



Family Bio Adventure Night: Take Home Activity

Color Race

Objective: Watch capillary action as plants absorb color.

Materials: A lettuce leaf, a carnation, a celery stalk (with leaves), 3 cups, food coloring that is not green

Procedure:

1. Set up 3 containers with clear water and put 2 drops of food coloring in each.
2. Place the lettuce leaf, carnation, and celery stalk in the different containers and set aside.*
3. Observe the plants over the next couple of days – what happens to the color of the plants? Do you think the whole plant will change, or just around the edges? Does one plant change faster than the others?

*You can also experiment by making long slices along the stems of the plants and placing them in different colors to create rainbow plants!

Discussion:

Why do these plants change color?

Coloring the water with food coloring does not harm the plant in any way, but it allows you to see the movement of water through the roots to the shoots. Splitting the stem simply proves that the tiny tubes in the stem run all the way from the stem to the petals of the flowers. This movement of liquid is called capillary action.

Can you use different types of color?

Try adding a colored drink powder like KoolAid, Gatorade, or lemonade instead of using food coloring. Does the manner in which you color the water make a difference? What would happen if you put the carnation stem into soda instead of water? Could you create a root beer colored carnation?

Why is it important to see how plants change color?

Like colored dyes in this experiment, some chemicals that pollute our waters can get into the soil and ground water and contaminate our vegetables and plants growing in the soil. Some chemicals and pollutants, just like the color dyes, may travel up into the plant and affect its health or growth.



Family Engineering Night: Family Take Home Activity

Tabletop Catapult

Objective: Create a catapult to launch pom-poms.

Materials: Tissue box, rubber band, plastic spoon, masking tape, pencil, pom-poms

Procedure:

1. Hold the handle of the spoon in one hand and the pom-pom in the scoop part of the spoon. Gently bend the spoon and release to test how the spoon works as a catapult.
2. Create a target (using a cup or a square of masking tape). Using your spoon and pom-pom, try to hit the target from at least 5' away.
3. Have an adult cut top off tissue box
4. Design a way to attach the spoon to the box using a rubber band, pencil, and masking tape.
5. Test out your catapult by trying to hit the target with the pom-poms.
6. Redesign the spoon, rubber band and masking tape as needed.

Discussion:

How can I aim my catapult?

Objects launched from a catapult follow a trajectory, a path that goes upwards from the launch force and then downwards from gravity. Watch the path of the pom-pom after it is launched. It should look like an arch. Use this knowledge to help aim your catapult.

Who invented catapults?

The ancient Greeks are given credit for inventing the catapult. They got the idea from the crossbow, which is another invention that helps launch objects farther than they can be thrown.

What are some other simple machines?

Wedges, screws, levers, pulleys, wheels, and inclined planes are all types of simple machines. Simple machines are used to make work easier.

NGSSS and Florida Standards Alignment:

SC.2.P.13.1 – Investigate the effect of applying various pushes and pulls on different objects.

SC.3.E.5.4 – Explore the Law of Gravity by demonstrating that gravity is a force that can be overcome.

SC.3.P.10.2 – Recognize that energy has the ability to cause motion or create change



Web Resources:

- <http://sln.fi.edu/qa97/spotlight3/spotlight3.html>
- <http://www.msichicago.org/simplemachines>



Family Gross Out Science Night: Take Home Activity

More Snot!

Objective: Make ooey gooey snot to play with.

Materials: Elmer's white liquid glue, green food coloring, water, Borax powder (available at most large grocery stores), plastic spoon (to stir), 1 teaspoon (to measure), mixing bowls, a measuring cup.

Procedure:

1. Mix one cup of glue, one cup of warm water, and a few drops of green food coloring in a bowl.
2. In another bowl, mix $\frac{1}{2}$ cup of warm water and one teaspoon Borax.
3. After it has dissolved, slowly pour the Borax solution into the glue solution while stirring.
4. Squeeze and knead the mixture with your hands, make sure you get all the glue combined – and you have your very own fake snot!
5. Keep your new snot in a zip lock bag and compare it to the snot made at your Family Science Night, is there a difference? Which one is “better” snot?

Discussion:

What is snot?

Snot is a thick mucus that lines the inside of your nose and nose hairs. It acts as a defense that traps dust and other particles from entering your windpipe and lungs. Often, if you get sick and get a runny nose, your body makes extra snot to flush out the germs making you sick.

