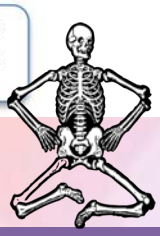
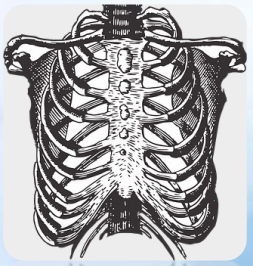
Applying New Knowledge:
Learning & Transfer

Child Care Training Consultants, LLC

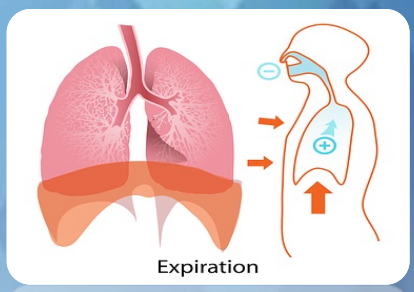


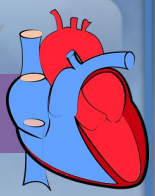
The Skeletal System:

What's inside of You!



Identify methods to engage children in active scientific exploration of the skeletal system by investigating the vital organs. Support scientific thinking and inquire by investigating, predicting, and exploring how our heart, lungs, intestines, and liver work.





Self-Study Guide

Teach children to ask questions, write or draw in a journal, and report predictions to form a hypothesis!

Dr. Theresa Vadala

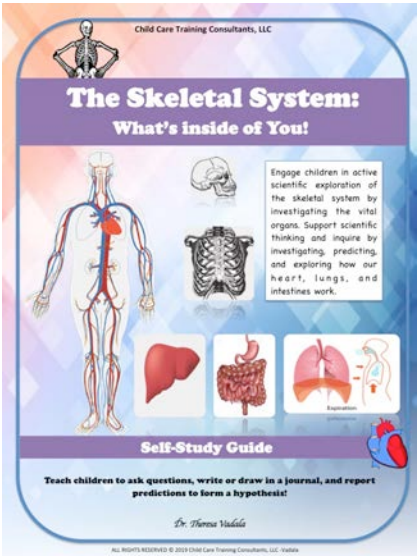
The Skeletal System: What's Inside of You!

by

Theresa Vadala, Ed. D

Child Care Training Consultants, LLC

Las Vegas, Nevada 89139



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Applying New Knowledge: Learning & Transfer

Child Care Training Consultants, LLC

Accredited by International Association for Continuing Education and Training (IACET)

PRESCHOOL Module 2 **CDA Subject Area 2:** Advancing children's physical and intellectual development **Title: The Skeletal System: What's Inside of You!**	**3 Hours**	**0.3 CEUs**

THE NEVADA REGISTRY TRAINING APPROVED

AUTHORIZED IACET PROVIDER

Dr. Theresa Vadala

(Instructor & Curriculum Designer)

Participants will engage in activities to involve children in active scientific exploration of the skeletal system by investigating how the rib cage protects our vital organs. Support scientific thinking and inquire by investigating, predicting, and exploring how our heart, lungs, and intestines work. Teach children to ask questions, write or draw in a journal, and report predictions to form a hypothesis.

Thank you for choosing
Child Care Training Consultants, LLC.,
for your CDA Training Needs!

Learning Assessment

Read the material provided, take the 5-10 quiz questions and

complete the training evaluation at the end of the course.

Participants must receive 100% on individual courses to obtain a certificate of completion.

Questions?
We are happy to help.

Support Services:

Please contact us 24/7 at

childcaretrainingconsultants1@gmail.com

Business # 702.837.2434

Child Care Training Consultants LLC.,

Goal

The goal is to empower educators as they take Child Development Associate (CDA) courses to make a powerful difference in the lives of young children!

Mission Statement

“Child Care Training Consultants, LLC’s is committed to provide research-based professional growth and development training courses primarily focused on the Child Development Associate. The CDA is the nation’s premier credential that is transferable, valid, competency-based and nationally recognized in all 50 states, territories, the District of Columbia, community colleges and the United State Military.

Vision

Child Care Training Consultants, LLC’s vision is to provide the early childhood community with courses based on CDA competency standards to obtain their CDA Credential and assist in reaching their goal as an exceptional early childhood educator to ultimately achieve higher child outcomes.

About the Instructor

Theresa has over 30 years experience in the field of Early Childhood Education. During that time, she served as a Preschool Teacher, Disabilities Coordinator, Program Facilitator, and Director of an Early Childcare Program. She has a Doctoral Degree in Educational Leadership with Specialization in Curriculum and Instructional Design. Theresa is a Professional Growth & Development Trainer and Curriculum Designer and offers web-based courses internationally. She is the Executive Director/Owner of of the training organization Child Care Training Consultants, LLC., (CCTC).

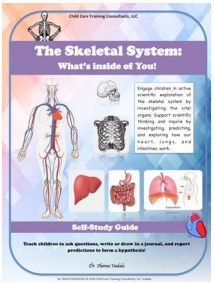
Business Description

Child Care Training Consultants, LLC. (CCTC) is an accredited provider (AP) with the International Association for Continuing Education and Training (IACET) that provides Continuing Education Units (CEU) for adult education nationally. The business is also a recognized training organization with the Council for Professional Recognition, Child Development Associate Council (CDA), National Credentialing Program.

Goals, Learning Objectives and Outcomes

Goal

The goal of this training is to provide childcare providers with the tools necessary to teach and support students scientific thinking and inquire by investigating the skeletal system.



Objectives

Learners will be able to…

1. Identify methods to engage children in active scientific exploration of the skeletal system by investigating how the rib cage protects our vital organs.

2. Support scientific thinking and inquire by investigating, predicting, and exploring how our heart, lungs, and intestines work.

3. Teach children to ask questions, write or draw in a journal, and report predictions to form a hypothesis.

Learning Outcomes

Learners will be able to…

1. Identify 2 methods to engage children in active scientific exploration of the skeletal system by investigating how the rib cage protects our vital organs.

2. Identify 3 scientific thinking and inquire strategies by investigating, predicting, and exploring how our heart, lungs, and intestines work.

3. Identify 2 methods on how children ask questions, write or draw in a journal, and report predictions to form a hypothesis.

Child Care Training Consultants, LLC

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Objective/s

Participants will be able to:

- Identify methods to engage children in active scientific exploration of the skeletal system by investigating how the rib cage protects our vital organs.

Provider's Guide

- The Skeletal System: Our Body Structure
- The Spine
- The Cranium: Brain Protection
- Ribs: Organ Protection
- Body Movement

Materials:

Exercise 1.1 The Skeletal System: Our Body Structure
Counting Cubes/items (206/300 Hundred)
Preserved chicken bones (Needs Preparation)
Photo chicken skeleton (Provided)
Exercise 1.2 Egg Carton Spine Model
Exercise 1.3 Body Movement
Exercise 1.4 Same & Different: Identifying Cultural Differences

Life Science Series

Part 1: The Skeletal System: Body Structure, Protection, and Movement

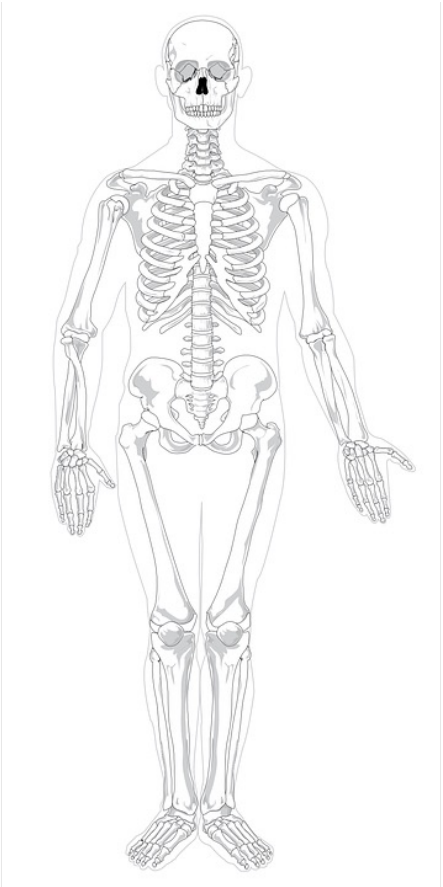
Life science is the study of living things. Living things are also call organisms and often referred to as biology. Teaching life science provides students with scientific inquiry about human life, animal life, and nature and provides the opportunity for children to develop a range of skills. The following skills are;

- Exploration of objects, materials, and events
- Raising questions
- Making careful observations
- Engaging in simple investigations
- Describing (including shape, size, number), compare, sort, classify, and order
- Recording observations using words, pictures, charts, and graphs.
- Using a variety of simple tools to extend observations.
- Identifying patterns and relationships
- Developing tentative explanations and ideas
- Working collaboratively with others
- Sharing and discuss ideas and listen to new perspectives

NOTE: Formative assessment questions are to be answered at the end on the quiz.

