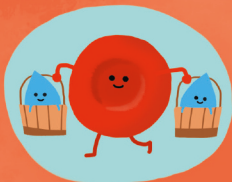
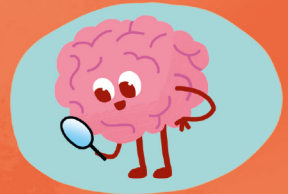




Tell me about...

HUMAN BODY



**A FIRST
SCIENCE book
for curious
minds!**

*Written by Emily Dodd
Illustrated by Chorkung*

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HUMAN BODY

A TEMPLAR BOOK

First published in the UK in 2023 by Templar Books,
an imprint of Bonnier Books UK
4th Floor, Victoria House,
Bloomsbury Square, London WC1B 4DA
Owned by Bonnier Books
Sveavägen 56, Stockholm, Sweden
www.bonnierbooks.co.uk

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Illustration copyright © 2023 by Chorkung
Design copyright © 2023 by Templar Books

1 3 5 7 9 10 8 6 4 2

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ISBN 978-1-XXXX-XXXX-X

This book was typeset in Catalina Demaine
The illustrations were created digitally

Edited by Ruth Symons
Designed by Nathalie Eyraud
Production Controller Ella Holden
Printed in China



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Brilliant Body

So many amazing things are happening in your body right now! Let's take a look at just a few of them...

As you breathe, spongy bags called lungs are sucking air in and putting it into your blood.



Tiny electrical signals are making your heart beat – bu-bum bu-bum – to pump blood around your body.

When you think or laugh or wiggle your toes, you use energy. The energy comes from the food you eat. The food goes into your blood and all around your body.



Your body is made from lots of different parts that work together to do important jobs. These parts are called organs.



If you look at the pictures in this book, you're using organs called eyes. And when you think about all of this, you use an organ called the brain.



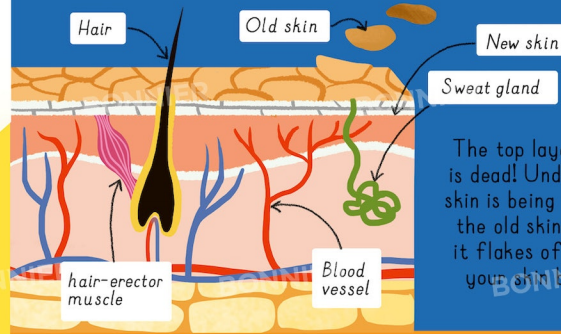
The Skin

Let's begin our body tour with your skin. This stretchy waterproof layer wraps around your body keeping germs out and keeping your insides... inside!

Your skin is full of sensors that help you to touch and feel things. You can feel pain and warmth and the tiny footsteps of an insect crawling on your arm.

Did you know...?
The skin is the biggest organ in the body!

Touch sensors help you to feel how hard to press when you lift and hold objects - so you don't drop or squash them.



The top layer of your skin is dead! Underneath it, new skin is being made. It pushes the old skin upwards until it flakes off as dust. Yes, your skin becomes dust!



Your hair and nails are made from the same stuff as skin. It's called keratin.

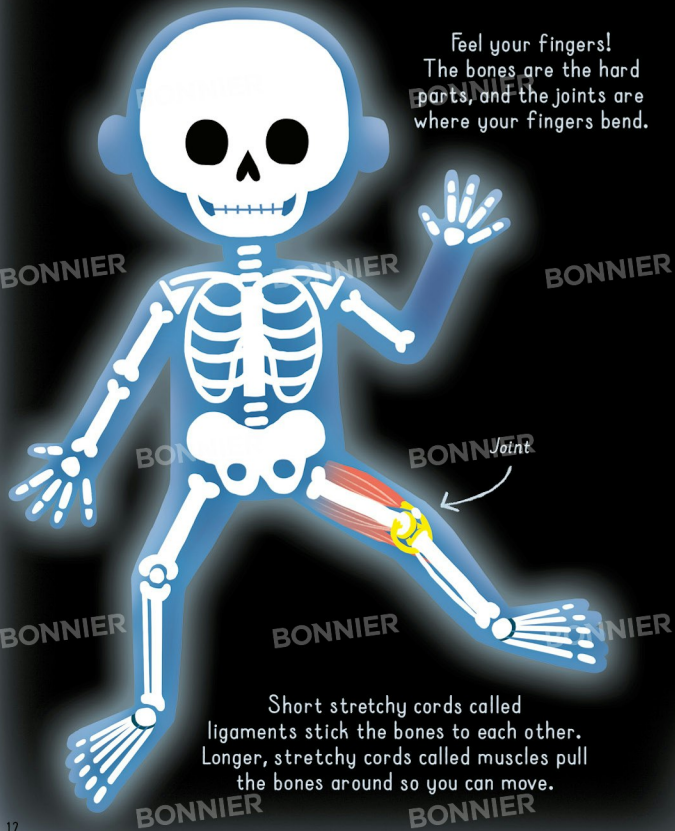


Your skin cools your body too. One way it does this is by making little drops of liquid called sweat.

