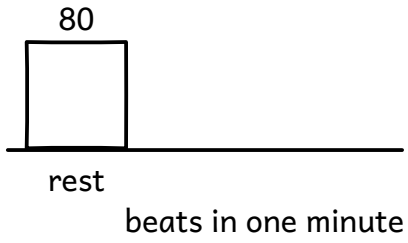
In symbols

20 × 4 = 80 beats in one minute

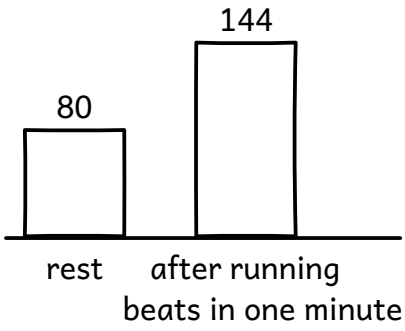
At rest, many young people have 70 to 100 beats a minute. After running it is much higher.

DRAW IT FIRST

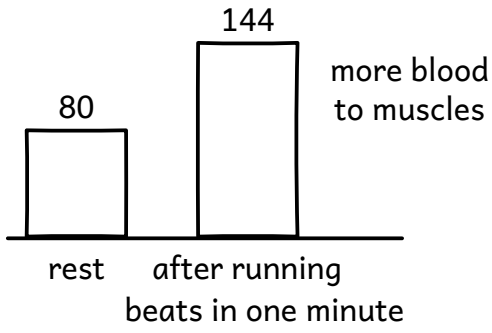
Draw what running does to your pulse



1 Draw a line. Write beats in one minute under it. Draw a short bar. Write 80 above it and rest below it.



2 Draw a tall bar. Write 144 above it and after running below it.

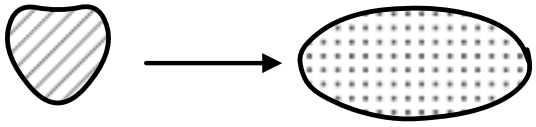


3 Beside the tall bar, write more blood to muscles.

When you run, your muscles work hard. They need more blood. So your heart beats faster to send it.

80 beats a minute

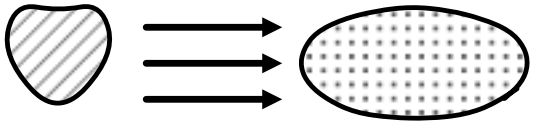
some blood



heart muscles

144 beats a minute

more blood



heart muscles

TRY IT

Count your pulse before and after running

You need: a clock or watch, if you have one, or a string 25 cm long and a small stone, a friend to help with the string, open, flat ground, paper and a pencil.

Be safe: Run only on open ground, away from roads and holes. Stop at once if you feel ill or dizzy. Stop at once if your chest hurts. With a heart or breathing problem, ask a grown up first.

1. No clock? A friend holds the string, 25 cm from hand to stone. They let the stone swing. Each return to their side takes about one second. They count 15 returns while you count beats.
2. Sit still for two minutes. Find your pulse with two fingers.
3. Count the beats for 15 seconds. Write the number. Multiply it by 4.
4. Run on open ground for one minute.
5. Stop. Find your pulse fast. Count for 15 seconds. Write it. Multiply by 4.
6. Sit still for two minutes. Count again, and write it.

What you will see: Your pulse is much faster after running. After a rest it slows down again. Numbers differ from person to person, so compare your own.

If you cannot try it, this is what happens.

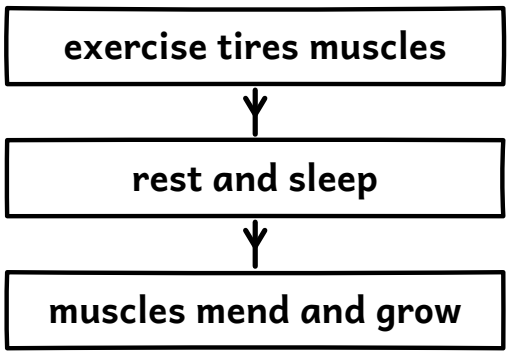
When	15 sec	1 min
At rest	20	80
After run	36	144
Rest again	24	96

Exercise is moving your body so that it works hard. Walking, running, jumping and games are exercise.

Bones are alive. Exercise that carries your weight makes bones stronger. It makes muscles stronger too.

Rest is stopping so your body can recover. Sleep is the best rest.

Hard work tires your muscles. They mend and grow while you rest and sleep. Most young people need 9 hours of sleep a night or more.



A WRONG IDEA MANY PEOPLE HAVE

~~**You get stronger while you are exercising.**~~

Why it feels right: Your muscles feel hard and strong while you use them.

The test that breaks it: Open and close one hand as fast as you can. Squeeze hard. Keep going for half a minute. Is your grip stronger or weaker at the end? It is weaker. Now rest for two minutes. Your grip comes back.

