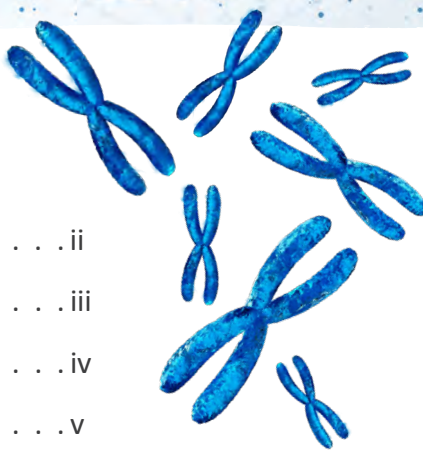
HEALTH AND THE PHYSICAL BODY

3–8 Science Unit Study

THE GOOD AND THE BEAUTIFUL

Health & the Physical Body

CREATED BY THE GOOD AND THE BEAUTIFUL TEAM



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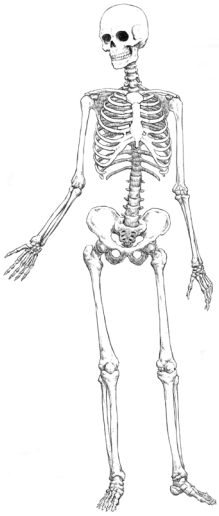


Unit Information

Science Journal

All The Good and the Beautiful science units include activities in a student journal. Each student should have his or her own student journal, and the parent or teacher will direct the student regarding when to complete the activities as directed in the lessons. Student journals can be purchased by going to **goodandbeautiful.com/science** and clicking on the *Health and the Physical Body* unit link.

Science Wall

All The Good and the Beautiful science units include vocabulary words to be placed on your science wall, which is a wall or tri-fold presentation board in your learning area on which you can attach the vocabulary words and other images. ***Cut out the vocabulary word cards at the beginning of the unit.*** The course will indicate when to place them on the wall.

Lesson Preparation

All The Good and the Beautiful science units include easy-to-follow lesson preparation directions at the beginning of each lesson.

Activities

Many of The Good and the Beautiful science lessons involve hands-on activities. An adult should always closely supervise children as they participate in the activities to ensure they are following all necessary safety procedures.

Unit Videos

Some lessons include videos that were created by The Good and the Beautiful. Have a device available that is capable of playing the videos from **goodandbeautiful.com/sciencevideos** or from the Good and Beautiful Homeschool app.

Content for Older Children

Some lessons include extra content that is more applicable for older children (grades 7–8). Parents or teachers may choose to skip this content if instructing only younger children.

Content for Younger Children

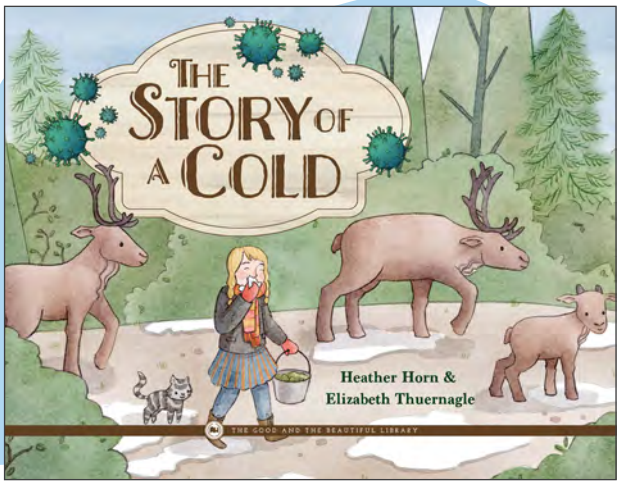
Some lessons include extra content that is more applicable for younger children (grades 3–6). Parents or teachers may choose to skip this content if instructing only older children.

Versions

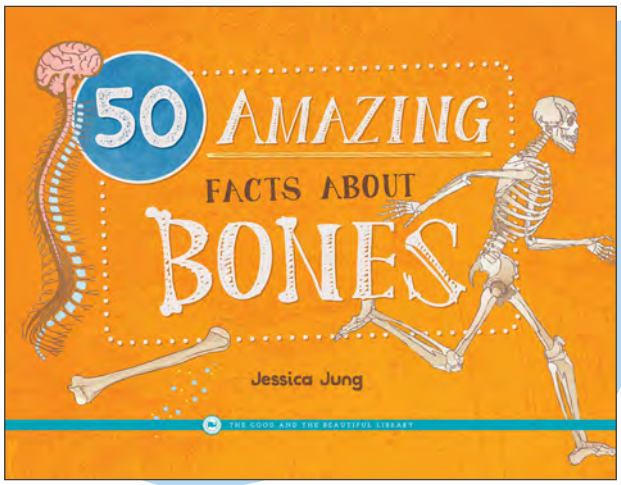
New discoveries are being made on an ongoing basis. This course is reviewed and revised periodically to keep information as up-to-date as possible. This version is the first edition of this unit.

Read-Aloud Book Pack

The books below are optional read-aloud books that complement this unit. These books can be purchased as a book pack by going to **goodandbeautiful.com/science** and clicking on the *Health and the Physical Body* link.



The Story of a Cold
by Heather Horn and Elizabeth Thuernagle



50 Amazing Facts About Bones
by Jessica Jung

CORRELATED BOOKS

The Good and the Beautiful Library has several books that correlate well with the *Health and the Physical Body* unit. It can be a wonderful experience for children to read books on their level related to the subjects they are learning in science. The library includes both fiction and nonfiction books organized according to reading level. Find these correlated books by going to **goodandbeautiful.com/science** and clicking on the *Health and the Physical Body* science unit product page.

GRADES 7–8

Lesson Extensions

How the Extensions Work

Each lesson has an optional lesson extension for children in grades 7–8. Complete the lesson with all the children, and then have the older children complete the self-directed lesson extension. These extensions are located in the *Grades 7–8 Health and the Physical Body Student Journal*.

Answer Key

The answer key for the lesson extensions can be found on the free Good and Beautiful Homeschool app in the science section. Visit **goodandbeautiful.com/apps** for information on accessing the app. The app can be accessed from a computer, phone, or tablet.

Flexibility

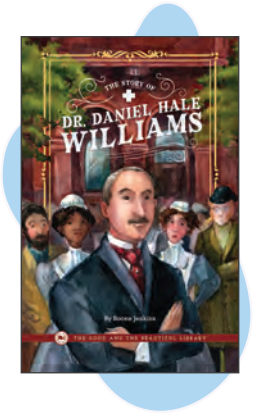
The amount of time it will take to complete each lesson extension will vary for each child. The average time is about 10–15 minutes per extension. Parents/teachers and children may choose to omit parts of the lesson extension if desired. Encourage the children to stretch their capabilities, but also reduce work if needed.

Taking Notes

Some of the grades 7–8 lesson extensions have the children summarize the material read. Teach the children to look for key information and then to summarize the most important points. Students can also add notes with their thoughts and the facts that are most interesting to them.