When sweat drops are warmed by a hot body, they float off into the air taking heat away with them!

Skeleton

The thing that gives your body its wonderful shape and height is a skeleton. It is made from 206 bones that join together at hinges called joints.



Strong bendy pieces called cartilage make up some parts of the skeleton including your ears, your nose and sections of your ribs.

The skeleton protects your insides too. Your ribs make a cage around your lungs and heart and your skull is like a helmet, protecting your brain.



Inside your biggest bones is a juice called marrow. New blood is being made in the marrow. That's right, your bones can make blood!

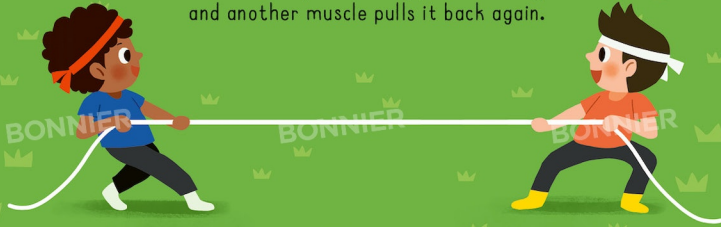


Bones are full of tiny holes that make them light. But the pattern of the holes makes them really strong too.

Muscles

Muscles are stretchy cords that pull body parts to make them move. If you wiggle your eyebrows and stick out your tongue, you did it using muscles!

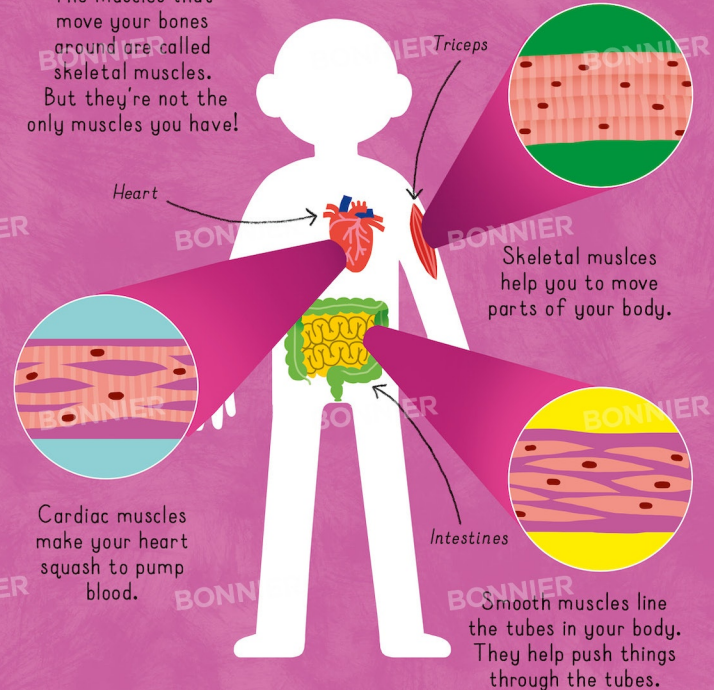
Muscles can pull, but they can't push so they need to work in teams. One muscle pulls a body part one way, and another muscle pulls it back again.



1. Bend your arm. The set of muscles at the front of your arm, called triceps, pulled it up by getting shorter.

2. Now straighten your arm. Another set of muscles at the back of your arm, called biceps, pulled your arm down to straighten it.

The muscles that move your bones around are called skeletal muscles. But they're not the only muscles you have!



Did you know...? Muscles help you hold in pee until you're ready to let it go.



Brilliant Brain

The brain controls your whole body, including your muscles. It looks like a squishy cauliflower and it's floating in a liquid inside your head. Your brain collects information from inside and around your body. Feelings, thinking and remembering happen here too.

This map shows what some of the thinking parts of the brain do:



Your brain does lots of important jobs all by itself, like making your heart beat and making you breathe, even while you're fast asleep!

But you can control your brain too. Try breathing more slowly now.



You slowed down your breathing by moving the muscles in your chest more slowly. You took over one of your brain's background jobs.



Tonight, when you sleep, your brain will be working on another background job, storing important information as memories. It deletes things that aren't important too, like what you ate for dinner six days ago. But you can't remember that?



Thinking

The top layer of your brain is made of tiny parts called neurons. They're smaller than a full stop and they're the shape of a tree in winter.

Neurons carry the electrical signals that make your thoughts.

That's right, thoughts are electricity – thinking is made of the same stuff as lightning!

