

Rainbow Milk

Create a swirl of color with this chemical reaction! Milk contains both fat and water. Like other oils, the fat molecules are unable to dissolve in water, leaving them suspended in solution. Soap molecules have a hydrophobic (“water-repelling”) and hydrophilic (“water-loving”) end. When soap is added to milk, it causes a chemical reaction. The hydrophobic end of the soap molecules rush to connect with the suspended fat molecules, causing the food coloring to get pushed around!

Materials needed:

- Shallow dish or plate
- Milk
- Food coloring
- Dish soap
- Cotton swabs

Step-by-step instructions:

1. Pour milk into a shallow dish until it covers the bottom.
2. Squeeze multiple drops of different shades of food coloring around the dish.
3. Add dish soap to the tip of a cotton swab then dip it into the center of the dish.
4. Experiment by moving the cotton swab around the dish.

Additional explorations:

- Try this experiment again using milk with a higher or lower fat content (e.g., whole milk instead of 2% milk). How does the chemical reaction change? Why do you think this changed it?
- Dip a cotton swab without soap into the dish. What happens?

Discussion questions:

- Why does the soap appear to repel the food coloring?
- As the food coloring moves around the dish, how do the colors combine? Do you see lighter or darker colors? Why?
- Can you reach a point where adding more soap does not cause the color to move? Why do you think that might happen?