What is true: Exercise tires muscles. Most of the growing happens in the rest afterwards, and in sleep.

KEY WORDS

pulse
the beat of your heart, which you can feel in your wrist.

exercise
moving your body so that it works hard.

rest
stopping so your body can recover. Sleep is the best rest.

BACK TO YOUR GUESS

The answer is C: Because my muscles need more blood.

Your muscles need more blood when they work hard. Your heart beats faster to send it.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. Why does your pulse go faster when you run?

   A Your heart is getting weaker.

   B Your heart sends more blood to your hard working muscles.

   C The air round you is warm.

   Answer at the back of the book.

2. Kofi counts 22 beats in 15 seconds. How many beats is that in one minute?

   A 22

   B 37

   C 330

   D 88

   Answer at the back of the book.

3. Mei has a pulse of 96 beats in a minute. How many beats would she count in 15 seconds?

   Answer at the back of the book.

4. Which of these helps bones get stronger?

   A Sitting still all day

   B Lying down all day

   C Running and jumping games

   Answer at the back of the book.

5. When do your muscles mend and grow stronger?

   A Only while you run

   B They never change

   C Only while you eat

   D While you rest and sleep

   Answer at the back of the book.

6. **From an earlier chapter**

   When you run, your legs carry your weight. Which is the longest bone in your body?

   A The thigh bone

   B The backbone

   C A rib

   Answer at the back of the book.

7. Kofi is running and his chest starts to hurt. What should he do?

   A Keep running. Pain shows his muscles are getting stronger.

   B Drink some water, then keep running.

   C Wait until the game ends, then tell someone.

   D Stop and rest, and tell a grown up.

   Answer at the back of the book.

8. Amina wants to feel her pulse. What should she do?

   A Press her thumb on her wrist.

   B Press very hard on her wrist.

   C Lay two fingers on the inside of her wrist.

   D Feel the back of her hand.

   Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

Two fingers on your wrist find your pulse. Count for 15 seconds and multiply by 4. Running makes your heart beat faster. Games and running make bones and muscles stronger. Muscles mend and grow in rest and sleep.

Draw: Draw two bars: rest and after running. Make the second bar taller. Write pulse above them.

S2.3.8 CHAPTER 8

Keeping food safe

How can food that looks fine make me ill?

YOUR GUESS

Pick one before you read on. It is fine to be wrong.

- ☐ **A** Food that looks fine can still carry germs.
- ☐ **B** If food looks and smells fine, it is safe.
- ☐ **C** Only old food has germs on it.

BY THE END YOU CAN

- Explain how flies and dirty hands carry germs to food
- Show ways to keep food covered, clean and cool

Food can look fine and still make you ill. Tiny things called germs can be on it.

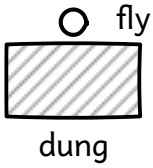
Germs are tiny things, too small to see. Some of them make you ill.

Germs live in dung and rubbish. Flies land there. Germs stick to their feet.

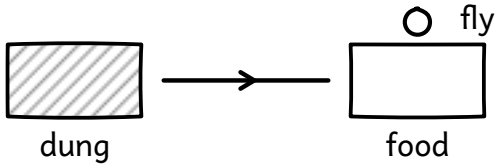
Then the fly lands on your food. The germs rub off. Now the food has germs on it.

DRAW IT FIRST

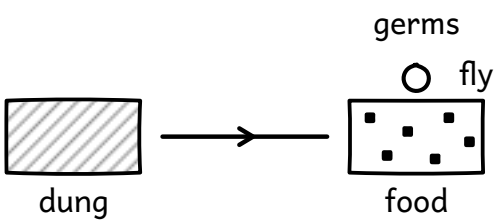
Draw how a fly carries germs



1 Draw a lump of dung. Draw a fly on it.



2 Draw an arrow to some food. The fly lands on the food.



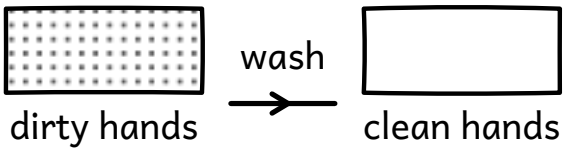
3 Draw tiny dots on the food. Write germs.

Hands carry germs too. You touch the ground, animals and the toilet. Germs stay on your hands.

Then you touch food or your mouth. The germs go in.