Optional Grades 7–8 Reading Book

We recommend *The Story of Daniel Hale Williams* by Boone Jenkins as extra reading for students in grades 7–8. This book can be purchased by going to **goodandbeautiful.com/science** and clicking on the *Health and the Physical Body* unit link.



The Story of Daniel Hale Williams
by Boone Jenkins

Supplies Needed

You will need the following supplies for **activities**. There are no experiments in this unit.

Lesson 1

- 1-cup measuring cup
- Sand (optional)
- Scissors

Lesson 2

- Small mirror or access to larger mirror
- Apple or other piece of fruit, such as a banana or peach, per child
- Glue stick
- Colored pencils or crayons
- Scissors

Lesson 3

- Saltine cracker for each child
- 1 piece of sandwich bread
- Quart-sized zipper bag
- ¼ cup vinegar, any kind
- Clear drinking glass or bowl
- 2 Tbsp cooking oil, any kind
- 1 Tbsp green dishwashing liquid soap
- Spoon or something to stir with

Lesson 4

- Glue stick

Lesson 5

- Paper clip
- Pencil, pen, or colored pencils (optional) for each child
- Two bowls of the same size
- Two or three packages of children's favorite snacks that include nutrition labels
- Kitchen measuring utensils

Lesson 6

- 2 clear glasses or jars
- Water
- 2–3 drops of red food coloring
- 1 Tbsp of sand or small pebbles
- 1 coffee filter
- 1 rubber band

Lesson 7

- Empty toilet paper roll

Lesson 8

- Pint-sized jar
- 1-cup, ¼-cup, ½-cup, and 1-tablespoon measuring utensils
- Light corn syrup
- Red Hots® cinnamon candies
- Uncooked white beans
- Uncooked split peas

Lesson 9

- 2 bendy straws
- Electrical tape
- Scissors
- Rubber bands
- 3 large, uninflated balloons
- 64-ounce plastic fruit juice bottle
- Clay or play dough
- Glue stick

Lesson 10

- Pen or pencil

Supplies Needed

You will need the following supplies for **activities**. There are no experiments in this unit.

Lesson 11

- Crayons or colored pencils
- 2–3 plastic straws per child
- String or yarn
- Tape or 5 paper clips per child
- Scissors

Lesson 12

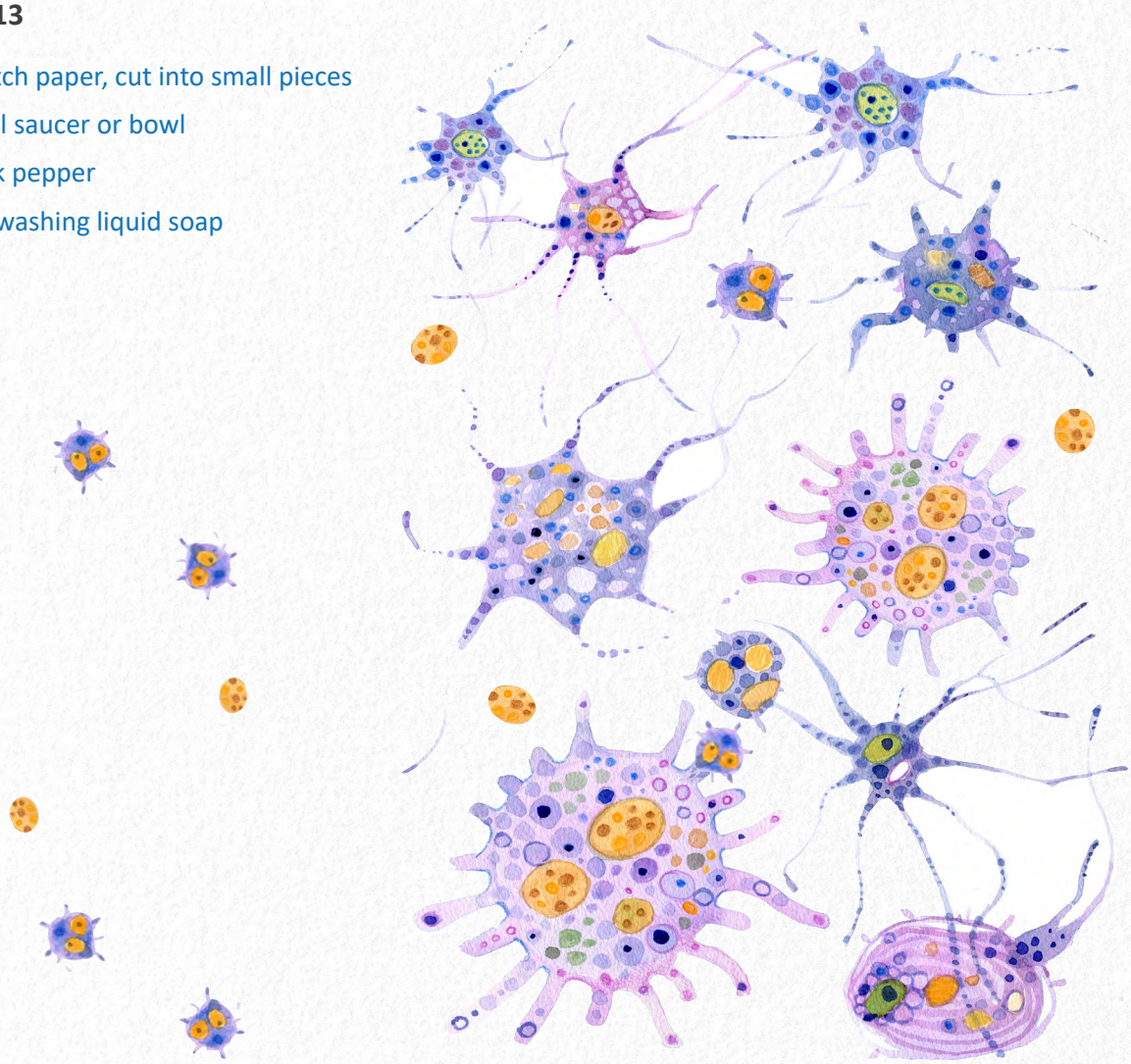
- Crayons or colored pencils

Lesson 13

- Scratch paper, cut into small pieces
- Small saucer or bowl
- Black pepper
- Dishwashing liquid soap

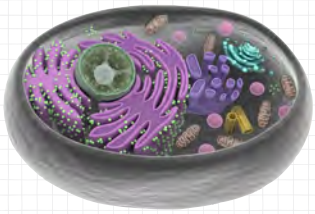
Lesson 14

- 1 red pipe cleaner per child
- 1 blue pipe cleaner per child
- 1 white pipe cleaner per child
- Pony beads, 4 different colors per child
- A pencil
- Transparent tape
- Scratch paper
- Mirror



Vocabulary

Instructions: Cut out the vocabulary cards in this section. Place them on your science wall when prompted to do so in the lessons. Review the vocabulary words several times during this unit and, if desired, at various times throughout the school year.



