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Introduction

The human body is amazing! Did you know you wake up each morning taller than when you went to bed? Or that your brain makes food taste better when you are hungry? Have you ever wondered what causes you to hiccup? Or just how much blood is in your body? Find out in this book!

Along with amazing facts, you'll learn how the different systems in your body work and how those systems work together to keep you alive and healthy.

There are lots of fun projects to try, too. Make “blood” in a jar and create a working model of your hand! Check out your own fingerprints and engineer a heart valve!

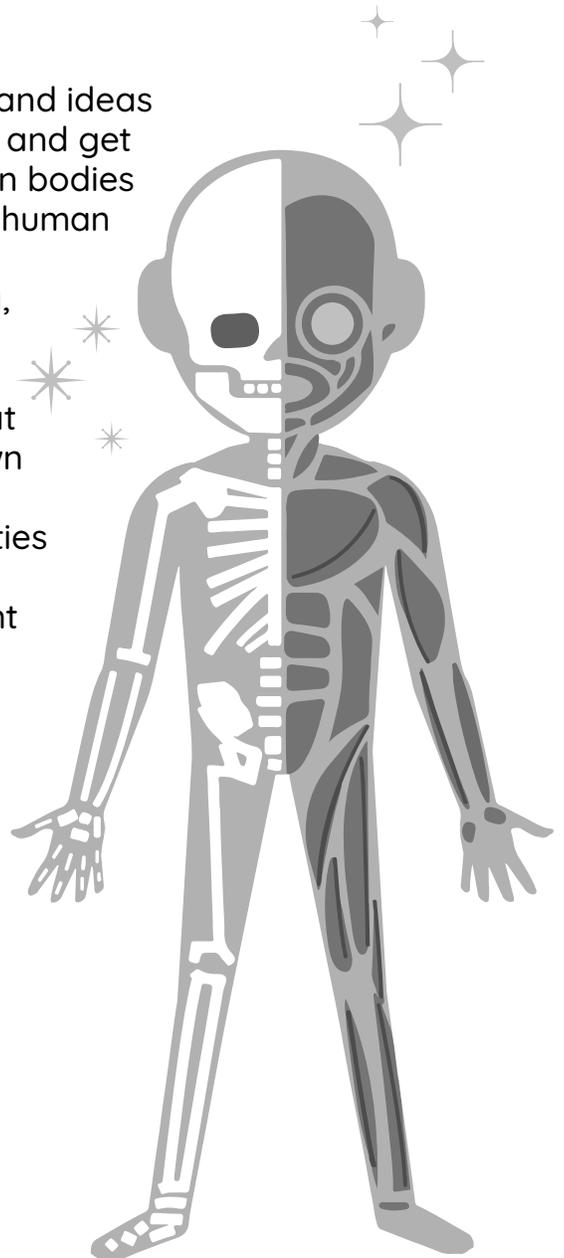
Get ready to learn all about your awesome, surprising, extraordinary body!

For parents and educators:

This fun and engaging book is filled with activities and ideas to stretch kids' thinking, expand their vocabularies, and get them engaged in learning. The focus is on their own bodies and how they work, with a good helping of amazing human body facts for them to learn along the way. Kids will interact with each page of the book by reading, writing, drawing, coloring, and more. There are also plenty of hands-on, minds-on activities and projects to try using common materials you have at home. Whether they are closely examining their own skin, experiencing optical illusions, or seeing how flexible they can be, kids will have many opportunities to discover the amazing workings of their bodies. Read and play along with your child—you just might learn something new!

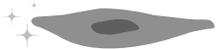
TRY THIS!

This book uses a lot of grays, which do not always reproduce well. If you plan to duplicate pages on a photocopier, try using the machine's "Photo" setting to decrease the chance of some elements on the page copying too lightly.



How Does It All Work?

This is a muscle cell.



A **cell** is the smallest living part of you.

A group of the same kind of cell is called **tissue**.

This is muscle tissue.



This organ is a heart.



Different kinds of tissues work together in **organs**.

It has muscle tissue, connective tissue, and nerve tissue.

