

SQUISHY HUMAN BODY MODEL

The Organ-izer

Use the **Organ-izer** outline. This will help you keep track of the parts.

Use the forceps and tweezers to remove the parts from the model. The organ-izer will help you keep track of the parts.

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Your kit includes:

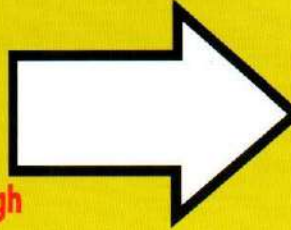
- Human body model and stand
- 9 squishy organs
- 12 plastic bones and muscles
- Forceps
- Tweezers
- Body parts Organ-izer

Lay the model on a flat surface to remove or replace the body parts.

READ THIS BEFORE STARTING!

IF YOUR MODEL CAME UNASSEMBLED:

Before you begin reading the book, follow steps 1 through 8 on this sheet to build the model. Then, remove the body parts in the order shown in the book. Refer to the photos in the book for reference.



1. THE BRAIN AND SKULL

- Place the brain (A) inside the skull.
- Press the skullcap (C) onto the skull.
- Press the peg on the skull into the hole on the model.

2. THE SHOULDER/SPINE/HIP

- Snap the pegs on the shoulder/spine/hip piece (D) into the holes in the model.

3. MUSCLES

Snap in:

- Leg muscle (E)
- Arm muscle (F)

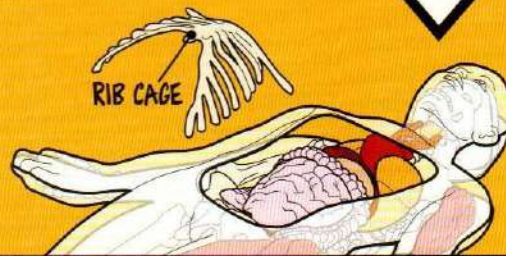
VEINS ARE PAINTED BLUE.



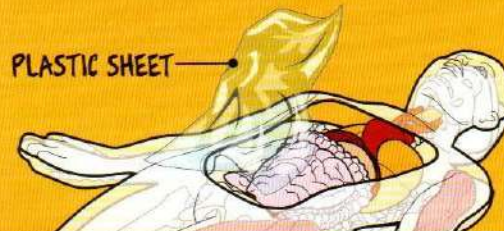
IF YOUR MODEL CAME ASSEMBLED:

Before you begin reading the book, remove the rib cage and plastic sheet, as shown below.

Remove the restraining bands and tape. Hold down the model, and detach the rib cage. Place the rib cage on the **Organ-izer**.



Remove the plastic sheet while holding down the squishy organs. You'll find another plastic sheet later, after you remove the lungs. You can dispose of both sheets.



Then, remove the body parts in the order shown in the book. Refer to the photos in the book for reference.

4. ARM AND LEG BONES

Snap in:

- Humerus (G)
- Radius/Ulna (H)
- Hand (I)
- Femur (J)
- Tibia/Fibula (K)
- Foot (L)



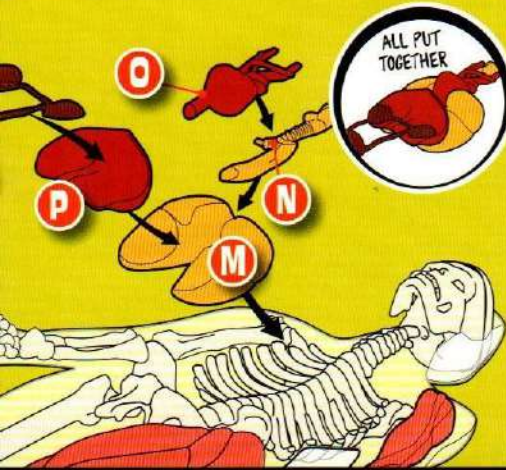
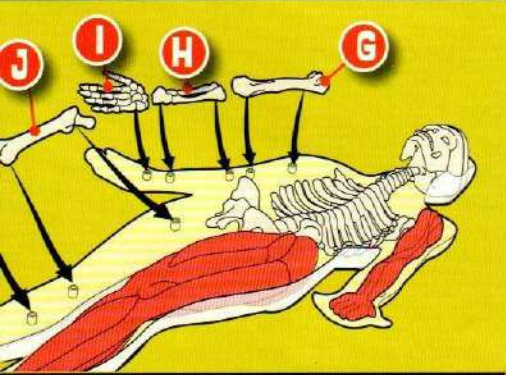
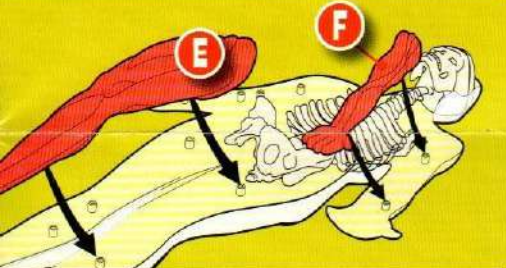
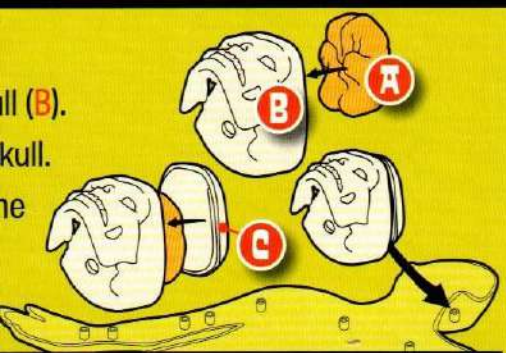
5. THE SQUISHY ORGANS

- Set the lungs (M) in the rib cage.
- Lay the esophagus/trachea (N) in the center of the lungs.
- Lay the heart (O) on the esophagus, with the arteries on the trachea.
- Fit the diaphragm (P) into the lung hollows.
- Lay the kidneys/bladder (Q) into the diaphragm hollows, bladder pointing down.



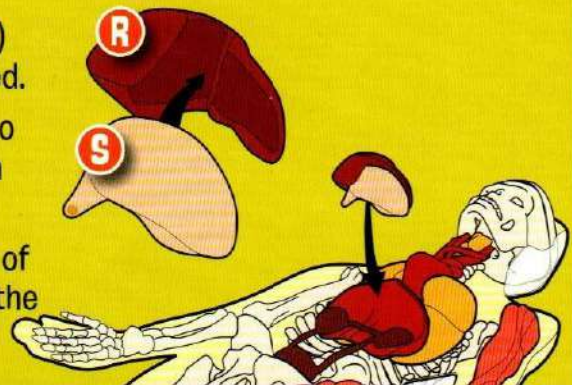
er.
 r to sort all the body parts. Match each body part to its
 help when you put your model together.

nd tweezers to help you remove the squishy organs from
 organs will be sticky, but try to remove only one at a time!



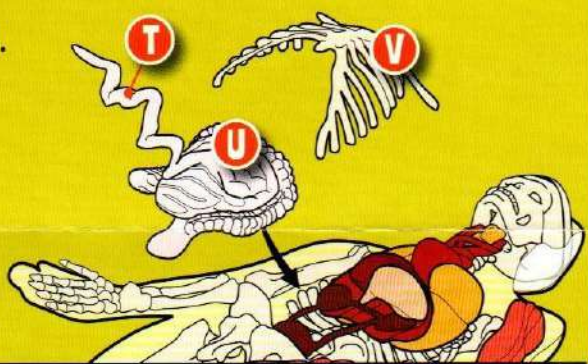
6. THE STOMACH AND LIVER

- Nestle together the liver (R) and stomach (S), as pictured.
- Tilt the stomach and liver so they form a shelf. Put them into your model, as shown.
- The two tubes sticking out of the stomach should be on the bottom.



7. INTESTINES

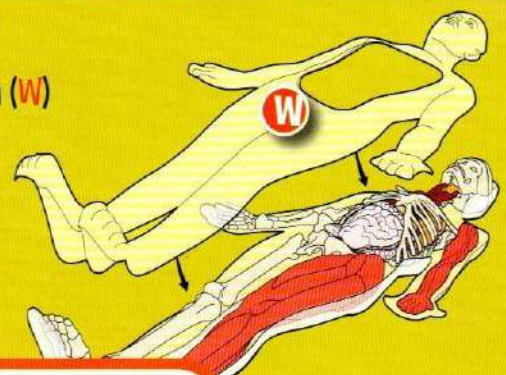
- Coil the small intestine (T).
- Insert the intestines (U) just below the stomach and liver.
- Attach the rib cage (V), lining up all four pegs. Press it snugly into place.



8. THE SKIN

- Place the front part of the skin (W) on top of your model.
- Snap your model together. Make sure each peg is secure.

BE CAREFUL NOT TO FORCE THE MODEL TOGETHER.



TO DISPLAY THE MODEL

- Put your model on its stand (X).
- The holes that are farther apart are for the toes.



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ORGAN•IZER

STOMACH

LUNGS

SKULL CAP

ARM MUSCLE

HUMERUS

INTESTINES

BRAIN

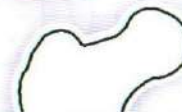
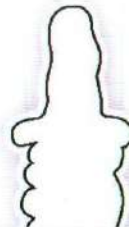
LIVER

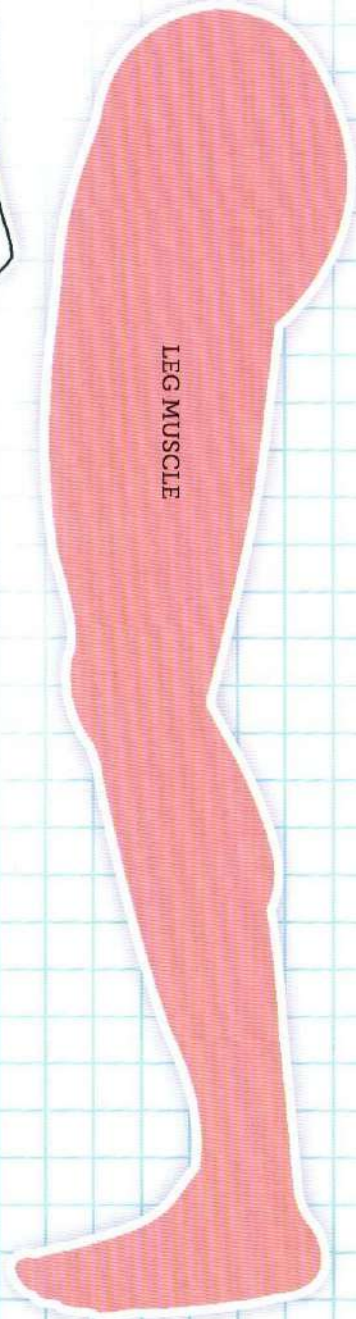
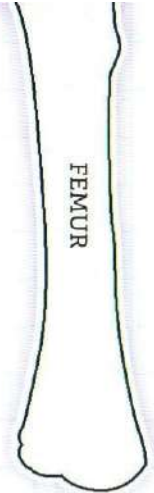
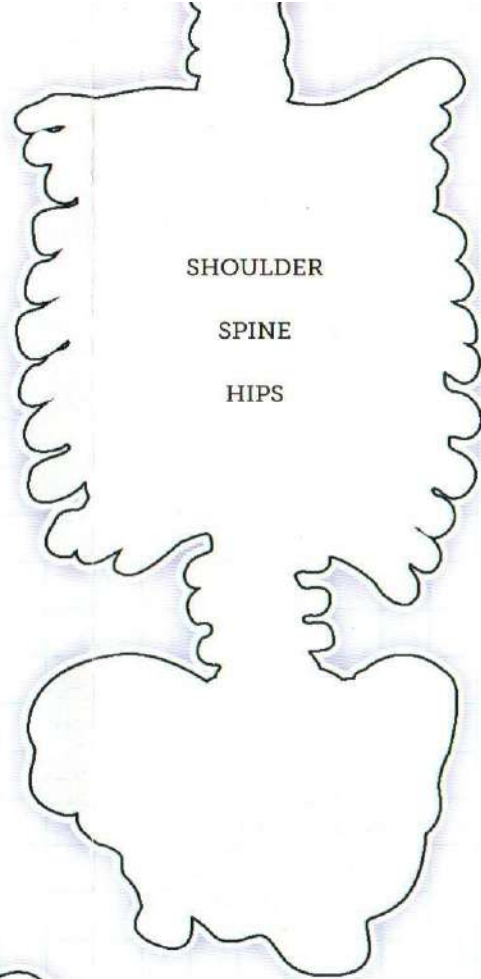
ESOPHAGUS/TRACHEA

