ARIZONA SCIENCE CENTER
Never stop wondering.
Never stop imagining.™

CHEMISTRY

Dancing Milk!

Target Grade Level(s): 4th - 8th

Chemistry is found everywhere, including in your kitchen! Milk has multiple chemical properties that are perfect for a quick chemical reaction. Milk is mostly water but it also contains vitamins, minerals, proteins and tiny droplets of fats. Fats and proteins are sensitive to changes to their surrounding. Adding a little soap is enough to mix up their surroundings! It changes the weak chemical bonds and the food coloring molecules are bumping and moving around in the liquid!

At the same time, soap molecules combine to form a *micelle*, or cluster of soap molecules. These micelles are attracting the fats in the milk. This rapidly mixing fat and soap causes swirling and churning, making your milk "dance"! When the micelles and fat droplets have dispersed throughout the milk, the motion stops.

Supplies

One (1) Dish Soap Bottle
At Least Two (2) Different Types of Milk
- Whole Milk, 2% Milk, Skim Milk

Water
Three (3) Clean Small Bowls
One (1) Box of Cotton Swabs
One (1) Food Coloring

Challenge

How Does Dish Soap Work?

1. Set up: For each bowl, assign a different type of milk and label them. For the last bowl, label it with water. Once labeled, pour enough liquid to cover the bottom of the bowl.
2. Introduce the bowls and ask your young chemist to make any observations. *What are the differences between the three bowls?*
3. Pick one of the milk bowls to start. Add one to three drops of food coloring in the bowl.
4. Take a clean cotton swab and touch the tip to the center of the liquid. *What happens?*
5. Take another clean cotton swab and place a drop of dish soap on the end. Now place the dish soap end to the center of the milk. Avoid stirring to see how long the reaction lasts. *Did anything happen?*
6. For the remaining bowls of liquids, repeat steps 3-5. Use a new cotton swab for each test.
7. Discuss with your young chemist on their findings. What observations did you see? Did the liquids react the same way? Why do you think each liquid reacted the way it did? Which one had the best swirling result?