SEE IT THREE WAYS

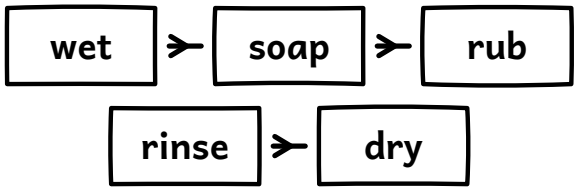
As a picture



In words

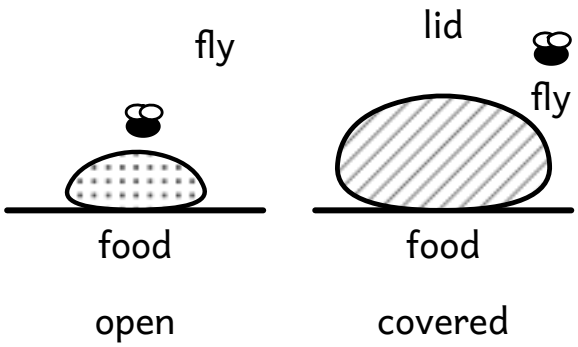
Wash your hands with soap and water. Wash before you eat or cook. Wash after the toilet.

Wash like this. Wet your hands. Add soap. Rub all over. Rinse. Dry.



Soap and water is best. Use wood ash only if you have no soap. Use only cold ash from a fire that is long out. Rub your hands with it. Then rinse them well with clean water.

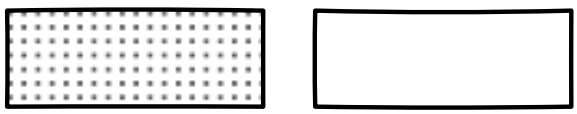
Keep food covered. Use a lid or a clean cloth. Then flies cannot land on it.



Germs grow fast in warm food. Eat cooked food soon. Never leave it out in the heat for hours.

To keep food for later, keep it cool. Before you eat it, a grown up heats it. It must be very hot all through.

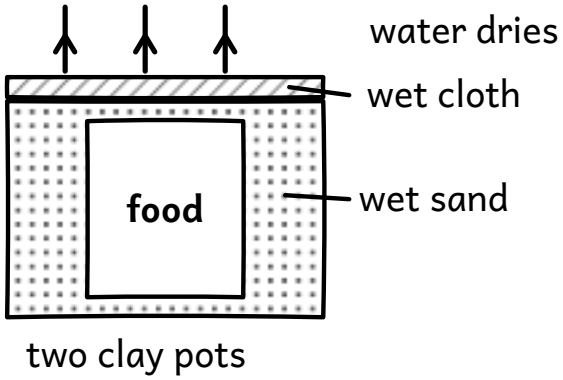
Raw meat and raw fish can carry germs. Keep them away from food you eat as it is. Wash your hands and the board after you touch them. Cook them until they are very hot all through.



keep them apart

Be safe. Hot food burns. Let it cool a little before you eat it. Only a grown up lifts a hot pot.

No fridge? Try a pot in a pot. Stand a small clay pot inside a bigger one. Fill the space between them with wet sand. Cover the top with a wet cloth.



A pot in a pot keeps food cooler.

As the water dries, the pots get cooler. The food stays cooler, but not cold like a fridge. It works best where the air is dry. Keep the pots in the shade. Wet the sand and cloth again each day. Cooked food in it should still be eaten soon.

wash your hands

cover the food

keep it cool

heat it until very hot

Four steps keep food safe.

Mould is a fuzzy growth on old food. It is made of tiny living things. Watch it grow in the next test.

TRY IT

Do dirty hands matter?

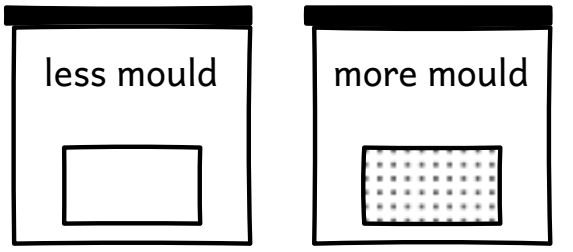
You need: two slices of bread, or two pieces of flat bread, two clean jars with lids, or two clean clear bags, soap and water, paper and a pencil, to label the jars, a shelf where no one will open them.

Be safe: Never open the jars. Never smell or taste the bread. Throw both away closed. Wash your hands after.

1. Wash your hands well with soap and water. Dry them on a clean cloth.
2. Touch one slice with both hands. Put it in a jar and close the lid. Label it washed.
3. Now rub your hands on the ground. Do not wash them. Touch the other slice.
4. Put it in the second jar and close the lid. Label it unwashed.
5. Wash your hands with soap and water.
6. Put both jars on the shelf. Look at them each day for a week. Never open them.

What you will see: On the first day, both slices look the same. After a week, the unwashed slice usually has more mould. Mould is a fuzzy growth you can see. If the two slices look the same, try again with more slices.

If you cannot try it, this is what happens.



A WRONG IDEA MANY PEOPLE HAVE

~~Food that looks and smells fine is safe.~~

Why it feels right: Bad food often looks bad and smells bad. So food that looks and smells fine must be safe.