KIDNEYS

SKULL

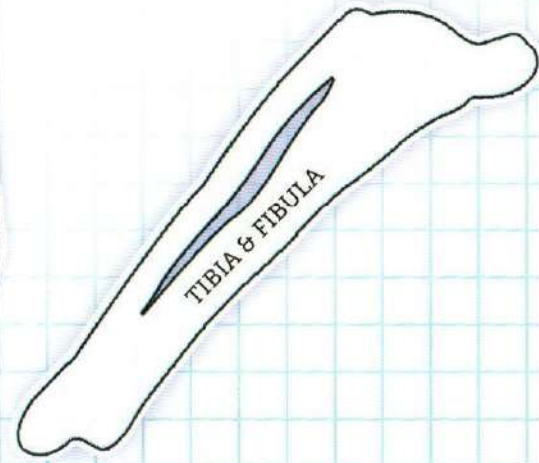
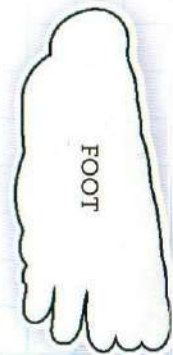
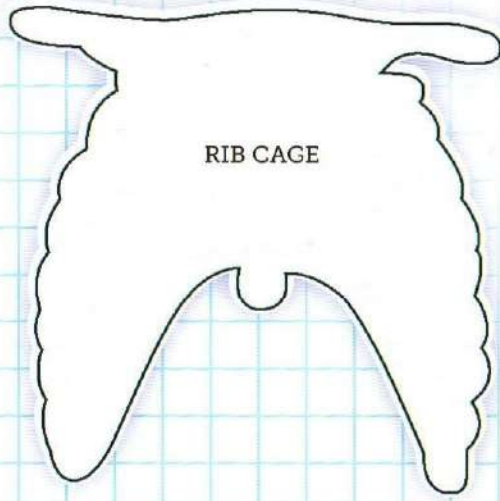
RADIUS & ULNA





Use this chart to sort all of your model's body parts as you remove them. If you match them up as you go, it will be easier to put your model back together again.

Explore away!



SQUISHY

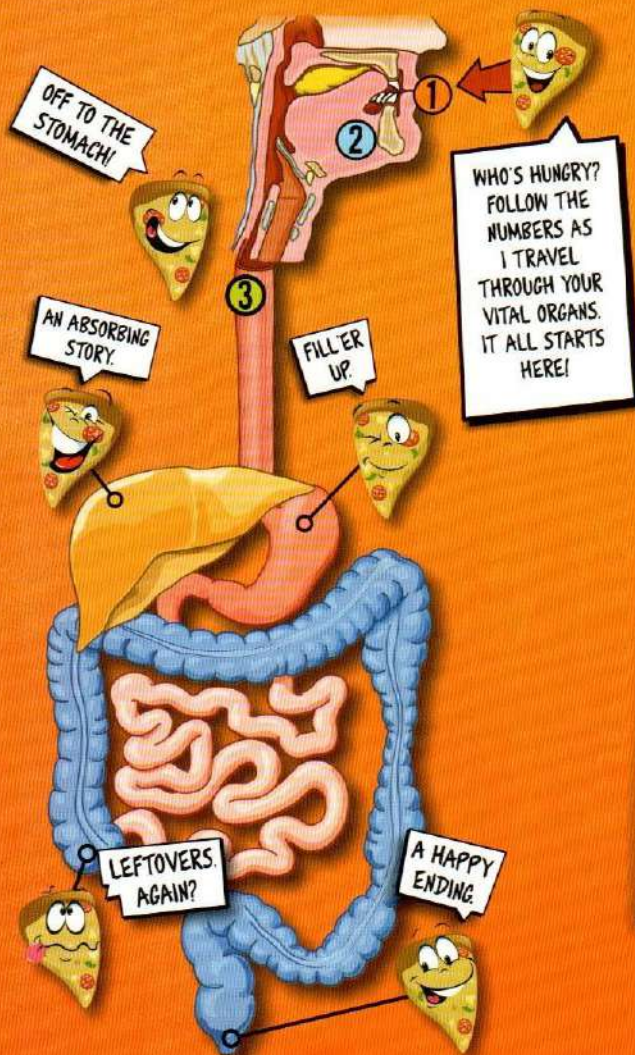
HUMAN BODY

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Get ready for an incredible journey through your own amazing body!

Your body turns food and water into you: a living, growing person. But how does your body change something like pizza into bones, muscles, and brain?

Let's follow a bite of pizza to help understand how all the parts of your body do their jobs.

MOUTH

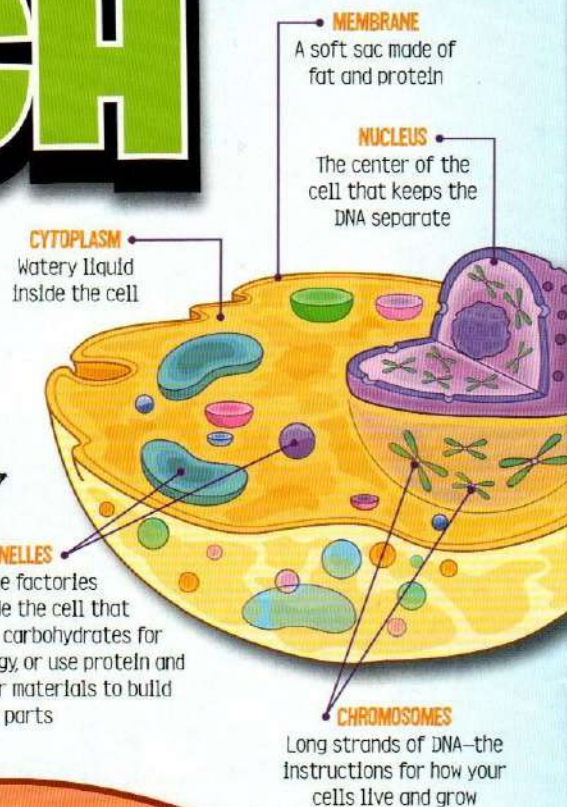
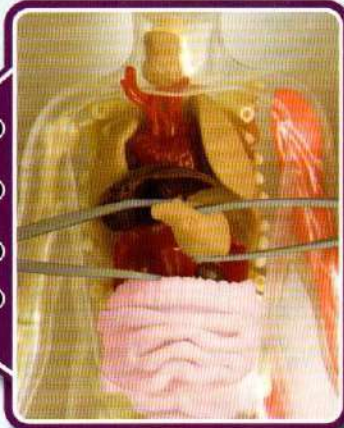
- 1 It all starts in your mouth, where your teeth bite and crush the pizza into tiny pieces.
- 2 Enzymes in your saliva (spit) start digesting the pizza even before you swallow it.
- 3 When your mouth is finished, you swallow the chewed-up pizza—and the incredible journey begins!

STOMACH

Your stomach is a muscular sac big enough to hold a meal, even a whole pizza! It gets food ready for the body to use.

Cells are the building blocks of the entire body.

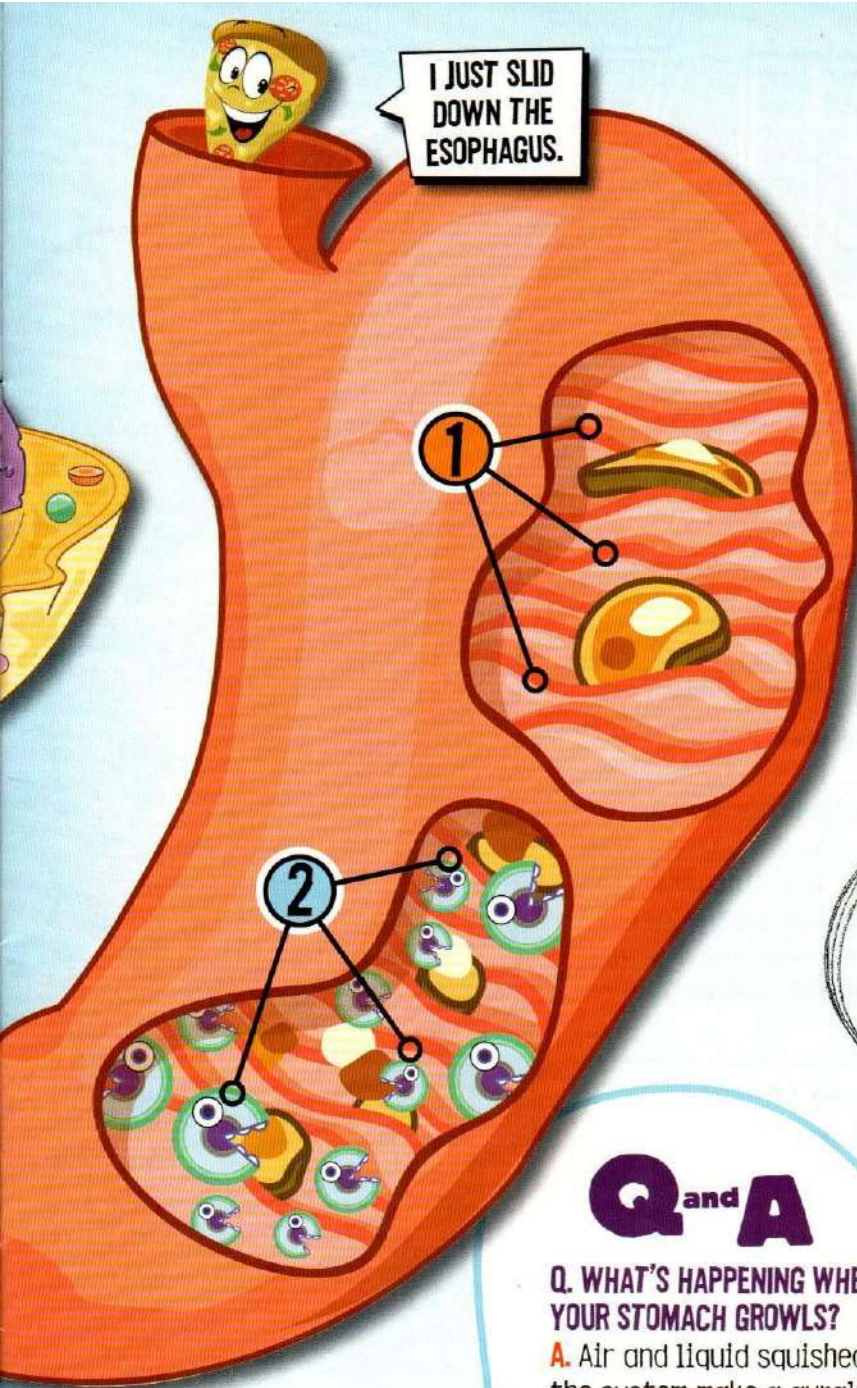
Your body is made up of trillions of living cells. Cells are like tiny water balloons: each one is a soft sac filled with liquid. If you glued a pile of water balloons together, it would be solid, but squishy—just like your body!