The Skeletal System: Our Body Structure

The skeletal system of a baby consists of 300 bones. Babies are born with soft and flexible bones called cartilage. During childhood, as the human body grows, the cartilage turns hard and fuses together and forms a bone. The adult human body has 206 bones. All of these bones make up a skeleton. These bones from the skeleton give your body structure, let you move in many ways, and protect your internal organs.



Exercise 1.1 The Skeletal System: Our Body Structure

Preparation:

Collect bones from a chicken dinner. Try and preserve the ribs. Place the bones in a pot of water and boil until the chicken is completely off the bone. Lay the bones in the sun for several days to dry. Scrub the bones with a bleach water solution. Spray bones with clear or white acrylic spray to preserve.

Engagement Strategy

Use a chicken skeleton photo and encourage children to match the chicken bones to the photo. Engage students in scientific thinking by asking questions and writing or drawing their predictions in their journals. What does the rib cage protect? Tell me how the chicken and human skeleton are the same. How are they different?

The Spine

The Spine

The human spinal column is made of 33 individual bones stacked one on top of the other. There are 7 vertebrae in the cervical region, 12 vertebrae in the thoracic region, 5 vertebrae in the lumbar region, 5 vertebrae in the sacral region and 4 vertebrae in the coccygeal region. This spinal column provides the main support for your body, allowing you to stand upright, bend, and twist, and protects the spinal cord from injury. The spine is composed of strong muscles, bones, flexible tendons, ligaments, and sensitive nerves. There are different types of vertebrae in the spine and each has a different function. The first seven vertebrae at the top are called the cervical vertebrae. These bones are in the back of your neck, just below your brain, and they support your head and neck.

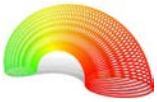
Spinal curves

The adult spine has a natural S-shaped curve. The neck (cervical) and lower back (lumbar) section have a slight concave curve. The thoracic and sacral regions have a slight convex curve The curves work like a coiled spring to absorb shock, maintain balance, and allow motion throughout the spinal column.

The human spinal column is made up of 33 bones.

- 7 cervical vertebrae
- 12 thoracic vertebrae
- 5 lumbar vertebrae
- 5 sacrum vertebrae
- 4 coccyx vertebrae

Note: Use a coil or slinky to demonstrate how the spinal column bends and twists.



Exercise 1.2 Egg Carton Spine Model

Materials

An egg carton for the vertebrae
Craft foam for the vertebral discs (Yellow Construction Paper)
Pipe Cleaner for the spinal cord
Scissors

Preparation:

Cut egg carton into sections. Poke holes through the sides of the egg carton section.

Directions:

Review facts about the spine and vertebrae. Ask students to name and choose which section of the vertebrae they would like to make.

- 7 cervical vertebrae
- 12 thoracic vertebrae
- 5 lumbar vertebrae
- 5 sacrum vertebrae
- 4 coccyx vertebrae

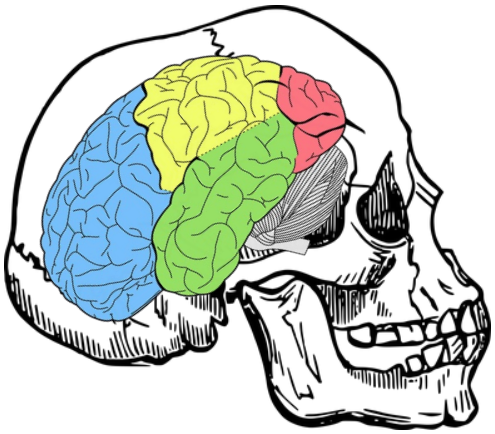
Provide students with the egg carton sections and a pipe cleaner. Direct students to thread the pipe cleaner through the egg carton placing a yellow disk in between each section. Encourage scientific thinking, art, language and math skills while working on the spine model. Ask, how many vertebrae does the section you selected have? How many vertebrae does it have? Where is the section of the vertebrae located? The top, middle or bottom?

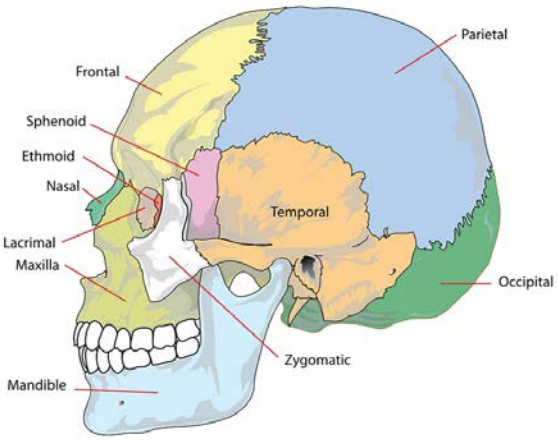
Variations:

Have students paint the egg carton sections, 5 different colors and create the entire vertebrae.

The Cranium: Brain Protection

The human cranium (skull) protects the brain. The skull is the central area that houses our brain and receives information. Our main senses, sight, hearing, sight, smell and taste originate from the brain. The air and oxygen we breath passes through the skull by the nose and mouth. Feel your skull by pushing on your head, especially in the back a few inches above your neck. The skull is made up of different bones. Some of these bones protect your brain, whereas others make up the structure of your face. If you touch beneath your eyes, you can feel the ridge of the bone that forms the hole where your eye sits. The jawbone, known as the mandible, is the only bone in the skull that moves. The mandible is the strongest bone I the skull and hold your teeth in place. The mandible is important for humans because it allows us to open our mouth and chew food.





What does the cranium protect?

_____

_____

What is the strongest bone in our skull?

_____

_____

Why is the mandible crucial for life?

_____

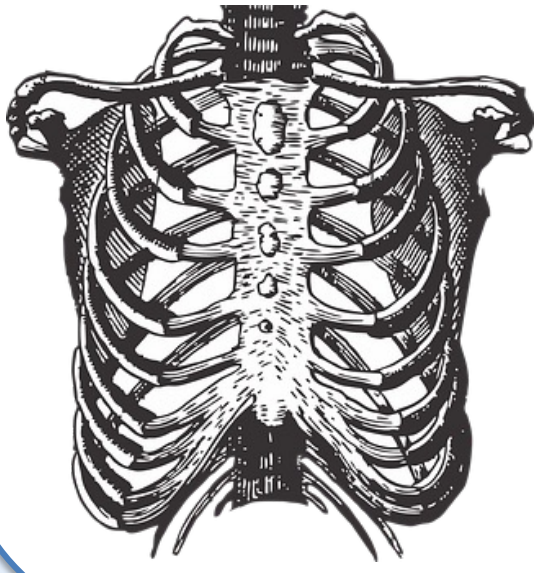
_____

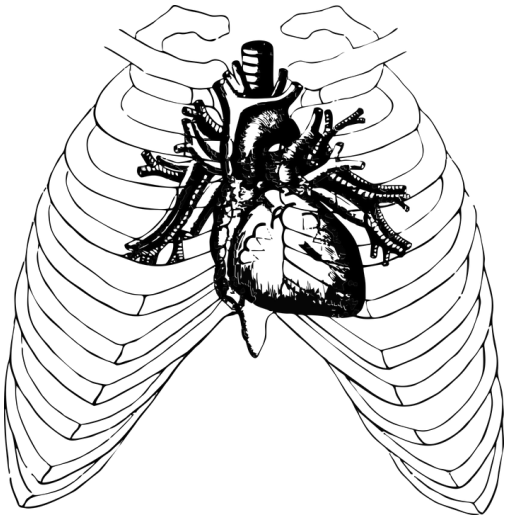
Ribs: Organ Protection

Your heart, lungs, and liver are organs in our body protected by the rib cage. The rib cage keeps the organs safe. Ribs resemble a cage of bones around your chest. To feel the bottom of the rib cage run your fingers along the sides and front of your body, a few inches below your heart. Breath deeply and feel your ribs right in front of your body. Your ribs come in pairs, and the left and right sides of each pair are exactly the same. Most people have 12 pairs of ribs, but some people are born with one or more extra ribs, and some people might have one pair less. All 12 pairs of ribs attach in the back to the spine, where they are held in place by the thoracic vertebrae. The first seven pairs of ribs attach in the front to the sternum, a strong bone in the center of your chest that holds those ribs in place. The remaining sets of ribs don't attach to the sternum directly. The next three pairs are held on with cartilage to the ribs above them. The very last two sets of ribs are called floating ribs because they aren't connected to the sternum or the ribs above them. The floating ribs are securely attached to the spine in the back.