The test that breaks it: Look at your two slices on the first day. Both look fresh. Tiny living things may already be on them. A week later, one has grown mould you can see. Never open the jars to smell.

What is true: Germs are too small to see. Many have no smell. Keep food covered, clean and cool.

KEY WORDS

germs
tiny things, too small to see. Some make you ill.

mould
a fuzzy growth on old food. It is made of tiny living things.

BACK TO YOUR GUESS

The answer is A: Food that looks fine can still carry germs.

Germs are too small to see. Food that looks and smells fine can still carry them.

CHECK YOURSELF

Try each one before you look. A wrong answer tells you where to go next.

1. How does a fly carry germs to food?

   A Germs stick to its feet, then rub off on food.

   B Flies make germs inside the food.

   C A fly carries germs only if it bites the food.

Answer at the back of the book.

2. When should you wash your hands with soap and water?

   A Only when they look dirty

   B Only after you eat

   C Only on the days you cook

   D Before you eat or cook, and after the toilet

   Answer at the back of the book.

3. What keeps flies off your food?

   A Leaving it open to cool

   B A lid or a clean cloth over it

   C Putting it on the floor

   Answer at the back of the book.

4. Ana has no fridge. How can she keep a pot of food cooler?

   A Leave it in the hot Sun

   B Wrap it in dry cloth near the fire

   C Take the lid off so it can breathe

   D A pot in a pot, with wet sand and a wet cloth

   Answer at the back of the book.

5. **From an earlier chapter**

   A grown up boils water hard for one minute. What happens to the germs in it?

   A They are killed.

   B They grow faster.

   C Nothing happens to them.

   Answer at the back of the book.

6. Name three ways to keep food safe.

   Answer at the back of the book.

7. Diego cooked rice this morning and left it out in the heat. It looks and smells fine now. Is it safe to eat?

   A Yes. It smells fine, so it is safe.

   B Yes. Only old food has germs.

   C No. Rice always makes you ill.

   D Not for sure. It was left out, and germs cannot be seen or smelled.

   Answer at the back of the book.

8. Joseph cut raw fish on a board. What should he do before he cuts bread on it?

   A Wash the board and his hands with soap and water.

   B Wipe the board with a dry cloth.

   C Nothing. Bread has no germs.

   D Smell the board. If it smells fine, it is clean.

   Answer at the back of the book.

KEEP IT

Copy this into your exercise book.

Germs are too small to see. Flies and dirty hands carry them to food. Wash hands with soap and water. Wash before eating and after the toilet. Keep food covered. Eat it soon or keep it cool.

Draw: Draw a fly going from dung to food. Draw a lid over the food. Write germs.

Key words, A to Z

Every key word in this book, what it means, and the chapter that teaches it.

backbone
the stack of small bones down your back. It is also called the spine. S2.3.1

balanced diet
some of every food group each day. S2.3.6

ball and socket joint
a joint that turns in many directions. The shoulder is one. S2.3.2

biceps
the muscle at the front of your upper arm. It bends your arm. S2.3.3

canines
pointed teeth. They grip and tear. S2.3.4

exercise
moving your body so that it works hard. S2.3.7

fat
food that stores energy, such as oil and nuts. S2.3.5

fibre
the tough part of plants. It helps food move through the gut. S2.3.6

germs
tiny things, too small to see. Some make you ill. S2.3.8

gut
the long tube that food travels through inside you. S2.3.6

hinge joint
a joint that bends one way, like a door. The knee is one. S2.3.2

incisors
flat teeth at the front. They cut and bite. S2.3.4

joint
a place where two bones meet. S2.3.2

molars
wide teeth at the back. They grind food. S2.3.4

mould
a fuzzy growth on old food. It is made of tiny living things. S2.3.8

muscle
it gets short and hard, and pulls on a bone. S2.3.3

protein
food that helps you grow and mend, such as beans and fish. S2.3.5

pulse
the beat of your heart, which you can feel in your wrist. S2.3.7

rest
stopping so your body can recover. Sleep is the best rest. S2.3.7

ribs
curved bones that make a cage round your heart and lungs. S2.3.1

skeleton
all the bones in your body. S2.3.1

skull
the hard bones of your head. They protect your brain. S2.3.1

starch
food that gives you energy, such as rice, maize and yam. S2.3.5

tendon
a strong cord that joins a muscle to a bone. S2.3.3

tooth decay
holes in a tooth, made by acid from germs. S2.3.4

triceps
the muscle at the back of your upper arm. It straightens your arm. S2.3.3

vitamins and minerals
small amounts of things in food that keep you healthy. S2.3.5

Answers

S2.3.1. The skeleton

1. **ribs**

   The ribs are curved bones. They make a cage that protects the heart and lungs.

   - **If you chose A:** The skull is the case round the brain, in the head.
   - **If you chose C:** The spine runs down the back. It is not a cage round the chest.

