SUMMER CAMP

What's Up Doc

Grades: K-3rd

Each of the five days is set to three-hour periods. Depending on how much time is allotted you may extend or shorten times if needed, however, the set minutes are a good time frame.

Tested, edited & approved by:

Sam Elge, Aurora High School Senior

Day One: Skeleton

Introductions - 5 minutes:

Have the entire group starting with the instructor state their name, age, and why they chose to participate in this camp. Run through expectations for the kids throughout the week, such as listening skills, being a good friend, sharing, etc.

Explain Skeleton System - 5 minutes:

The skeleton system is made up of bones that give your body structure. Without the skeletons, we would be floppy and we wouldn't be able to hold our shape. We would simply be a blob that sits on the floor with little ability to move.

Skeleton Walkthrough - 10 minutes:

Go through simple parts of the human skeletons. Use a model skeleton if available. You may use the official scientific terms if you would like. Mention that there are 206 bones in an adult body and over 300 bones in a baby's body. This is because as we get older, our bones grow into each other and combine into less bones.

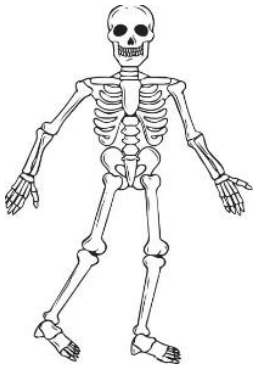
Review bones such as:

- Skull (Frontal, Parietal, Occipital, Temporal)
- Ribs
- Spine (Cervical, Thoracic, Lumbar)
- Pelvis (Ilium, Ischium, Pubis)
- Arm (Radius, Ulna, Humerus)

- Wrist (Carpals)
- Hands (Metacarpals)
- Fingers (Phalanges)
- Leg (Femur, Tibia, Fibula)
- Ankle (Tarsals)
- Feet (Metatarsals)
- Toes (Phalanges)

Play-Doh Skeleton - 20 minutes:

Using a guide, make a model skeleton using white play-doh. Feel free to print out the skeleton below.



Connect the bones using a thin wire spool. Carefully watch the students to be sure they are safe with the wire and don't accidentally hurt themselves.

Clean Up - 5 minutes

Skeleton Game - 15 minutes:

Make two teams, and make a single file line for each team. The first person in line from each team will see a picture of a skeleton posing. Let them examine the picture for 5 seconds. There will be two skeletons hanging on the wall. The first person in line from each team will run up to the skeletons and rearrange them to make the same pose they saw in the picture. The first person to correctly recreate the pose wins. Go through the line a few times. At the end, the team with the most points wins.

Chalk Skeletons - 25 minutes:

Have all kids partner up and trace each other on the sidewalk with chalk. Then fill in the bodies with skeletons. Encourage the kids to make them realistic and label them with the correct terms (these can be the simple terms).

X-Ray Puzzle - 10 minutes:

Draw skeletons on black construction paper using white crayon, pencil, or chalk. Cut them up to create a puzzle. The kids can work in small groups or individually to put the puzzle together.

Parts of the Bone - 5 minutes:

Use a diagram or a physical model to show the parts of the bone. There are the ends of the bone (epiphyses), the middle, skinny part of the bone (diaphysis), and within the bone is a cavity that holds bone marrow. Bone marrow makes red and white blood cells.

DNA Candy Model - 20 minutes:

We are going to take a break from the skeletal system to do a quick DNA overview. DNA is everywhere throughout our body. It's in every single cell. DNA is the instructions to our body. Your DNA tells you what color your hair is, what color your eyes are, how long your hair is, how tall you are. Everything about you is because of your DNA. For the DNA candy model, you will need marshmallows, licorice, and toothpicks. Put two marshmallows on one tooth pick. Use 10 toothpicks with two marshmallows on each of them. The marshmallows represent the nucleotides. Attach each end of the toothpick to a separate piece of licorice. Remember to twist at the end to complete the DNA model.

The final result should look like this:

Clean Up - 5 minutes

Active Game - 30 minutes:

It's good to go run around and get some energy out of your system. Play a game of tag.

Pipe Cleaner Skeletons - 30 minutes:

This is another easy, fun craft to make. Like the name suggests, you will make a skeleton model made out of pipe cleaners. Use as many pipe cleaners as you need to be able to make a skeleton. Make two if there is time.

Day Two: Brain and Respiratory

Skeleton Review - 5 minutes:

Pull up a picture of a skeleton or use a model skeleton and see what the kids remember. Go through the bones that were discussed the previous day. Then ask about what is inside the skull.