Did you Know!

- Most people have 12 pairs of ribs.
- Some people are born with one or more extra ribs.
- Some people might have one pair less.





Body Movement

Movement is one of the most important aspects of a young child's life. Children's early interactions involve movement. Children progress through developmental motor sequences, however some may move at a slower, more awkward pace. It is important for adults who are beginning to instruct a child who moves more slowly or awkwardly to understand the child's abilities.

Exercise 1.3 Skeletal Movement

Show students a skeleton model or poster/photo/x ray. Discuss and have students feel and identify their own skeletal system through body movement. Teach students vocabulary word; Cranium, Clavicle and Vertebrae. Play a movement game and substitute the word head with cranium or skull, shoulder for clavicle, and vertebrae for ribs.

- Head (Skull/Cranium)
- Shoulder (Clavicle)
- Ribs (Vertebrae)

Variations: Talk about joints. Ask students to bend their elbow and knees. Ask what other part of their skeletal system bends. Engage in activities that include joint movement.

Movement Activities:

- Dance with ribbons or scarfs
- Wear bells while you do body movements. Go slow and quietly, go faster and ring the bells louder!
- Simon says bend your elbow, twist to the left, bend over and touch your toes!
- Hopscotch, use non- dominant foot to hop, emphasize joint movement
- Relay Races jogging with high knees
- Create an obstacle course around chairs with making tape, sticky side up. Go through without getting stuck!
- I Spy Game – Hop, crawl or sidestep to find the item
- Draw a chalk maze outdoors
- Play Simon Says and use phrases such as; pretend to lift weights, squat, jumping jacks
- Walk the line – Sidestep, heel toe on a strip of tape or chalk line

Same, Different, and Special

ACTIVITY

Humans are the same as the bones that make up the skeleton are all very much alive, growing and changing all the time like other parts of our body. Our bones and skeletal structure are required for our bodies to be able to move, stand walk or sit. Without our bones there is not movement. Interesting facts about our bones:

- At birth you have 300 bones in your body.
- Adults have 206 bones as they fuse together as you get older.
- You have 26 bones in your foot.
- You have 27 bones in your hand.
- Some bones help protect important organs in the body for example the rib cage helps to protect your heart, liver and lungs.
- The inside of her bones is filled with marrow which is a soft tissue.
- When bones are connected, they form a joint.
- The brain is protected by 8 different types of bones.
- The longest bone in the body is the 'femur'. This is the thigh bone and is also considered to be the strongest bone in the body.
- The smallest bone in the body is actually located in your middle ear. It is called the 'staples' (or stirrup) and it's only 0.11 inches
- There are 54 bones in your hands, fingers and wrists. This is the part of the body that has the most bones.

The human body is different genetically, ethic affiliation, and geographic ancestry. Humans are also different in their physical appearance; height, body weight, skin tone, freckles, hair texture, hair color, eye color, and facial differences, just to name a few. Explain to students that although we are the same because we all have a skeletal system, we are very different on the outside of our body. Some children are born with special needs and may have medical issues, developmental issues, learning, or mental health issues. Ensure students that they are ALL special in different ways.

NOTE: An explanation of learning styles and multiple intelligences may be explained at this time as an extension to this training content (Different ways of learning).

ACTIVITY

Exercise 1.4

Same, Different and Special: Identifying Cultural Differences and Special Needs

Talk to students about the skeletal system and how we are the same. Have a discussion with students and ask open-ended questions.

Everyone's body is made up of a skeleton. Name parts of the inside of the human body that are the same as other people. (skeleton, skull, rib cage, spine, jawbone, etc./ Students may remember names such as clavicle, vertebrae, cranium, etc.) Expand on students' comments.

Ask students; How are humans different? (Taller, shorter, skin color, hair texture, speak different languages, etc.). Expand on students' comments.

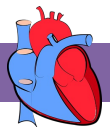
What makes some humans different. Talk about students with special needs. Discuss how they may all learn the same way, with different learning styles, but may have different or limited body movements.

Use chart paper or white board and write student responses.

Same, Different, and Special

Same (Inside)	Different (Outside)	Special Needs

Variations: To differentiate this activity, use only scientific words for body parts.



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Objective/s

Participants will be able to:

1) Support scientific thinking and inquire by investigating, predicting, and exploring how our heart, lungs, and intestines work.

Provider's Guide

- Heart
- Lungs
- Liver

Materials:

Exercise 2.1 Every Beat of our Heart Exercise

- None

Exercise 2.2 Home Made Stethoscope

- Two funnels
- Plastic tube (1 FT long)
- Duct Tape

Exercise 2.3 Lung Model in a Bottle

- Stethoscope (Optional)
- Balloon
- plastic straw
- Masking tape/duct tape
- Water bottle with cap (16.9 OZ)
- Pre-drilled caps

Exercise 2.4 Filtering the Liver Experiment

Materials:

- Water bottle
- Funnel
- Coffee filter or paper towel
- ½ cup of sand
- 1 Cup up of water

Life Science Series

Part 2: Our Vital Organs: Heart, Lungs, and Liver

Introduction

Preschool is the perfect time to begin teaching students about their vital organs: the heart, lungs and liver. While students may be too young to understand how these organs function in the body, they are not too young to begin learning about the importance of heart health.

Ask children to place their hands over their hearts. Then have children make a fist with one hand and look at the size of their fists. Explain that their hearts are a little larger than their fists and that their hearts are located inside their chests under their ribs. Have children try to feel their ribs to get a better understanding of where they are.

Ask children to make a fist with one hand. Then have them bend that arm at the elbow and feel the muscle in their upper arm. Explain that the heart is a muscle, too. Ask children to tell you what they know about muscles.
Explain that the heart muscle is a pump.

What does the heart pump? Explain that it pumps blood through the body. Have children squeeze their fists to simulate the pumping action of the heart. Point out that the heart pumps blood all the time. Have children squeeze their fists again and again. Ask them how their hands feel after they have squeezed them many times.

Point out that the squeezing makes the muscles in their hands get tired, but the heart muscle pumps and pumps and never gets tired. Tell them that they cannot start or stop their hearts the way they can start or stop squeezing their fists.

The Heart

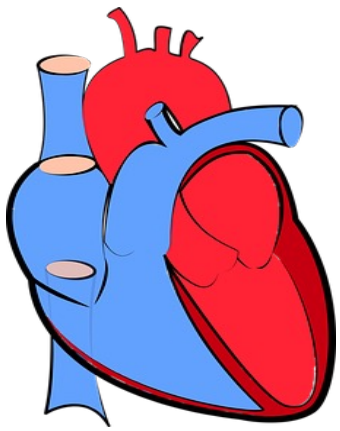
The heart is one big pump made of muscle fibers. The heart circulates blood around body so that oxygen and nutrients can be delivered to cells. A healthy adult heart beats about 60-80 times per minute. Children's heartbeats are faster, around 100-120 beats per minute (bpm). Blood is transported around the body through blood vessels that are split into two functions, carrying oxygenated blood away from the heart, and carrying deoxygenated blood towards the heart. Blood vessels carrying oxygenated blood in order of large to small are called:

- Aorta,
- Arteries,
- Arterioles
- Capillaries.

Vessels carrying deoxygenated blood in order of large to small are called: Veins and capillaries. There are so many blood vessels that, laid out end to end, would span 60 000 miles. Red blood cells carry oxygen around the body. An average adult has around five quarts of blood and the heart pumps 83 gallons an hour, or 2 000 gallons worth every day. It takes around 60 seconds for blood to leave the heart, circulate around the body and then return to the heart. The heart is protected by the rib cage and sternum.

The heart is a muscle, physical exercise helps keeps it healthy and working well so you can live longer. Be Active! Jump rope, dance, jog, just exercise for 30 minutes a day!

Eat a variety of healthy foods. Read food labels and avoid foods high n unhealthy fats.



Expand Learning!

- Teach students about time and measurement (Quart, Gallon)
- Teach students the importance of exercise, movement, and healthy eating.