THE VITALS

- 1 Muscles in the stomach wall squeeze food around to mix it.
- 2 Special cells along the sides of your stomach make a strong acid that breaks down the pizza even more. The acid dissolves the protein and the calcium from the cheese.
- 3 Your stomach slowly squeezes out what's left of the pizza into the intestines.





I JUST SLID DOWN THE ESOPHAGUS.

1

2

A LAYER OF THICK SLIME PROTECTS THE STOMACH FROM ITS OWN ACID. THIS IS WHY THE STOMACH DOESN'T DIGEST ITSELF.



STOMACH



THAT'S WHAT HAPPENS WHEN YOUR STOMACH IS EMPTY. AS YOU EAT, YOUR STOMACH STRETCHES, GIVING YOU THAT "FULL" FEELING.

Q and A

Q. WHAT'S HAPPENING WHEN YOUR STOMACH GROWLS?

A. Air and liquid squished through the system make a gurgling noise, like blowing through a straw into a glass of juice.

TRY THIS!

Chyme Time

Place a piece of bread and some soda pop in a sealable plastic bag. Seal the bag tightly and squeeze the soda and bread together. The soupy result is similar to the liquid called chyme created by your stomach's muscles and acid.

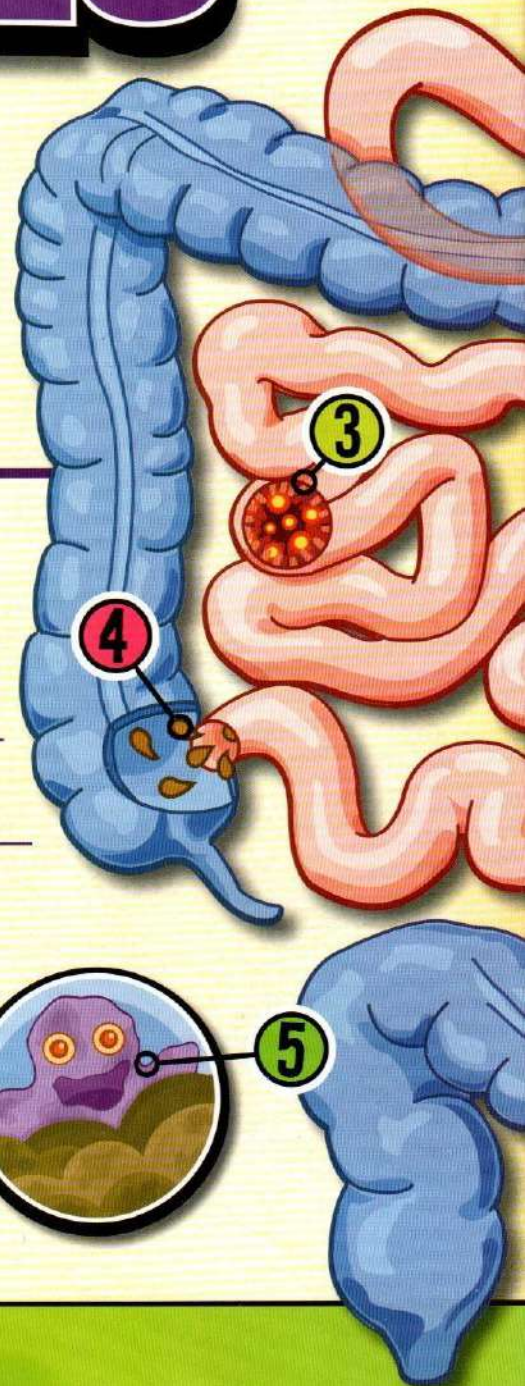
INTESTINES

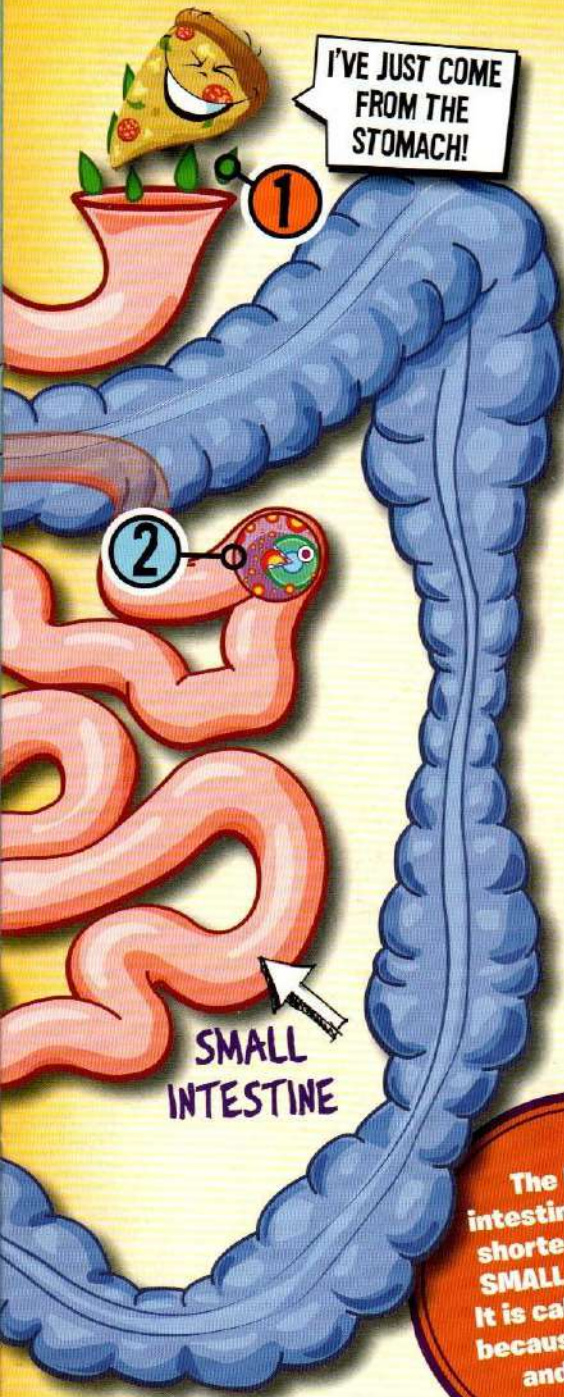


Together, your small and large intestines are one long, squishy tube. One end is connected to the stomach, and the other end is connected to, well, your “other end.”

THE VITALS

- 1** The small intestine adds substances that make the stomach acid harmless to the delicate lining of the small intestine.
- 2** Enzymes in the small intestine break down all the nutrients into tiny molecules.
- 3** Fuzzy hairlike cells along the inside of the small intestine, called villi (VIL-eye), absorb the nutrients and pass them along into your blood: protein from the cheese, sugar from the crust, vitamins from the sauce, and fat from the oil.
- 4** Things like the tough fiber from the pizza’s tomatoes are squirted into your large intestine. It absorbs much of the leftover water, leaving thick, brown POOP!
- 5** Bacteria in your large intestine feast on your poop.





I'VE JUST COME FROM THE STOMACH!

1

2

SMALL
INTESTINE

The **LARGE** intestine is much shorter than the **SMALL** intestine. It is called "large" because it's wider and thicker.

**LARGE
INTESTINE**

HAPPY ENDING

THE END OF THE ROAD.

Bacteria in the large intestine make gas as a waste product. This gas can get released at the most unfortunate times. Chemicals called skatoles (SKAT-ols) and indoles (IN-dols) give your poop its smell.

Sometimes, unfriendly bacteria get in the way of the large intestine's job of absorbing water, so it all comes out as diarrhea (DI-uh-REE-uh).

A muscle at the end of the large intestine called a sphincter (SFINK-ter) muscle holds poop inside your body until you can get to the bathroom.

**TRY
THIS!**

Corn-a-copia

Eat corn, and watch for it in your poop. How long did it take to show up? Brag about it to your friends.

**GROSS
ALERT!**

People release gas (fart) an average of 14 times a day, no matter who they are.