When you learn something new and interesting, the tree-like neurons grow new branches. It might be happening in your brain right now!

1: Your thoughts travel up the trunk and along the branches.

2: Then they jump to the next neuron – a bit like a squirrel jumping between trees.

Thoughts follow a path through the neuron forest. They travel along a mix of old branches and new branches.

Only a small part of your brain is made from neurons. The rest is made of 'helping parts' that feed your brain and kill germs. The helping parts make a barrier to stop the electricity from leaking out, too.

Nervous System

The brain is connected to the rest of the body by wires called nerves. There's one big cable called the spinal cord and nerves connect into it from all over the body. Along with the brain, this connected group is called the nervous system.

Electrical signals come in from body parts to your brain and your brain makes sense of them.

The brain then sends signals back to the rest of the body to make things happen.

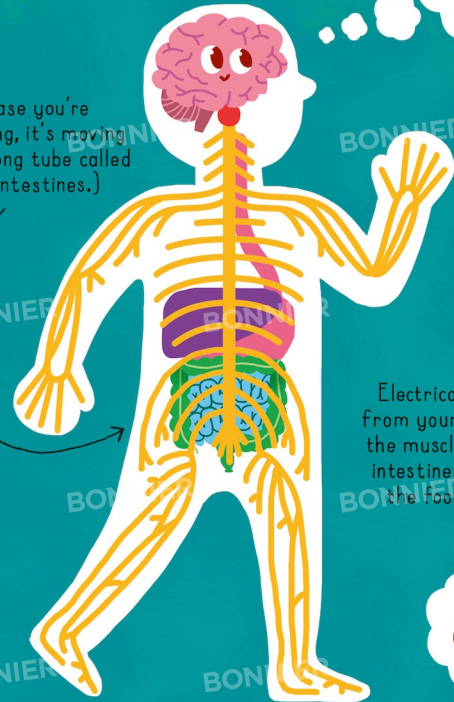


You might not be thinking about food right now, but your brain is receiving signals to tell it exactly where the food you ate yesterday is.

(In case you're wondering, it's moving along a long tube called your intestines.)

Electrical signals from your brain tell the muscles in your intestines to push the food along.

You won't know they're doing it, until the leftover waste reaches your bottom and a muscle alerts your brain to make you think: "I need a pool!"



Eyes

You use them to see, but what are the eyes?
Eyes are movable balls full of liquid, with windows at the front to let light in.

1. Light bounces

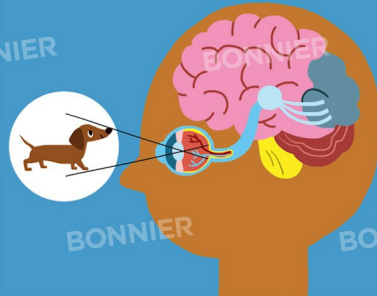
Light bounces off objects and into your eyes.



When brown light bounces off a dog, you see it looking brown.

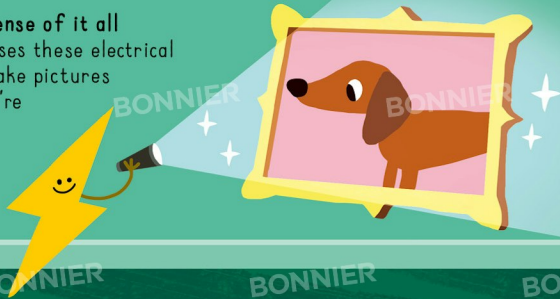
2. Collecting light

Your eyes collect information about colour and brightness and send it to your brain as electricity.



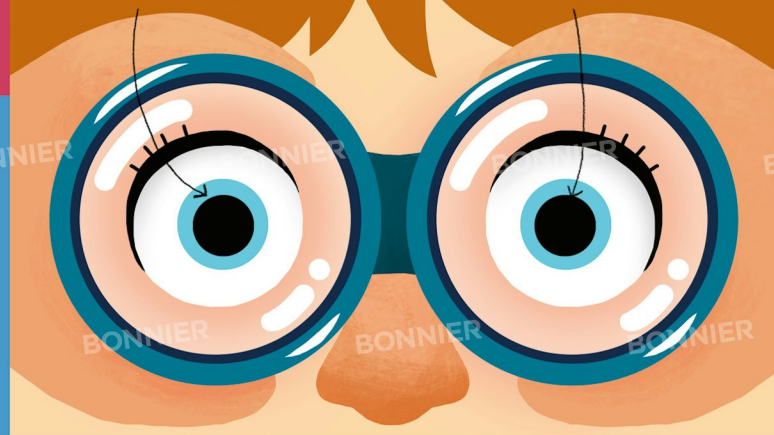
3. Making sense of it all

Your brain uses these electrical signals to make pictures of what you're looking at.



This is the iris.
It's the coloured part of the eye.