Explain the Brain - 5 minutes:

The brain is how we exist. We use it to think and speak. We use it to move. We use it to control our five senses.

Touch - everywhere
Smell - nose
Taste - mouth
Hearing - ears
Sight - eyes

If we didn't have our brains, we wouldn't be able to learn. The brain is clearly very important.

Watch Brain and Senses Videos - 30 minutes:

Watch "The Brain for Kids - What is the brain and how does it work?" by Smile and Learn - English The Brain for Kids - What is the brain and how does it work?

Watch "Senses for Kids - Taste, Touch, Sight, Hearing and Smell" by Smile and Learn - English Senses for Kids - Taste, Touch, Sight, Hearing and Smell

Discuss what you learned after each video.

Egghead - 10 minutes:

Because the brain is so important to life, it needs to be protected. You will need two plastic containers with lids, two eggs, and water. The eggs will act as the brain, the containers will act

as the skull, and the water will act as the cerebrospinal fluid. Place two eggs in their own container. Fill one container with water and leave the other empty with just the egg inside. Shake the container without water to demonstrate what happens to our brain when it isn't protected. The egg will break. Then shake the container with water. The egg will not break. This happens in our own bodies. There is a water-like fluid that surrounds our brain, so when we move a lot, our brain doesn't hit our skull and become damaged. The stuff that surrounds our brain is called cerebrospinal fluid.

Clean Up- 5 Minutes

Telephone - 10 minutes:

Neuron chains send signals to do everything. They do it all the time, and there is never a moment when there are no signals traveling through the brain. The brain uses signals to send and receive information. This is how the five senses work. The brain sends a signal somewhere in the body, and that place sends a signal back. Everyone lines up into lines. There should be at least four people per line. The person in the front will receive the word. The front person is the ear. They will then whisper to the person behind them the word. That person is the hair. The hair will whisper the word to the neuron, and the neuron will whisper the word to the brain in the back of the line. The brain will say the word out loud. If it's right, the hair, neurons, and brain worked well. If it is wrong, one of them must not work right.

Brain Hat - 20 minutes:

Download the instructions and handouts at https://ellenjmchenry.com/store/wp-content/uploads/2016/04/Brain-Hat-2.0-download.pdf

Explain what each lobe of the brain does. The handout includes some general explanations.

Watch Informational Episode - 30 minutes:

Watch "The Magic School Bus Rides Again" season 1 episode 11.

Active Game - 30 minutes:

Play an outdoor game such as tag or kickball.

Begin Respiratory System - 5 minutes:

Explain the lungs. We breathe air in our nose and that air goes down to our lungs. Our lungs are in our chest and the heart is in the middle of them. When the air reaches our lungs, we take the oxygen and put it in our blood.

Balloon Lungs - 10 minutes: Take two bendy straws and bend them. Tape the straws together so the tops face away from each other. Take two balloons and tape them to the tops of the straws. When you blow through the bottoms of the straws, the balloons should inflate like lungs. When air goes into our lungs, they expand. The balloons could be replaced with paper bags.

Bottle Lungs - 30 minutes:

This craft is similar to the balloon lungs, but there are a few alterations. You will need three straws, two bendy straws and one slightly thicker straw. Cut the bendy straws in half so that the bottoms are shorter. Put the bottoms of the straws inside the thicker straw and tape them together. Just like the balloon lungs, tape small balloons to the end of the bendy straws. Next, take a two liter plastic bottle and cut it in half using an X-ACTO knife. Cut a hole in the bottle cap just big enough to fit the thick straw through. Take another balloon and cut the bottom of it off. Fold the balloon over the bottom of the bottle. When you pull the balloon down, the "lungs" should inflate.

Day Three: Muscles and Organs

Review Nervous and Respiratory Systems - 5 minutes:

Spend some time to ask questions to the kids to make sure they understand what they learned yesterday.

Explain Muscular System - 5 minutes:

The muscular system is made up of muscles. Muscles are what make us move. The only thing muscles do is contract. This means that they get shorter and stiffer. This is what happens when we flex. When your muscles uncontrollably contract and relax, we call that muscle spasms. Muscle spasms for an extended period of time are called cramps.

