

# 549 Abstract

**Project Title: Coats of Color**

**Project ID: 549**

## **Abstract**

We are trying to figure out if M&M's and Skittles use the same kind of dye using candy chromatography

## **Items to Include:**

**Introduction:** I wanted to test this experiment due to an experience that I had in a Girl Scout sleepover at a museum. When I was there, we soaked different markers in water to try and figure out which marker a message was written in. I decided that since both markers and candy shells have color that can bleed, I decided to do a form of candy chromatography with both Skittle and M&M's to test if they use the same kind of dye. The research is important because it could educate people on the types of dye used in our food.

**Problem Statement and Engineering Goal / Hypothesis:** Determine what colors of dye were used to create the color used in the candy shells of M&M's and Skittles, and if both candies used the same dyes. If I do chromatography on Skittles and M&M's, then I will determine which color dyes were included in each.

## **Procedures:**

1. First, you must collect 3 Skittles and M&M's of the following colors: Red, Orange, Green and Yellow
2. You must fill up a cup with 3 cups of water. Then add  $\frac{1}{8}$  of a teaspoon of salt. Then fill up a beaker with about 100 millimeters of the water.
3. Take one petri dish and use a pipet to drip 3 drops of water on to the bottom of the dish, and make sure the drops are evenly spaced.
4. Place a Skittle of one color on the droplet, and take it off after 2 minutes
5. Dab the end of a toothpick into the colored droplet and apply the pigment to a strip of filter paper.
6. Apply 2-3 more coats of the water, letting them dry in between each coat. Do not forget to use a clean toothpick for each color.
7. Clip the papers to a pencil or ruler side-by-side over a beaker of salty water, just barely touching the surface.
8. When the water has climbed up to nearly the top of the paper, take them off of the beaker and place them on a clean, dry surface to dry out.
9. After the papers with the colors on them have dried, observe them and take notes of the length that the droplets traveled on the paper, and the colors that appear on the paper.
10. Repeat with each color of Skittle and M&M.

**Results:** I concluded that none of the dyes used in M&M's and Skittles were the same because the dyes did not travel the same distance. The green dye of the M&M's bled yellow and blue while Skittles only bled green, so I do not think that they are the same dye. The orange dyes of both looked very similar and their averages were only 0.2 cm apart, so I conclude that they could possibly be the same dye. The yellow dyes were very far apart on average, so I believe that they are not the same dyes.

**Conclusion:** I determined that all of the dyes used in the candy except for the green M&M were the same color as the shell. The green M&M bled yellow and blue instead of green. I do not think that M&M's and Skittles use the same dye for their shells because the M&M's dyes were much brighter, and the Skittle dye traveled farther.