The black circle in the centre of the iris is a hole called the pupil.



Your brain checks how bright it is and it sends signals to your iris muscles to change the pupil size. That way, just the right amount of light comes in to see.

Behind the pupil is a see-through disc called a lens. Muscles change the lens shape, depending on if the objects you look at are nearby or far away.

The shape of the lens changes, so the things you look at are always clear instead of blurred.



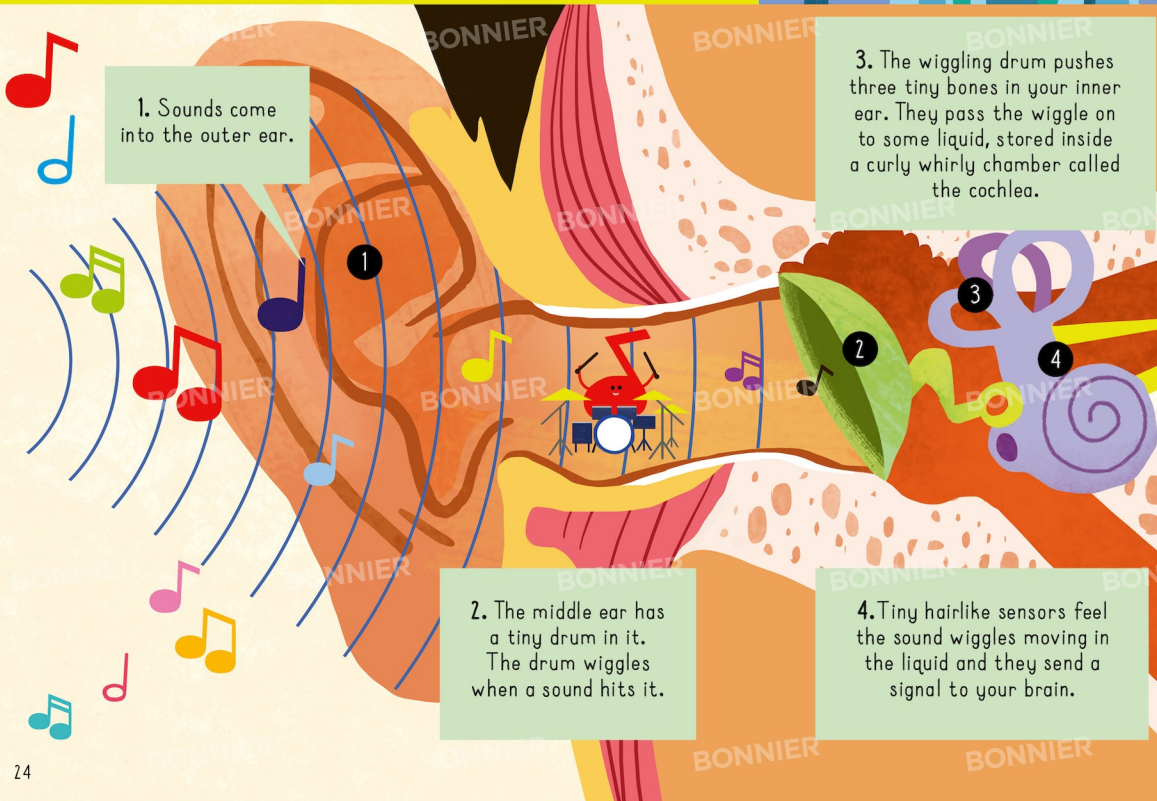
Ears

Your ears are cup-shaped to catch sound. The cups are the outer ear. But there's even more ear hidden inside your head! The outer ear is connected to the middle ear. And that's connected to a part called the inner ear.

Ears also help us to balance. The liquid in the cochlea moves as your body moves, and sends signals to the brain.



Did you know...?
Your brain has a stored library of sound memories so you know what sounds are and what they mean. That's how you can understand when people speak!



1. Sounds come into the outer ear.

3. The wiggling drum pushes three tiny bones in your inner ear. They pass the wiggle on to some liquid, stored inside a curly whirly chamber called the cochlea.

2. The middle ear has a tiny drum in it. The drum wiggles when a sound hits it.

4. Tiny hairlike sensors feel the sound wiggles moving in the liquid and they send a signal to your brain.



Mouth & Nose

Your mouth and nose work together to taste. Next time you eat something, try holding your nose shut and you'll notice what a big difference your nose makes!

Your food mixes with spit and it touches bumpy sensors in your tongue. These are called taste buds and they can detect five tastes.