Watch Muscular System Video - 5 minutes:

Watch "Muscular System Video | Types of Muscles | Video for Kids" by learning junction
Muscular System Video | Types of Muscles | Video for Kids

Watch Bill Nye - 25 minutes:

Watch Bill Nye explain the muscular and skeletal system. This video will review the skeletal system a little bit: Bill Nye the Science Guy - S02E08 Bones and Muscles

Paper Hand - 20 minutes:

This activity demonstrates muscles in the hands by the movement of the fingers. Each person needs a paper cutout of a hand. Cut up five straws. Four straws should be cut up into four pieces, one piece being long, running from the base of the finger to the wrist. The other three pieces should be placed along the finger where the long bones are. The string acts as the joint. The straw for the thumb should be cut up into three pieces with two short pieces. Pull yarn through each of the straws using one piece of string or yarn for each finger. Tape down the string and the straws where they should be placed. Pull down on the excess string at the bottom to make the fingers bend. If you choose, you can take it a step further and tie the excess string into loops. When you place your fingers in the loops, you can move the hand craft to mimic your own finger movements. If you choose to do this, you may want to switch out the paper for cardboard.

Lifesize Organs - 15 minutes:

For this activity, there will be two volunteers. Each volunteer will be traced on separate pieces of paper large enough to fit a person. On one of the pieces of paper, the kids will place the organ print-outs where they think each organ is. After that is complete, the camp instructor will help them place them in the right spots on the other piece of paper. Download the printable organs at Printable Life-Size Human Body Organs

Watch Organ Video - 5 minutes:

Watch an educational video that explains the organs of the body: Human organs for kids

Active Games - 90 minutes:

For the rest of the day, play some active games that activates the organs and body reactions and build muscle.

Game/Activity Ideas:

- Tag (freeze, infection, normal)
- Kickball
- Obstacle Course
- Playground

- Dancing (Just Dance)
- Keep the Balloon Up
- Wiffle Ball
- Catch

Day Four: Digestive System

Review the Muscular System and Organs - 5 minutes:

Spend some time to ask questions to the kids to make sure they understand what they learned yesterday.

Explain Digestive System - 10 minutes:

The digestive system consists of six main parts. The mouth, esophagus, stomach, small intestine, large intestine and rectum. Your mouth produces something called saliva or spit. When you eat something the saliva breaks down the chemicals in the food, which helps make the food mushy and easy to swallow. Your tongue helps by pushing the food around while you chew with your teeth.When you swallow the tongue pushes tiny bits of food called bolus (BO-luss). The food then travels to the second part of the digestive system called the Esophagus. The esophagus is like a stretchy pipe that is 10 inches long. It moves food from the back of your throat to your stomach. When swallowing the epiglottis (ep-ih-GLOT-iss) flops down to stop food and liquid from going into your windpipe. Once the food enters the esophagus, it doesn't just drop right into the stomach. Instead, muscles in the walls move in a wave to slowly squeeze the food through the esophagus. This takes about two to three seconds. Once the food enters the stomach it breaks the food into a liquid mixture. The stomach churns and mashes all the small balls of food that come from the esophagus into smaller pieces. The gastric juices or stomach acid helps with this process. Once the food is through the stomach it moves onto the small intestine. The small intestine is approximately 1.5" to 2" around. The small intestine breaks down the food even more. Other organs like the pancreas make juices that help the body digest the fats and proteins in the foods. The liver produces something called bile which helps to absorb fats into the bloodstream. The gallbladder is like a warehouse that stores bile until the body needs it. Food spends as long as four hours in the small intestine. The last section is the Colon or Large Intestine. This is the last chance that it has to absorb any water and minerals into the blood. As the water leaves the waste product, what's left gets harder until it becomes a solid. This is now stool and is what your body discards in the bathroom.

Pancreas Explanation - 5 minutes:

Exocrine cells of the pancreas produce enzymes that help with digestion. When food enters the stomach, exocrine cells release the pancreatic enzymes into a system of small ducts that lead to the main pancreatic duct. The pancreatic duct runs the length of the pancreas and carries pancreatic enzymes and other secretions, collectively called pancreatic juice.
The main pancreatic duct connects with the common bile duct, which carries bile from the gallbladder, and together they connect with the duodenum at a point called the ampulla of Vater. Here, bile and pancreatic enzymes enter the duodenum to aid with the digestion of fats, carbohydrates and proteins.

Liver Explanation - 5 minutes:

The liver is one of the largest and most important organs in a person's body. It is about the size of a football and weighs about 3 pounds in the average-sized person. The liver is located on the upper right side of a person's body, behind the lower ribs. Almost all the blood in a person's body passes through the liver. The liver performs hundreds of functions, including storing nutrients; removing waste products and worn-out cells from the blood; filtering and processing chemicals in food, alcohol and medications; and producing bile, a solution that helps digest fats and eliminate waste products.