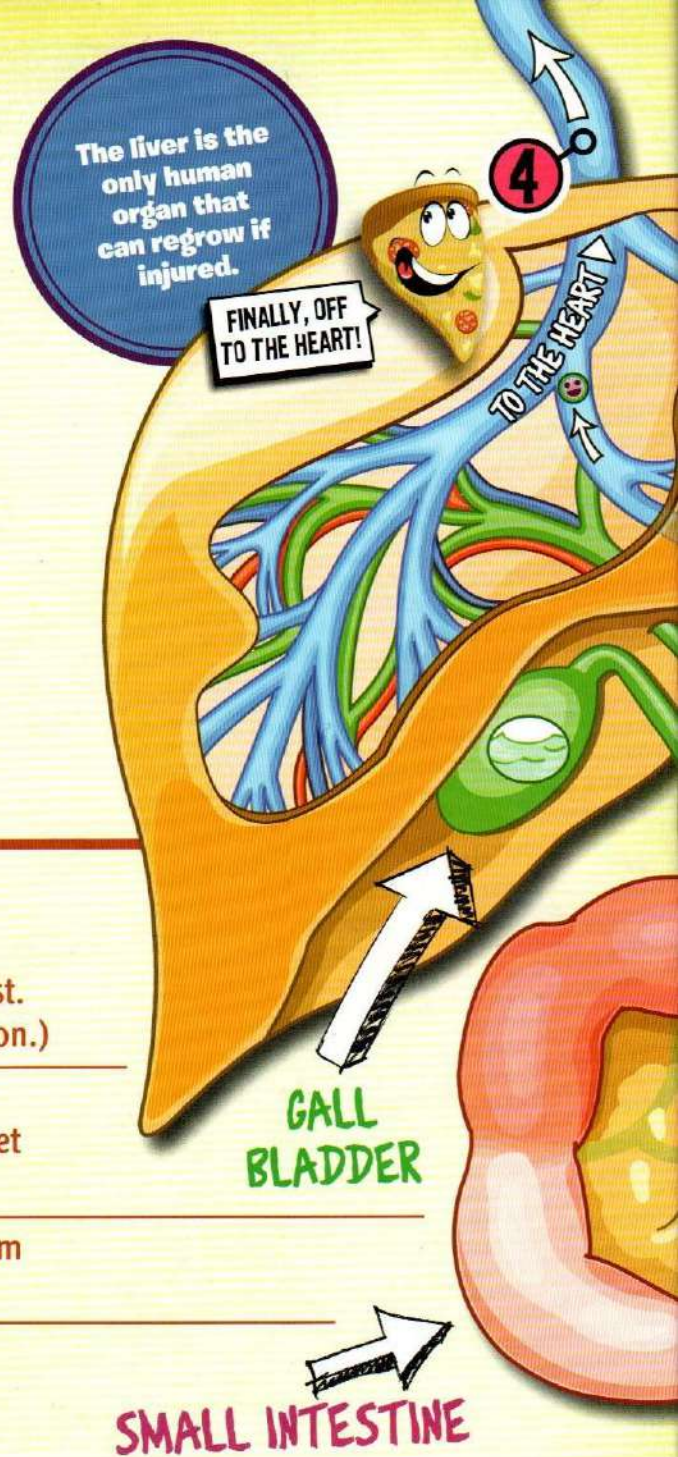
LIVER



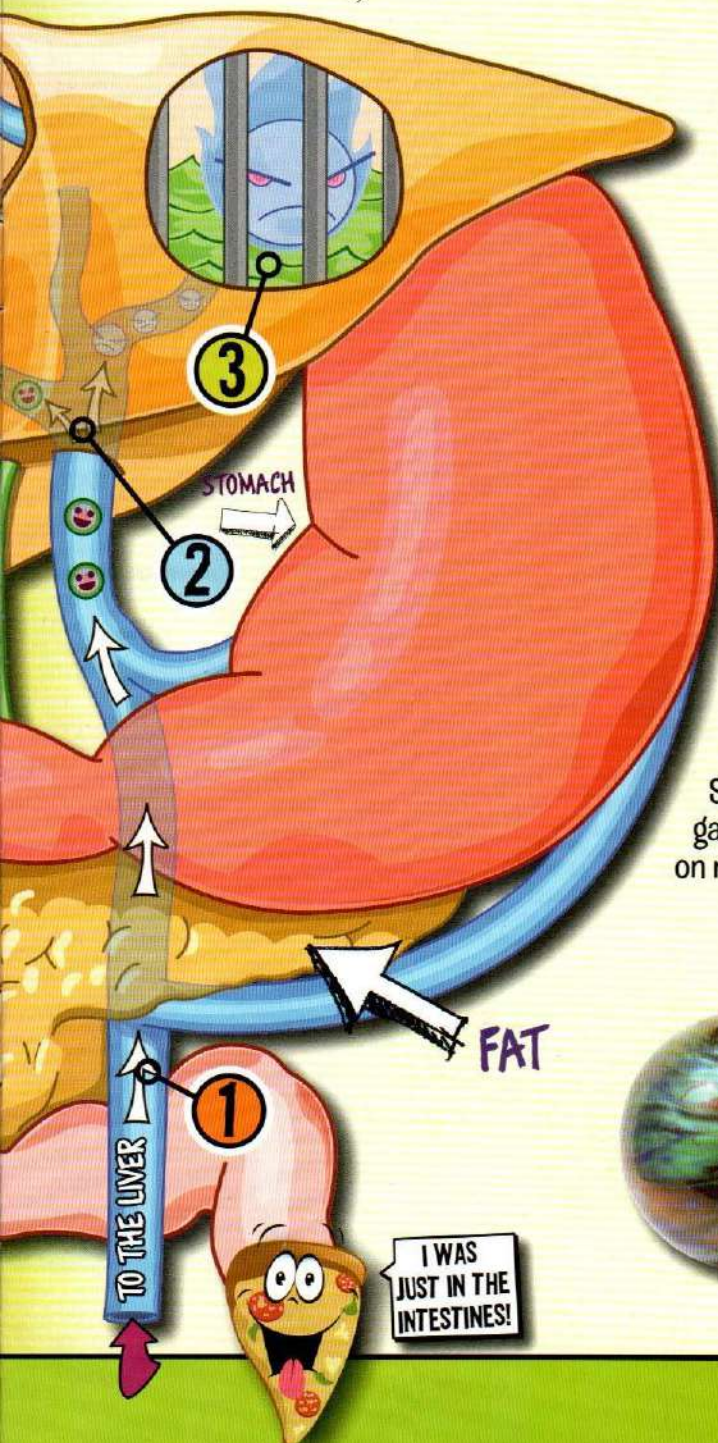
You can't LIVE without your LIVER! It's your largest internal organ and acts as the body's security guard.

THE VITALS

- 1 All the blood from your intestines goes to your liver first. (The flow of blood starts at the bottom of this illustration.)
- 2 Nutrients from the pizza go through your liver to get processed. The liver decides whether to store them or let them through, depending on what your body needs.
- 3 The liver keeps poisons, such as food preservatives, from going to the rest of the body.
- 4 When your liver is done, it sends the blood to your heart, so the nutrients from the pizza can be sent all over your body.



LIVER



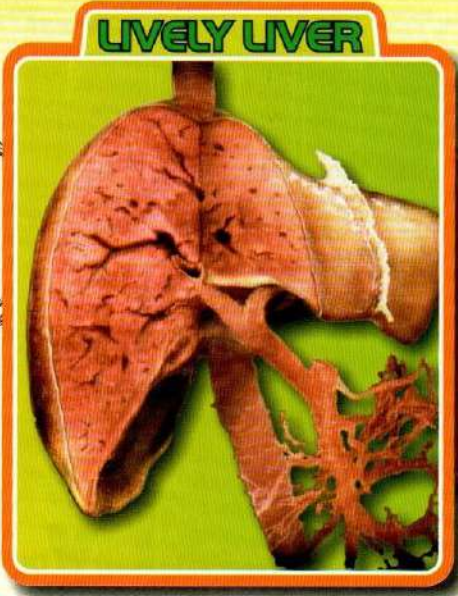
THE LIVER IS DENSE WITH LOTS OF BLOOD FLOWING THROUGH IT.

THAT'S BILE

THE GALL BLADDER ROCKS!

Has your vomit ever been green? That's because of the bile. The liver makes bile, which helps digest fat. It is stored in the gall bladder until needed, then squirted into the small intestine.

Substances in bile can sometimes form hard lumps called gallstones. Most are smaller than a pea. But the biggest gallstone on record weighed 14 pounds (6.4 kg)—as much as a bowling ball!



LIVELY LIVER



GALLSTONE

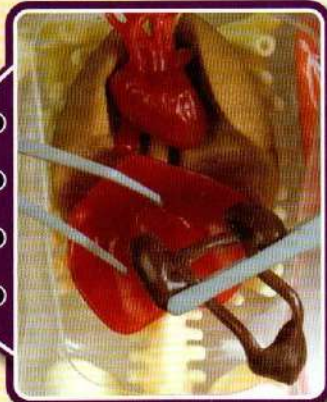
BOWLING BALL

TRY THIS!

Let Them Eat Liver!
Because it stores nutrients, an animal's liver is one of the most nutritious meats you can eat.

KIDNEYS AND BLADDER

KIDNEY



You have a pair of kidneys that are the body's plumbing system.

YOU CAN LIVE WITH ONLY ONE KIDNEY!

Drink plenty of water so your kidneys can do their job.

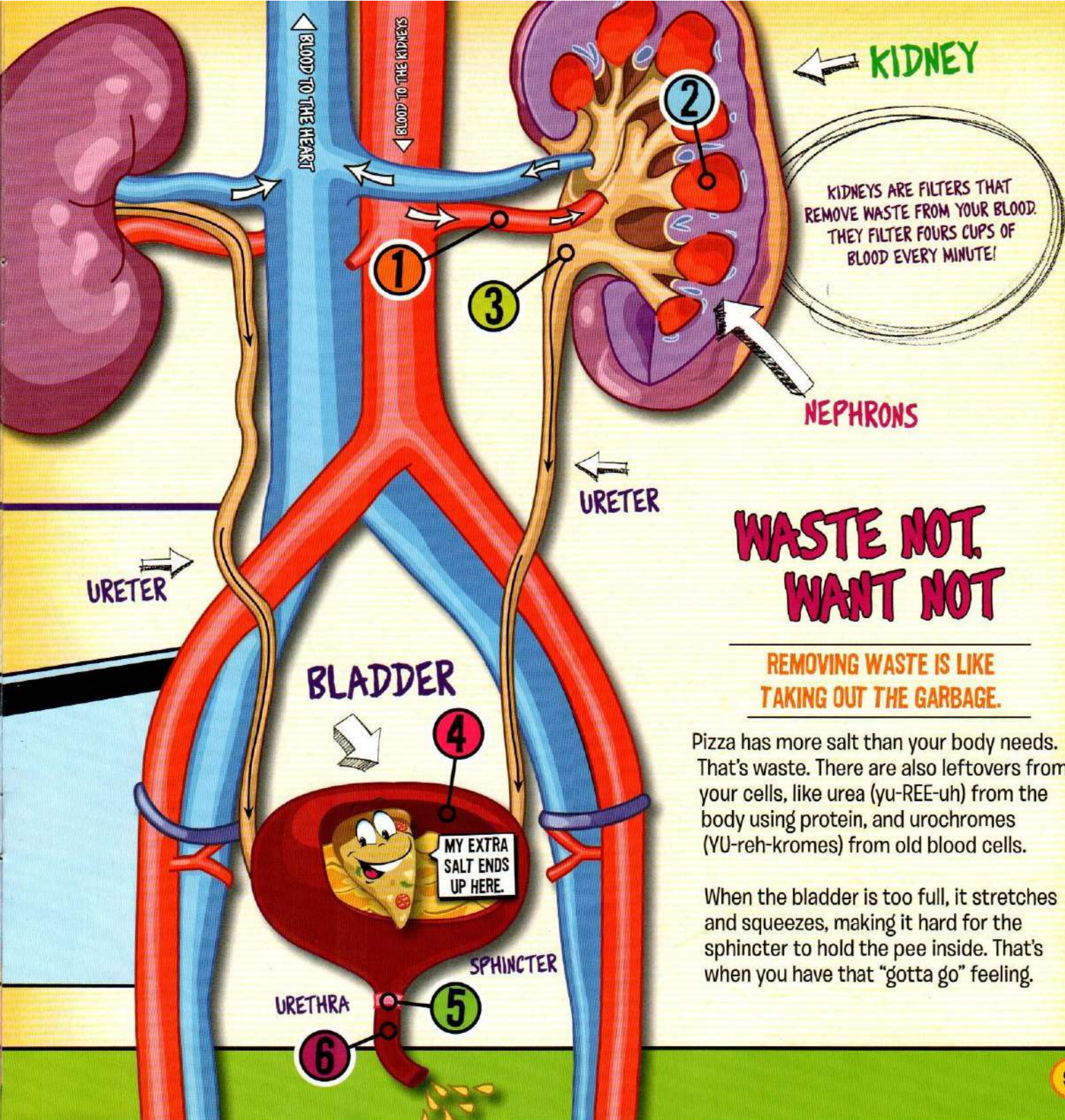
THE VITALS

- 1 Blood flows into the kidneys for filtering. They can filter all of your blood as much as 400 times per day.
- 2 The blood is filtered through millions of tiny loops called nephrons (NEF-rons).
- 3 Ureters are tubes that carry urine (pee) from your kidneys to your bladder.
- 4 Your bladder stores urine until a convenient time for you to, well, pee. When it's about half full, you start to feel the urge.
- 5 You control a little muscle called a sphincter (SFINK-ter) at the bottom of the bladder to let out the urine when you're ready.
- 6 The urethra (yu-REE-thra) carries the urine out of the body. The bladder relaxes, and you feel relief.

TRY THIS!

Copycat

What you eat can come out in your pee. Eat red beets, and your pee will turn pink. Asparagus will make your pee smell like, you guessed it, asparagus!



KIDNEY

KIDNEYS ARE FILTERS THAT REMOVE WASTE FROM YOUR BLOOD. THEY FILTER FOUR CUPS OF BLOOD EVERY MINUTE!

NEPHRONS

URETER

WASTE NOT, WANT NOT

REMOVING WASTE IS LIKE TAKING OUT THE GARBAGE.