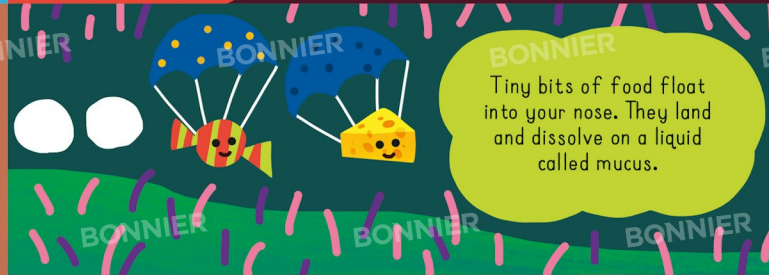
When you eat, your teeth chop and mash the food up.

Incisors
Incisors cut and slice.

Canines
Pointy canine teeth grip and tear food.

Molars
Molars grind food up.

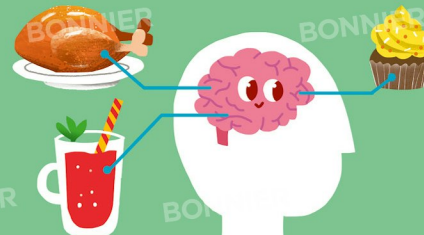
A coating called enamel keeps your teeth strong and protected.



Sensors inside your nose detect the dissolved food smell and they send signals to your brain.



Your brain combines information from your nose and mouth to recognise thousands of different flavours!



Digestive System

Food powers everything you do – it gives you energy to think, move, grow and repair your body. Meals take a two-day journey from your mouth... to your bum!

1: Eating

Your teeth chew, slice and crush food. Your cheeks add spit and your tongue mixes everything together.

Spit starts to break food down.



3: Stomach

Juices are added to dissolve food. Muscles churn it up.



2: Swallowing

Food travels down your food pipe to your stomach.



4: Small Intestines

Mushy food juice travels through a long tube called the small intestines. The goodness seeps through the tube walls and into your blood.



5: Blood

The goodness from food travels in your blood as a type of sugar. Spare sugar gets stored in your muscles and liver so your body can keep going even in between meals.



6: Large intestines

Muscles push leftover food waste along and into poo shapes. It leaves your body as poo!

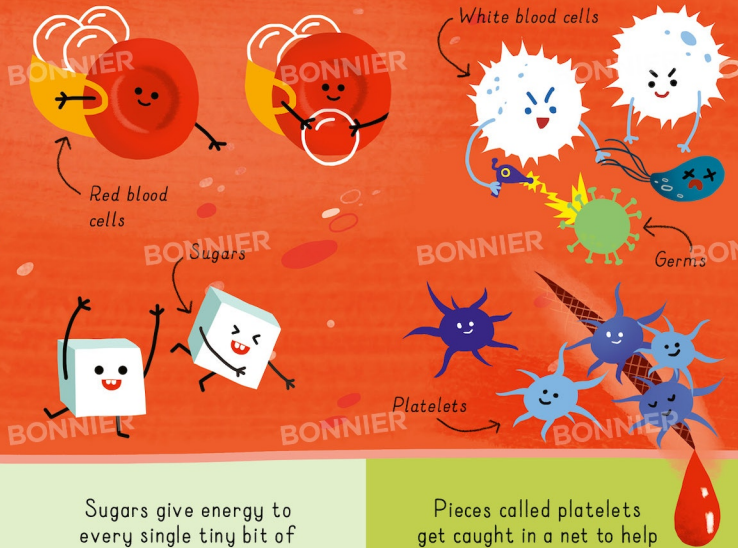


Blood

Blood is mostly made of water. But floating inside it are all kinds of important things, including energy to power your body, a defence army to fight germs and tiny donut shapes that carry gases.

Red blood cells pick up gases and drop them off where they're needed.

White blood cells fight germs by gobbling them up or squirting killer chemicals at them.



Sugars give energy to every single tiny bit of your body.

Pieces called platelets get caught in a net to help make a scab when you get a cut.

Your brain checks salt levels to work out how much water you should wee out.

Salt feeds the nerves.

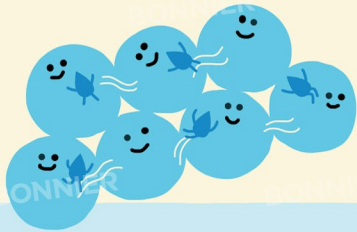


Juices called hormones float in your blood to carry messages to body parts. They tell us important things like when to grow.

Hormones make lots of other things happen including helping us to feel sleepy at night.

Water

Your body is two thirds water! Most of it's hidden in and around tiny bubbles called cells. But there's also water in your blood and surrounding your brain and spine.



Cells stick together to make all of your body parts. Water moves between cells, too.

