

Putting Your Body Together

By: Dr. Anthony Fredericks & Rebekah Murray

Please Do Not Miss...

If you only have a limited amount of time, please don't skip...

- The Squishy Human Body
- Inch by Inch

Overview

Think about it. The human body is a wonderful collection of pumps and levers, chemicals and filters, tubes and vessels, holes and bags, liquids and solids, smooth things, rough things, soft things, and tough things...and they're all controlled by the world's most complex computer - the brain! The human body can adapt to an array of climates, battle tropical diseases, transport one to distant lands, do any kind of homework assignment (UGH!), climb tall mountains, and perform amazing feats of strength and dexterity. The human body is a package of surprises, a collection of extraordinary events, and an assembly of thousands of parts.

Background Information

The human body has nine different systems (e.g. reproductive, excretory, respiratory, etc.). The human body comes in a variety of shapes and sizes...but we are more alike than different. The human body is the most amazing, fantastic, and incredible "thing" in the entire universe! Children will probably notice that when they look at themselves in a mirror and then look at a friend and family member they all look fairly similar. All three have a head, two arms, a body, two legs, and two feet. Basic body shapes are fairly similar. But when a child examines each of the individuals on specific components of those bodies they will note that there are some significant differences, too. All three people have a head, but the distance around the top of those heads is different. All three people have a waist, but the distance around those waists is different. What's the point? Simply, that human beings have bodies that are very similar in design and function, but

are also quite dissimilar in their proportions and dimensions. Yes, we are all alike...and at the same time we are all different.

Main Ideas

- The human body has nine different systems (e.g. reproductive, excretory, respiratory, etc.).
- The human body comes in a variety of shapes and sizes...but we are more alike than different.
- **Brain** – the command center of the body
- **Spinal Cord** – relays information to and from the brain
- **Heart**- circulates blood through the body
- **Lungs** – supplies the body with oxygen
- **Stomach** – breaks down and digests food
- **Liver** – filters, cleans your blood
- **Small Intestines** – absorbs nutrients & minerals from food
- **Large Intestines** – escorts waste from the body
- The human body is the most amazing, fantastic, and incredible “thing” in the entire universe!

Materials Needed

- ***Parts* by Tedd Arnold**
- The Squishy Human Body
- String
- Scissors
- Ruler or Yard Stick
- Inch by Inch Worksheet

Preparation

1. Read “Background Information” to become more familiar with the properties of our digestive systems.
2. Read through *Parts* by Tedd Arnold. Prepare questions that you can ask along the way.
3. Make sure that you have all the supplies that you will need for each day's experiment or craft.

Opening

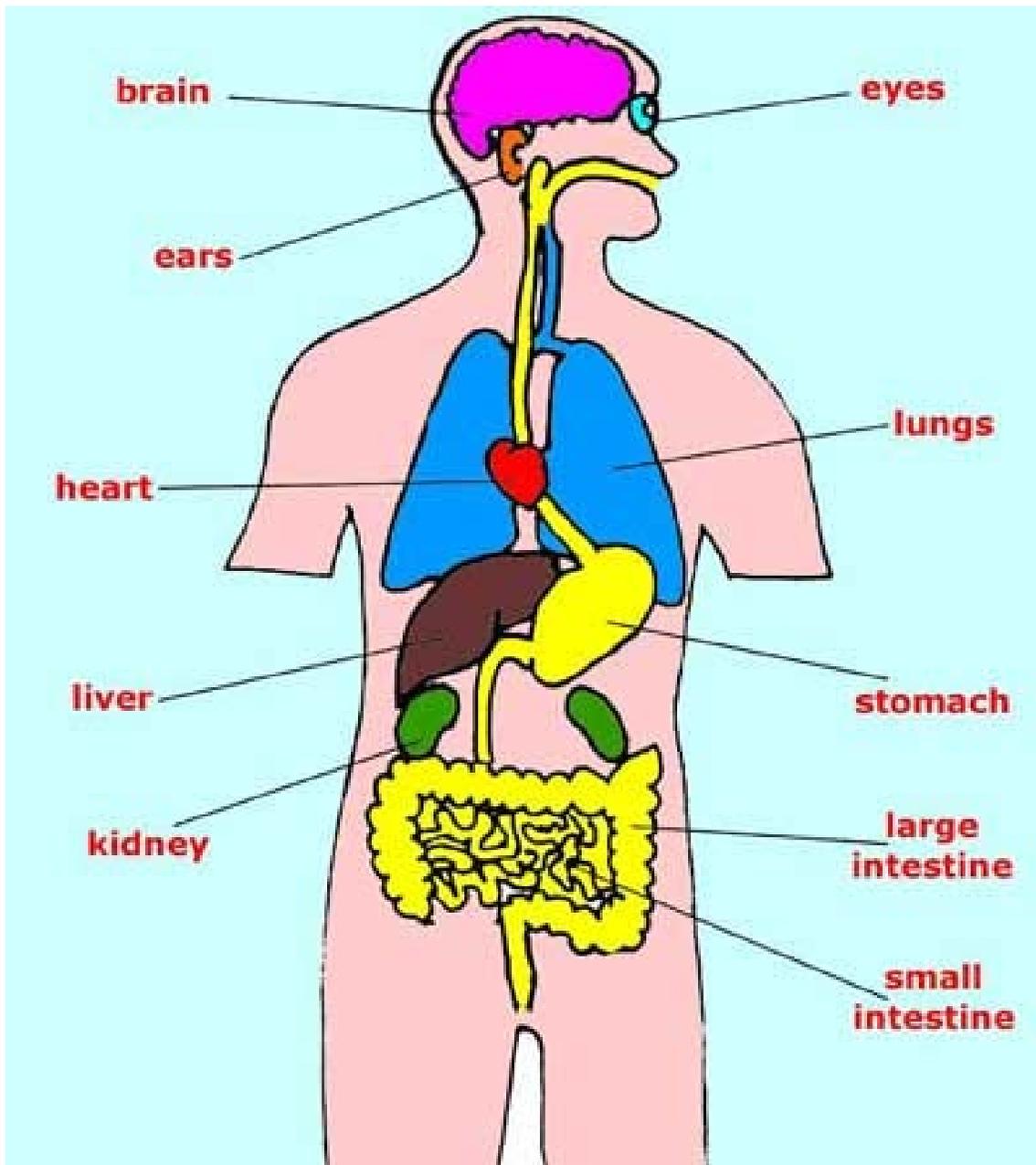
Read through *Parts* by Tedd Arnold.