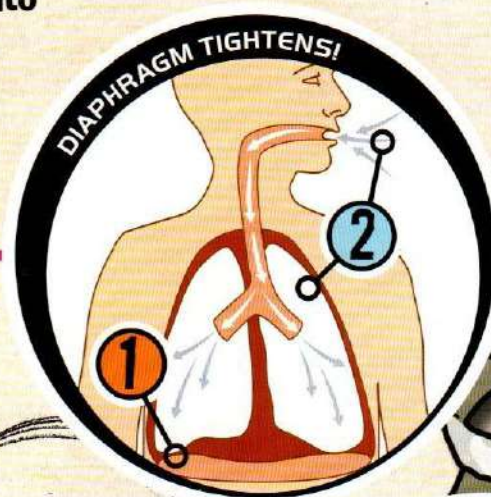
Pizza has more salt than your body needs. That's waste. There are also leftovers from your cells, like urea (yu-REE-uh) from the body using protein, and urochromes (YU-reh-kromes) from old blood cells.

When the bladder is too full, it stretches and squeezes, making it hard for the sphincter to hold the pee inside. That's when you have that "gotta go" feeling.

DIAPHRAGM



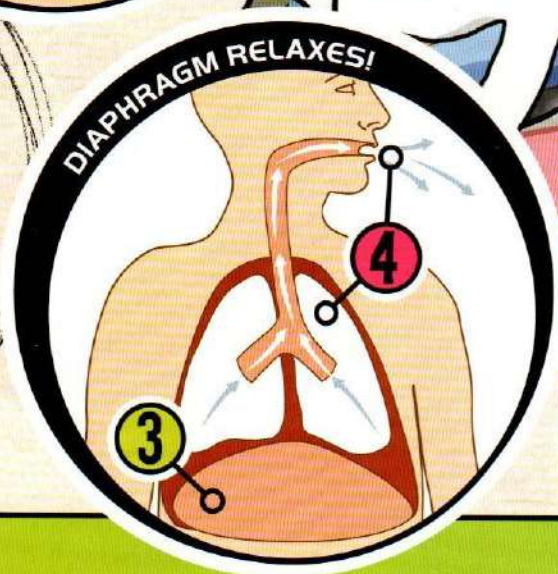
The diaphragm is a thin, flat muscle located below your lungs in the rib cage. It is your most important breathing muscle. Its movement draws air into and out of your lungs.



THE VITALS

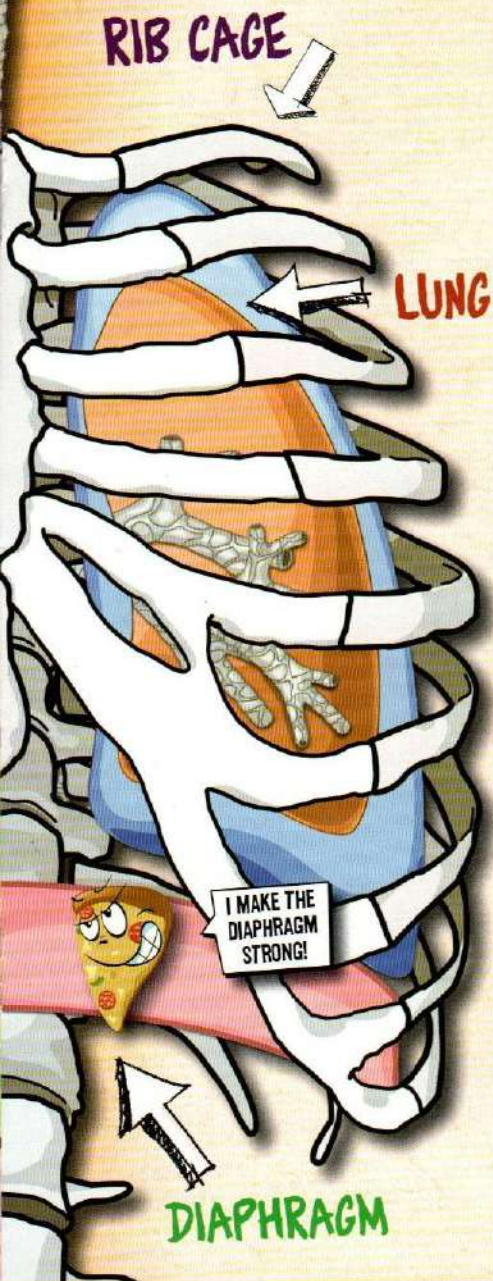
- 1** The diaphragm's (DIE-uh-franz) movement draws air into your lungs. First, it tightens and gets flat.
- 2** The space in the rib cage is bigger and draws in air. This is you breathing in.
- 3** The diaphragm relaxes, and curves up under the ribs.
- 4** Air is let out of the lungs. This is you breathing out.

WATCH SOMEONE'S CHEST WHEN THEY'RE BREATHING HARD. WHEN YOU ARE BREATHING REALLY FAST YOUR RIB MUSCLES HELP TO LIFT THE RIBS UP AND DRAW MORE AIR INTO YOUR LUNGS.



TRACHEA





Q and A

Q. WHAT ARE HICCUPS?

A. They are spasms (sudden movements) of the diaphragm. There are lots of ways people try to stop them, like holding their breath and counting to 10. But none of these tricks really work.

The record for the longest hiccups is 68 years. A man started hiccuping in 1922 in his late 20s. His hiccuping finally stopped in 1990, one year before he died.

Q. WHY DO YOU GET A PAIN IN YOUR SIDE WHEN YOU RUN TOO FAR?

A. That pain in your side is a pain in the diaphragm! It comes from not getting enough oxygen. It doesn't happen as much when you exercise regularly.

BREATHLESS

SO WHAT DOES THE DIAPHRAGM HAVE TO DO WITH THE PIZZA?

Plenty! The diaphragm is a muscle, and muscles are made of protein. Protein from the pizza's cheese will make your diaphragm strong. It takes energy to move muscles, and energy comes from the carbohydrates in the pizza crust.

HEART

RIGHT LUNG



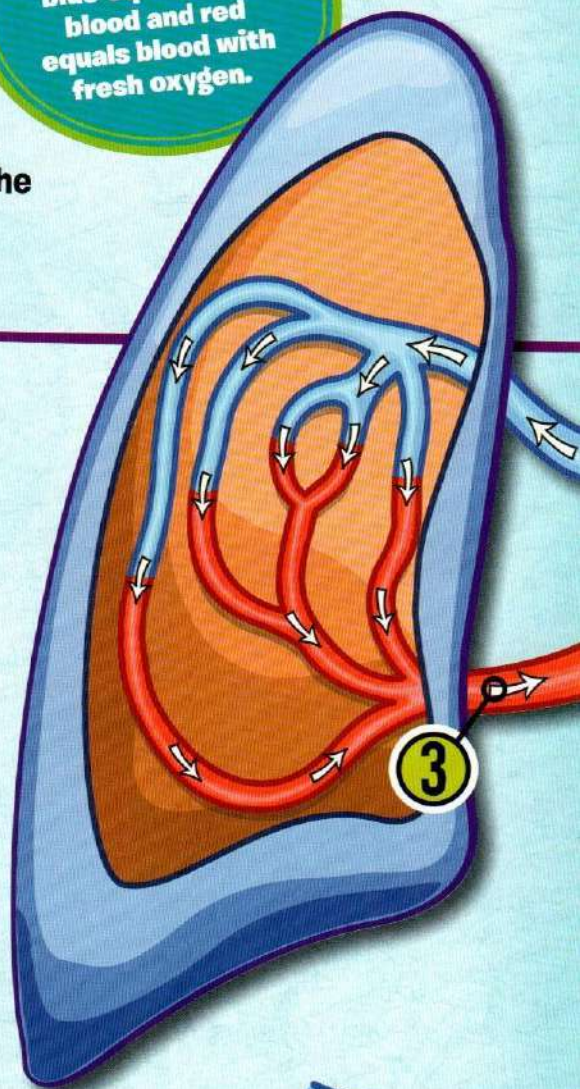
In this illustration, blue equals used blood and red equals blood with fresh oxygen.

Love your heart! It's a strong, thick muscle for pumping blood. Blood flows in tubes all around the body, like a giant water slide!




THE VITALS

- 1 Nutrients from the liver flow to the heart. (The action starts at the bottom of the illustration.)
- 2 The right side of the heart pumps blood through the lungs to pick up oxygen. Now the blood has both food and oxygen and is ready for the body to use!
- 3 The blood flows to the left side of the heart.
- 4 The left side of the heart is stronger because it needs extra power to pump blood way out to your fingers and toes. Whoosh! Now the pizza is headed out all over your body!
- 5 Arteries carry blood and oxygen to the body. Vitamin C from the tomato sauce keeps arteries and veins healthy.
- 6 Veins carry used blood back to the heart to get more oxygen from the lungs.



FROM THE LIVER ▶



NOW I'M
HEADED TO THE
WHOLE BODY!

YOUR HEART IS
TRULY RED, AND IT IS
ABOUT THE SAME
SIZE AS YOUR FIST.

LONELY HEART



BLUE BLOOD

BLOOD CARRIES OXYGEN AND
NUTRIENTS AROUND YOUR BODY.

The liquid part of blood, called plasma, is clear. It's the doughnut-shaped red blood cells that make it look red. But if blood looks red, why do our veins look blue? Looking at them through layers of skin makes them look bluish.

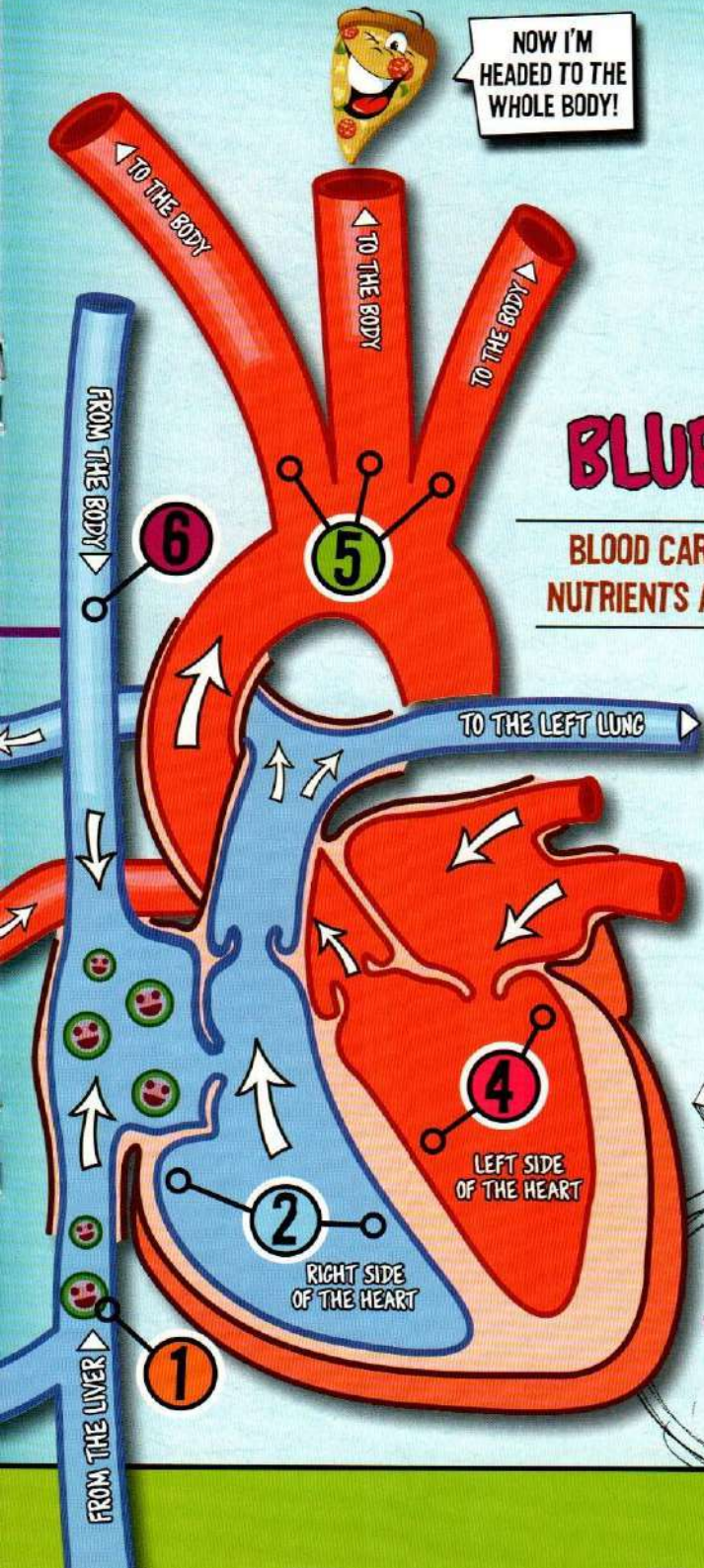
The plasma carries nutrients. The red cells carry oxygen. Other blood cells fight diseases and infection.