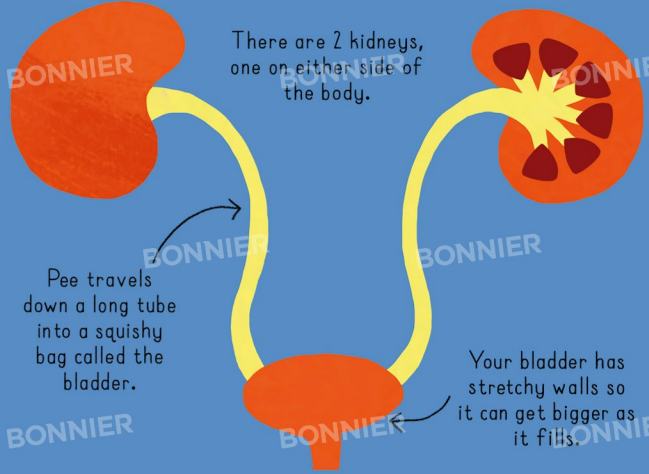
When you drink, water travels through the digestive system and into your blood. The blood carries this water around your body.



Kidneys are organs that clean blood. They take old blood cells and waste chemicals out – and they mix all of that with water to make pee.

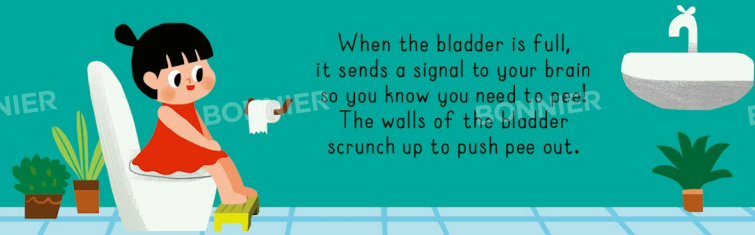


There are 2 kidneys, one on either side of the body.



Pee travels down a long tube into a squishy bag called the bladder.

Your bladder has stretchy walls so it can get bigger as it fills.



When the bladder is full, it sends a signal to your brain so you know you need to pee! The walls of the bladder scrunch up to push pee out.

You lose water when you pee, when you sweat, and even when you breathe because it floats out of your lungs.

Drinking every day replaces the water you lose!

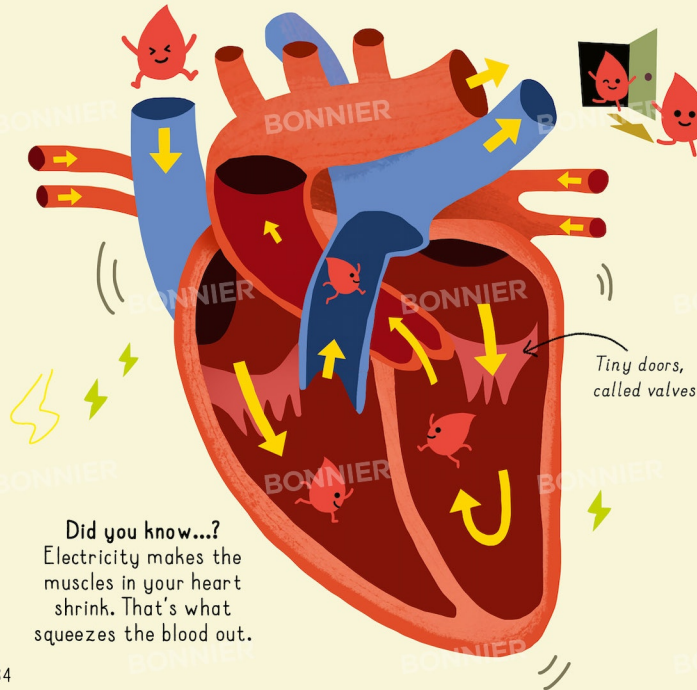


Pumping Blood

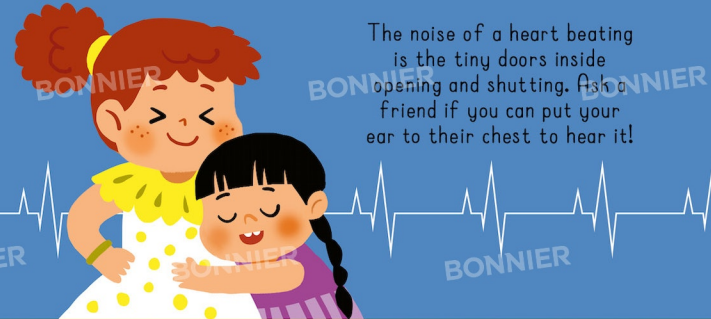
Your heart is a muscle the size of your fist. It squeezes 90 times every minute to pump blood around your body.

Spaces inside the heart fill up with blood with every heartbeat.

Tiny doors between the spaces open to let blood through. They only open in one direction, so the blood has to keep moving forwards.