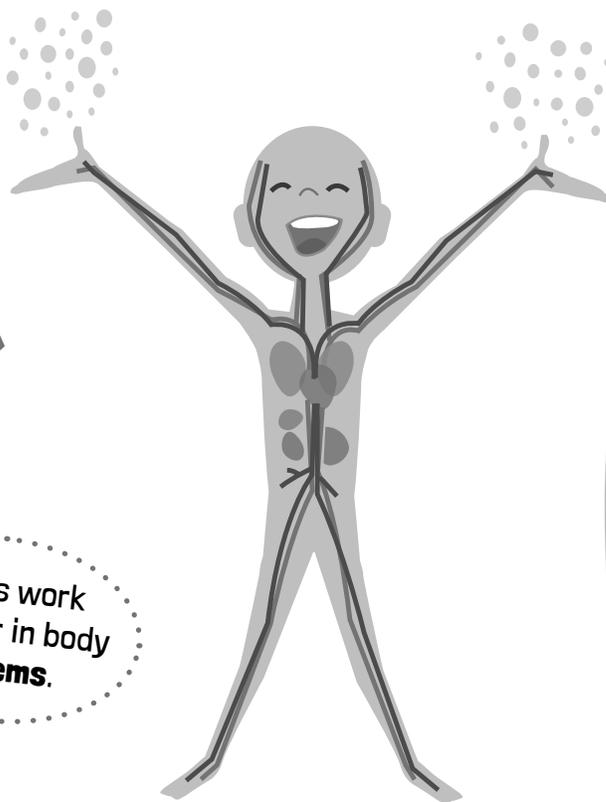
WOW!
Your heart beats about **100,000** times a day!

TRY THIS!

Make a fist. That is about the size of your heart!



The heart is part of the circulatory system.



Organs work together in **body systems**.

This system moves blood around your body.

Protect Your Brain!

If you get hit in the head, or if you fall and bang your head, your hard skull takes the hit, keeping your soft brain safe inside. But your skull doesn't work alone. Your brain is surrounded by a **fluid** inside your skull. This clear liquid also surrounds your spinal cord.

Directions: Try this activity to see how the fluid helps to protect your brain.



Egg-speriment

Materials

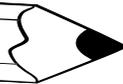
- 2 raw, uncracked eggs
- water
- 2 clear plastic containers with lids

Directions

1. Put an egg in each container. The eggs will be the brains and the containers will be the skulls.
2. Fill one of the containers with water all the way to the top. The water will represent the fluid surrounding your brain.
3. Put the lids on both containers. Check that they are closed tightly.
4. Hold one container in each hand, and shake those brains!
5. Set the containers down and observe them.



Draw what happened to the eggs.



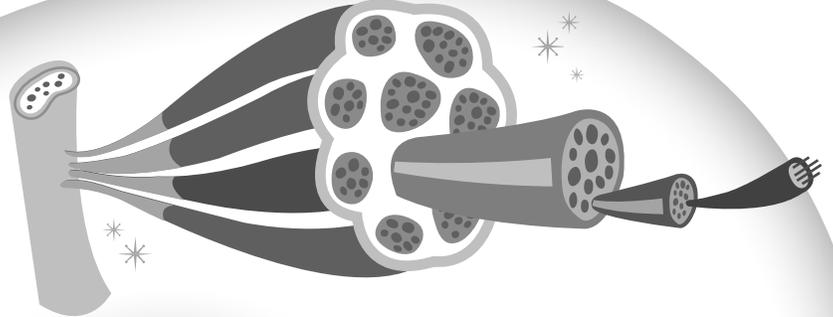
Why do you think this happened?

Did the fluid make a difference? yes no

If yes, how? _____

600 Muscles

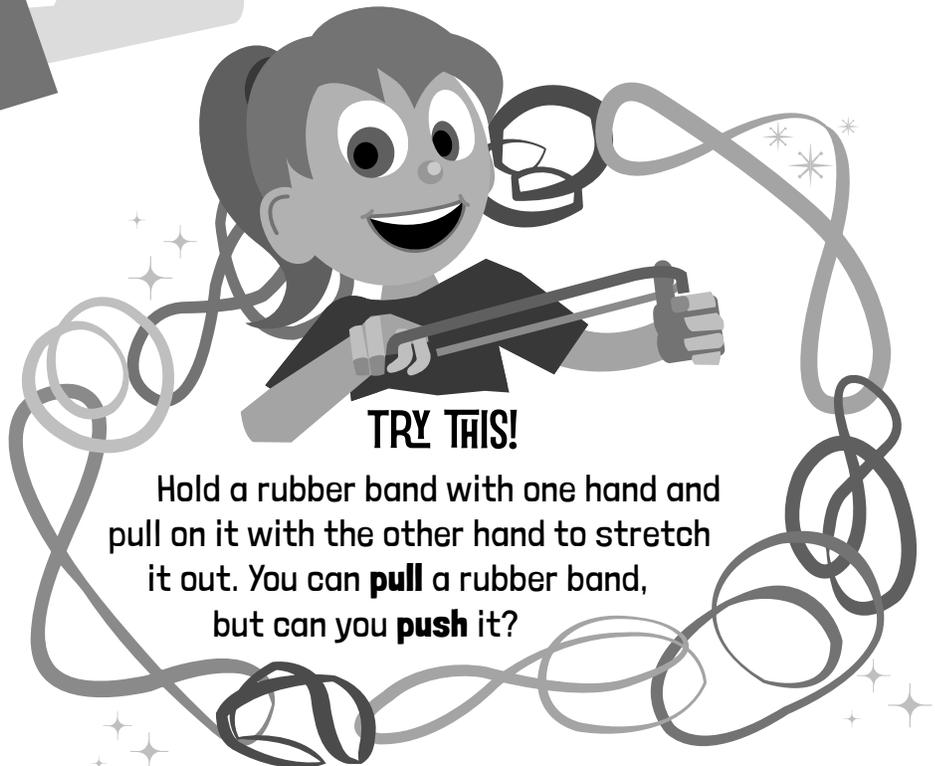
It is true! You have about 600 muscles in your body. They are all made of stretchy tissue, like rubber bands. Each muscle is made of thousands of these long, stretchy **fibers** all bundled together.