2. **It holds you up, protects soft parts and helps you move.**

   It supports you and protects soft parts. Muscles pull on bones to move you.

   - **If you chose B:** Bones do not do these jobs. Look at the three jobs again.
   - **If you chose C:** The skull and ribs protect. Muscles pull on bones to move you.

3. **The backbone is a stack of small bones.**

   Many small bones in a stack can bend where they meet.

   - **If you chose A:** Bones are hard. The backbone bends because it is made of many small bones.
   - **If you chose B:** The ribs make a cage round the chest. The bending comes from the backbone.

4. **No. Bones in the body are alive. They grow and mend.**

   Living bones have blood in them. They grow, and they can mend when broken.

   - **If you chose A:** Your bones grow as you grow, and a broken bone mends. Dead sticks do not.
   - **If you chose C:** Bones are alive at every size. An adult bone mends when it breaks, too.

5. **About 94 more**

   Take 206 away from 300. That gives 94. The 300 is not exact, so say about 94. Some bones join together as a baby grows.

6. **One thigh bone, then two bones in the lower leg.**

   The thigh bone is the longest bone in the body. The lower leg has two bones.

7. **The upper arm has one bone and the lower arm has two.**

   The upper arm has one long bone. The lower arm has two bones side by side.

   - **If you chose A:** Only the upper arm has one bone. The lower arm has two bones side by side.
   - **If you chose B:** It is the other way round. The upper arm has one long bone. The lower arm has two.

8. **The backbone and the leg bones**

   The backbone and the leg bones carry your weight. This is the support job of the skeleton.

   - **If you chose B:** The skull and ribs protect soft parts. The backbone holds the skull up.
   - **If you chose C:** Arm bones help you move things. You can stand with your arms still. They do not hold you up.

S2.3.2. Joints

1. **The knee**

   The knee is a hinge joint. It bends one way and then straightens.

   - **If you chose A:** The shoulder turns in many directions. It is a ball and socket joint.
   - **If you chose C:** The hip turns in many directions. It is a ball and socket joint.

2. **The shoulder**

   The shoulder is a ball and socket joint. It turns in many directions.

   - **If you chose A:** The elbow is a hinge joint. It bends one way and cannot make a circle.
   - **If you chose B:** The knee is in the leg. It bends one way, like the elbow.

3. **A place where two bones meet**

   Two bones meet at a joint. The bones do not bend. The joint lets them move.

   - **If you chose B:** A muscle is not a joint. A joint is where bones meet.
   - **If you chose C:** A joint is not inside one bone. It is where two bones meet.

4. **The knee bends one way. The hip lets the whole leg swing.**

   The knee is a hinge joint. The hip is a ball and socket joint.

   - **If you chose A:** Only the shoulder and hip are ball and socket joints. The knee is a hinge.
   - **If you chose C:** The knee and elbow are hinge joints. They bend one way only.

5. **The ribs**

   The ribs are curved bones. They protect the heart and lungs.

   - **If you chose A:** The skull is the hard case round the brain. Go to S2.3.1.
   - **If you chose C:** The thigh bone is in the leg. It is the longest bone in the body. Go to S2.3.1.

6. **Two bones meet at a round joint. A ball sits in a cup.**

   A hinge joint bends one way. A ball and socket joint turns in many directions.

7. **The bones are joined tight and do not move.**

   The skull is many bones joined tight. It protects the brain. Only the jaw joint moves.

   - **If you chose A:** The skull is many bones. The zigzag lines are joints where they meet.
   - **If you chose B:** The joints of the skull are tight. Only the jaw moves.

8. **The knee, a hinge joint**

   The knee is a hinge joint. It bends one way and straightens. So the lower leg swings back and forth.

   - **If you chose A:** The hip lets the whole leg swing. The lower leg swings at the knee.
   - **If you chose B:** A bone is stiff. It does not bend. The bend is at a joint.
   - **If you chose C:** The ankle is a hinge too, but it moves the foot. The lower leg swings at the knee.

S2.3.3. Muscles move bones

1. **It can only pull.**

   A muscle pulls by getting shorter and harder. It cannot push.

   - **If you chose A:** A muscle cannot push. When it stops pulling, it goes soft.
   - **If you chose B:** A muscle cannot push. The back muscle pulls your arm straight.

2. **biceps**

   To bend the arm, the biceps gets short and hard. The triceps goes soft.

   - **If you chose A:** The triceps is long and thin here. It is soft. It pulls when you straighten the arm.
   - **If you chose C:** In a pair, one muscle pulls while its partner goes soft. That is how the arm moves.

3. **A tendon**

   The muscle pulls the tendon. The tendon pulls the bone.

   - **If you chose B:** A joint is where two bones meet. A tendon joins a muscle to a bone.
   - **If you chose C:** A rib is a bone. A tendon is the cord that joins a muscle to a bone.