Cells

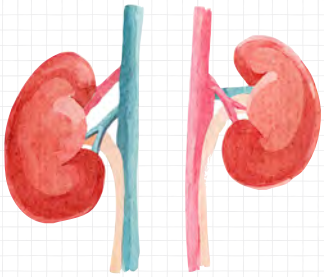
the smallest functional units of an organism

Tissues

groups of cells that are the same and work together to do a job in the body

Organs

self-contained groups of tissues that perform a specific job in the body

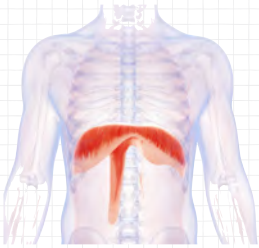


Nephrons

tiny filters in the kidneys that trap and remove waste from the blood

Blood Vessels

Very tiny tubes that form a network throughout the body to exchange oxygen, nutrients, and waste between blood and tissues. Three types of blood vessels are arteries, veins, and capillaries.



Diaphragm

the thin muscle that separates the chest and abdominal cavities and is the principal muscle of respiration

How the Body Is Formed

Objective

Help the children learn about the structure and function of cells and how the human body is formed.

Preparation:

- ☐ Cut out the "Parts of a Cell" cards.

Activity Supplies:

- 1-cup measuring cup
- Sand (optional)
- Scissors

☐ Travel Through a Cell Activity

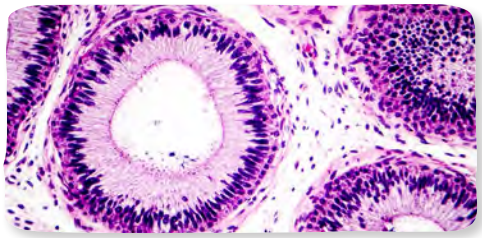
Read to the children: The human body comes in all different shapes and sizes. We have different colors of hair and eyes, different heights, and different skin tones. But underneath all these differences, we have exactly the same basic makeup. We are all made of ***cells***.

Have you ever put a puzzle together to create a beautiful picture? Cells are much like puzzle pieces. They are extremely small units that form the organs and tissues of the human body.

Let's do an activity to learn more about a cell.

1. **Place the "Travel Through a Cell" activity page in front of the children.**
2. **Shuffle the "Parts of a Cell" cards.**
3. **Place the "Parts of a Cell" cards facedown along the top of the "Travel Through a Cell" page.**
4. **Have each child take turns flipping over a card and reading what is on the card. Have that child point to the part of the cell that the card refers to on the "Travel Through a Cell" page.**

Optional: When all cards have been read, flip the cards back over. Take turns drawing a card and reading only the description of the cell part without showing the picture. Have the other children guess which part the description refers to by pointing to that part on the "Travel Through a Cell" page.



Cell Division and Development of a Baby

Have the children turn to the "Cell Division and Development of a Baby Cards" in Lesson 1 of their student journals and cut out the cards.

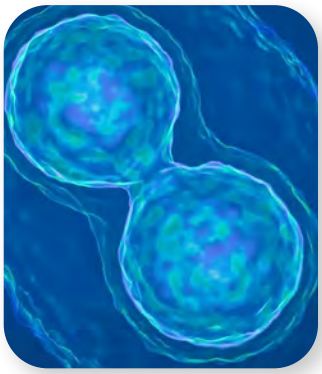
Read to the children: You have trillions of cells in your body. A trillion is a huge number that is hard to imagine. **Show the children the 1-cup measuring cup.** If we filled this cup with sand, it would hold about 8 million grains of sand. **Fill the cup with sand (optional).** It would take 125,000 cups to get 1 trillion grains of sand!

Have the children turn to the "Cell Division and Development of a Baby" page in Lesson 1 of their student journals. When you come to a bold blue word, have the children glue the corresponding card onto the page.

Read to the children: Follow along on your student journal page as I read, and then find the matching "Cell Division and Development of a Baby Cards" card to glue into place.

A baby begins life as a single cell called a **zygote**. This cell has all the genetic information from the mother and the father that join together inside the mother's womb, where the baby begins growing.

All cells grow and multiply through division. What happens when you divide a cookie in half? [You get two pieces of a cookie.] What if we divide those two pieces in half again? We get four pieces! Cell division works *almost* the same way.



The single zygote cell divides, creating two cells. Those two cells divide, creating four cells. Then the four cells divide, creating eight cells, and so on. Unlike the cookie, which gets smaller when we divide it, when cells of a zygote divide, there are more and more cells of almost the same size—so it grows!

As the zygote cell divides over and over, different **types of cells** with different shapes, sizes, and functions begin to form. We have about 200 different kinds of cells, and each kind has a specific job.

Some of these cells become **tissues**, but not the kind of tissue you sneeze into! ***Tissues*** in your body are groups of cells that are the same and work together to do a job in the body. Your entire body is covered with a kind of tissue. Do you know what it's called? Skin tissue! Your skin is really millions of flat skin cells that have all come together to form the skin tissue. We also have muscle tissue, nerve tissue, and even blood tissue.

As the baby continues to grow, an **embryo** is formed. It is at this stage that the tiny heart forms and begins to beat, pumping blood through all the developing parts and organs of the baby's body.

The cells continue dividing, tissues continue growing, and ***organs,*** self-contained groups of tissues that perform a specific job in the body, begin to take shape. Liver cells come together to form the tissues of the liver, intestinal cells come together to form the tissues of the intestines, nerve cells form the nerve tissue, and muscle cells form muscle tissue.

As the embryo continues to grow, the organs begin working together in systems. The systems continue developing into full maturity until the baby goes from being an embryo to a **fetus**. Then, at just the right time, the **baby** is born!

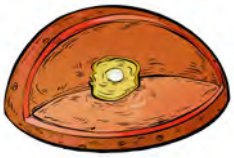
Parts of a Cell

Cytoplasm is a jelly-like substance that is mostly composed of water and fills the cell.

The cell membrane is a thin outer layer that holds the cell together and separates it from its environment. It lets in nutrients and lets out waste.

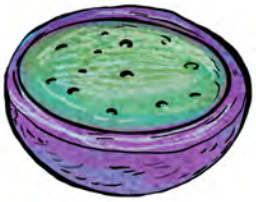
Energy for the cell is made in the mitochondria.

The nucleus is the control center of the cell that contains DNA (hereditary information) and tells the cell what to do.



The endoplasmic reticulum transports the protein needed for the cell's growth and repair.

