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Halloween Science Adventures

Fun hands-on activities that explore the science of Halloween

By Andy Allan the Science Wiz; Director of Curriculum Development at Champions Science Adventures

As a scientist and educator, Halloween always raises questions among my students about spooky sounds, the science of candy and all things that glow in the dark. This year help your children find the answers by doing an experiment that encourages them to discover the 'why' on their own.

Champions Science Adventures summer camps and clubs has created experiments to answer all those tricky Halloween science questions. Best of all, they can be done at home using simple supplies found in your kitchen pantry! Below are two, or visit www.scienceadventures.com for more.

CANDY CHROMATOGRAPHY

What you will need:

Bag of M&M's

Coffee Filter

Scissors

Clear plastic cup

Water

Chromatography is a way of separating chemicals that are combined together in a mixture. Look at the ingredients on the back of the packet of M&M's. How many yellow dyes are listed? Why are their 4 yellow dyes in the ingredients but only one yellow colored M&M?

In chromatography the chemicals are dissolved and placed at the bottom of something absorbent like a coffee filter. As water is pulled through the coffee filter by capillary action the different chemicals will separate out. Some chemicals will dissolve quickly and will travel up the paper with the water while others will want to stick to the paper and stay low. When looking at mixtures of dyes you will see color trails for the different dyes used.

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What to do:

Take the coffee filter and cut it into rectangular strips about 1 inch wide and long enough to reach from the bottom of your cup and fold

over the rim.

Fill the cup with about $\frac{1}{2}$ inch of water. Select a color of M&M. Dip the edge of the M&M into the water for a few seconds. While it is still wet draw colored line across one end of the filter paper about $\frac{1}{4}$ inch from the bottom. Place the filter paper in the cup so that the bottom touched the water but the colored line is above it. Fold the top end of the filter paper over the rim to hold the filter in place or use a small piece of tape. Let it sit for a few minutes and observe what happens. Repeat for other colors.

How many of the M&M's had yellow in their color? What you are seeing is the different dyes that make up each candy's color separating out on the filter paper. Rarely are pigments of any kind pure color they are usually mixtures of pigments designed to give the right hue.

Try this experiment with Skittles!

SPOOKY GHOST CUP

What you will need:

- 1 Paper 3.5oz Dixie cup
- 1 White plastic bag or white cloth
- 1 Small Toy Metal Spring
- 2 ft of kitchen string

Whether you are being told to clean your room or crinkling a candy wrapper, sound is caused by vibrations. If you place two fingers on either side of your throat as you talk you can feel your vocal cords vibrating. Twang a ruler on a desk or pluck a rubber band, whenever something is made to vibrate it pushes and pulls on the air around it creating sound waves that travel to our ears. With just a few vibrations and a little science you can create your very own spooky Halloween sound effect.



What to do:

- Take the spring and tie the string to one end of it.
- Allow the spring to dangle freely by holding the string.
- Bump the spring against the side of a table. What do you hear?

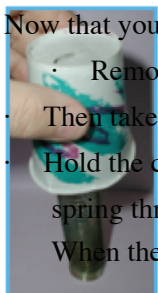
You did not hear much because the spring's wire is so thin and does not move very much air creating sound our ears can pick up. What you need to do is get the sound directly from the spring to your ear and not use the air.

- Bang the spring again, but this time hold the end of the string against your ear. What did you hear?

Spooky, isn't it! Now the vibrations travel up the string directly to your ear so the sound is a lot louder.

Now that you know the spring can make a cool sound, it's time to make an amplifier so everyone can hear it.

- Remove the string.
- Then take the cup and poke a hole in the middle of the paper cup's bottom using a pencil.
- Hold the cup upside down and carefully feed the end of the spring up into the cup. The goal is to get the tip of the spring through the hole in the bottom of the cup. You may need to bend the tip of the spring to make this easier.
- When the tip pokes through the hole feed about $\frac{1}{2}$ inch of spring through the hole and tape it flat to the bottom of



the cup.

- Shake the cup. What do you hear?



Now when the spring vibrates, the vibrations are transmitted to the cup. The whole cup vibrates and moves a lot more air than just the spring so the sound is louder.

To complete the spooky cup cover it with a white plastic bag or a piece of white cloth. Add some ghost eyes and you have your very own groaning ghoul to carry around with you on Halloween.

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