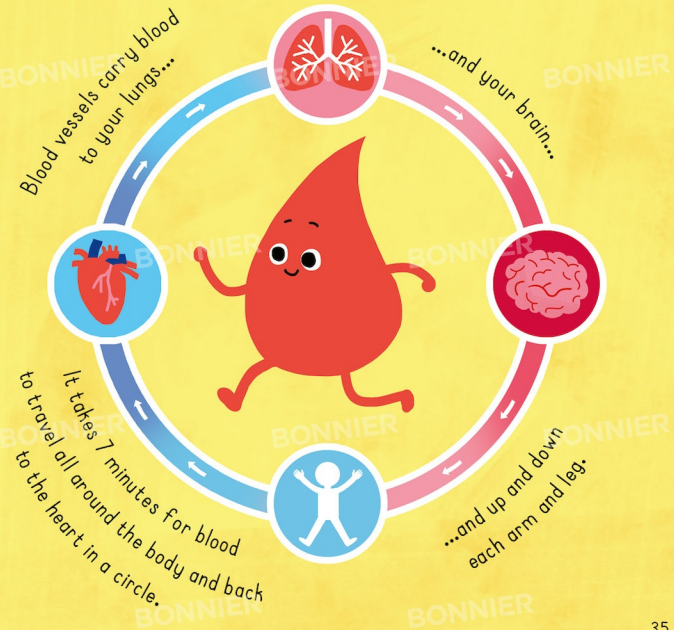


Did you know...?
Electricity makes the muscles in your heart shrink. That's what squeezes the blood out.



The noise of a heart beating is the tiny doors inside opening and shutting. Ask a friend if you can put your ear to their chest to hear it!

Blood travels in tubes called blood vessels.

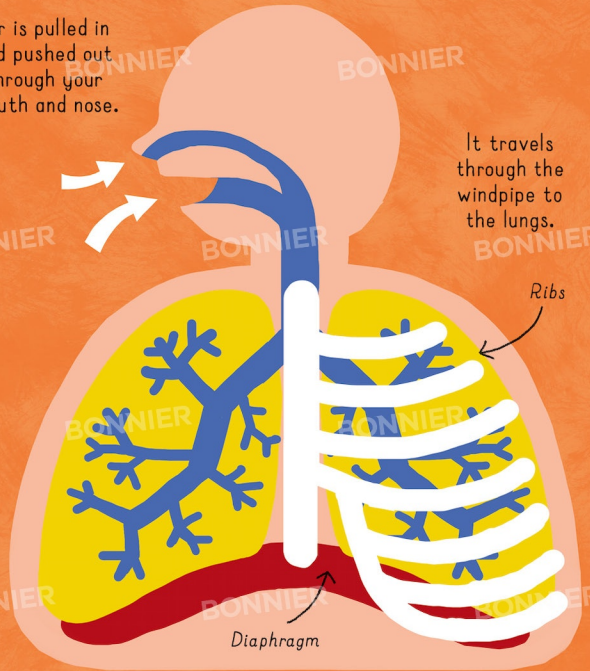


Lungs & Breathing

Inside your chest are two big spongy bags called lungs. They are filled with tiny tubes that take part of the air, a gas called oxygen, into your blood!

Air is pulled in and pushed out through your mouth and nose.

It travels through the windpipe to the lungs.

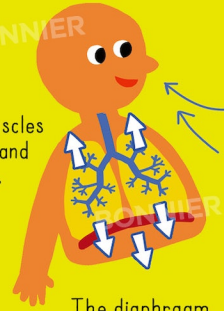


A big muscle called the diaphragm moves the lungs so they inflate and deflate.

Muscles between the rib bones lift the ribs up and down.

1. Breathing in

Rib muscles shrink and pull up.

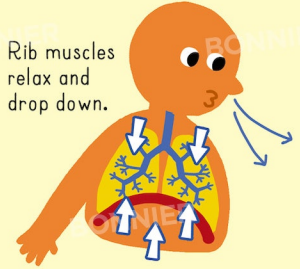


The diaphragm bends and pulls down.

The lungs get bigger and inflate.

2. Breathing out

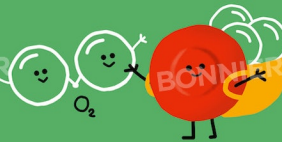
Rib muscles relax and drop down.



The diaphragm relaxes and lifts up.

The lungs get smaller and deflate.

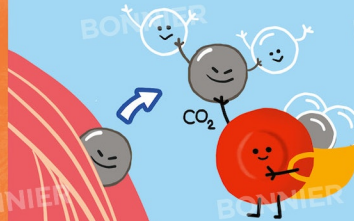
1. Lungs put oxygen gas from the air into your blood.