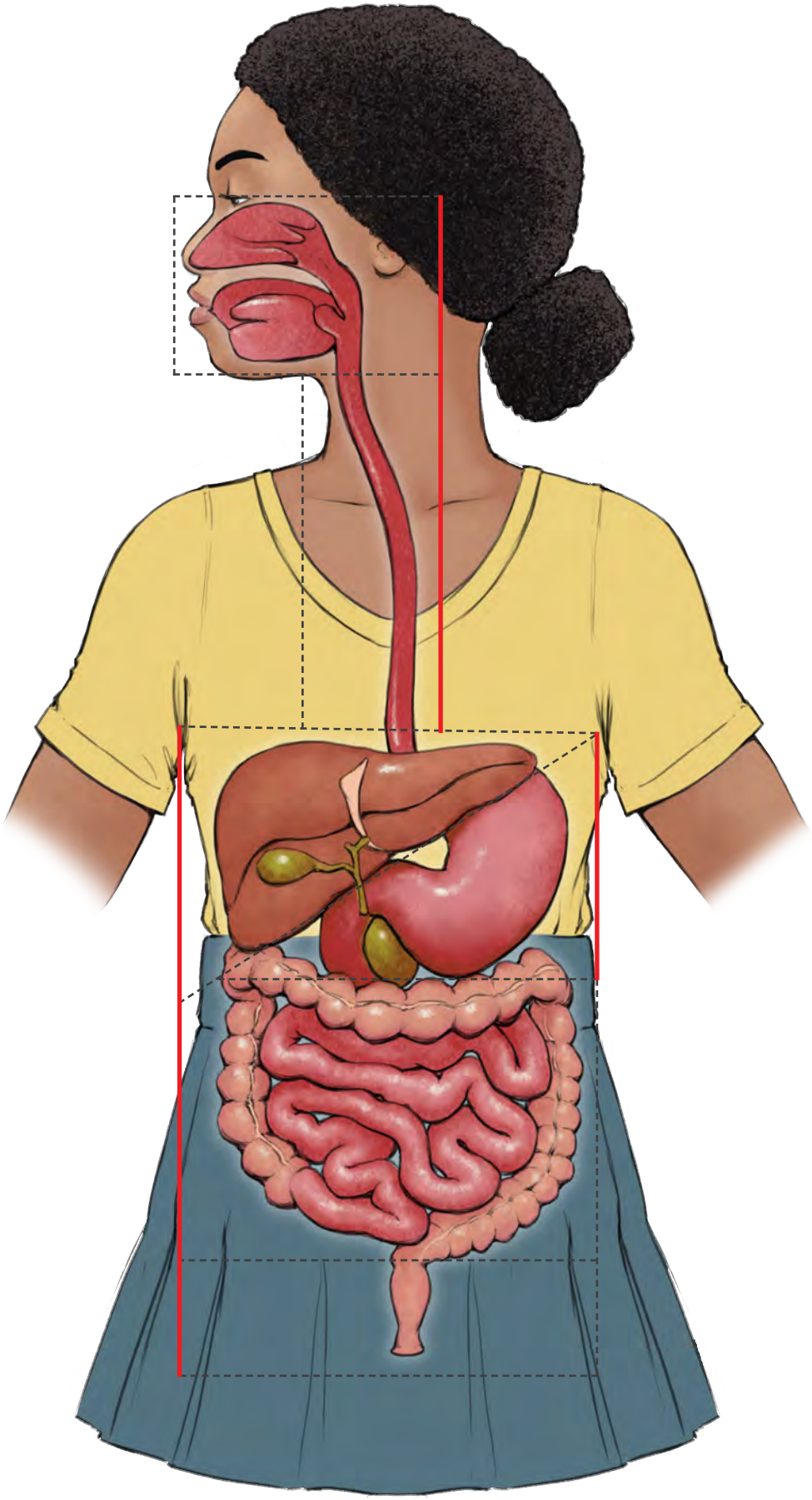
Lysosomes are the cleaners of the cell. They destroy harmful substances and old, worn-out cell parts.



In the Golgi apparatus, proteins and lipids are packaged and tagged with markers that determine their destination.

Ribosomes are small protein factories that can be attached to the endoplasmic reticulum or float around in the cytoplasm.

Digestive System Lift-a-Flap



The Digestive System: Part 2

Objective

Help the children understand the process of digestion and the organs involved.

Preparation:

- ☐ None

Activity Supplies:

- Saltine cracker for each child
- 1 piece of sandwich bread
- Quart-sized zipper bag
- ¼ cup vinegar, any kind
- Clear drinking glass or bowl
- 2 Tbsp cooking oil, any kind
- 1 Tbsp green dishwashing liquid soap
- Spoon or something to stir with

☐ Where It All Begins

Read to the children: In our last lesson, we learned that digestion begins in the mouth, where food is broken down by chewing and the tongue pushes the food to the throat.

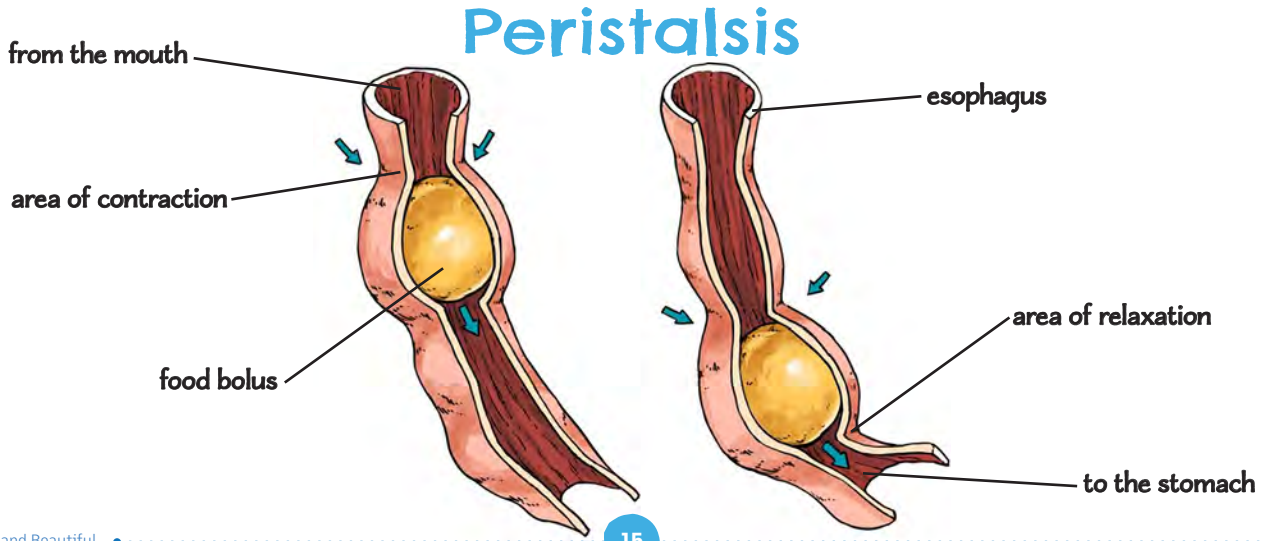
<u>But then what happens?</u>

Give each child a cracker. Have the children chew the cracker and swallow, paying close attention to what happens when they swallow.

<u>How do you think the food goes down our throats?</u>

Once food leaves your mouth, it enters the ***esophagus***, which is a muscular tube in your throat that ends at your stomach. As food goes down the esophagus, muscles below the food relax while muscles above the food contract. This is a muscular process called *peristalsis* [peh–ruh–STAAL–suhs], which pushes the food down the esophagus into the stomach.

This muscular movement can be found throughout the digestive system, including in your stomach and intestines.