HEART

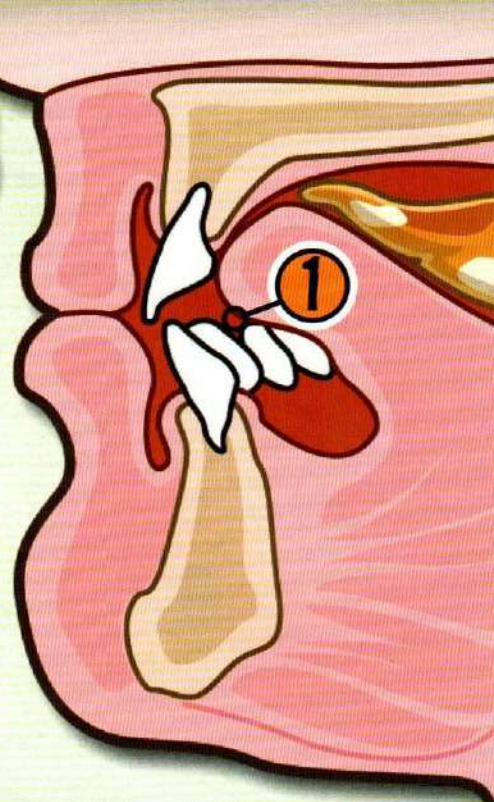
BLOOD IS 83% WATER—
MAKE SURE YOU KEEP
ENOUGH IN YOUR SYSTEM.
HAVE A GLASS OF
WATER WITH
YOUR PIZZA!

GROSS
ALERT!

Don't pick that scab! It's the body's own bandage. The clump of sticky, dry blood protects your cut while it heals underneath. It will fall off when it's done its job.



ESOPHAGUS AND TRACHEA

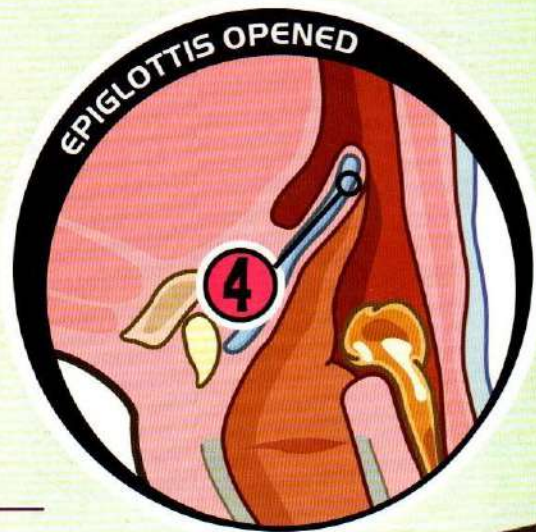


Your mouth is used for breathing and eating, so how do air and food get to the right places? Your throat starts out as one tube and splits into two.



THE VITALS

- 1 The mouth and tongue help you chew and swallow.
- 2 When you swallow, the epiglottis closes and covers the trachea, sometimes called the windpipe. The epiglottis is a piece of cartilage that stays open for breathing but closes off the trachea when you swallow. This trapdoor keeps food from going down the wrong tube.
- 3 Muscles push food and liquid down the esophagus to the stomach.
- 4 After you swallow, the tongue relaxes, and the epiglottis opens so you can breathe again.



GOOD VIBRATIONS

VOCAL CORDS MAKE SOUND TO TALK AND TO SING.

The voice box, or larynx, is located at the top of the trachea. Stretched along the sides are two little strands—your vocal cords. When you tighten them and breathe out, the air passes between the vocal cords, making them vibrate just like guitar strings.



Q and A

Q. WHAT HAPPENS WHEN SOMETHING "GOES DOWN THE WRONG WAY"?

A. If food or drink trickles down when the epiglottis is open, it gets into the trachea. Your body coughs to get it out.

Q. WHAT IS A COUGH?

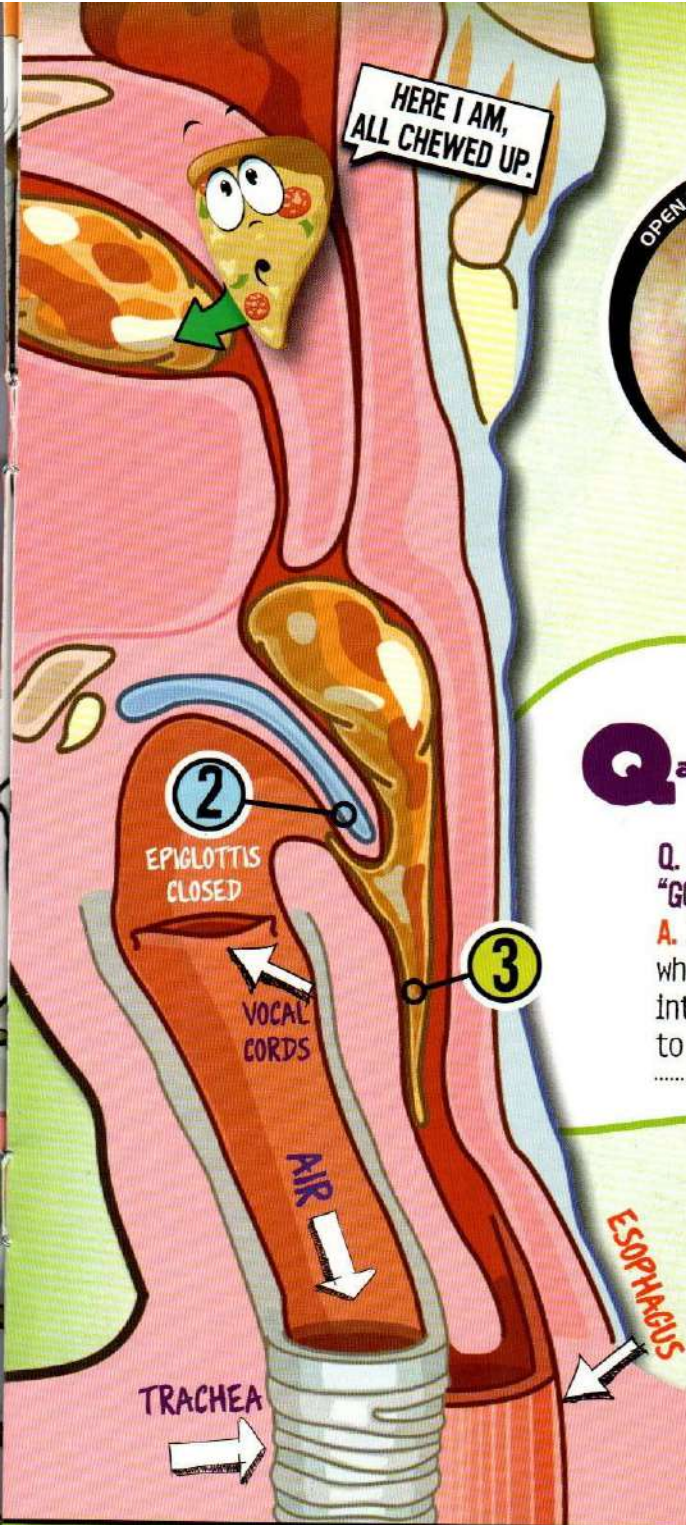
A. A cough is a powerful blast of air to clear something out of your trachea.

Q. WHAT IS A SNEEZE?

A. A sneeze is like a cough, but directed out your nose to clear it. Can you sneeze with your eyes open? Most people can't.

FROM HIGH TO LOW

Boys' voices change when the voice box goes through a growth spurt. The vocal cords get thicker and longer, creating a deeper sound. Girls' voice boxes don't grow as much.



LUNGS

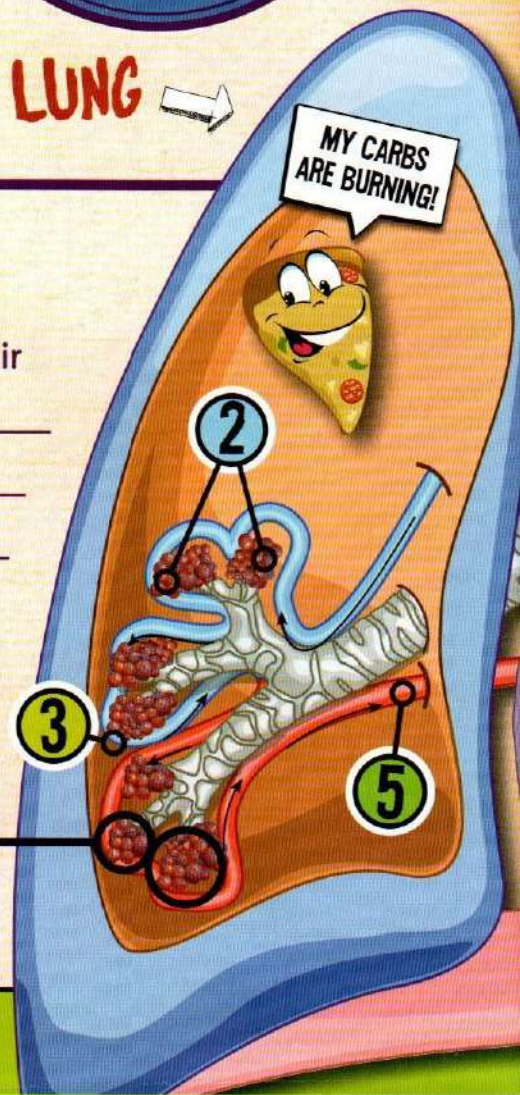
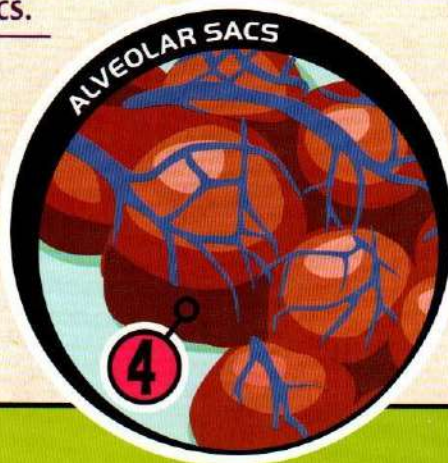
Why do colds give us super-snotty noses? Viruses irritate the lining of the nose, so the nose makes extra mucus in an effort to wash away the irritating germs. But all that snot and sneezing just gives the virus a free ride to the next person.