Digestion Activity - 30 minutes:

Gather all your supplies and put on rubber gloves. Pour 1-2 tablespoons of water or in your ziplock bag. Now it's time to demonstrate the digestive process. Put the crackers and banana into the bag and crush/mix them together. Cut the corner of the ziplock bag and send the mush through into a pair of stockings/tights. Set the stocking in a bowl of lemon juice and vinegar. This will represent the gastric juice/stomach acid. Have the students squeeze the mush down the intestine. When the food/mush gets to the bottom of the stocking/tights, put a styrofoam or paper cup with a 3-4" small hole cut out of the bottom. The cup represents the large intestine. Squeeze the remaining mixture out and let it sit in the tin. This represents the stool that isn't used in the digestive process. You can do two groups of this if you have a bigger group.

Clean Up - 5 minutes

Digestive System Cartoon - 30 minutes:

Watch "The Magic School Bus - For Lunch - Ep. 10" by Victor's Nelvana Shows The Magic School Bus - For Lunch - Ep. 10

Cardboard Model - 15 minutes:

On a large piece of cardboard, draw a person. Cut up pieces of cardboard and glue them on the large piece to make the digestive system. The result should look like this:

When complete, take a piece of food and show the kids the path it takes through the body.

Active Game - 60 minutes:

In order to activate our metabolisms and get our organs going, we need to burn energy. Play a game and have some fun!

Snack - 20 minutes:

To recuperate from the games, make and enjoy a snack. Your digestive system is sure to be ready to handle the food you eat.

Day Five: Blood

Review the Digestive System - 5 minutes:

Spend some time to ask questions to the kids to make sure they understand what they learned yesterday.

Prepare "What's In Your Blood" - 5 minutes:

Pour red orbeez into a large clear tote. Let them soak in water until you start the "What's In Your Blood" activity. Add in ten white ping pong balls. The orbeez represent red blood cells, and the ping pong balls represent white blood cells.

Explain the Circulatory System - 5 minutes:

This day is all about the heart and the circulatory system. The circulatory system is the collection of blood vessels in our body that moves the blood to different places. Blood holds things that the body needs. It holds things like oxygen and nutrients. Oxygen is what we breathe. We need it to keep our bodies functioning. Nutrients are stuff in food that is used just like oxygen. Examples of nutrients are fats, carbs, proteins, vitamins, minerals, and water. When the blood delivers these things to the places in our bodies, it goes back to the heart. From the heart, blood goes to the lungs to get the nutrients. Then it goes back to the heart to be sent out again. There are several different blood vessels in our bodies: arteries, veins, and capillaries. First, we are going to talk about capillaries.

Watch Bill Nye - 25 minutes:

Watch an informational video about the circulation system from Bill Nye: Blood & Circulation

Capillary Action - 10 minutes:

To get blood back to the heart, the blood has to travel upward. This force is called capillary action. We will demonstrate capillary action by using cups, colored water, and paper towels. Get out seven cups, preferably clear, and fill four of them halfway with water. Use food coloring to color all four of them different colors. Take the other three and put them in between the cups with water in a line. Take six paper towels and fold them so the width touches the opposite width. Fold them in the direction three more times. Place the paper towels in the water filled cups with each towel leaning into an empty cup. Wait for the color to diffuse through the whole paper towel and drip into the empty cups.

Heart Pump Model - 15 minutes:

Take a cup and fill it with water. Cut the bottom off of a balloon and place it over the top of the cup. Secure it with a rubber band and tape. Poke two holes in the balloon. Place one straw in each hole. One straw should have a water balloon taped to it. The side with the water balloon remains out of the cup. When you press down on the balloon that sits on top of the cup, the balloon on the straw should inflate and water should pump out of the other straw.

Blood Slime - 20 minutes:

Pour ½ cup clear liquid school glue in a bowl. Dissolve ½ teaspoon baking soda in ½ cup warm water in a separate container. Pour the baking soda solution into the bowl and stir it into the glue with the large popsicle stick. Add the red Perler beads, microfoam balls, and glitter to the mixture. Add 1 tablespoon of saline solution. Mix quickly until the slime pulls away from the side and bottom of the bowl. If the slime is sticking to the bowl, slowly add a drop or two of saline solution and mix until the slime no longer sticks to the bowl. Careful not to add too much saline solution or else your slime might get too firm. Knead the slime with your hands for a few minutes until it reaches the desired consistency. Add red food coloring if you want to make the slime look like blood!