Sample Brainstorming Questions: "What do you think is the neatest thing about your body?" "How are our bodies like animal bodies?" "Why do bodies come in so many different shapes and sizes?" and "If you could change your body, what would you do?"

The Squishy Human Body

Directions: Have one person remove the skeletal pieces, muscles and internal organs from the plastic model and lay them out on The Organizer sheet. Using the Squishy Human Body Model sheet begin to put together the model following all the directions (use the tweezers and forceps). As one person assembles, have another person name each part. If you have a third or fourth person, have them use the diagram or information from the book to provide the group with interesting facts about each part. Once the human body is reassembled, switch rolls and allow a new student to take apart and then reconstruct the body. When completely assembled, the model will effectively demonstrate significant organs, bones and muscles of the human body.

Fun Facts: Your lungs are the only body organ light enough to float on water. The average person takes about 23,040 breaths every day. Your stomach contains hydrochloric acid - one of the most powerful acids in nature. The acid in your stomach is strong enough to dissolve razorblades. Scientists have counted over 500 different liver functions. In an adult, the surface area of the small intestine is approximately 1500 square feet (about the size of a volleyball court). Without your kidneys, your body would be poisoned by its own wastes in a matter of a few hours. Fresh urine has no bacteria in it. In fact, fresh urine is much cleaner than your saliva or your hands. 43% of the human body is muscle. The largest muscle in the body is the gluteus maximus, which extends from the buttocks down the thigh. The smallest muscle in the human body is located in your ear. It takes 17 muscles to smile and 43 to frown. It is not possible to tickle yourself.



Brain – the command center of the body

Spinal Cord – relays information to and from the brain

Heart- circulates blood through the body

Lungs – supplies the body with oxygen

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Liver – filters, cleans your blood

Small Intestines – absorbs nutrients & minerals from food

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Further Exploration

Inch by Inch

Directions: Invite a child to use the piece of string to measure various body components on his/her body (they may need some assistance), a friend's body, and the body of a family member. After the child has taken a measurement with the string, lay it next to the ruler to obtain the distance in inches or centimeters. Record the measurements on the chart.

Fun Facts: Humans come in all shapes and sizes. We start off as small babies, but rapidly grow in size. Babies are, pound for pound, stronger than an ox. A baby's head is one-quarter of his total length, but by age 25 will only be one-eighth of his total length. Your eyes are always the same size from birth but your nose and ears never stop growing. After age 40, humans tend to get shorter by about $\frac{1}{4}$ inch every decade. The width of your armspan stretched out is the length of your whole body. When the pituitary gland malfunctions, it can boost or reduce the amount of growth hormone in a growing child's body, resulting in gigantism or dwarfism. The tallest person in the world was 8 feet 11 inches tall. The shortest person in the world was 23.2 inches tall.