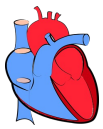
Exercise 2.1 Every Beat of our Heart Exercise

Discuss with children the importance of exercise for our heart. Exercise is fun and helps you feel good and is good for your heart. The heart is a muscle and needs exercise to pump blood around your body. This happens when we exercise. As students are still, have them place their hand over their heart and feel their heartbeat. Have students jump/hop/jump rope to get their heart beating. When we exercise our heart beats fast and pumps blood through our bodies. Now, have students place their hand over their heart. Ask, “now how does your heart feel?” “What other types of exercises can you do to pump blood through your body?”

Variations: Jump and touch your left heal! Jump and touch your right heal!

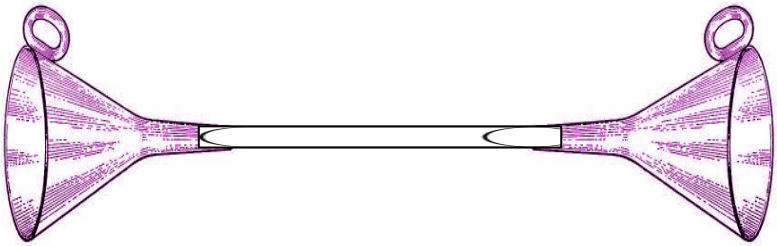
Talk Test: Point out that children can tell if they are jumping enough by using the "talk test” (If they can talk while jumping, they are at the right pace; if they can't talk at all, they need to slow down.)

Exercise 2.2 Home Made Stethoscope



Materials:

- Two funnels
- Plastic tube (1 FT long)
- Duct Tape



Directions:

Provide students with two funnels and a one-foot-long plastic tubing. Assist students if needed with inserting the tube and add a piece of tape to hold in place. Have students place one funnel on their heart and the other funnel up to their ear to listen to their own heartbeat.

Variations:

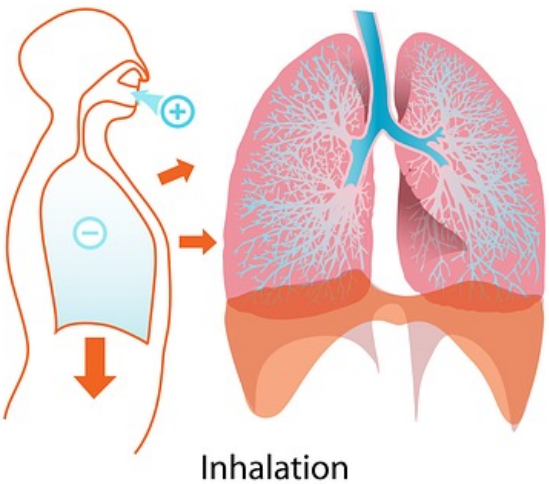
Use an empty paper towel roll, funnel and masking tape to create a stethoscope with one side. Students can listen to another child’s heartbeat.

Our Lungs

Our lungs allow us to breathe, talk, shout, sing, laugh, cry, and more! And speaking of a game, your lungs even work with your brain to help you inhale and exhale a larger amount of air at a more rapid rate when you're running a mile — all without you even thinking about it once. Your lungs are in your chest, and they are so large that they take up most of the space in there. You have two lungs, but they aren't the same size the way your eyes or nostrils are. Instead, the lung on the left side of your body is a bit smaller than the lung on the right. This extra space on the left leaves room for your heart.

Exercise is good for every part of your body, and especially for your lungs and heart. When you take part in vigorous exercise (like biking, running, or swimming, for example), your lungs require more air to give your cells the extra oxygen they need. As you breathe more deeply and take in more air, your lungs become stronger and better at supplying your body with the air it needs to succeed.

Your lungs are protected by your rib cage, which is made up of 12 sets of ribs. These ribs are connected to your spine in your back and go around your lungs to keep them safe. The diagram, a dome-shaped muscle, beneath the lungs works with our lungs to allow you you inhale (breath in) and exhale (breath out) air. You can't see your lungs, but it's easy to feel them in action: Put your hands on your chest and breathe in very deeply. You will feel your chest getting slightly bigger. Now breathe out the air, and feel your chest return to its regular size.



Inhalation

Exercise 2.3 Lung Model in a Bottle

Materials:

- Stethoscope (Optional)
- Balloon
- plastic straw
- Masking tape/duct tape
- Water bottle with cap (16.9 OZ)
- Pre-drilled caps

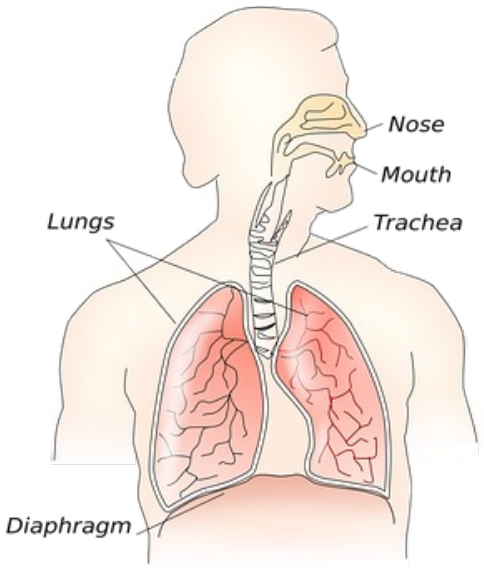
Preparation:

Drill a hole in a water bottle cap, large enough to fit a plastic straw.

Directions:

Students can assist in the construction of the lung model. Assist students with constructing their lung model (pre-drilled caps). Tape the balloon on the end of the straw (with masking tape or duct tape). Place the balloon and straw in the bottle. Place the straw through the bottle cap. Screw the bottle cap onto the bottle. Have student blow softly in to the straw. The balloon will fill with air. Explain that when we inhale our lungs fill with ar. When we exhale, the air leaves our lungs.

Variations: Use a balloon or paper bag to blow in to simulate lungs.

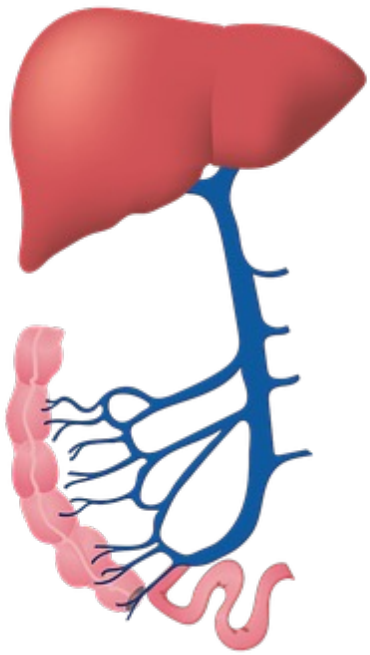


Liver

Your liver is the largest organ in your body. By the time you're grown up, the liver will weight about three and a half pounds (1.6 kilograms) It measures about 8 inches horizontally and 6.5 vertically. It is about 4.5 inches thick. The liver does many jobs, but here are three major ones:

- It cleans your blood.
- It produces an important digestive liquid called bile.
- It stores energy in the form of a sugar called glycogen.

The liver cleans your blood and helps your body by taking toxins (substances in the body that are actually like poisons) out of your blood. The liver also cleans blood that has just been enriched with vitamins and minerals during digestion. After you've eaten, the vitamins, minerals, and other nutrients from food we eat pass from the intestine into the blood. The nutrient-rich blood makes a stop at the liver. The liver processes the blood by removing harmful toxins that the body doesn't need. The liver makes bile, a bitter thick greenish-brown substance that aid in digestion. Other waste processed by the liver goes through your blood to your kidneys and out in your urine.



Expand Learning!

- Teach students a science experiment on how the liver cleans toxins. Add 1 cup of charcoal pebbles, sand, potting soil, and cotton in an empty liter soda bottle. Add water and pour into cup. As the water pours out with particles explain to students this is how the liver cleans or filters toxins from the blood in our body.

Exercise 2.4 Filtering the Liver Experiment

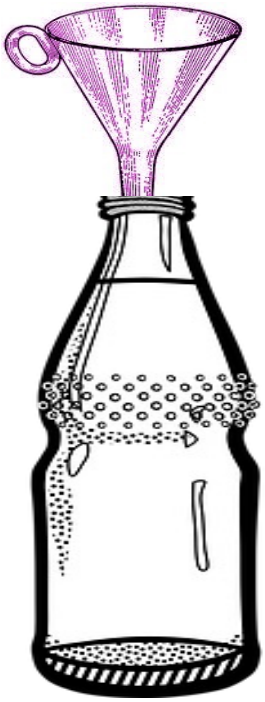
Materials:

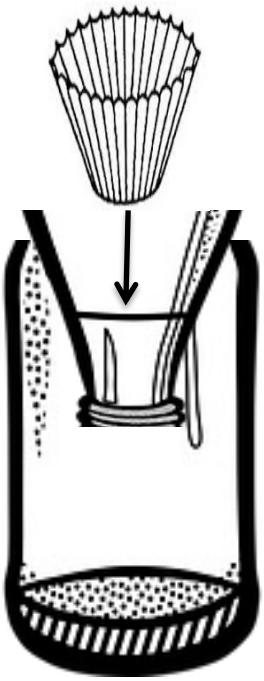
- Water bottle
- Funnel
- Coffee filter or paper towel
- ½ cup of sand
- 1 Cup up of water

Directions:

Place filter inside the funnel. Place funnel with filter inside the water bottle. Pour sand inside the funnel. Slowly pour water over the sand. Observe the particles that are filtered through. Teach students that this is similar to our liver. It cleans toxins from our body. Use a scientific journal to predict what will happen when the water is poured into the funnel on the sand.