The sloshing and squeezing simulate what the stomach does as it churns the food. **Discuss the following questions with the children:**

1. Why do you think we broke up the bread instead of just putting the whole piece into the bag? [to simulate chewing]

2. What did the vinegar do to the bread? What substance does the body produce that does the same thing to food as the vinegar? [The vinegar soaked into the bread and continued to break it down. Gastric acid.]

3. What happened when we sloshed and squeezed the contents of the bag? What does the stomach do to food that is similar to the sloshing and squeezing? [The bread broke down. The stomach squeezes the food and, along with gastric acid, breaks it down.]

Bile Activity

Read to the children: When the stomach is finished churning and breaking down the food, it is not quite ready to be used by the body as fuel. This is because it is still partially made of fatty substances called lipids, which can't mix with water-based substances like your blood. The food moves to the small intestine where it mixes with a greenish-brown liquid from the liver called ***bile*** that helps the lipids and water-based substances mix with each other. Let's simulate what happens in the small intestine when bile mixes with the partially digested food.

Have the children turn to the "Bile Activity" page in Lesson 3 of their student journals. Have the children complete the "Hypothesis" questions at the top of the page. Read to the children: A hypothesis is a guess of what one thinks might happen before doing an experiment or activity.

Supplies:

- Clear drinking glass or bowl
- 2 Tbsp cooking oil, any kind
- 1 Tbsp green dishwashing liquid soap
- Spoon or something to stir with

Instructions:

1. **Add water to the glass. Leave about one inch of space at the top. Ask the children the following questions:** What part of your body does the jar represent? [the small intestine] What does the water represent? [blood]

2. **Add oil (which will represent fat) to the glass. Ask the children the following question:** Which liquid represents the lipids in your food? [cooking oil]

3. **Add dishwashing soap (which represents bile) to the water and oil mixture. Stir. Ask the children the following questions:** Which liquid represents the bile? [dish soap] Were the oil and water able to mix before we added the dish soap? [no] What happened to the oil and water when we added the dish soap and stirred them? [They were able to mix.]

Vitamins and Hydration

Objective

Help the children understand what vitamins and minerals are, how they're used by the body, and what their dietary sources are.

Preparation:

- ☐ Cut out the "Vitamin Game Cards."
- ☐ Read the nutrition labels for the snacks chosen for this lesson and assemble the kitchen measuring utensils needed to measure out one serving of each snack.

Activity Supplies:

- Paper clip
- Pencil, pen, or colored pencils (optional) for each child
- Two bowls of the same size
- Two or three packages of the children's favorite snacks that include nutrition labels
- Kitchen measuring utensils

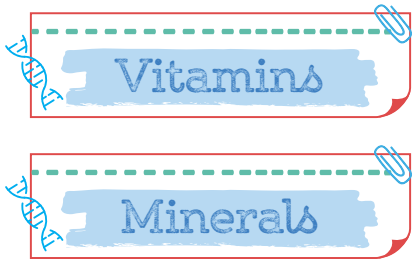
☐ Introduction

Read to the children: Cars have a lot of moving parts. What liquid do most cars require in order to use their moving parts to drive? [gas or fuel] Just like a car, your body needs fuel to keep moving, thinking, and learning each day. The fuel that your body requires comes in the form of nutrients, such as ***vitamins*** and ***minerals***—substances found in nutritious foods. They help keep your bones, muscles, skin, and organs healthy. Nutrients also help improve your vision and battle infections.

Our bodies can best use vitamins and minerals from eating nutritious, whole foods as close to their original form as possible. God gave us foods to nourish our bodies, and it's important to eat foods full of vitamins and minerals.

☐ Science Wall: Vocabulary Words

Place the vocabulary cards VITAMINS and MINERALS on your science wall. Read and discuss the words and definitions.

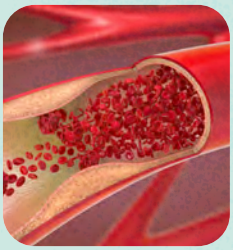


Spin-a-Vitamin Spinner

The Circulatory System Part 2: Blood

Objective

Help the children learn about blood and how it flows through the body.



Preparation:

- ☐ None

Activity Supplies:

- Pint-sized jar
- 1-cup, ¼-cup, ½-cup, and 1-tablespoon measuring utensils
- Light corn syrup
- Red Hots® cinnamon candies
- Uncooked white beans
- Uncooked split peas

Introduction

Read to the children: Hold your arm so that your palm is facing up and take a look at the skin of your lower arm. Do you see the blue lines just under your skin? These are some of the vessels carrying a substance to every part of your body and delivering the oxygen and nutrients you need to function and stay healthy—blood!

Pulsing through the blood vessels of the average adult is more than 10 pints of blood. Thanks to the heart, blood circulates through the entire body in less than a minute. Let's learn more about this life-giving substance.

Blood Model Activity

Gather the "Blood Model Activity" supplies. As you read the information to the right, have the children follow the directions to create the blood model. Allow the children to complete the activity without your help, if possible.

Read to the children: What if you could use a microscope to see the tiny particles that make up our blood? What do you think you would see? To give you an idea of what makes up our blood, you're going to make a model in a jar. Let's get our supplies together!

Help the children gather the supplies needed for this activity. You will need the following items:

- **Pint-sized jar**
- **1-cup, ¼-cup, ½-cup, and 1-tablespoon measuring utensils**
- **Light corn syrup**
- **Red Hots® cinnamon candies**
- **Uncooked white beans**
- **Uncooked split peas**

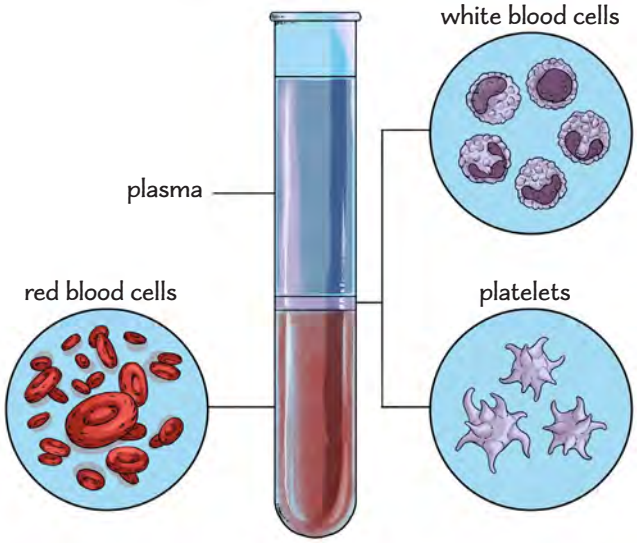
Steps:

1. **Help the children measure ½ cup of the corn syrup and pour it into the jar. Rinse the ½-cup measuring cup in hot water. Read to the children:** The corn syrup represents plasma, the liquid part of our blood.

2. **Help the children fill the ½-cup measuring cup with cinnamon candies and pour them into the jar. Read to the children:** The cinnamon candies represent disc-shaped red blood cells.
3. **Help the children fill the tablespoon with uncooked white beans and pour them into the jar. Read to the children:** The white beans represent white blood cells.

