Sci 9 Name:

 Period:

**Candy Chromatography**

There are natural and artificial food colorings. Most candies have artificial colors. **Lakes** are dyes combined with salt, which makes them more stable and allows them to be dispersed in oils. Lakes are often used in low water products like hard candy and lipstick.

You can use a technique called **chromatography**, which is the separation of a mixture by passing it through a medium (in this experiment, you’ll use filter paper) in which different parts of the mixture move at different rates. Chromatography works because different substances in a mixture have different **solubility**. Solubility is how much of a particular substance can dissolve in a particular **solvent** (a liquid). For instance, you can dissolve a lot of sugar in water, but not quite as much salt. In chromatography, the least soluble substances fall out of the filter paper column first, while the most soluble travel the farthest up the filter paper.

In this experiment you will do chromatography on green M&Ms and green Skittles and compare the chromatography patterns.

Problem

How are the green colors in Skittles and M&M’s different?

Materials

* 1 green Skittle
* 1 green M&M
* Aluminum foil
* Water
* Dropper
* Toothpicks
* Pencil (not a pen!)
* 1 strip of filter paper
* Scissors
* Metric ruler
* Salt
* beaker

Procedure

1. Cut arectangular 6 cm x 8 cm strip from the filter paper. The edges should be as straight as possible.
2. 1 cm up from the bottom and 1 cm from the side of filter paper mark a dot in pencil. Label MM.
3. Make another dot 1 cm from bottom and 1 cm from other side. Label S.
4. Study the color of green Skittle and green M&M, and record any observations and predictions.
5. Next, start removing the dye from your candies. Cut out two small (about 2 cm X 2 cm) pieces of foil.
6. Place two drops of fresh water on top of each of the two pieces of foil.
7. Place a green M&M on each drop on one piece of foil.
8. Place a green Skittle on each drop on the other piece of foil. *Why don’t you want to have the Skittles and M&Ms on the same piece of foil?*
9. **Wait about a minute** **for the candy color to seep into the water.**
10. Dip a toothpick into the tiny pool of green M&M dye. Touch it just above where you made the pencil dot on the filter strip labeled “M&M.”
11. Repeat step 10 for the Skittles strip.
12. **Let the tiny dots dry**. This should only take a minute. Repeat dabbing a dot at the same places with the same candy’s dye on the filter paper, and then letting it dry, at **least four times**. Your chromatography results will be much better if you have thick, tiny dots of each color.
13. Make the chromatography solution by pouring **three cups of water in a bowl, and adding 1/8 teaspoon of salt.**
14. Pour small amount (about half a cm) salt solution into beaker.
15. Place filter paper into beaker containing salt solution. Green dots should be above the level of solution.
16. Now, watch and wait. The salt water should move by **capillary action** up the filter paper, carrying the candy dyes with it. (Capillary action describes the upward flow of liquids in a narrow tube or porous material. It is caused by the attraction of the liquid molecules to each other and the tube material.) What do you see?
17. When you see that the wet layer of salt water has **travelled ½ cm from the top of the filter paper, remove the filter paper strip from the liquid.**
18. Set the strips on a clean, flat surface to dry.\
19. Observe the strips. Try to match the bands you see with the names of the dyes on the candy wrappers.

Questions

1. What colours do you see one the Skittles strip?
2. What colours do you see one the M&M strip?
3. Why would you extract the skittles and M&M dyes on the same piece of foil?
4. Explain why you saw different colours higher up on the filter paper.
5. Give three more examples of colored items you would expect to be able to separate by chromatography.
6. Is there another method dissolved substances can be separated?