Why is it important to watch your snot?

Snot is important in our bodies. It acts a barrier for dust and other particles, but it can also spread germs to others. Sneezes can send snot and spit flying 26ft, moving up to 100 miles per hour!

Why is snot different colors?

Snot can be different colors depending on how you are feeling. Clear mucus is mostly water with some salt and other compounds. Snot can also be different shades of green or yellow, and even brownish or reddish. Very yellow or very green snot is caused by dead white blood cells and could indicate an infection; brown or red snot may indicate your nose is dried out or irritated from too much rubbing or blowing.



NGSSS and Florida Standards Alignment:

SC.K.L.14.1 – Recognize the five senses and related body parts.

SC.1.N.1.2 – Using the five senses as tools, make careful observations, describe objects in terms of number, shape, texture, size, weight, color, and motion, and compare their observations with others.

Web Resources:

- <http://www.webmd.com/allergies/features/the-truth-about-mucus>
- <http://sciencenordic.com/where-does-all-snot-come>



Physical Science Night: Family Take Home Activity

Positively Negative

Objective: You will use static electricity to “magically” attract objects.

Materials: Balloon, paper towel or wool material, tissue paper, salt, pepper, Styrofoam, non-waxed floss

Procedure:

1. Blow up a balloon and tie the end.
2. Cut the tissue paper and Styrofoam into one square centimeter pieces. Set out the tissue, salt, pepper, Styrofoam, and non-waxed floss on a flat surface.
3. Hypothesize which materials will be attracted to the balloon.
4. Vigorously rub the balloon with a piece of wool or a paper towel for about 1 minute.
5. Slowly move the balloon towards the tissue, without touching. What happened?
6. Slowly move the balloon towards the other items, without touching.

Discussion

Which objects did the balloon attract?

The balloon should've attracted the tissue, pepper, Styrofoam, and floss. If it is humid, it may not attract as well. Try using a hair dryer near the experiment area. Static electricity happens when negative charges build up (in this case, from rubbing the balloon). The negative charges are attracted to positive charges. Opposites attract. The balloon will pick up an object if it has an opposite charge and is lightweight.

Where else have you seen or experienced static electricity?

Lightning is static electricity. Sometimes in the winter, you can rub your socks on the carpet, and then get shocked when you touch something metal. If you slide down a plastic slide, the metal pins at the bottom can shock you.

NGSSS and Florida Standards Alignment:

SC.4.P.10.2 - Investigate and describe that energy has the ability to cause motion or create change.

SC.5.P.10.3 - Investigate and explain that an electrically-charged object can attract an uncharged object and can either attract or repel another charged object without any contact between the objects.

Web Resources

<http://pbskids.org/zoom/activities/sci/staticelectricity.html>



Sci Fi: Science in Films: Family Take Home Activity

Movie Makeup: Bloody Scabs

Objective: You will make a realistic bloody scab.

Materials: Red food coloring, cocoa powder, petroleum jelly, tissue

Procedure:

1. Start with a teaspoon of petroleum jelly.
2. Add a pinch of cocoa powder and a few drops of red food coloring and mix.
3. Dab half of the mixture onto desired scab area (keep away from eyes).
4. Crumple up about 2 square inches of 1ply tissue and squish into scab.
5. Add the rest of the jelly mixture, as desired.
6. Sprinkle some cocoa powder to make it look crusty and/or add a few drops of food coloring to make dripping blood.

Now you can experiment with different techniques to meet your specific scab needs. Try to make it dry or look like a gash, or make it look like a bite mark!

Discussion:

What body system does your blood pump through?

Your body pumps blood through the circulatory system, a system that maintains homeostasis. The circulatory system contains the cardiovascular system, which transports blood throughout the body, and the lymphatic system.

What are some major organs in your circulatory system?

The cardiovascular system includes the heart and blood vessels. The lymphatic system contains the conducting system and lymphoid tissue.

How are scabs formed?

When your body gets a cut, glue-like platelets rush to the scene to stop other liquid from flowing out. As it starts to dry, it forms a scab on the outside, while underneath new skin forms until the scab falls off.