Variations: Cut a water bottle in half. Place the filter in the top half of the water bottle to filter sand and water.





NOTE: Formative assessment questions are to be answered at the end on the quiz.

Formative Assessment

Part 2: Vital Organs: Heart, Lungs, and Liver

1. What major organ is a about the size of your fist?

   A. Head B. Heart C. Lungs D. Liver

2. What is the heart doing each time it beats?

   A. Blinking B. Pumping C. Breathing D. Drinking

3. What type of fluid does the heart pump?

   A. Water B. Bile C. Oxygen D. Blood

4. What organ helps us breathe, talk, shout, sing, laugh, and cry.

   A. Skin B. Liver C. Heart D. Lungs

5. Exercise is good for every part of your body, and especially for your lungs and heart.

   True or False (Circle one)

6. Your liver is the largest organ in your body. True or False (Circle one)

7. The liver cleans your blood and helps your body by removing toxins. True or False (Circle one)

8. Your lungs are protected by your rib cage, which is made up of _____ sets of ribs.

9. The heart is a _____, physical exercise helps keeps it healthy and working well so you can live longer.

10. After you've eaten something, the vitamins, minerals, and other nutrients from the food pass from the intestine into the _____.

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Objective/s

Participants will be able to:

1) Teach children to ask questions, write or draw in a journal, and report predictions to form a hypothesis.

Provider's Guide

- The Stages of our Digestive System

Materials:

Exercise 3.1 Digestive System: Beginning to End

Exercise 3.2 How long are your intestines?

- Twine 22 feet
- Rope 5 feet

Life Science Series

Part 3: Intestines and the Digestive System

Introduction

The intestines, which lie between the stomach and the anus, are part of the digestive system. It is divided into two major sections: the small intestine and the large intestine Digestion consists of complex interactions involving numerous organs, nerves, hormones, and other chemical messengers. The small intestine and large intestine (colon) each have distinct but overlapping roles in digestion. Both break down food with enzymes and pass it into the bloodstream for circulation throughout the body. In this way, the food is converted into nutrient forms capable of providing the organs with energy to function and to grow.

When you do eat, the saliva breaks down the chemicals in the food a bit, which helps make the food mushy and easy to swallow. Your tongue helps out, pushing the food around while you chew with your teeth. When you're ready to swallow, the tongue pushes a tiny bit of mushed-up food called a **bolus** toward the back of your throat and into the opening of your esophagus, the second part of the digestive tract.

The Stages of our Digestive System

The small intestine is a long tube that's about 1½ inches to 2 inches (about 3.5 to 5 centimeters) around, coiled up and it's packed inside beneath your stomach. If you stretched out an adult's small intestine, it would be about 22 feet long. The large intestine, like the small intestine, is packed into the body, and would measure 5 feet (about 1.5 meters) long if you spread it out.

Teach children that our bodies need good nutritious foods and plenty of water to work and play.

Stages of our Digestive System

1. Chewing – Chewing breaks down food into smaller pieces
2. Swallowing – Food goes down the esophagus
3. Stomach – Food goes down to stomach and stays about 4 hours.
4. Small Intestine – Breaks down food
5. Large Intestine – Food the body doesn't use stays in large intestine and leaves the body as waste.
6. Liver – Cleans toxins from blood/Breaks up fat
7. Pancreas –Helps digest foods

Exercise 3.1 Digestive System: Beginning to End

Provide students with a snack.

Ask students to take a small bite and chew.

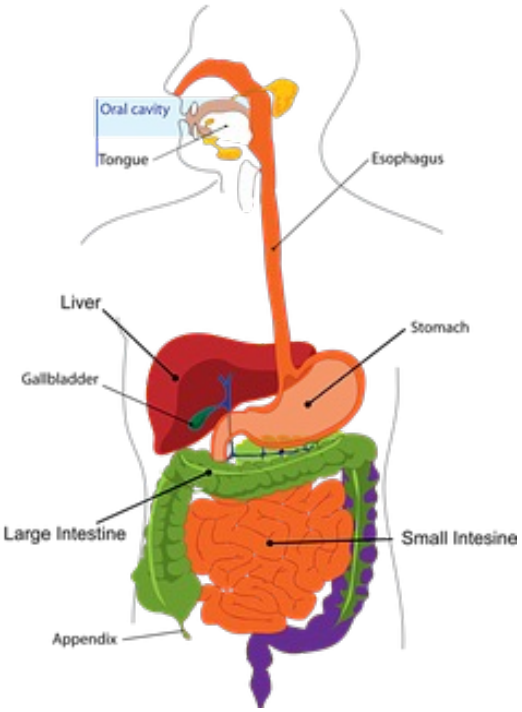
Explain to students that when they swallow, the food they chewed goes down their esophagus into their stomach and stays there for about about 4 hours. The food then goes to their small and large intestines. The food changes forms in our body goes through the large intestine/colon and that is why we go to the restroom several times a day.

Variations:

The liver and pancreas can be discussed further to differentiate lesson.

The Stomach

The food we eat goes to your stomach, which is attached to your mouth by a long tube called the esophagus. The food is broken down into molecules your body can use, which is a process called digestion. The stomachs main job is to store and break down the food you eat. Your stomach stretches to hold all the food eaten. Food can be stored in the stomach for up to three to five hours. Normally, after three hours the food in your stomach is digested and goes to the intestines.



Try This!

- Fill a backpack with items. Discuss how the stomach stretches when we eat, similar to the backpack stretching out as items are placed in it.
- Blow a balloon to demonstrate how the stomach stretches.

The Intestines

The intestines are part of the digestive system. It is divided into two major sections: the small intestine and the large intestine. The small intestine and large intestine (colon) each have distinct but overlapping roles in digestion. The small intestine and large intestine break down food with enzymes and pass it into the bloodstream for circulation throughout the body. In this way, the food is converted into nutrient forms capable of providing the organs with energy to function and to grow.

The small intestine is about 6 m (20 ft) long. It is coiled in the center of the abdominal cavity. It is the part of the gastrointestinal tract between the stomach and the large intestine (colon).

The large intestine has a larger width but is only 1.5 m (5 feet) long. Most food products are absorbed in the small intestine. The large intestine is responsible for absorption of water and excretion of solid waste material. Food and waste material are moved along the length of the intestine by rhythmic (occurring regularly) contractions of intestinal muscles; these contractions contract and relax and push ingested food through the digestive tract to waste. Waste is solid because most of the water has been removed by the intestines as it travels through.

Exercise 3.2 How long are your intestines?

Materials:

Cut a piece of twine 22 feet long.

Cut a piece of rope 5 feet long.

The twine represents the small intestine. The rope represents the large intestine.

Directions:

Discuss the major stages of the Digestive System with students. Stretch and lay out twine and rope on the floor. Using scientific thinking, math and questioning skills have students measure the “intestines” using a variety of items (ruler, shoe, blocks, items in class, body length, etc.) Have students predict how long the “intestines” are. Encourage students to write or draw their prediction in a journal.

NOTE: Formative assessment questions are to be answered at the end on the quiz.