Wrap Up

- Have students recall different facts that they learned about the human body. As a class, take apart the Squishy Human Body. Work together to reassemble it.
- Have students recall the major organs of the human body and their functions. Have a different student come and locate the organ on the squishy human body.

Signs of Success

The student will...

- Share stories or experiences that relate to and reinforce the selected activities.
- Identify different features of the human body.
- Demonstrate curiosity, engagement, and creativity in seeking out and examining parts of the human body.
- Work cooperatively, taking turns with materials and sharing ideas.
- Conduct inquiry using a book as a source of information.

Inch by Inch

Use string and rulers to gather the following measurements.

	<u>Yourself</u>	<u>A Friend</u>
	Name:	Name:
Length of left thumb		
Distance around the top of the head		
Distance around waist		
Distance around the right calf		
Height of each ear	R:	

	L:	
Distance from the right elbow to the tip of the right index finger		

Other Books to Explore

Amsel, Sheri. *The Everything KIDS Body Book: All You Need to Know About Your Body Systems*. (Avon, MA: Adams Media, 2012).

Cobb, Vickie and Andrew Harris. *Your Body Battles a Broken Bone*. (Minneapolis, MN: Millbrook Press, 2009).

Cole, Joanna and Bruce Degan. *The Magic School Bus Inside the Human Body*. (New York: Scholastic, 1990).

Daniels, Patricia and Christine Wilsdon. *Ultimate Bodypedia: An Amazing Inside-out Tour of the Human Body*. (Washington Dc: National Geographic, 2014).

Daynes, Katie and Colin King. *See Inside Your Body*. (London, England: Usborne Publishing, 2006).

Green, Dan and Simon Basher. *Human Body: A Book with Guts*. (New York: Kingfisher, 2011).

Harris, Robie H. and Nadine Westcott. *Who Has What? All About Girl's Bodies and Boy's Bodies*. (Somerville, MA: Candlewick Press, 2011).

Jackson, Tom and Carolyn Bracken. *Magic School Bus Presents: The Human Body* (New York: Scholastic, 2014).

Kates, Bobbi and Joe Mathieu. *We're Different, We're the Same*. (New York: Random House, 1992).

Krensky, Stephen. *Bones*. (New York, Random House, 1999).

Saltz, Gail and Lynne Cravath. *Amazing You: Getting Smart About Your Private Parts*. (New York: Puffin, 2008).

Sweeney, Joan. *Me and My Amazing Body*. (New York: Dragonfly, 2000).

Pennsylvania Educational Standards

Reading

1.2.3 A

1.3.3 A

1.6.3 A, B

1.8.3 A, B

NRC National Science Education Standards

Content Standard A: Science as Inquiry

Content Standard C: Life Science

AAS Benchmarks for Science Literacy

1B Scientific Literacy

12A Value and Attitudes

12D Communication Skills

**Sample Schedule For Making It A Week Long Unit
Day 1:**

Have students name as many internal organs as they can. Create a list on the board. Read through *Parts* by Tedd Arnold. Use the brainstorming questions.

Day 2:

Split the class in half. Have half the class work with the squishy human bodies. Allow students to take them apart, place them on the organizer sheet, and then try to put them back together. Have the other half of the class work in partner pairs to complete the Inch by Inch worksheet.

Day 3:

Rotate groups from Day 2.

Day 4:

Have students draw and label the internal organs of the human body.

Day 5:

Review what you learned about the human body. Have students recall different facts that they learned about the human body. As a class, take apart the Squishy Human Body. Work together to reassemble it.

Fantastic Facts About the Human Body

About Skin

The weight of your skin is approximately twice the weight of your brain.

The average human being has about five millions hairs on her or his body. On average, there are about 100,000 hairs on a human head.

Every hair on your body is connected to a nerve.

There are more bacteria on your scalp than under your armpits.

Human nails grow at an average rate of about $\frac{8}{100}$ th of an inch a month.

Fingernails grow four times faster than toenails.

An average man has about 12 square feet of skin on his body.

In one day a billion skin scales fall from your body.

A square inch of skin on the back of your hand has more than 204 feet of nerves.

Human skin ranges from $\frac{1}{100}$ th of an inch on the eyelid to about $\frac{1}{5}$ th of an inch on the back.

Hair on the head grows at a rate of about $4 \frac{3}{4}$ inches per year.

Boy's hair grows faster than girl's hair.

About 60 hairs fall off your head every day.

About Skeletons

One-half of the bones in your body are located in your hands and feet.

Each of your hands has 19 bones; each of your feet has 26 bones.

Bones contain 99% of the body's calcium - about two pounds worth.