4. **Each muscle can only pull one way, so a partner pulls back.**

   The biceps bends the arm. The triceps pulls the other way to straighten it.

   - **If you chose A:** No muscle pushes. Each one only pulls.
   - **If you chose C:** The point is direction. One muscle pulls the arm up and the other pulls it down.

5. **A hinge joint**

   A hinge joint bends one way. The elbow, knee and finger joints are hinge joints.

   - **If you chose A:** A ball and socket joint turns many ways, like the shoulder. The elbow bends one way. Go to S2.3.2.
   - **If you chose B:** The elbow moves. Only some joints, such as those in the skull, are joined tight. Go to S2.3.2.

6. **A straight arm. The triceps at the back is labelled.**

   To straighten the arm, the triceps pulls. It gets short and hard as it pulls.

7. **It goes soft and long.**

   The triceps pulls the arm straight. The biceps goes soft and long, ready to pull again.

   - **If you chose A:** A muscle cannot push. The triceps pulls the arm straight.
   - **If you chose B:** The biceps pulled to bend the arm. To straighten it, the triceps pulls and the biceps goes soft.
   - **If you chose C:** The biceps is at the front. It pulls the arm bent. The triceps at the back pulls it straight.

8. **A hard lump. The biceps is pulling.**

   The biceps gets short and hard. It pulls your lower arm up. You can feel it.

   - **If you chose B:** A muscle goes hard when it pulls. It never pushes.
   - **If you chose C:** Bones cannot move by themselves. Muscles pull on them, and you can feel the muscle go hard.

S2.3.4. Teeth

1. **Canines**

   Canines are pointed. They grip and tear food.

   - **If you chose A:** Incisors are flat at the front. They cut and bite.
   - **If you chose C:** Molars are wide and bumpy at the back. They grind.

2. **The molars at the back**

   Molars are wide and bumpy. They grind food.

   - **If you chose A:** Incisors cut and bite. The wide back teeth do the grinding.
   - **If you chose B:** Canines grip and tear. They are not wide enough to grind.

3. **Acid**

   Germs feed on sugar and make acid. The acid makes holes in the tooth.

   - **If you chose B:** Germs make acid. Water does not make holes in teeth.
   - **If you chose C:** Germs do not make teeth. They make acid, and acid makes holes.

4. **120 seconds, which is 2 minutes**

   Four times 30 is 120 seconds. There are 60 seconds in a minute, so this is 2 minutes.

5. **The muscle at the back of the upper arm**

   The triceps pulls to straighten the arm. The biceps pulls to bend it.

   - **If you chose A:** The front muscle bends the arm. It goes soft when the arm straightens. Go to S2.3.3.
   - **If you chose C:** A tendon is a cord that joins a muscle to a bone. It does not pull by itself. Go to S2.3.3.

6. **Chew one end until it is soft. Rub all sides of every tooth. Use a fresh end each day.**

   The soft end works like a brush. It takes away the sticky layer where germs live.

7. **A chewing stick, chewed soft at one end**

   The soft end works like a brush. Rub every side of every tooth. Use a fresh end each day.

   - **If you chose B:** A soft chewing stick works like a brush. It takes the sticky layer away.
   - **If you chose C:** A sharp stick can hurt your gums. Chew one end soft, then rub your teeth with it.

8. **Clean them too. They keep the space for adult teeth.**

   Milk teeth can decay and hurt. A milk tooth lost too soon leaves the next tooth less room.

   - **If you chose A:** Milk teeth keep the space for adult teeth. A bad milk tooth also hurts.
   - **If you chose B:** Germs live on every tooth. Milk teeth can decay too.
   - **If you chose C:** Germs live on every tooth, including the back ones.

S2.3.5. Food groups

1. **Cassava**

   Cassava is a root full of starch. Starch gives you energy.

   - **If you chose A:** Fish is rich in protein. Starch comes from foods such as cassava, rice and yam.
   - **If you chose B:** Oil is rich in fat. Starch comes from foods such as cassava, rice and yam.
   - **If you chose C:** Spinach is a green leaf. It is rich in vitamins and minerals.

2. **Lentils**

   Lentils are rich in protein. Protein does not come only from meat.

   - **If you chose A:** Rice is mostly starch. Lentils, beans and groundnuts are the protein foods.
   - **If you chose B:** Oil is fat, not protein. Lentils, beans and groundnuts are the protein foods.

3. **Protein**

   Protein helps the body grow and mend. Beans, fish and eggs are rich in it.

   - **If you chose A:** Starch gives you energy. It is not the group that helps you grow and mend.
   - **If you chose C:** Fat stores energy. It is not the group that helps you grow and mend.

4. **Some foods belong to two groups.**

   A food can give more than one thing. Groundnuts give protein and fat. Milk gives protein, vitamins and minerals.

