Science Does A Body Good
Family Science Night 2GO

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**Blood Typing Activity**

**Materials**
- Pipette or dropper
- Water
- Plastic tray
- 4 Cups
- Food Coloring (red and blue)
- Permanent Marker

**This demonstration will show which blood types are compatible and with whom**

**Procedures:**
2. Put a few drops of red food coloring in the cup marked “A”.
   - Put a few drops of blue food coloring in the cup marked “B”
   - Put a few drops of both blue and red in the cup marked “AB” (should look purple)
   - **DO NOT put any food coloring in the cup marked “O”, just plain water**
3. Fill the cups about half-way with water.
4. Using the pipette, place four drops of type “A” blood onto the plastic tray making sure these are evenly spaced out. (Rinse out the pipette after every use)
5. Add a different drop of donor blood to each of the four type “A” drops. You should have four separate drops containing the mixtures below.
   - A + A
   - A + O
   - A + B
   - A + AB
6. You can repeat this process using a different receiver type at the beginning.

**This demonstration clearly shows**
- “O” can receive “O” blood
- “A” can receive both “A” and “O” blood
- “B” can receive both “B” and “O” blood
- “AB” can receive all blood types and is the universal receiver
- “O” can donate to all blood types and is the universal donor as it can give to any blood type
**BLOOD MODEL SLIME**

**MATERIALS**
- 2 oz Liquid starch
- 3 ounces of water
- ½ cup of glue
- Red food coloring
- Mini white Styrofoam balls
- Red perler beads
- Red foam pieces
- Bowl
- Spoon or spatula for mixing

**PROCEDURES**
1. In your bowl add glue, water and red food coloring and mix well.
2. Add your liquid starch and stir until mixed. At first, all the liquid will be separated, but after stirring vigorously for about 2 minutes, your slime will suddenly come together. It will look a bit stringy and dull at first, but after about two minutes, the slime will fully bond.
3. Add the white Styrofoam balls, red perler beads, and red foam pieces. Pay attention to how the blood model looks like.
   - This makes the four parts of the blood:
     ** Each of these parts should be represented in your model
     - Plasma (Slime)
     - Red Blood cells (red perler beads)
     - White blood cells (white Styrofoam balls)
     - Platelets (Red foam pieces)

Human blood appears to be a red liquid to the naked eye, but under a microscope we can see that it contains four distinct elements: plasma, red blood cells, white blood cells, and platelets. The plasma is liquid part of blood, and is actually colorless. The red blood cells give blood it's red color.
Facts about the Brain:

- The human brain is like a powerful computer that stores our memory and controls how we as humans think and react.
- The brain is the center of the human nervous system, controlling our thoughts, movements, memories and decisions.
- The brain contains billions of nerve cells that send and receive information around the body.
- The human brain is over three times as big as the brain of other mammals that are of similar body size.
- Each side of the brain interacts largely with just one half of the body. The interaction is with opposite sides, the right side of the brain interacts with the left side of the body, and vice versa.
- The largest part of the human brain is called the cerebrum. Other important parts include corpus callosum, cerebral cortex, thalamus, cerebellum, hypothalamus, hippocampus and brain stem.
- The human brain is protected by the skull, a protective casing made up of 22 bones that are joined together.

PROCEDURES:
1) Print the templates and color the different parts of the brain.
2) Carefully cut around the brain template and then cut along the solid lines on the hemispheres. Fold along the dotted lines and glue each fold together.
3) Glue the brain stem below and in between the temporal lobe and cerebellum.
4) The center attachment pieces are optional to attach the two hemispheres together. Make sure to attach along the frontal and parietal lobes.
5) Put your brain hat on and share what you’ve learned about the brain!

