Title

Milk Swirl Demo

Activity Overview

Description: Campers will observe surface tension in action.

Topic Area(s)
Surface tension, molecular bonding

Grade Level P-6 **Duration** 15 minutes

Learning Outcomes:

- Campers will observe differing surface tension levels
- Campers will see how different fat content affects the color dispersion
- Campers will see how particles move in patterns

Hook

Ever wish you could watch molecules dance? Look closely as the soap grabs on tight and takes the food coloring on a fantastic ride through the milky cosmos.

Background Information

-All liquids bear surface tension; a thin layer of support at the upper level, almost like a thin skin

-Surface tension differs between substances based on density, composition and in this case; fat content

-Milk contains varying levels of fat, depending on the intensity of its processing. This fat can lend itself to the surface tension of the liquid.

-When soap is added to the milk, it will act on the fat molecules and force them away from the point of contact

-The food coloring acts as a visual aid in this process, it should initially move out in ripples from the point of contact

Materials

- Water
- Skim Milk
- Whole Milk (3 - 5%)
- Dish soap
- Aluminum plates
- Small containers for soap
- Q-Tips
- Assortment of food coloring

Safety Considerations

Do not eat science

Procedure

1. Hand out plates.

2. Come around presenting the different liquids, pour small amounts of each into different pie plates

3. Pass out soap containers and Q tips, advise campers to apply a liberal coating on one side of the q tip (don't put them in the milk yet!)

4. Come around to groups or campers with different food coloring, either offer color choices or just drop a few into the center of the liquid (make sure none of the drops are touching)

5. Instruct campers to place their soapy q tip in the middle of the pie plate; Watch what happens!

6. Experiment with different liquids using the same process.

Wrap-Up/Debrief

When the cotton swab with soap touched the milk, the soap separated the fat from the water in the milk, dissolving the fat (which is how soap cleans greasy, dirty dishes). This also decreased the milk's surface tension. As the soap spread out from the cotton swab, it decreased the milk's surface tension around it, and the higher surface tension surrounding this area pulled the milk (along with its food coloring) toward it. If enough soap is added, however, the soap and milk become evenly mixed and the milk (and food coloring) no longer move when more soap is added.