4. **Help the children fill the ¼-cup measuring cup with uncooked split peas and pour them into the jar. Read to the children:** The split peas represent platelets.
5. **Have the children stir the contents of the jar to mix all the parts.**

6. **Have the children place the lid on the jar and make sure that it's closed tightly.**
7. **Review the contents of the jar and help the children to identify the plasma, red blood cells, white blood cells, and platelets.**



Parts of the Blood

Read to the children: Our blood is made up of many vital components that assist our bodies in a variety of ways. From fighting off infections to controlling bleeding, our blood is truly an incredible substance. Let's learn more about a few of blood's components.

- **Plasma** is the "liquid" part of our blood that carries proteins, nutrients, hormones, and blood cells through the circulatory system to all parts of the body. It is more than just a carrier, however. Plasma also contains minerals your body needs for many processes, helps blood stop flowing when you're injured, and can be donated to others who have severe injuries. The diagram below shows how our blood would look if it were separated into its different components.
- **Red blood cells** deliver oxygen to our body's tissues and carry away carbon dioxide. The liver and spleen, along with the rest of a body system called the lymphatic system, filter out dead red blood cells from the blood. Unlike most other cells in our bodies, red blood cells do not have a nucleus. This gives them more room to carry hemoglobin, but it also means they cannot divide to create more cells. After about 120 days, they eventually get worn out and die. New red blood cells are created by our bone marrow.

Fun Fact!

There are over 5 million red blood cells in a single drop of blood!

- **White blood cells** are a very important part of our immune system that help our bodies fight off infection and sickness. Unlike red blood cells, white blood cells have a nucleus and mitochondria. There are five different types of white blood cells in our bodies, and each serves a specific purpose. **Read the information in the yellow box on the next page to the children to learn more about each type of white blood cell.**

The Respiratory System

Objective

Help the children understand the features of the respiratory system, how the human body breathes, and the importance of the lungs.

Preparation:

- ☐ Remove the "Breathe In, Breathe Out" activity page.
- ☐ Cut out the "Breathe In, Breathe Out Cards."

Activity Supplies:

- 2 bendy straws
- Electrical tape
- Scissors
- Rubber bands
- 3 large, uninflated balloons
- 64-ounce plastic fruit juice bottle
- Clay or play dough
- Glue stick

☐ Balloon Blowing Activity

Hand each child a deflated balloon. Have each child blow up his or her balloon, pinch the open end closed, and then release it. Do this a few times. If the child is too young or unable to blow up the balloon on his or her own, you can demonstrate by blowing up the balloon instead.

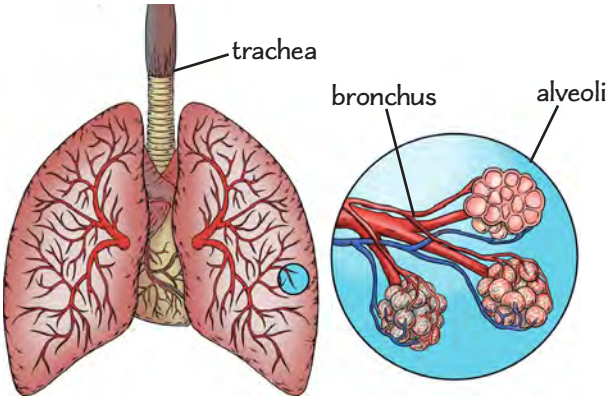
Read to the children: What caused the balloon to inflate, or get bigger, when you blew into it? When you blew into the balloon, you forced tiny air particles from your lungs into the balloon, which then bounced around the inside walls of the balloon and created enough air pressure to force the balloon to grow larger and inflate. What happened when you released the balloon? All the air came out, and the balloon deflated.

The air that you blew into your balloon came from your lungs, which are a very important part of your respiratory system. God has designed your lungs to keep your body alive and healthy from the very moment you are born into this world. Your lungs are hard at work every time you cough, sneeze, or hiccup. They are even working when you take a big breath to smell Mom's delicious cookies baking in the oven! Not only that, but without a continual supply of air containing a gas called oxygen, you could not live. Let's take a closer look at how your entire respiratory system functions and why your lungs are so important.

☐ The Respiratory System Video

WATCH ONLINE

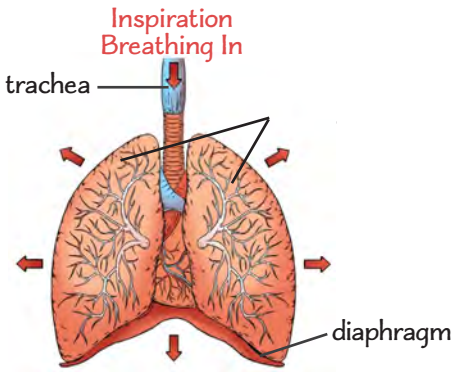
Watch the video titled "The Respiratory System" at goodandbeautiful.com/sciencevideos or on the Good and Beautiful Homeschool app.



1 INSPIRATION

Also called inhalation, this is the process of breathing in oxygen, which is then delivered to all parts of our bodies. A muscle below the lungs called the *diaphragm* pulls downward when you breathe in, allowing the lungs and muscles between the rib cage to expand, drawing air in through your nose (or mouth) and down the trachea to fill the lungs.

Touch your stomach area as you breathe. Feel how your diaphragm causes your lungs to expand.



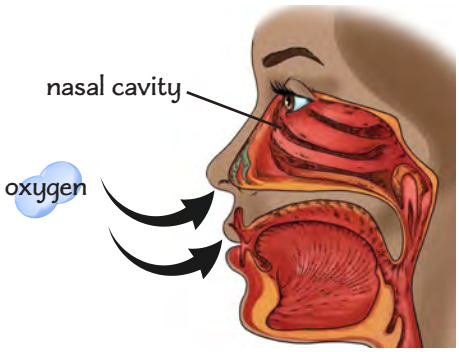
2 NASAL CAVITY OR MOUTH

When air is drawn into your nose, it enters an area called the nasal cavity. Here very small hairs help collect any dust or unwanted particles that come in with the air.

Place your hand under your nostrils to feel the air flow in and out of your nasal cavity.

When air is drawn into your mouth, the air goes directly into your trachea.

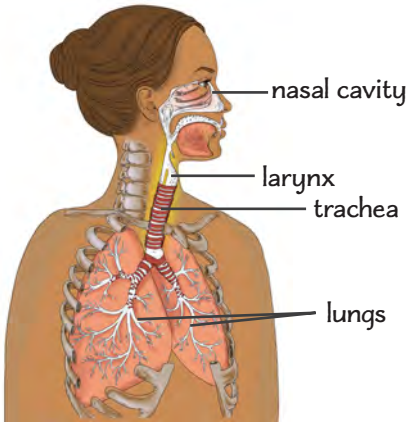
Place your hand in front of your mouth and breathe onto it to feel the air flowing.



3 LARYNX & TRACHEA

From your nasal cavity, air travels through your larynx [LEH–rings] (voice box) and trachea [TRAY–kee–uh]. The trachea is a tube lined with ring-shaped pieces of cartilage.