2. Blood carries oxygen gas to your muscles so they can move.



3. Blood carries away a waste gas called carbon dioxide.

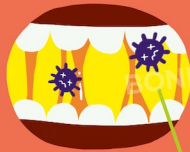


4. Lungs take carbon dioxide out of your blood and you breathe it out.



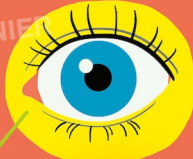
Immune System

Your body tries to stop germs from coming in. If germs do get in, your body fights them. Here are some of the ways your body stops germs...



Mouth
Spit kills some germs.

Eyes
Eyelashes stop things falling in. Eyelids clean eyes when you blink.



Stomach
Acid kills some germs in food.



Nose
Hairs and snot catch floating germs.

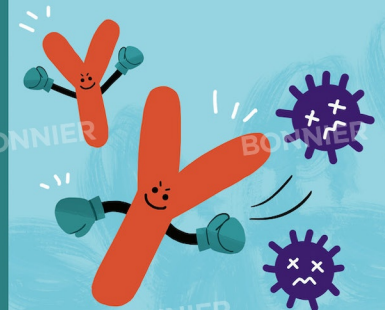
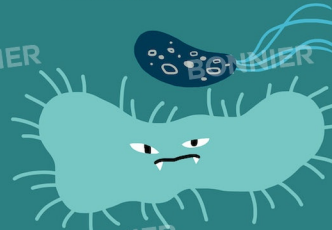


Skin
Skin acts as a barrier to stop germs. Sweat kills some germs.

Blood
An army of white blood cells kill germs by gobbling them up or squirting killer chemicals at them. Blood seals up cuts with a scab.



Germs
Bad bacteria and viruses multiply and make you feel unwell.



Antibodies
Blood makes Y shapes called antibodies to fight germs. Then, when those germs come again, the antibodies are ready to kill them.



Good bacteria live in your tummy too – they help to break food down. These are different to bad bacteria, which cause sickness.



Doctors give us medicine if our bodies need help to fight sickness.



Feelings

Your brain releases chemicals when you exercise. The same chemicals float into your blood when you laugh, or hug someone you love, or stroke a pet. These chemicals make us feel happy.

One friend might feel happy when they see a dog and another might feel scared – that's because feelings are different for everyone. They change depending on what happens to us and what personality we have, too.

Happy is just one of the many feelings humans have. You might feel sad, angry or scared.



When you feel scared, chemicals float into your blood to make your heart beat faster.



Your tummy stops digesting food so you have more energy to run.

More blood travels to your arms and legs to help you run away or fight.

Empathy is connecting to how others are feeling, even though it might be very different to how you feel.



Are you feeling scared?

Yes...

If you use words to show others you understand what their feelings are, it helps them to feel less alone.



Helping Your Body

Your body is an amazing machine that helps you do so much. But how can you help your body?

Regular exercise keeps your body healthy right now and for years to come!

You need exercise that makes you out of breath – things like running, jumping and sports.

You also need exercise that helps your legs and arms stretch – like climbing, swinging and walking.

Exercise strengthens your bones, muscles, heart and lungs. You get used to being active, so exercise becomes easier.

Eating a mix of different kinds of food including fruit and vegetables really helps your body to work well, grow strong and repair.

These things help you to feel good and feeling good helps your body stay healthy:



Creating things

Learning new skills



Playing and connecting with others

Expressing your feelings



After you've done all that you might need a sleep! Your body repairs itself when you're sleeping and your brain works much better after a good sleep, too. Goodnight!



Glossary

Bacteria

A living thing is made from one cell. It can copy itself and multiply. Some bacteria are helpful to the body. Other bacteria are harmful.

Blood

A red liquid that carries important things to all the different parts of your body. It carries water, air, food, signals and a defence army of cells.

Brain

The organ that controls the whole body. It sits inside your head and is where thinking happens.

Cell

The smallest living part of your body. Cells join together to make each organ and body part.

Chemical

A name for a solid or liquid that can be made from one thing or several things mixed together. Water is a chemical. So is salt.

Germ

A tiny thing that is so small you can't see it. It can make you very ill if it multiplies in your body. Germs include bacteria and viruses.

Hormones

Hormones are chemicals that travel through the blood to send signals to parts of the body – to tell them to stop or start doing something.

Lungs

Two spongy bags in the chest that fill with air when you breathe

Muscles

Stretchy chords that shrink to move parts of your body. They work in teams.

Nerves

Cells that carry signals between the brain and the body to make things happen.

Organ

Part of the body with an important job to do, for example the heart or the muscles.

Sensor

Something that collects information. For example a sensor could detect movement, heat or light.

Signal

A traffic light is a signal that tells cars to move or stop. Chemicals and electricity send signals to parts of the body to say stop or move, too.

Skeleton

The movable set of bones that join together to give your body its solid shape and height. Your skull is also part of your skeleton.

Virus

A virus is like a bacteria but much smaller and not alive. Viruses live inside other living things and they make them unwell.

