Curiosity Guide #705
Color Science

Accompanies Curious Crew, Season 7, Episode 5 (#705)

Icy Color Combinations

Investigation #3

Description

Can you hear my teeth chattering? Let's do a little freezing and find out a lot about color!

Materials

- Water
- Red, blue, and yellow food coloring
- Spoon
- Lots of clear drinking glasses
- 3 ice cube trays. Note: Any ice trays will work with the freezer procedure.
- Freezer
- Pitcher
- Tea kettle

Materials for an alternate method (if you don't have a freezer or time to wait for freezing)

- 3 syringes
- 3 pitchers or similar large containers
- Red, yellow, and blue food coloring
- Ice cube trays. Note: Use trays with separate compartments. Trays with removable separator spines will not work.

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Procedure

1) Begin by filling a pitcher with water. Then add several drops of red food coloring and stir with a spoon.
2) Pour the red colored water into an empty ice cube tray. Place the tray in the freezer.
3) Rinse out the pitcher and repeat the process to make a tray with blue and a tray with yellow cubes.
4) Wait for the ice cubes to freeze.
5) Put two colored cubes into a glass. You will be using several glasses. Start with two blue in one glass, two red in another glass, and two yellow in the third glass.
6) Then combine one red and one blue, one yellow and one red, one red and one blue.
7) Try one glass with all three colors, one with two of one color and one of another, and any other ideas you would like to try out.
8) Predict what each glass will look like when the ice cubes melt.
9) Either let the ice cubes melt on their own or speed up the process by adding a similar amount of some hot water to each glass.
10) What did you notice?

Another way: This can also be done by using a syringe for each pitcher or container of color. Fill the syringes with the colored water and combine different colors in empty ice-tray cells for immediate comparison. Don't forget to try differing amounts of the various colors you combine!

My Results

Explanation

In the subtractive color system, color is produced when different wavelengths of light are absorbed or reflected. The color that we see corresponds to the wavelengths that are reflected off an object. Magenta, yellow, and cyan are primary colors in the subtractive color system. When the ice cubes melt, the colors are added together. The result is secondary colors that include purple, orange, and green. Changing the proportion of the cubes added will change the shade of the resulting color.

Be a color whiz! You may have noticed that the food coloring boxes are labelled red, yellow, and blue. In fact, our procedures use these terms so you can find the correct food coloring in your pantry! Red, yellow, and blue are the common names for primary colors that we learned when we were young and that are still in use by many people and products. The technical names for the specific primary colors in the subtractive system, however, are **magenta**, **yellow**, and **cyan**. **And now you know!**

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