NGSSS and Florida Standards Alignment:

C.6.L.14.5 – Identify and investigate the general functions of the major systems of the human body (digestive, respiratory, circulatory, reproductive, excretory, immune, nervous, and musculoskeletal) and describe ways these systems interact with each other to maintain homeostasis.



Web Resources:

- <http://science.nationalgeographic.com/science/health-and-human-body/human-body/heart-article.html>
- <http://www.makeup-fx.com/>

STEM Night: Family Take Home Activity

Solar Ovens

Objective: Make your very own solar oven – and use it to make ‘s’mores!

Materials: cardboard pizza box, aluminum foil, plastic wrap, black construction paper, newspaper, scissors, tape, ruler or stick, plate, graham crackers, chocolate bars, marshmallows.



Procedure:

- 1. Ask:** how is food cooked? What do ovens, microwaves, and toasters all have in common to help them cook food?
- 2. Imagine** how you could use heat from the sun to cook your own food. What kind of contraption would you build? How would it work?
- 3. Design and create** your solar oven using your gathered materials.
 - a.** Cut a flap on your pizza box lid. The flap should face the pizza box opening. Leave an inch between the sides of the flap and the edge of the lid.
 - b.** Which material will reflect light from the sun? Wrap a sheet of this material around the flap.
 - c.** The flap will leave a square opening on top of your pizza box. The sun’s light will be reflected from the flap through this window. What material can you wrap on top to allow sunlight to pass through?
 - d.** The bottom of the pizza box needs to absorb heat. This will help the food cook faster. What material can you tape on the bottom to absorb heat?
 - e.** The oven needs a little more insulation. What material can you roll up, place on the bottom of the oven, and form a border around the cooking area?
 - f.** The oven needs to stay open so sunlight can be reflected on the flap. What can you use to prop your oven open?
- 4. Test** your design. Take out your solar oven on a sunny day between 11 am and 3 pm. Adjust the flap until as much sunlight as possible is reflected on the oven panels. Put a graham cracker, a chocolate bar, and a marshmallow on top of a plate on the bottom, in the insulated area. See how long it takes for the chocolate bar to melt!
- 5. Improve** your design while the s’mores are cooking. Adjust the flap to let more sun in, change insulation materials, or move the oven to a sunnier spot if the ‘s’mores aren’t cooking!



Discussion:

How can you cook food without electricity?

For centuries, people found ways to cook food without modern conveniences such as electric-powered stoves, microwaves, and ovens. Instead, they depended on other heat sources, such as fire, to cook their food. More recently, people have developed solar ovens, which harness heat from the sun and use that energy to cook food.

How do solar ovens work?

Solar ovens capture energy from the sun and use the heat to warm up food. To capture the sun's energy, solar ovens must *reflect* sunlight onto the food. This is done using aluminum, mirrors, or other reflective material to bounce the sun's rays onto the food. The oven converts the sunlight into **thermal energy**, or power made from heat.

Solar ovens must also *absorb* sunlight to make the oven hot enough to cook food. Black surfaces are used to absorb as much heat as possible. Solar ovens must also hold on to this solar heat by using *insulation*. Cardboard, newspaper, and other insulation can be used to prevent the heat from escaping the oven.

How can you improve your solar oven?

Solar ovens can only reach about 200 to 250 degrees in direct sunlight, which means they will cook food slower than conventional ovens will. Some tips to improve your solar oven include making the reflective surface movable, so that it can be moved if the sun moves in the sky; adding plastic covers to trap heat; and adding more insulation material to the inside of the oven.

NGSSS and Florida Standards Alignment:

SC.2.E.7.2 - Investigate by observing and measuring, that the Sun's energy directly and indirectly warms the water, land, and air.

SC.3.P.10.1 - Identify some basic forms of energy such as light, heat, sound, electrical, and mechanical.

SC.3.P.10.4 - Demonstrate that light can be reflected, refracted, and absorbed.

SC.5.P.9.1 - Investigate and describe that many physical and chemical changes are affected by temperature.

Web Resources:

- http://www.solarcooker-at-cantinawest.com/pizza_box_solar_oven.html
- <http://www.hometrainingtools.com/build-a-solar-oven-project/a/1237/bhcd2/1262811159/>
- http://www.teachengineering.org/view_activity.php?url=http://www.teachengineering.org/collection/cub/_activities/cub_energy2/cub_energy2_lesson09_activity3.xml