Muscles can **contract**, or squeeze together. When they relax, they go back to their original size. *This means that muscles can pull, but they cannot push.*



Exercise doesn't give you more **muscle fibers**, but it makes the muscles you have **bigger**.



TRY THIS!

Hold a rubber band with one hand and pull on it with the other hand to stretch it out. You can **pull** a rubber band, but can you **push** it?

Fooling Your Eyes and Your Brain

Your eyes are great at helping you see the world around you, but they are not perfect. Scientists sometimes use **optical illusions** to learn about how our eyes and brain work.

Depth Perception

Why do you have two eyes? Each eye sees from a slightly different angle.

1. Close one eye and look at something small far away.



2. Hold up your thumb to cover the object.



3. Hold your thumb still and switch eyes. What happens?



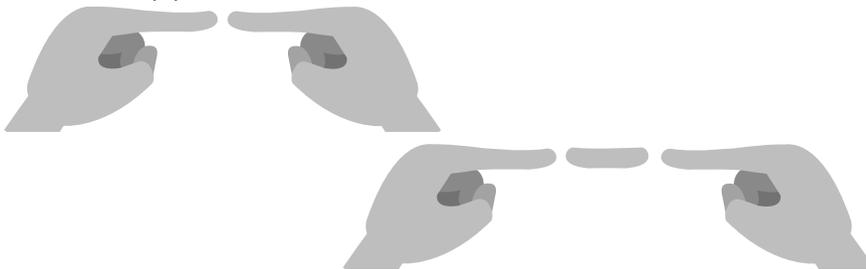
What is going on?

Each eye takes in the object from a different angle. Your brain merges the two images together to tell how far away things are. This gives us **depth perception**—the ability to tell how *near* or *far* something is.

Floating Finger Illusion

1. Point your index fingers toward each other, almost touching. Hold them a few inches in front of your eyes.
2. Focus your eyes on the opposite side of the room.
3. Do you see the floating finger with two fingernail ends? **yes** **no**
4. Slowly move your fingers closer and farther apart.

What happens? _____



What is going on? Each of your eyes sees your fingers from a different angle. Your brain tries to make sense of the conflicting images and comes up with a floating, double-ended finger.

Peripheral Vision

Try this: Hold your hands near the sides of your head. Look straight ahead. Slowly move your hands backwards until you can't see them anymore.



This is how far you can see to the side using your **peripheral vision**.



Your Body Has a Filter

Find the Best Filter

Materials

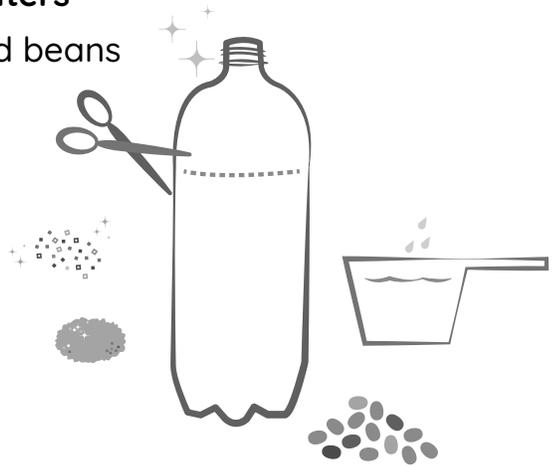
- a cup
- plastic water bottle (no cap)

materials for “blood”