   - **If you chose B:** They were not sorted wrongly. A food can give more than one thing.
   - **If you chose C:** They are not the same. Fat stores energy. Protein helps you grow and mend.

5. **Cassava: starch. Groundnut oil: fat. Fish: protein. Spinach: vitamins and minerals.**

   Cassava is full of starch. Oil is fat. Fish gives protein. Green leaves such as spinach give vitamins and minerals.

6. **Molars**

   Molars are wide teeth at the back. They grind food small.

   - **If you chose A:** Incisors are at the front. They cut and bite. They do not grind. Go to S2.3.4.
   - **If you chose B:** Canines are pointed. They grip and tear food. Molars do the grinding. Go to S2.3.4.

7. **Each group does a job. Fat stores energy, and the body needs some.**

   No group is bad. Each has its own job. The body needs a little fat too.

   - **If you chose A:** No food group is bad. Each one does a job, and the body needs some of each.
   - **If you chose C:** The body needs every group. Starch, protein, vitamins and minerals do other jobs.

8. **Rice, maize and yam**

   Rice, maize and yam are all rich in starch. Starch gives you energy.

   - **If you chose A:** Only rice is rich in starch. Fish is rich in protein and oil is fat.
   - **If you chose B:** These are rich in protein. Starch foods are rice, maize, cassava and yam.
   - **If you chose C:** These are rich in fat. Starch foods are rice, maize, cassava and yam.

S2.3.6. A balanced diet

1. **Some of every food group each day**

   Each food group does a job. A balanced diet has some of every group.

   - **If you chose A:** A balanced diet has every group, even foods you like less. Each group does a job. Go to S2.3.5.
   - **If you chose B:** Starch gives energy. You also need protein, vitamins, minerals and a little fat. Go to S2.3.5.

2. **Maize, beans, greens, a little oil and clean water**

   Maize gives starch, beans give protein and greens give vitamins and minerals. Oil gives fat. Clean water is there too.

   - **If you chose A:** This day is all starch. It has no protein, vegetables or fruit.
   - **If you chose C:** This day has protein and fat, but little starch for energy. It has no vegetables or fruit.

3. **Beans**

   Beans have fibre. Fibre helps food move through your gut.

   - **If you chose A:** Oil is fat. It has no fibre. Fibre is in plant foods such as beans and fruit.
   - **If you chose B:** White sugar has no fibre. Fibre is in plant foods such as beans and fruit.
   - **If you chose C:** Fish has no fibre. Fibre is in plant foods such as beans and fruit.

4. **Water a grown up boiled hard for one minute, then cooled**

   Boiling kills the germs in water. Cooled with a lid on, it is safe to drink.

   - **If you chose B:** Muddy water is full of dirt and germs. It is not safe.
   - **If you chose C:** Clear water can still hold germs. You cannot see them.

5. **Acid**

   Germs on teeth feed on sugar and make acid. The acid makes holes in the hard outside of the tooth.

   - **If you chose A:** No new tooth grows. The germs make acid, and acid eats the tooth. Go to S2.3.4.
   - **If you chose C:** Germs feed on sugar. That is why sweet food left on teeth causes decay. Go to S2.3.4.

6. **For example: maize porridge is starch. Beans are protein. Greens give vitamins and minerals. A little oil is fat.**

   A good meal has foods from more than one group. Check each group, and add a food if one is missing.

7. **The body needs clean water all day, even when you eat well.**

   Your body loses water all day. Food does not give enough, so drink clean water.

   - **If you chose A:** Food has some water, but not enough. Your body needs clean water all day.
   - **If you chose B:** Your body uses water all day, not only in the heat.

8. **She can choose foods that grow near her, from every group.**

   Foods from near home can fill every group. Beans, greens and maize are one example.

   - **If you chose A:** Beans, greens and maize or rice grow in many places. Near home foods can fill every group.
   - **If you chose B:** Starch gives energy. Her body also needs protein, vitamins, minerals and a little fat.
   - **If you chose C:** Fruit has vitamins and minerals. A day of only fruit has little starch or protein.

S2.3.7. Exercise and rest

1. **Your heart sends more blood to your hard working muscles.**

   Working muscles need more blood. The heart beats faster to send it.

   - **If you chose A:** A heart that beats faster is not weaker. It is working harder to send more blood.
   - **If you chose C:** Warm air is not the reason. Your muscles need more blood to work hard.

2. **88**

   15 seconds fits 4 times into one minute. So 22 × 4 = 88 beats.

   - **If you chose A:** That is the count for 15 seconds. A minute is four times as long.
   - **If you chose B:** You added 15. To get one minute, multiply by 4.
   - **If you chose C:** You multiplied by 15. Fifteen seconds fits 4 times into a minute, so multiply by 4.

3. **24**

   A minute is four times 15 seconds. So 96 ÷ 4 = 24.