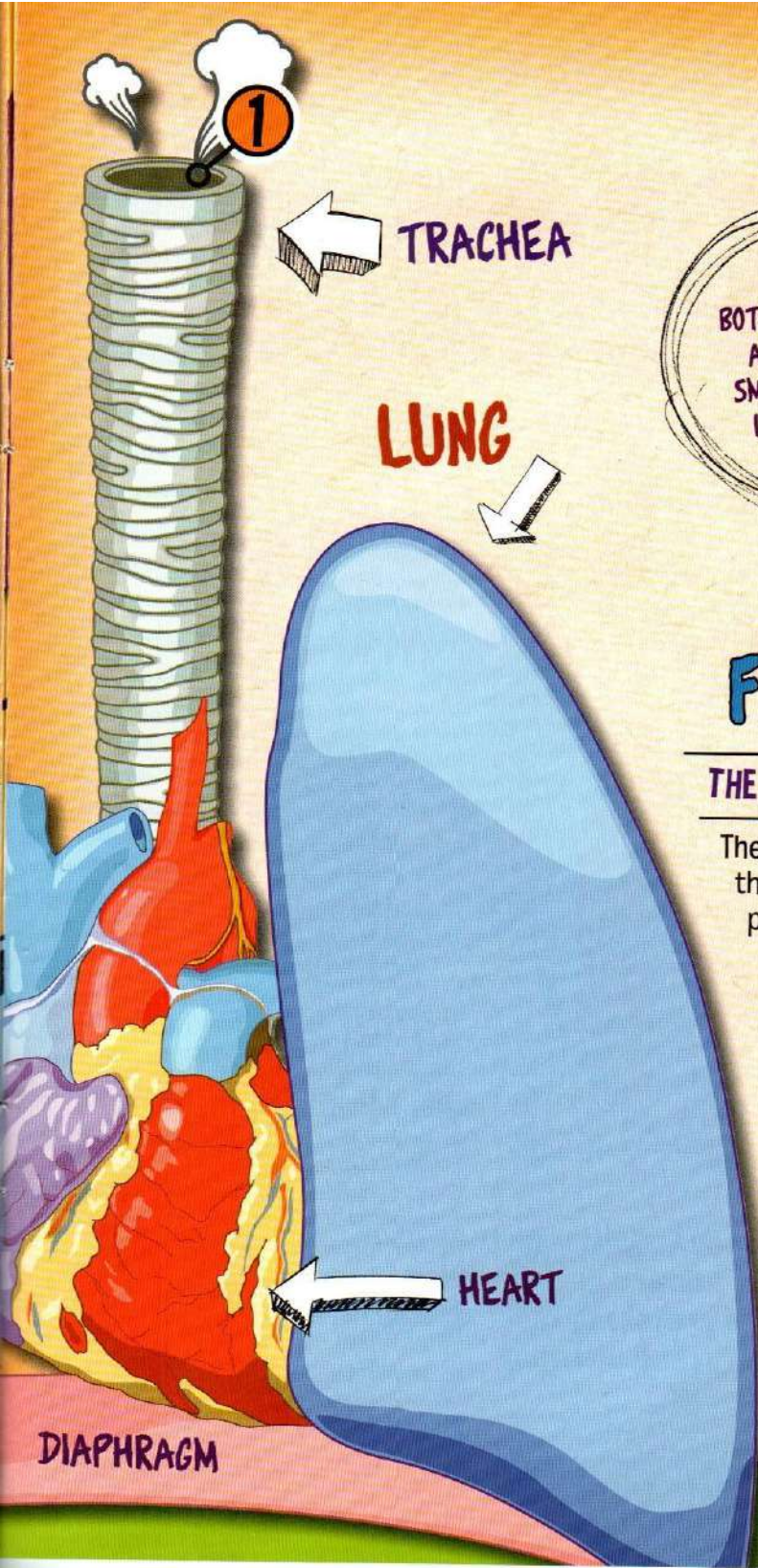
Lungs bring oxygen into the body. This helps burn carbohydrates from the pizza to make energy for living.

LUNG

THE VITALS

- 1 Oxygen comes from the air. The diaphragm contracts and draws air through the trachea and into the lungs.
- 2 The air ends up in tiny sacs containing alveoli (al-VEE-o-lie).
The heart pumps blood to your lungs.
- 3 Blood flows closely around the sacs.
- 4 Oxygen passes through the sac wall into the blood. Oxygen is picked up by the red blood cells.
- 5 Blood goes back to the heart. The heart pumps the oxygen-rich blood all over your body.





LUNG GONE WRONG



BOTH AIR POLLUTION
AND CIGARETTE
SMOKE CAN CAUSE
LUNG DISEASE.

FRESH AIR

THE BODY'S EXHAUST SYSTEM.

The lungs provide another way for the body to remove waste—they get rid of a waste gas called carbon dioxide. The gas passes from your blood into the air you breathe out.

Keep your lungs clean! Dirt and smoke that get all the way into the alveoli can never get out. Your body has several ways to clean the air before it gets to your lungs:

NOSE HAIRS CATCH BIG PARTICLES.

DUST STICKS TO SNOT.

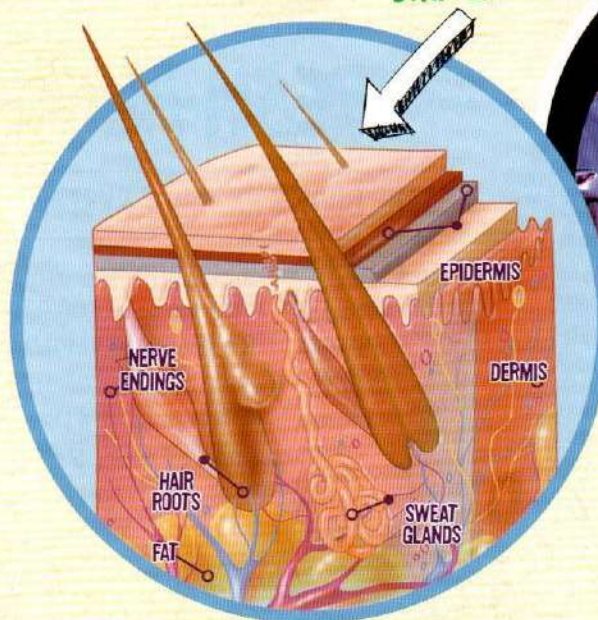
SNEEZING BLOWS IT BACK OUT OF YOUR NOSE.

COUGHING BLASTS IT OUT OF YOUR THROAT.

SKIN AND MUSCLES

Your skin is your largest organ. It keeps your body parts inside your body. It protects you and regulates your body's temperature.

SKIN LAYERS



DIFFERENT AMOUNTS OF MELANIN CREATE DIFFERENT SKIN COLORS.

Muscles connect your bones together so they can move. The pizza is really needed here because your muscles use lots of protein to build strength, carbohydrates for energy, and vitamins to stay healthy.

RESTING MUSCLES ARE SOFT AND SQUISHY. WORKING MUSCLES ARE STIFF AND HELP YOU LEAP TALL BUILDINGS IN A SINGLE BOUND.

MUSCLE MAN



I HELP YOU MAKE A NEW SKIN EVERY MONTH!

MELANIN IS A BROWN COLOR IN OUR SKIN THAT PROTECTS US FROM THE SUN. IN SOME PEOPLE'S SKIN, MELANIN FORMS IN SPOTS CALLED FRECKLES.

MUSCLES WORK IN PAIRS: ONE TO BEND A JOINT AND ONE TO STRAIGHTEN IT.

THE VITALS

Your body has three types of muscles:

- 1 SKELETAL (voluntary):** They move when you tell them to.
- 2 CARDIAC (involuntary):** Your heart muscle. You don't have to think about it—it's always working.
- 3 SMOOTH (involuntary):** These are mostly in your gut. They help you breathe and digest food without your having to think about it.

I PROVIDE PROTEIN, CARBOHYDRATES, AND VITAMINS TO YOUR SKIN AND MUSCLES.

AN ADULT'S SKIN WEIGHS ABOUT 6 POUNDS (2.7 KG)!

MUSCLES GET TIRED, BUT EXERCISE WILL MAKE MUSCLES STRONGER.

Point and Flex

Feel your muscles as you flex your arm. See how the muscles change shape and get firm.

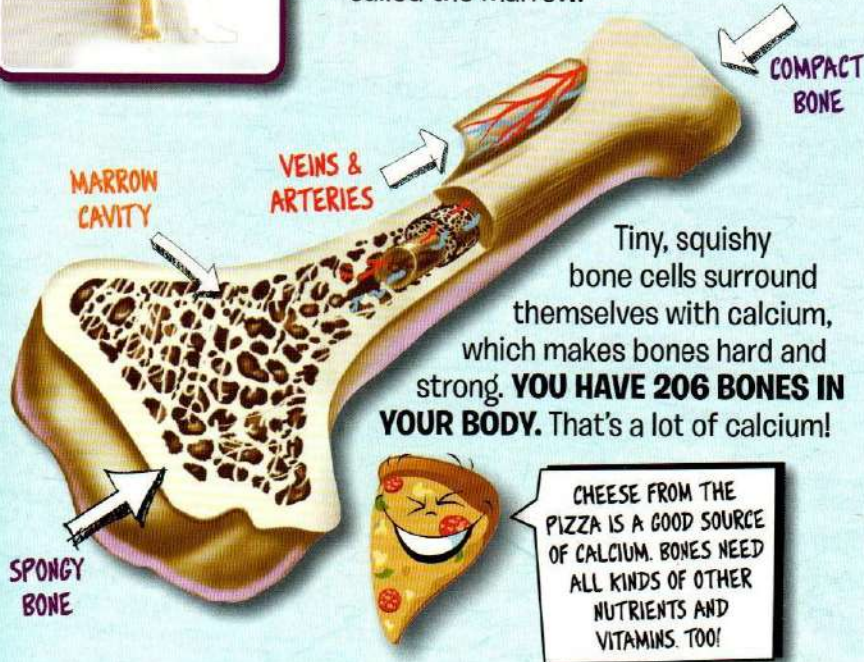
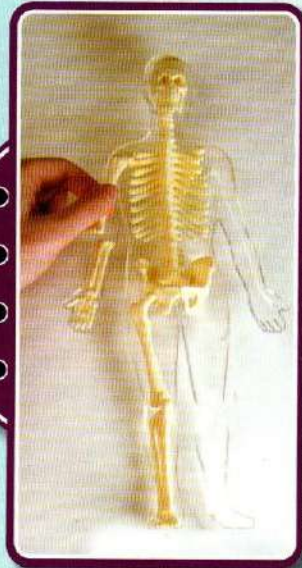
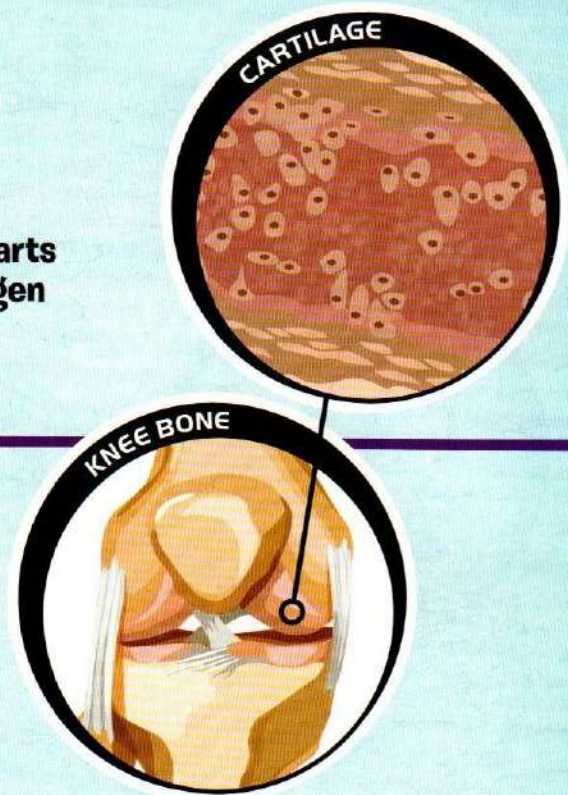
TRY THIS!