- 1 cup water
- $\frac{1}{8}$ tsp. glitter
- $\frac{1}{8}$ tsp. ground pepper
- $\frac{1}{8}$ tsp. colored drink mix

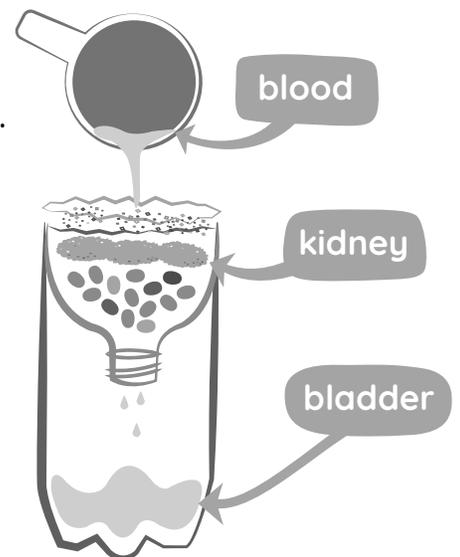
suggestions for filters

- gravel or dried beans
- sand
- paper towels
- cheesecloth
- coffee filters
- cotton balls
- fabric



Directions

- ① Ask a grown-up to cut the plastic water bottle as shown. Turn the top part, which will be the *kidney*, upside down and set it in the bottom part, the *bladder*.
- ② In a cup, mix together the water, drink mix, glitter, and pepper. This will represent *blood* with waste in it.
- ③ Your goal is to try to get as much “waste” out of the “blood” as possible by filtering it through the “kidney.”
- ④ To start, choose one filtering material and place it into the upside-down water bottle. Pour the “blood” through your filter.
- ⑤ Observe the “blood” as it goes through the “kidney” filter into the “bladder.”
How much waste did you remove? **some** **most** **all**
- ⑥ Try pouring the “blood” through the “kidney” filter again using a combination of filtering materials.
Which filters did you use? _____
How much waste did you remove this time? **some** **most** **all**
- ⑦ Keep trying different filter combinations.
What combination of filters worked best for you? _____



The Great Protectors!

Mucus, coughing, and sneezing don't seem like superheroes or protectors, but they are! Here is how they each protect you from germs.

Mucus

Do you ever get a runny nose? That gooey stuff is **mucus**, and it might be gross, but it has an important job! *Germs, dust, and dirt* in your body stick to mucus. When you blow your nose, it carries all that bad stuff out of your nose so it doesn't get to your lungs.

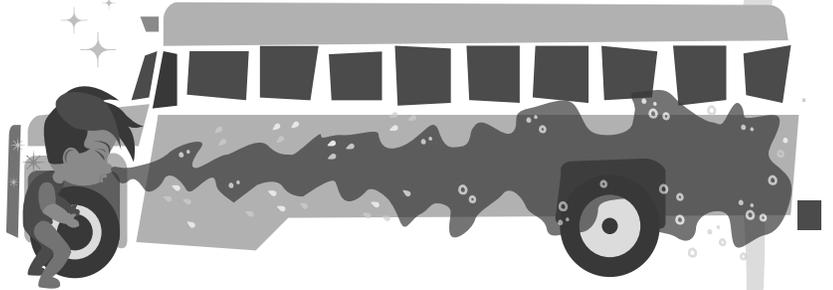


Healthy Habit Hint

Always blow your nose into a tissue and then wash your hands so you don't spread germs!

Sneezing

Your body has another trick to keep germs out of your lungs—**sneezing**! The purpose of a sneeze is to send germs out of your body. When you sneeze, a whole bunch of your muscles contract quickly and force air and germs out of your nose. Some of the muscles used to sneeze are your *diaphragm, chest muscles, belly muscles, and throat muscles*. Your *eyelids* always close when you sneeze.



A sneeze can travel **100 miles per hour** and sneeze germs can travel the length of a school bus!

Healthy Habit Hint

Always sneeze into a tissue or your elbow so you don't shoot germs all over everyone around you.

Coughing

What happens if pollen or dust **do** get into your trachea or lungs? You **cough**! Air comes out quickly, carrying out anything that is irritating your airway. Unlike sneezing or hiccupping, you can cough on purpose when you need to.

Healthy Habit Hint

Cover your mouth when you cough!

And what about yawning?

Another thing your *body* sometimes does automatically is **yawn**. You can also yawn on purpose. Why do we yawn? Nobody knows for sure!

Try this: Do a big, loud yawn. Watch the people around you. Do they yawn, too? Sometimes yawning is contagious!