Your "solid" skull consists of 29 interlocking bones.

The smallest bone in the human body is the stirrup bone inside the ear. It is less than one-fourth of an inch long. The longest bone is the thigh bone (also known as the **femur**).

About the Human Body

The tallest person in the world was 8 feet 11 inches tall.

The shortest person in the world was 23.2 inches tall.

After age 40, humans tend to get shorter by about ¼ inch every decade.

About Brains and Nervous Systems

The human brain continually uses enough energy to light a 20-watt light bulb.

The human brain triples in size from birth to adulthood (from 14 ounces to 48 ounces). But from adulthood to age 65 it shrinks by about one ounce.

The fastest nerve impulses in the brain travel at about 300 miles per hour.

The adult brain has approximately 100 billion nerve cells.

As humans get older thousands of brain cells die every day.

Brain cells are the smallest cells in the human body. Each is .0002 inches across. 35 of them would fit across the period at the end of this sentence.

The brain receives about 9 gallons of blood every hour.

About the Five Senses

By the age of 60 most people have lost about 50% of their taste buds and 40% of their ability to smell.

The human eye can distinguish nearly 10 million different shades.

In order to hear a sound the eardrum only has to move 40 billionths of an inch.

The human tongue has more than 9,000 taste buds.

We blink, on average, 15,000 times a day. Each blink lasts about a tenth of a second. We blink about 8 million times a year.

A square inch of skin may have as many as 800 pain sensors.

The tip of the tongue is the most sensitive part of the human body.

Males have larger eyes than females.

All babies are born with blue eyes. Their eyes turn to their permanent color by the time they are one year old.

Your eyes produce about 8 ounces (one cup) of tears a year.

About the Heart and Circulatory System

During your lifetime, your heart will beat over 2½ billion times.

It takes about 20 seconds for blood to reach every cell in your body.

Every day your heart pumps about 9,460 gallons of blood. That's enough to fill more than 150 bathtubs.

A drop of blood contains over 5,000,000 red blood cells.

Red blood cells live for about 100 days.

If it were possible to lay your body's entire blood vessels end to end they would measure about 60,000 miles (that's more than two times around the world).

The total weight of all the blood pumped through your body each day is about 43 tons.

The heartbeat of a newborn baby is about 120 beats per minute.

The only part of the human body that has no blood supply is the cornea of the eye.

About Muscles

The human arm can make 27 different movements.

An average man has about 66 pounds of muscle.

The largest muscle in the body is the *gluteus maximus*, which extends from the buttocks down the thigh.

You use 72 muscles to say one word.

You need about 200 muscles just to take one step forward.

The smallest muscle in the human body is located in your ear.

Skeletal muscles can contract and relax in less than .1 second. Heart muscles require one to five seconds to relax and contract.

43% of the human body is muscle.

About the Respiratory System

During one 24-hour period an adult will take in about 2,200 gallons of air into her or his lungs.

Your lungs are the only body organ light enough to float on water.

The average person takes about 23,040 breaths every day.

A pair of lungs weighs about 2.2 pounds.

In one day more than 2,200 pounds of air will pass into an adult's lungs.

When you sneeze, you expel air from your lungs at nearly 100 miles per hour – that's hurricane force!

An adult takes in about one pint of air with each breath.

A newborn baby takes about 40 breaths a minute.

During the course of a normal day, an adult will exhale 78 gallons of carbon dioxide.

About Teeth

Your teeth began developing in the second month after conception (while you were still in your mother's womb).

The world's most common disease (more than the common cold) is dental caries (tooth decay).

Your first teeth (milk teeth) begin to emerge when you are about seven months old. Your last teeth (wisdom teeth) usually arrive when you are about 25 years old.

About the Digestive System

Your stomach contains hydrochloric acid - one of the most powerful acids in nature.

During his lifetime an average man will eat 50 tons of food and drink 13,000 gallons of liquid.

In an adult the surface area of the small intestine is approximately 1500 square feet (about the

size of a volleyball court).

Each day your body secretes about seven quarts of digestive juices.

The salivary glands in your mouth produce about $\frac{1}{2}$ quart of saliva a day.

About the Excretory System

Your body produces between four and eight cups of urine a day.

The total length of all the filtering tubes in your two kidneys is more than 190 miles.

180 quarts of blood are filtered through your kidneys every day.

Fresh urine has no bacteria in it. In fact, fresh urine is much cleaner than your saliva or your hands.

Without your kidneys, your body would be poisoned by its own wastes in a matter of a few hours.

About Cells

Brain cells are so small that 40 of them would fit inside the period at the end of this sentence.

The average person has about 30 billion fat cells.

The human brain contains about 10,000,000,000 nerve cells.