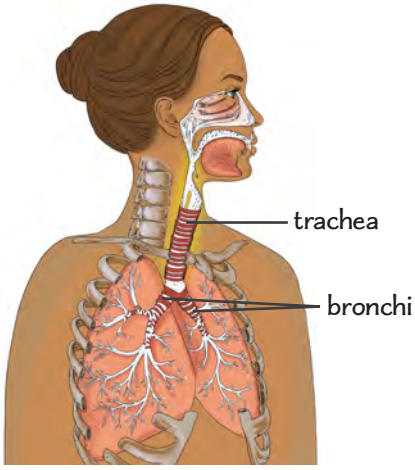
Feel the front of your neck. Do you feel the lumps of the ring-shaped cartilage? These pieces of cartilage help keep the trachea open so that air can flow freely through it.



4 BRONCHI

When the air reaches the base of your trachea, it splits into two tubes, one leading to the left lung and the other to the right lung. These tubes are called the bronchi (singular: bronchus).

Place your hand on your chest to feel it move as you slowly take in a breath of air.



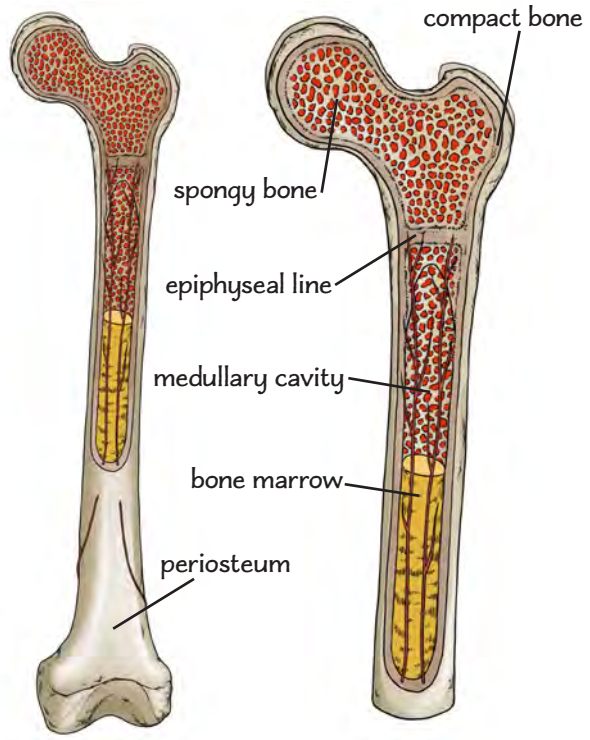
Read to the children: While there are lots of different bone sizes and shapes in our bodies, bones are all made of the same materials.

- The outside of our bones has a hard outer cover called the **periosteum** [pair–ee–AH–stee–uhm] protecting it.
- The next layer is called **compact bone**. It is a very dense layer that provides strength and protection.
- Beneath the compact bone is a porous layer of **spongy bone** that is softer and weaker than compact bone because it has bigger holes.

Most bones in our bodies have only these three parts, but long bones have some additional parts.

- The **medullary** [muh–DOO–luh–ree] **cavity** is a long, narrow column inside the spongy bone that holds bone marrow.
- This soft **bone marrow** tissue is where red blood cells, white blood cells, and platelets are created.

The **epiphyseal** [eh–puh–FIH–zee–uhl] **line** is an area of the bone that allows it to grow in length. After children finish growing, this area hardens and becomes the epiphyseal plate.



Healthy Bone Growth

Read to the children: Our bones grow all through childhood. While children are growing, they need a lot of calcium, which is found in foods like milk, broccoli, oranges, leafy greens, canned salmon and other canned fish, and soybeans. Calcium helps bones grow, so if there isn't enough calcium in a child's diet, his or her bones could become weak or brittle or not grow as they should.

Remodeling is a process where new bone tissue is formed after older bone is broken down and enters the bloodstream. Remodeling never stops. In fact, your skeleton will completely regenerate every ten years or so!

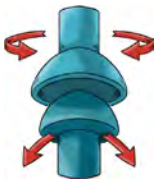
Something else that is very important for having strong bones is exercise. Just like muscles, which respond to the stress exercise puts on the body by becoming stronger, bones respond to lifting and carrying extra weight by becoming denser and stronger.

Types of Joints

Read to the children: There is one more very important part of the skeletal system—the joints! A ***joint*** is a special structure of the body where two or more bones come together.

Our bodies would be very stiff if we didn't have joints. They allow the bones of the skeletal system to work together so that we can dance, walk, flip, run, and move around in hundreds of different ways. Let's take a closer look at the different types of joints found in the body.

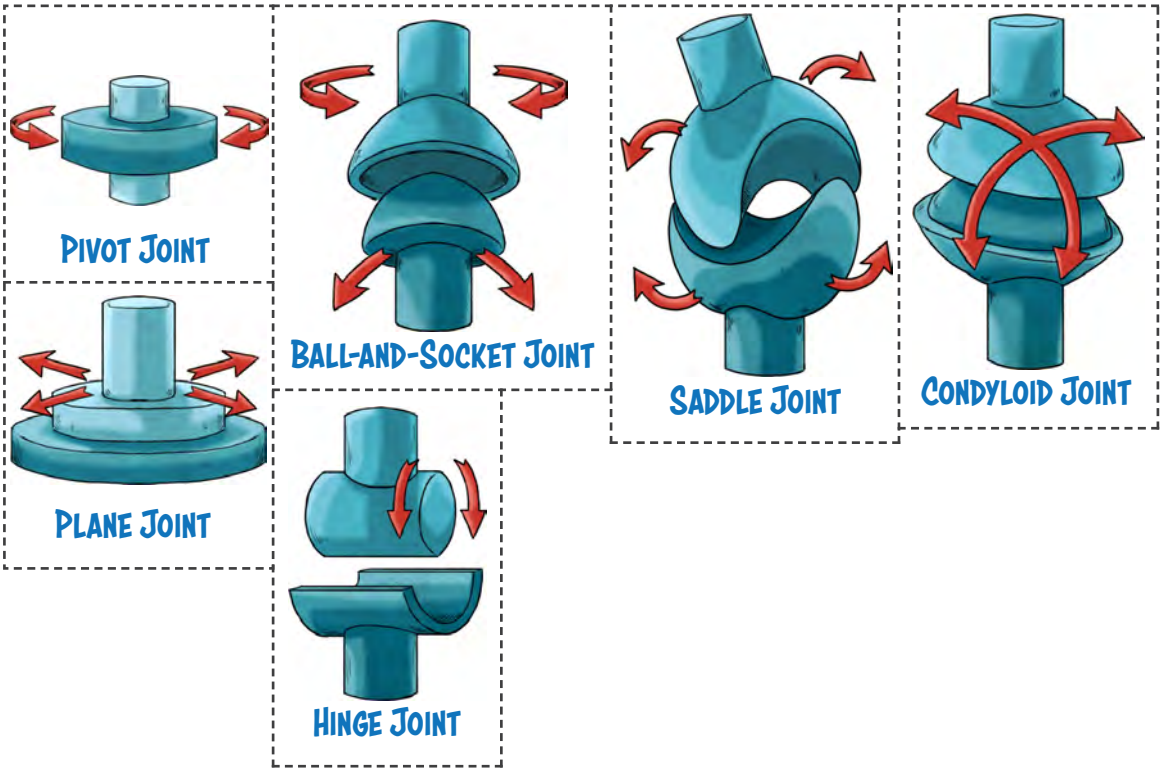
- The **ball-and-socket joint** is found in our hips and shoulders. One of the bones in the joint is round on the end, like a ball. The end of the other bone is concave, making a cup to fit around the first bone, allowing it to move freely. This joint allows the greatest range of motion.