Formative Assessment

Part 3: Intestines and the Digestive System

1. The intestines are part of the digestive system and is divided into _____ major sections.
   A. One B. Two C. Three D. Four

2. The small intestine is about _____ long.
   A. 4 m B. 5 m C. 6 m D. 20 m

3. The large intestine is about _____ long.
   A. 4 ft B. 5 ft C. 6 ft D. 20 ft

4. . The small intestine is responsible for absorption of water and excretion of solid waste material. True or False (Circle one)

5. A bolus is?
   A. Small Intestine B. Large Intestine C. Mushed up food D. Part of your digestive tract

6. Waste is solid because most of the water has been removed by the intestines as it travels through. True or False (Circle one)

7. What is responsible for breaking up fat?
   A. Stomach B. Liver C. Large Intestine C. Small Intestine

8. The food we eat goes to your stomach, which is attached to your mouth by a long tube called the _____.
   A. Large Intestine B. Small Intestine C. Liver D. Esophagus

9. The small intestine and large intestine break down food with enzymes and pass it into the bloodstream for circulation throughout the body. True or False (Circle one)

10. Food can be stored in the stomach for up to three to five hours.
    A. 3-5 hours B. 6-9 hours C. 9-12 hours D. 24 hours

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Glossary of Terms

aorta: the main artery of the body, supplying oxygenated blood to the circulatory system. In humans it passes over the heart from the left ventricle and runs down in front of the backbone.

arteries: any of the muscular-walled tubes forming part of the circulation system by which blood (mainly that which has been oxygenated) is conveyed from the heart to all parts of the body.

arterioles: a small branch of an artery leading into capillaries.

bolus: a small rounded mass of a substance

capillaries: any of the fine branching blood vessels that form a network between the arterioles and venules.

cartilage: flexible connective tissue

digestion: the process of breaking down food

enzymes: biological molecules (typically proteins) that significantly speed up the rate of virtually all of the chemical reactions that take place within cells

esophagus: muscular tube connecting the throat (pharynx) with the stomach.

muscle: the tissue of the body which primarily functions as a source of power.

skeleton: the framework of bones in your body.

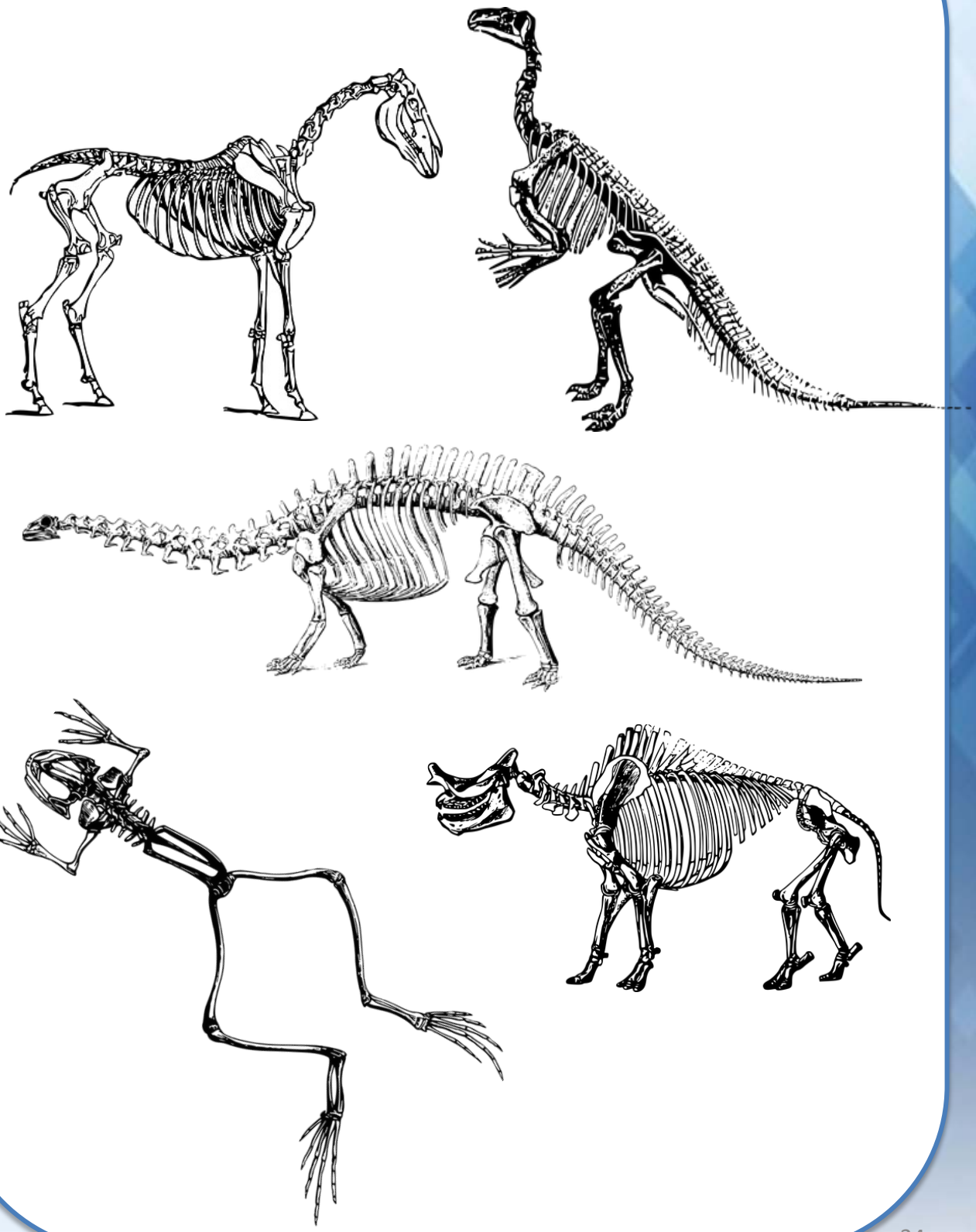
tissue: groups of cells that have a similar structure and act together to perform a specific function

vertebrae: each of the series of small bones forming the backbone

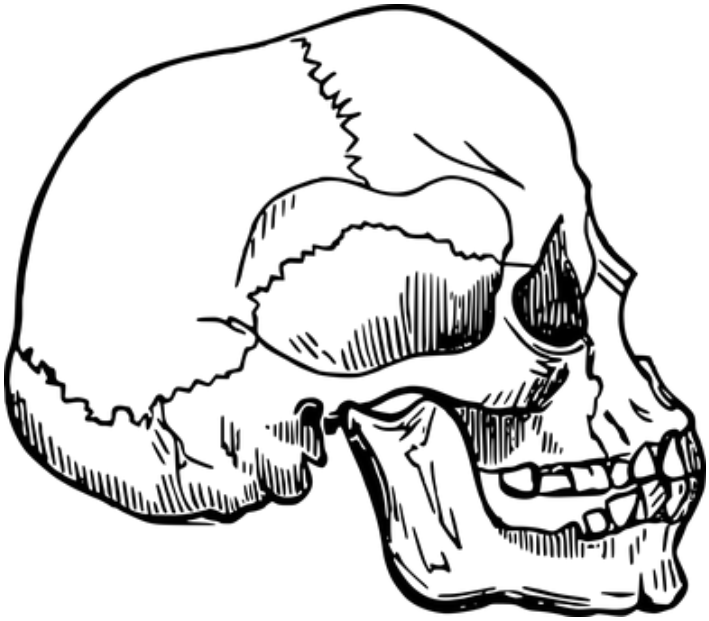
Appendices

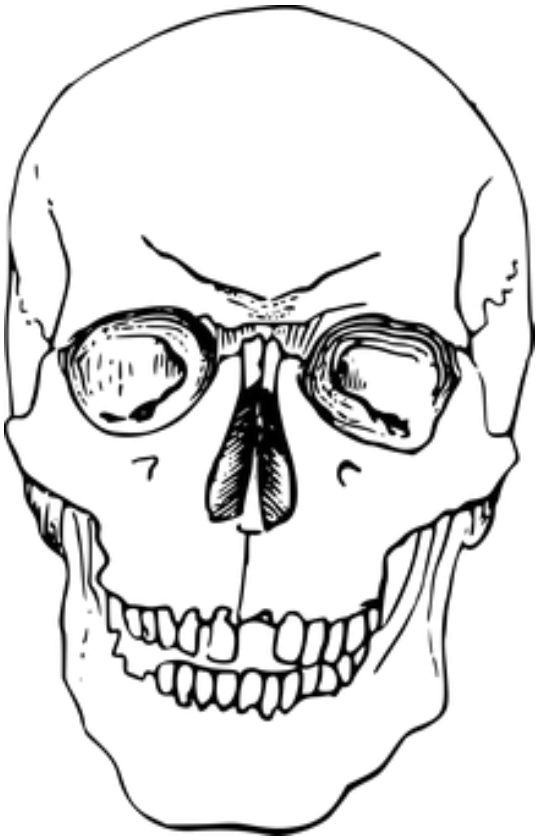
Animal Skeleton Mini Poster
Cranium/Skull Mini Poster
Heart Mini Poster
Lungs Mini Poster
Rib Cage Mini Poster
Skeletal Mini Poster