4. **Running and jumping games**

   Exercise that carries your weight makes bones stronger.

   - **If you chose A:** Bones are alive. Like muscles, they get stronger when you use them.
   - **If you chose B:** Bones are alive. They grow stronger when they carry your weight as you move.

5. **While you rest and sleep**

   Hard work tires muscles. They mend and grow while you rest and sleep.

   - **If you chose A:** Running tires muscles. They mend and grow afterwards, in rest.
   - **If you chose B:** Muscles do change. They grow stronger with use and rest.
   - **If you chose C:** Food helps the body. Muscles mend and grow while you rest and sleep.

6. **The thigh bone**

   Your thigh has one bone. It is the longest bone in your body.

   - **If you chose B:** The backbone is a stack of small bones, not one long bone. Go to S2.3.1.
   - **If you chose C:** Ribs are short curved bones round the chest. Go to S2.3.1.

7. **Stop and rest, and tell a grown up.**

   Never exercise through chest pain. Stop, rest and tell a grown up.

   - **If you chose A:** Pain is a warning. Exercise should not hurt your chest. Stop at once.
   - **If you chose B:** Water does not fix chest pain. Stop at once and tell a grown up.
   - **If you chose C:** Chest pain needs a stop at once. Tell a grown up now.

8. **Lay two fingers on the inside of her wrist.**

   Use two fingers. Lay them on the inside of the wrist, on the thumb side.

   - **If you chose A:** The thumb has a beat of its own. Use two fingers.
   - **If you chose B:** Press only a little. A hard press can hide the beat.
   - **If you chose D:** The pulse is on the inside of the wrist. Use the thumb side.

S2.3.8. Keeping food safe

1. **Germs stick to its feet, then rub off on food.**

   A fly lands on dung or rubbish. Germs stick to its feet. Then it lands on food.

   - **If you chose B:** Flies do not make germs. They carry germs on their feet from dirty places.
   - **If you chose C:** A fly does not need to bite. Germs rub off its feet when it lands.

2. **Before you eat or cook, and after the toilet**

   Germs on your hands can get into food and into your mouth. Soap and water wash them away.

   - **If you chose A:** Germs are too small to see. Clean looking hands can still carry them.
   - **If you chose B:** Germs on your hands go into your mouth as you eat. Wash before you eat, too.
   - **If you chose C:** Germs are on hands every day. Wash before you eat or cook.

3. **A lid or a clean cloth over it**

   A cover stops flies from landing on the food. So germs cannot rub off on it.

   - **If you chose A:** Open food lets flies land on it. Cover it, and keep it cool another way.
   - **If you chose C:** The floor has dirt and germs. Keep food covered and off the floor.

4. **A pot in a pot, with wet sand and a wet cloth**

   The water dries from the sand and cloth. That makes the pots, and the food, cooler.

   - **If you chose A:** Heat helps germs grow fast. Keep food in the shade.
   - **If you chose B:** That keeps food warm. Germs grow fast in warm food.
   - **If you chose C:** An open pot lets flies land on the food. Keep it covered and cool.

5. **They are killed.**

   A hard boil kills the germs in water. Let it cool with a lid on before you drink it.

   - **If you chose B:** Germs grow fast in warm food. A hard boil is hot enough to kill them. Go to S2.3.6.
   - **If you chose C:** Boiling kills the germs. That is why boiled, cooled water is safe to drink. Go to S2.3.6.

6. **Keep it covered. Wash hands with soap and water. Keep it cool, or heat it until very hot all through.**

   Covers stop flies. Clean hands stop germs. Cool food slows germs, and a hard heat kills them.

7. **Not for sure. It was left out, and germs cannot be seen or smelled.**

   Germs grow fast in warm food. They are too small to see, and many have no smell.

   - **If you chose A:** Many germs have no smell. Food can smell fine and still make you ill.
   - **If you chose B:** Germs grow in a few hours in warm food. Food cooked today can be unsafe.
   - **If you chose C:** Rice kept cool, or heated until very hot, is fine to eat.

8. **Wash the board and his hands with soap and water.**

   Raw fish can carry germs. Washing stops them reaching food you eat as it is.

   - **If you chose B:** A dry wipe leaves germs on the board. Wash it with soap and water.
   - **If you chose C:** Germs from the raw fish can rub onto the bread. The bread is eaten as it is.
   - **If you chose D:** Many germs have no smell. Wash the board to make it safe.

About this book

For learners who can read short sentences and point to their elbow, knee and jaw. In many schools this fits children of about 8 to 10, and older learners can use it too. Activities use their own body, foods from home, an eggshell, vinegar and string. Nothing from an activity is ever eaten or tasted. A learner can work alone: every exercise has its answer and the reason for it.

Written and drawn by attnom. Edition 1.0, 2026-11-09.

This book is free. You may read it, print it, copy it and share it with anyone.

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