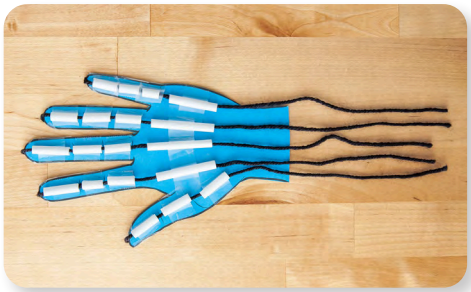


Bones Matching Cards

Skull	Clavicle also called the collarbone	Humerus long, straight bone in the top of the arm	Tarsals the small bones of the ankle
Ribs protect the vital organs	Ulna & Radius the two bones in the lower arm	Tibia & Fibula the shin and calf bones of the lower leg	
Sternum also called the chest bone	Spine runs down the center of the back	Pelvic Bone base of the spine connects to it	
Femur longest and strongest bone in the body	Carpals small bones of the wrist	Patella also called the kneecap	
Metacarpals & Phalanges the small bones in the hand and fingers	Metatarsals & Phalanges the small bones in the foot and toes		

Joints Matching Cards





Let's do an activity that will help us see how the tendons in your palms work.

Have the children turn to the "Hand Model" page in Lesson 11 of their student journals and complete the hand model by following these instructions:

1. **Cut out the hand and lay it on a flat surface.**
2. **Using the lines on the "Hand Model" page as a guide, cut the straws into three shorter pieces per finger and thumb and four longer pieces for the tendons in the hand.**
3. **Tape the straw pieces onto the hand model, leaving a small space between them. Make sure they are straight on the finger.**
4. **Cut the string into 5 pieces, each long enough to go from the tips of the fingers to a few centimeters past the bottom of the hand. Thread the string down each finger through the pieces of straw, going from the fingertip and down through the hand past the wrist. Be careful not to pull the string all the way through.**
5. **Use a piece of tape or a small paper clip on the end of the string to secure it at the top of each finger.**

The strings in our hand model represent the tendons in our wrists and palms that help our fingers curl in, and the straws represent the bones. What happens to the fingers when you pull the strings? [They should curl in.] Do you remember what pulls on those tendons to make the fingers move? [muscles] There are skeletal muscles at the base of the thumb and in the palm of the hand that help move the fingers, as well as important muscles in the forearm where most finger and arm movements begin.

Science Wall: Vocabulary Word

Place the vocabulary card TENDON on your science wall. Read and discuss the word and definition.

Exercise Adventures Videos (Optional Activity)

Have the children follow along with The Good and the Beautiful's *Exercise Adventures for Kids* videos by viewing them on The Good and the Beautiful Kids YouTube channel.

Lesson 11 Extension

Have children grades 7–8 complete the self-directed Lesson 11 extension titled "Muscle Fatigue" in their student journals.

Healthy Lifestyle Seek & Find Key

Discussion Points:

Eating a healthy meal
Eating lots of fruits, vegetables, grains, proteins, and healthy fats will help you stay strong and regain health quickly when sick.

Exercising
Regular exercise keeps your body strong and working its best.

Sleeping
Getting plenty of sleep helps your body restore itself and heal.

Praying
Times of peace can help restore both soul and body.

Playing outside
Our bodies create Vitamin D naturally when out in the sunshine, which strengthens our bodies' ability to fight off sickness. The fresh air is also good for keeping our lungs clean and healthy.

Washing hands
Keeping your hands clean can help cut down on the spread of germs.

Studying God's word
Life has challenges and stresses for everyone, which can weaken the body. Studying God's word every day brings us joy and peace that restore our minds and bodies.

in the video, every living thing contains DNA. DNA is made up of three things that provide the structure of the DNA strands.

1. A phosphate group—represented by the red pipe cleaner
2. A sugar group—represented by the blue pipe cleaner
3. Nucleotide base pairs—represented by the beads

There are four different types of bases that make up the two base pairs.

(1) Adenine and (2) thymine are always paired together, and (3) cytosine and (4) guanine are always paired together. **Write these base names down on small pieces of paper and label each pile of beads.**

We are going to create a DNA model so that you can see how the different parts come together.

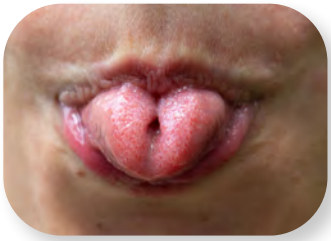
Help the children complete each step below:

1. **Select two beads to form a base pair. Slide the beads onto a white pipe cleaner.**
2. **Lay out a red pipe cleaner and a blue pipe cleaner parallel to each other on the table. Lay the white pipe cleaner with the beads between the red and blue pipe cleaners.**
3. **Twist one end of the white pipe cleaner around the red pipe cleaner and the other end around the blue pipe cleaner.**
4. **Continue creating base pairs, securing them along the sugar (blue) and phosphate (red) strands.**
5. **When finished, twist the model into a double helix formation.**

Dominant & Recessive Gene Tests

Have the children turn to the "Genetic Tests & Fingerprints" page in Lesson 14 of their student journals and complete the questions or activities as you read. Read to the children: Let's look at some examples of traits in humans that are dominant or recessive.

1. Brown eyes are most dominant, green eyes are more dominant than blue eyes, and blue eyes will always be recessive. Answer question #1 on your journal page.
2. Dark hair shades, such as brown and black, are dominant, while lighter hair shades, including blonde and red, are recessive. Answer question #2 on your journal page.
3. Unattached earlobes are dominant over attached earlobes. Look at your earlobes in the mirror. Answer question #3 on your journal page.



4. Being able to curl your tongue is dominant over not being able to curl your tongue, which is recessive. Answer question #4 on your journal page.

Fingerprint Activity

Read to the children: Much like your DNA, your fingerprints are completely unique to you. Each person is born with a unique fingerprint pattern that never changes. As you touch and handle surfaces, sweat and oil from your sebaceous glands leave a trace of your fingerprint pattern behind.

1. **Have the children use pencils to color a 1" square on a piece of scratch paper. Make sure that they color the square fully and bear down a bit on the pencil to leave behind as much graphite as possible.**
2. **Tear off 5 pieces of transparent tape about 1½–2 inches long per child. Lay them on the table sticky side up.**