MATERIALS:
- BRAIN HAT TEMPLATES
- SCISSORS
- GLUE OR TAPE
RIGHT HEMISPHERE

Frontal Lobe
Temporal Lobe
Parietal Lobe
Occipital Lobe
Motor Cortex
Sensory Cortex
Cerebellum

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ATTACHMENTS

CUT THIS PIECE AND USE GLUE TO ATTACH IT TO THE TWO HEMISPHERES TOGETHER ABOVE THE HEAD

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**BUILD A WORKING ARM MUSCLE**

**MATERIALS:**
- Long cardboard tube
- 2 Short cardboard tubes
- Tape
- Marker
- Straight pin
- Large paperclip

**PROCEDURES:**

1. With the marker label the long tube "humerus". Label one short tube "radius" and the other "ulna". These will represent the bones of your arm.
2. Use a straight pin to pierce a hole through the humerus, about a half-inch from the right end. Pierce a hole through the ends of the radius and ulna as well, about a half-inch from the left end.
3. Grab the large paperclip and straighten to create a long flexible wire. Bend a hook at the bottom end.
4. Place bones on the table. You'll want the humerus on the left, the radius on the upper right, and the ulna on the bottom right as shown to the right.
5. Line up the pierced holes, then thread paperclip wire through the holes to create a joint. Make sure the wire is bent at each end, to keep the wire from coming out.
6. You'll also want to tape over the sharp ends, to keep the wire from popping the balloons.
7. Partially inflate two long balloons, leaving a tail at both ends. These are your bicep and tricep muscles.
8. Tie the right end of the bicep balloon to the radius and ulna. You might want to tie it a little closer to the elbow joint.
9. Tie the left end of the bicep balloon to the top of the humerus.
10. Now using the triceps balloon, tie the right end to the right side of the elbow joint. Bring the balloon around the back of the elbow and tie the remaining loose end of the tricep to the top of the humerus.
11. You've created a Faux movable arm!!

**How arm muscles work**

The basic action of any muscle is contraction. When you think about moving your arm using your biceps muscle, your brain sends a signal down a nerve cell telling your biceps muscle to contract. The amount of force that the muscle creates varies—the muscle can contract a little or a lot depending on the signal that the nerve sends. All that any muscle can do is create contraction force.
HOW THE STOMACH DIGESTS FOOD

MATERIALS:

- QUART ZIPLOC (STOMACH) BAG
- PERMANENT MARKER
- SNACK ZIPLOC BAG
- A FEW CRACKERS
- CLEAR SODA
- OPTIONAL: TRAY
- OPTIONAL: SMALL CUP

PROCEDURES:

1. On the QUART size bag draw an image of a stomach with the permanent marker.
2. On the SNACK size Ziploc bag add a couple of crackers and physically crush the crackers inside the bag.
3. Then you will place all the crushed crackers in the Ziploc bag with a stomach drawn on it.
4. Have your grown up pour soda to demonstrate how the food is chemically broken down (sodas are high in acid). Then close the Ziploc bag.

HOW DOES MY DIGESTIVE SYSTEM WORK?

Each part of your digestive system helps to move food and liquid through your GI tract, break food and liquid into smaller parts, or both. Once foods are broken into small enough parts, your body can absorb and move the nutrients to where they are needed. Your large intestine absorbs water, and the waste products of digestion become stool. Nerves and hormones help control the digestive process.
MATERIALS:
❖ 2 LONG STRAWS
❖ SCISSORS
❖ TAPE
❖ TWO PLASTIC BAGS
❖ DOUBLE SIDED TAPE OR GLUE
❖ LUNG TEMPLATE

STEPS:
1. TAPE BOTH STRAWS WITH BAGS TOGETHER.
2. USE THE GLUE OR DOUBLE SIDED TAPE TO ATTACH YOUR NOSE AND LIPS TEMPLATE TO THE STRAWS.
3. COLOR AND TAPE YOUR LUNG PRINTABLE TO THE BACK OF THE STRAWS.
4. TAPE YOUR BAG TO EACH LUNG, TIGHTLY SO NO AIR ESCAPES.
5. BLOW AND WATCH THE “LUNGS” EXPAND AND TAKE IN AIR AND EXHALE. REPEAT

How your lungs work?
Your lungs bring fresh oxygen into your body. They remove the carbon dioxide and other waste gases that your body doesn’t need. To breathe in (inhale), you use the muscles of your rib cage - especially the major muscle, the diaphragm. Your diaphragm tightens and flattens, allowing you to suck air into your lungs. To breathe out (exhale), your diaphragm and rib cage muscles relax. This naturally lets the air out of your lungs.
MAKE YOUR OWN HAND

MATERIALS:
- Hand template
- Scissors
- Tape
- String
- Straws

PROCEDURES:
1. Begin by coloring and cutting out your hand template.
2. Cut the plastic straws into small pieces, about ½ inch long.
3. Tape the straw pieces in a row down each finger. Try to fit 3 on each finger and 2 on the thumb. You can use a few longer sections to run down the hands to the wrist. Taping the pieces on is the part that requires a little patience.
4. Cut 5 lengths of string long enough to run down from the tips of the fingers to a few inches past the wrist.
5. Tape a string to the back of each finger tip. Pull the string over the tip of the finger and string it through the plastic straws running down that finger, then through the straw running to the wrist.
6. Once all the fingers are threaded, you can pull the strings to make the fingers bend open and closed.