Beat The Clock - 5 minutes:

The heart pumps 1.3 gallons of blood per minute. The goal of this activity is to try to move 1.3 gallons of water from one container to another in under a minute. Move the water using a standard cup. You can try it twice if you'd like.

Working Circulatory System - 30 minutes:

This activity, much like the other heart model, demonstrates how blood moves in and out of the heart. First, drill two very small holes in each of the two ½" PVC caps. Cut the collar and the top off of the small balloons so only the neck remains. Place two of the balloon necks on separate pieces of IV drip pipe. Cut the drip pipes with the balloons on them so they are 3 cm long. Stick the drip pipe through one of the holes in the PVC caps so the balloon sticks out of the top of the cap. Each PVC cap should have a 3 cm drip pipe. The other balloon necks are placed on two other pieces of drip pipe. Place the longer pieces of drip pipe through the other holes in the PVC caps. Place them opposite of the short pieces, meaning the balloon should be on the inside of the cap. Cut the physioball in half. Cut off the collars of the two big balloons. Place one balloon on each half of the physioball. Glue one PVC cap with the drip pipes in the holes on each half of the physioball. Glue the physioball back together. Place a drip chamber over each small balloon that sticks out. Lead both of the chamber pipes to the top, leaning in a cup. Lead the other pipes with the balloons on the inside of the caps to a separate cup. For clearer instructions, watch this video: How to Make Working Model of Heart (English) Teaching Tool or Science Project

Active Game/Exercise - 50 minutes:

To keep your heart healthy, it's important to be active and exercise. Spend at least 20 minutes doing exercises. You can jog around, do sit-ups, do push-ups, and do jumping jacks. To make sure everyone is moving and having fun, you can play tag.

Play with "What's in Your Blood" - 10 minutes: The orbeez should have absorbed a lot of the water by now. Play with them. The orbeez are red blood cells which are plenty and small. They work to carry nutrients throughout your body. The pingpong balls represent white blood cells which work to fight infections.

Supplies: (Unless stated in the activity, each project is done by each child, so the number of items depends on the size of your group.)

- **Day One**
  - Play-Doh Skeleton
    - White Play-Doh
    - Skeleton Model on paper
  - Skeleton Game
    - Skeleton Poses
    - Skeleton moving model
  - Chalk Skeletons
    - Chalk
  - X-Ray Puzzle
    - Black construction paper
    - White crayon, white colored pencil, or white chalk
    - Scissors
  - DNA Candy Model
    - Colored Marshmallows
    - Licorice
    - Toothpicks
  - Pipe Cleaner Skeletons
    - Pipe cleaners

- **Day Two**
  - Egghead
    - Plastic containers with lids
    - Eggs
    - Water
  - Brain Hat
    - Cutout
    - Instructions
    - Glue
    - Tape
  - Balloon Lungs
    - Two bendy straws
    - Balloons, pink preferably
  - Bottle Lungs

        - Two bendy straws
        - One slightly thicker straw, with no bend
        - Scissors
        - Tape
        - Small balloons
        - Two Liter empty bottle
        - X-Acto knife

- **Day Three**
    - Paper Hand
        - Paper cut out of a hand
        - 5 straws
        - String
        - Tape
    - Lifesize Organ Model
        - Large Paper
        - Organ Cutouts
- **Day Four**
    - Digestion Activity
        - Gloves
        - Bowl
        - Ziploc Bag
        - Lemon Juice-Vinegar Solution
        - Stocking
        - Cup
    - Model
        - Cardboard
        - Food of Choice
    - Snack
        - Food of Choice
- **Day Five**
    - What's in your blood prep
        - Red orbeez
        - Large clear tote
        - Water
        - Ping pong balls

- Capillary Action
  - Clear cups
  - Water
  - Paper towels
  - Food coloring
- Heart Pump Model
  - Cup
  - Water
  - Balloon
  - Scissors
  - Rubber Band
  - Tape
- Blood Slime
  - Baking Soda
  - Clear Glue
  - Small Red Beads
  - Microfoam Balls
  - Red Food Coloring
  - Saline Solution
  - Mixing Container
  - Stirring Tool
- Beat The Clock
  - Tote
  - Water
  - Cup
  - Timer
- Working Circulatory System
  - Physioball
  - IV Set (for drip pipe and chamber)
  - Standard Balloons
  - Small Balloons (water balloons)
  - ½" PVC Caps
  - Cups