Animal Skeleton Mini Posters

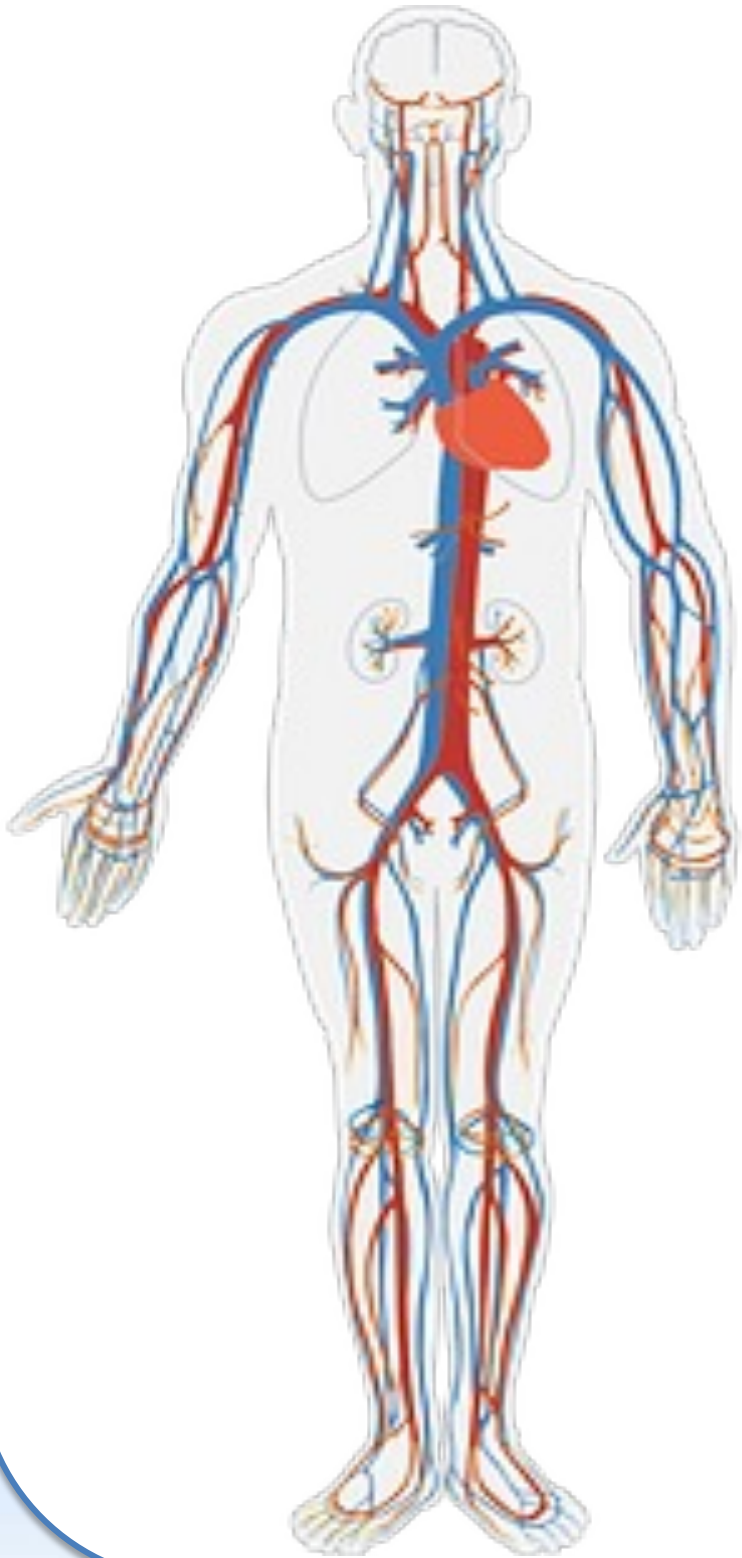


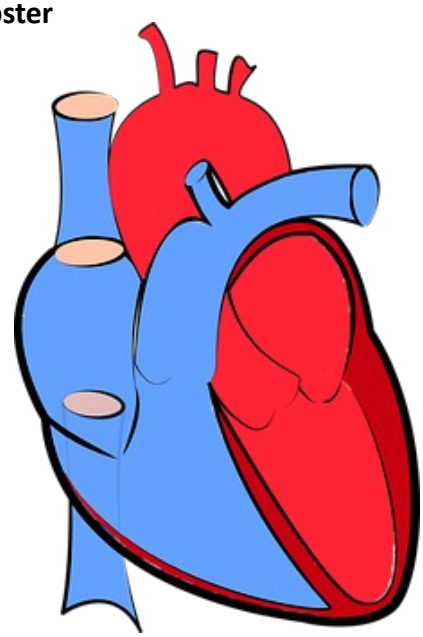
The Cranium/Skull Mini Poster



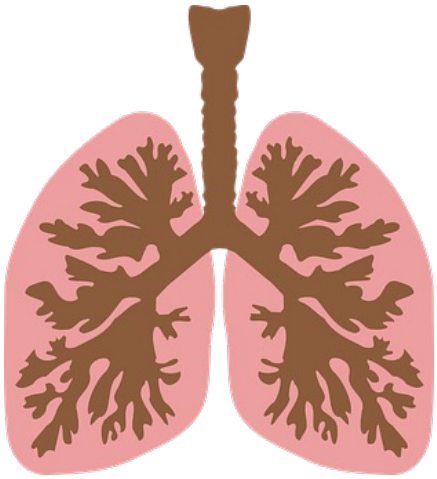


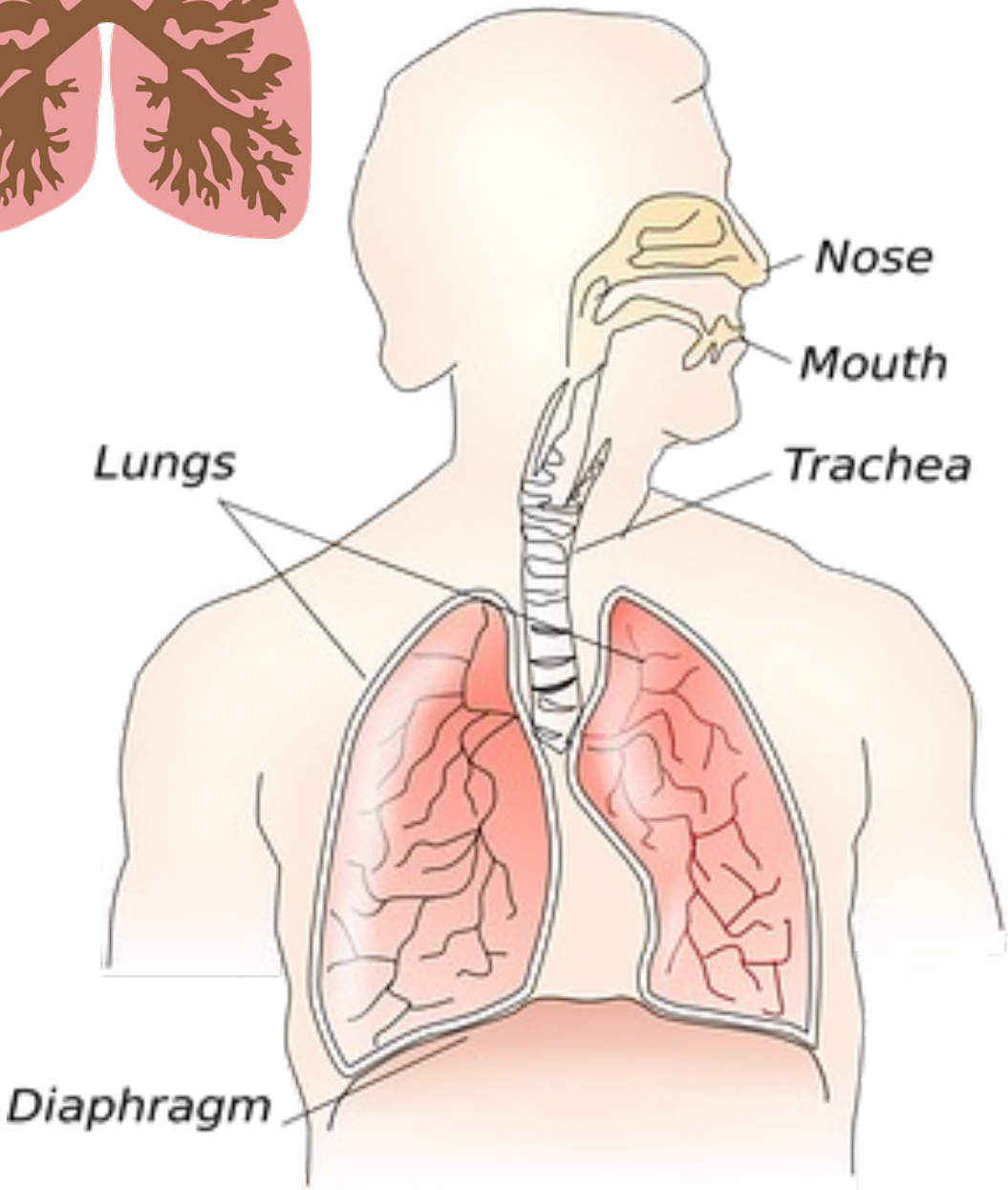