FACTS ABOUT HANDS
1. A hand is a five finger appendage located at the end of a human forearm.
2. Hands allow humans to manipulate objects, lift heavy objects and complete small complex tasks with their fingers.
3. The five fingers on the human hand are the thumb, index finger, middle finger, ring finger, and little finger.
4. Some anatomists don’t consider the thumb a finger, and in those situations the hand is considered to have four fingers and a thumb.
5. A person can be right-handed or left-handed. It’s estimated that 90% of the human population is right-handed.
6. The three main sections of the human hand are the carpus, metacarpus and fingers.
7. The human hand known is made up of 27 different bones, 8 carpal bones, 5 metacarpal bones, and 14 phalange bones.
8. The bones in the human hand make up about 25% of all the bones in the human body.
9. The human hand has over 30 muscles that work together with joints, bones and nerves to give mobility.
10. The hands receive their blood supply from two main arteries.
The Heart Science

The pumping you do on the balloon mimics how the heart pumps in our bodies. The balloon on the straw works like the valves on the heart. It opens when you push down on the pump and closes as you release. This is what lets the blood flow up through the open straw, but like in the body, it prevents backflow of blood. Now, of course this is a simplified model. The human heart has a lot more going on than just a single valve and two blood paths. But this is a great way to get a basic understanding of how our hearts pump blood throughout our bodies.

PUMPING HEART MODEL

MATERIALS:
- 2 cups
- 2 bendy straws
- Balloon
- Tape/glue
- Colored water

PROCEDURES:
1. Pour the colored water in one of the cups.
2. Take your balloon and cut the neck of it off. Take that top part, stretch it out a bit and put it over the top of the cup so it is taut. Save the neck part as well.
3. Have an adult take a sharp object, such as a straight pin or toothpick and poke a hole in the top of the balloon once towards the edge of the cup. Make a second hole about an inch away from the first. (scissors or a knife might be needed, but try to make the hole as small as you can)
4. Take your straws and push one through each hole with the bendy part sticking out the top. You might have to push hard, but they should pop through.
5. Take the neck of the balloon that you set aside and use it to cover the opening of one straw sticking out of the cup. Place the other cup under the open straw to catch the blood as it comes out. Your pumping heart model is ready to get that blood flowing!!!
SPINAL CORD CRAFT

MATERIALS
- Yarn
- Beads
- Pipe Cleaner

** Pipe cleaner = Spinal cord
** Beads = Vertebrae
** Yarn = Nerves

PROCEDURES
1. Tie off or bend one end of the pipe cleaner so nothing falls off the end.
2. Alternate vertebrae and nerves on the spinal cord.
3. There should be a total of 24 vertebrae.

FACTS ABOUT THE SPINAL CORD
1. Your Spinal cord is part of the central nervous system, it's like the internet of nerve signals
2. It functions independently of the brain and controls voluntary and involuntary movement of the muscles.
3. Your spinal cord stops growing once you turn five.
4. Damage to the spinal cord can cause paralysis
5. Stem cell treatments may repair spinal cord injuries.
6. Technology allows paralyzed people to regain movement in their limbs.
7. You need your spinal cord in order to sweat.
What is DNA made of?

DNA is a nucleic acid, which is the part of the cell that contains molecules that store information. DNA is made of a pattern of four different nucleotides, which are bound on one end to a phosphate group and on the other to a nitrogenous base. The nitrogenous base can be one of four types: adenine, cytosine, guanine or thymine. The nucleotides are joined in long strings to make up DNA and these two strands twist together to create DNA’s characteristic double helix. Each strand has the sugar or phosphate end of the nucleotides. The sides are joined together by pairs of complementary nucleotides.