



Home Scientist At Home Badge Activities

For Girls in Grades 2-3

ADULT HOW-TO GUIDE

STATIC ELECTRICITY RELAY

Play a fun game to learn about static electricity.

Directions:

1. Stand at one end of the table with your balloon and can. (If you are participating with multiple players, all players should start at the same end of the table.)
2. Rub the balloon against your shirt or hair as fast as you can to create a static charge.
3. Lay the pop can down on its side on the table.
4. On the count of three, hold the charged balloon near/to the side of the can without touching it. The can should roll toward the balloon.
5. Once the balloon starts to roll, race the other players with their cans to the end of the table/finish line without touching it. First person to get their can to the end of the table/finish line wins. (Note: you may need to rub the balloon on your shirt or hair again in order to maintain a charge)

The Science Behind It:

When you rubbed the balloon against your hair or shirt it became negatively charged; however, your hair (which is probably standing on end after rubbing the balloon on it) and the pop can are positively charged. The positively charged pop can is attracted to the negatively charged balloon, so when the balloon is near, the pop can will start to roll to meet the balloon. This is similar to how positive and negative magnets stick to each other.



Supplies Needed

- Empty pop can
- Blown up balloon (1 per person)
- Smooth flat surface (table or floor)
- If you are using the floor, use two pieces of tape or two identifiers to indicate a start and finish line

**“Pop” will be used to refer to soft drinks.*

BLOW UP A BALLOON WITHOUT USING YOUR BREATH

Use household items to create a chemical reaction that blows up a balloon.

Directions:

1. Add 1 cup of vinegar to the empty plastic bottle.
2. Using the funnel, carefully add four spoonfuls of baking soda to the balloon.
3. Stretch the balloon's opening over the mouth of the bottle. Once the balloon is secure, lift the balloon to make sure the baking soda falls inside the vinegar. The balloon should inflate.
4. Discuss the science behind the experiment!

The Science Behind It:

The baking soda and vinegar create carbon dioxide when they mix. There is not enough room inside the bottle for the extra gas, so it expands into the balloon, blowing it up!



Supplies Needed

- Funnel
- Balloon
- Empty plastic water bottle
- Baking soda
- Vinegar
- Measuring cup (1 cup)

FLOATING POP EXPERIMENT

Learn about density using pop.

Directions:

1. Fill the large container with water. The water should be deep enough to tell the difference between which can is floating or sinking.
2. Gently place each can in the water one at a time while observing what happens when each can is placed in the water.
3. Have a discussion about why one can floats and the other sinks.

The Science Behind It:

The density of the liquids is what causes them to float or sink. If something is less dense than water, like the can of diet pop, it will float. If something is more dense than water, like the can of regular pop, it will sink. The difference in density of the cans has to do with the type of sweetener that is used. Regular pop is made with sugar, while diet pop is made with artificial sweetener. The amount of sugar used in regular pop is more than the amount of artificial sweetener that is used in diet pop. Therefore, the large amount of sugar in regular pop is what causes the can to be denser than water. And the smaller amount of artificial sweetener in diet pop causes the can to be less dense than water.



Supplies Needed

- 1 can of Diet Coke
- 1 can of Coke
- Large empty container (preferably clear)
- Water

EGG BOUNCE

Use science to make an egg bounce like a ball.

Directions:

1. Gently place the egg in the glass. (The egg will expand, so be sure it has a little room in the glass.)
2. Pour vinegar into the glass until the egg is completely covered.
3. Cover the top of the glass in plastic wrap and let it sit for 1-3 days, or until the egg becomes translucent. During this time, you will see bubbles and a white film forming on the egg.
4. After 1-3 days, take the egg out of the glass.
5. Rinse the egg off with water while carefully rubbing the outside of the egg to remove the white film. This should leave you with a translucent egg that feels rubbery.
6. Place the egg on the plate. Lift it about 1-2 inches, drop it on the plate, and watch it bounce. (Be sure not to lift the egg too high.)
7. Discuss the science behind the experiment.



Supplies Needed

- White vinegar
- Raw Egg
- Clear glass or jar
- Plastic wrap
- Plate

The Science Behind It:

A chemical reaction occurs between the vinegar and the eggshell that causes the eggshell to dissolve. The eggshell is made of calcium carbonate which reacts to the acid in the vinegar creating carbon dioxide resulting in bubbles. Underneath the eggshell is a thin membrane that remains leaving the egg feeling and looking like a bouncy ball.

Now that the experiment is done, you can have some messy fun. Lift the egg high in the air while still holding it over the plate and let it go. What happens?

MAKE ICE CREAM

Learn about density using pop.

Directions:

1. Take a Ziploc sandwich bag and write your name on it with the permanent marker.
2. Carefully add the following ingredients to the sandwich bag:
 1. 2 teaspoons of sugar
 2. ¼ teaspoon vanilla extract
 3. ½ cup milk
3. Once all ingredients are added, remove all air from the sandwich bag and seal it. It is highly recommended that you put the sealed bag into another sandwich bag and seal it to avoid spilling.
4. Open the gallon-size Ziploc bag and fill it about halfway with ice and add 6 tablespoons of rock salt to the bag. Place all sandwich bags in the gallon-size Ziploc bag and seal it.
5. Carefully take turns shaking the bag for 10 minutes. Due to the reaction going on with the rock salt, the bag will produce a large amount of condensation, so it may look like the bag is leaking!
6. After 10 minutes, check to make sure your ice cream has hardened. If it has, move on to the next step. If it hasn't, put it back in the gallon-size Ziploc bag and keep shaking for a few more minutes or until your ice cream hardens.
7. Take the sandwich bag out of the gallon-size Ziploc and rinse it off under water.
8. Cut the tip off one of the ends of the sandwich bag and squeeze the bag contents into a bowl. Add your toppings and enjoy!

The Science Behind It:

If you live in an area where it snows during the winter, you've probably seen a truck dropping salt on the road after a storm. Your family may even put salt on your driveway when it's icy. Salt helps ice melt and adds a little bit of traction, which means the grains help tires (or shoes) grip the ice to keep from slipping. Sand is often mixed with salt for even better traction.

When making ice cream we use salt because the salt helps keep the ice cream temperature low enough to freeze milk. The sugar helps keep the ice cream from freezing solid!



Supplies Needed

- ½ cup milk (per person)
- ¼ teaspoon vanilla extract (per person)
- 2 teaspoons sugar (per person)
- 6 tablespoons rock salt
- 1 Ziploc sandwich bag (per person)
- 1 gallon-size Ziploc bag
- Ice
- Measuring cups
- Spoon
- Bowl
- Permanent marker
- Ice cream toppings (optional)



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