The Heart Mini Poster



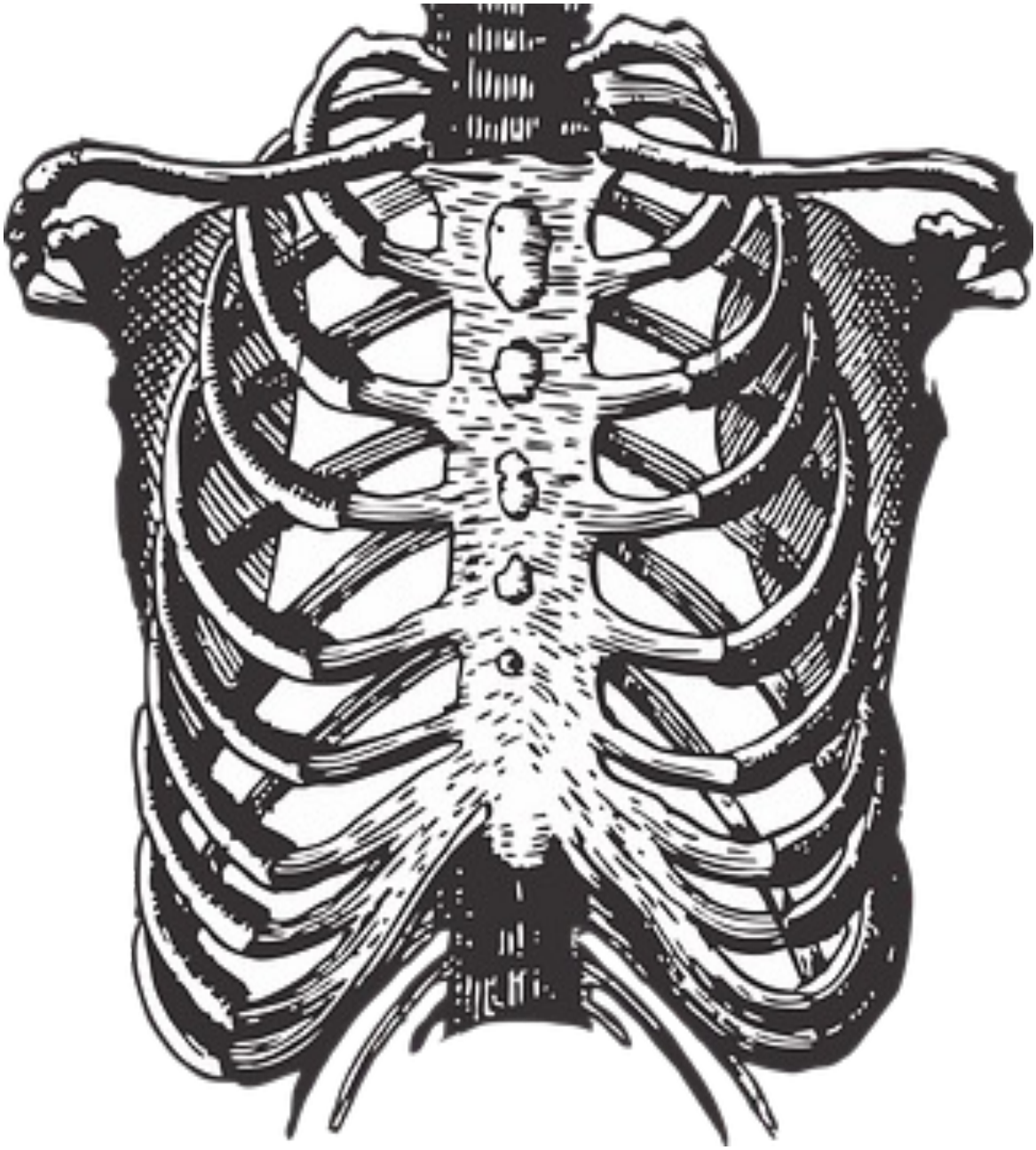


The Lungs Mini Poster

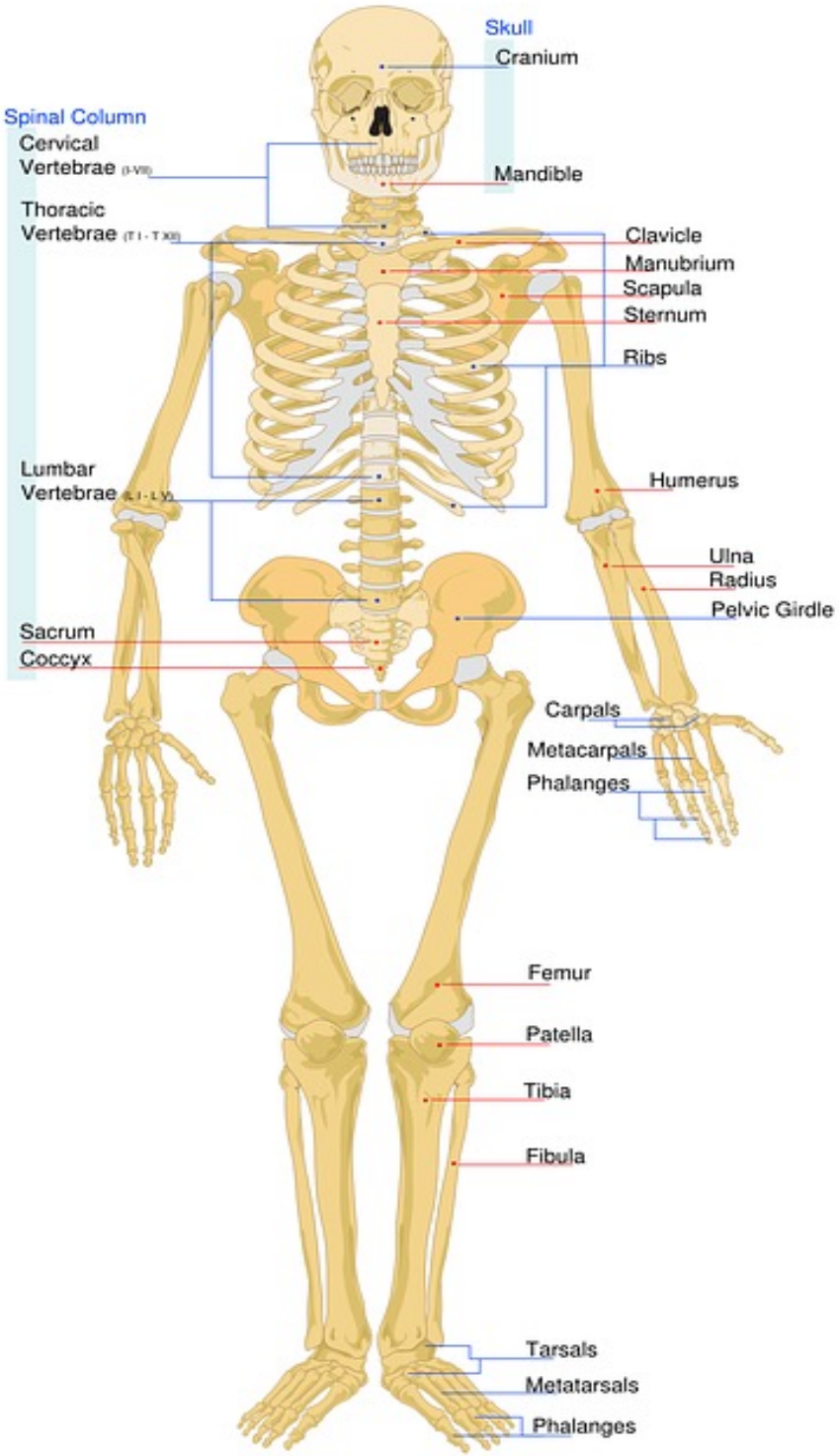




The Rib Cage Mini Poster



Skeletal Mini Poster



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