BONES

Bones are living, growing body parts that need blood to bring in oxygen and nutrients. Without them, you'd be a blob!

TO-MARROW

Bones produce red and white blood cells in the center part, called the marrow.

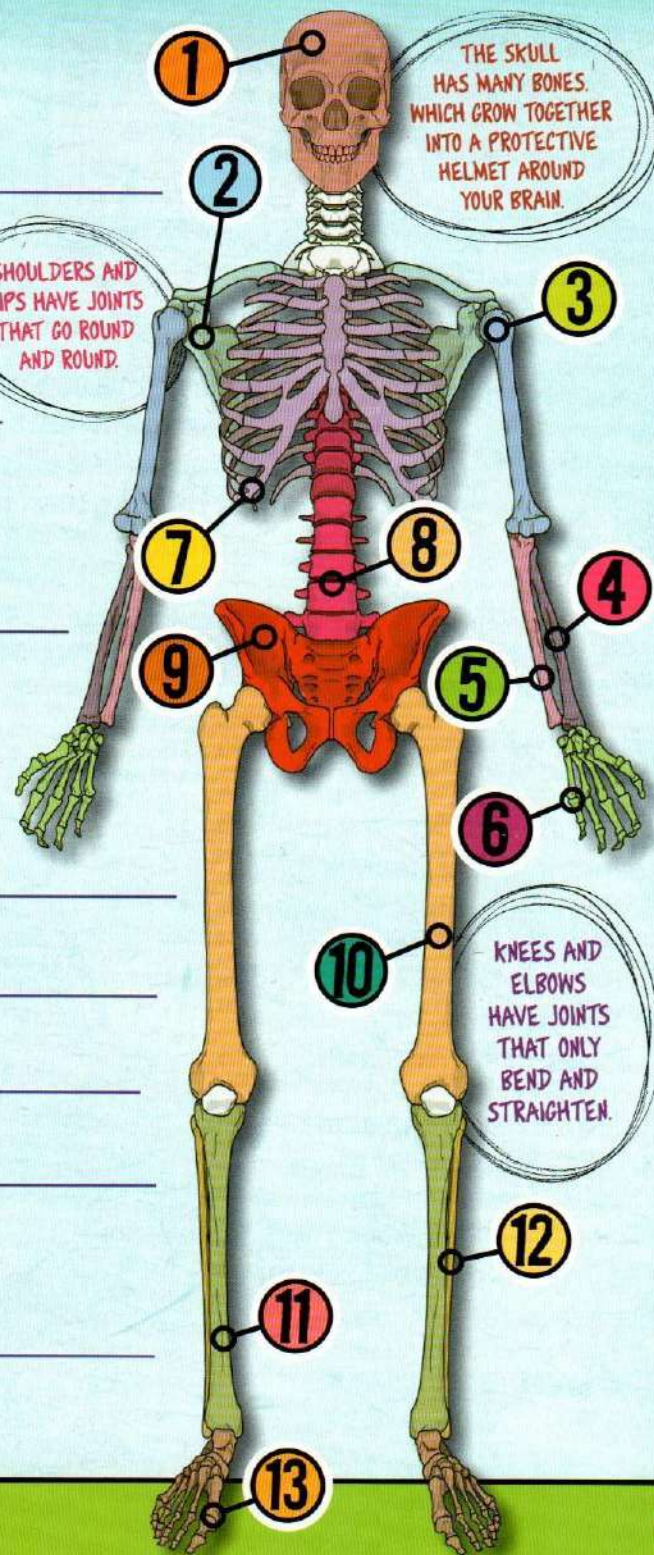


WORK-IN-PROGRESS

Kids' bones are special because they are still growing. They are hard, but not like rocks. Parts of them are made of cartilage, which feels rubbery, like your ears and your nose. The ends, where the joints come together, are also covered in cartilage.

THE VITALS

- 1 SKULL**
Protects your most important organ—your brain.
- 2 SHOULDER BLADES**
They are not really attached to your back.
- 3 HUMERUS**
Ball joints at the shoulder (and at the hips) allow you to swing your arms and legs.
- 4 RADIUS AND ULNA**
These two bones spin around each other so you can turn your wrist.
- 6 HANDS**
The thumb is special because it can twist and move separately.
- 7 RIB CAGE**
Protects very important organs—your heart and lungs.
- 8 BACKBONE**
Includes 33 bones that are stacked like blocks.
- 9 HIP BONES**
Shaped like a bowl to hold your guts.
- 10 FEMUR**
The longest bone in your body.
- 11 TIBIA AND FIBULA**
The two bones that make your lower leg.
- 13 FEET**
You have 26 bones in each foot.



BRAIN

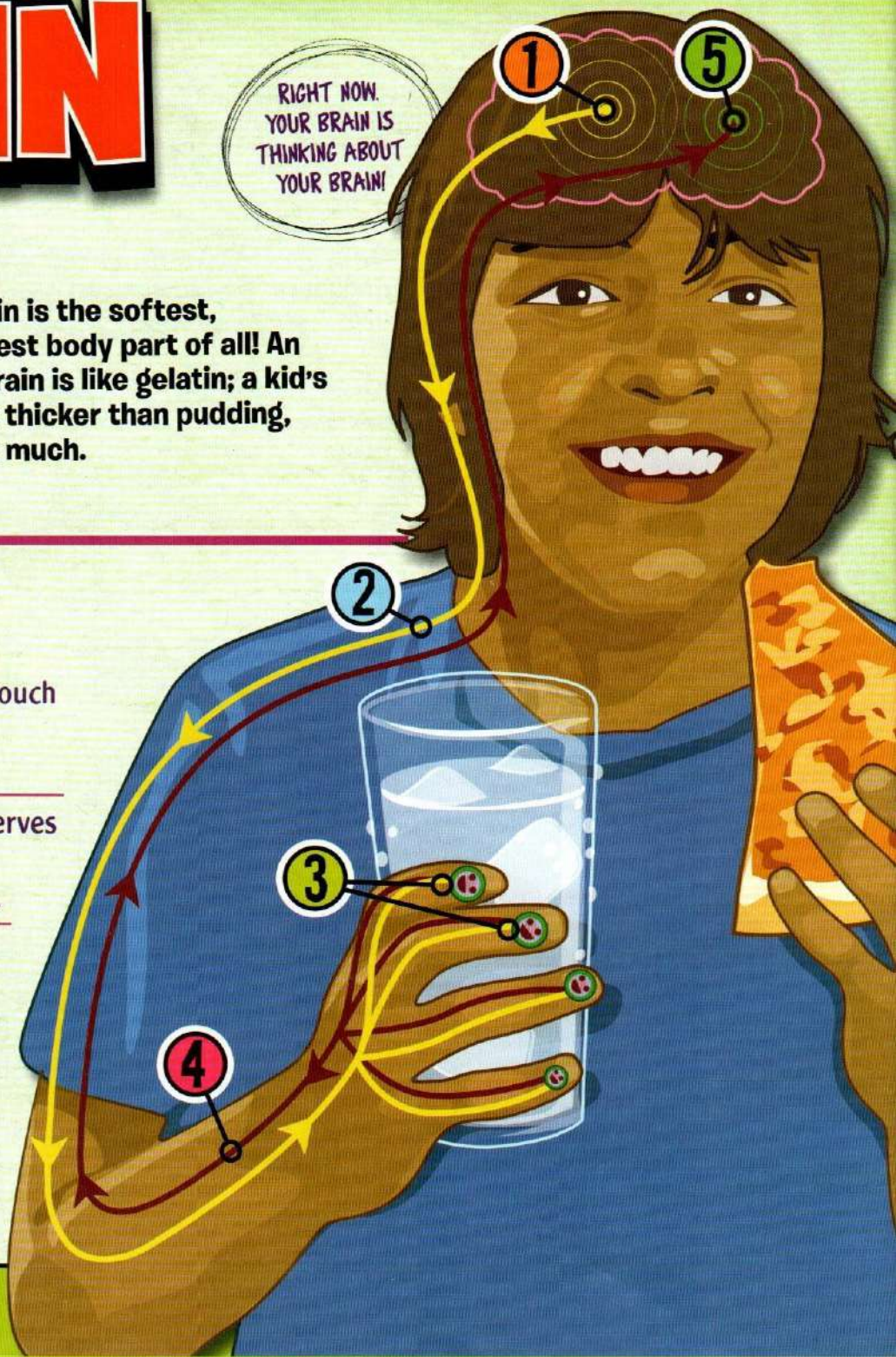
RIGHT NOW,
YOUR BRAIN IS
THINKING ABOUT
YOUR BRAIN!

Your brain is the softest, squishiest body part of all! An adult brain is like gelatin; a kid's brain is thicker than pudding, but not much.



THE VITALS

- 1** The brain decides it wants to touch something, like another piece of pizza or a glass of water.
- 2** It sends messages down the nerves to the arm and hand, telling muscles to reach out the hand.
- 3** Special cells in the skin sense pain, heat, cold, or touch.
- 4** Messages about what you are touching travel back to the brain.
- 5** The brain recognizes what you feel.



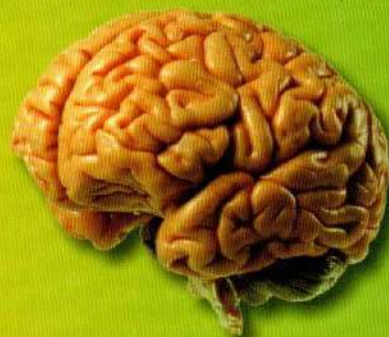
NERVE CELLS CAN BE VERY LONG THE LONGEST ONES STRETCH FROM YOUR BACK ALL THE WAY TO YOUR TOES.



THE BRAIN IS DIVIDED INTO THREE MAJOR PARTS:

1. CEREBRUM:
THINKING AND SENSING
2. CEREBELLUM:
MOVEMENT AND BALANCE
3. BRAIN STEM:
AUTOMATIC BODY FUNCTIONS, LIKE BREATHING AND DIGESTION.

BRAINY



SOME NERVE

NERVES CONNECT YOUR BRAIN TO THE REST OF YOUR BODY.

Your brain has many jobs. Thinking is one, but it also sends and receives messages. Your brain uses neurons (NU-rons) to carry messages. Neurons are tiny particles that are found throughout your body.

Messages travel through neurons by chemicals and electricity. One neuron sends a message to the neuron next to it. This goes on until the message gets to its destination. The message might be "Ouch!" from stubbing a toe. Or it might be "I'm hungry. I'm going to reach for another piece of pizza."

