



Challenger's Morning Science Segment:

January 11, 2016

Topic: Contorting Milk Molecules

Build: Liquid Color Explosions

Credit: <http://www.stevespanglerscience.com/lab/experiments/milk-color-explosion/>

Materials Needed:

Milk [whole or 2%] / clean, dry plate or dish with raised edge / food colors / dish soap / cotton swab

Make a color explosion in milk – Pour milk into the dish to cover the entire bottom and allow the milk to settle. Next, add a drop each of several food colors in the center, close together. Take a cotton swab and apply dish soap to the cotton. Place the soapy cotton swab into the middle of the milk dish and hold for up to 10 seconds. Watch the colors explode across the dish!

The science [credit: <http://www.stevespanglerscience.com/lab/experiments/milk-color-explosion/>]

“Milk is mostly water but it also contains vitamins, minerals, proteins, and tiny droplets of fat suspended in solution. Fats and proteins are sensitive to changes in the surrounding solution (the milk).

Dish soap, because of its bipolar characteristics (nonpolar on one end and polar on the other), weakens the chemical bonds that hold the proteins and fats in solution. The soap's polar, or *hydrophilic* (water-loving), end dissolves in water, and its *hydrophobic* (water-fearing) end attaches to a fat globule in the milk. This is when the fun begins.

The molecules of fat bend, roll, twist, and contort in all directions as the soap molecules race around to join up with the fat molecules. During all of this fat molecule gymnastics, the food coloring molecules are bumped and shoved everywhere, providing an easy way to observe all the invisible activity. As the soap becomes evenly mixed with the milk, the action slows down and eventually stops.”

This activity ties into the Challenger Learning Center of Maine's mission to inspire curious minds of all ages: Challenger is holding two public events during January 2016, to commemorate the 30th anniversary of the Challenger Space Shuttle's last flight: January 21 (6-7:30 PM) - Family Science Night - Lost Lessons of the Challenger Crew; January 27 (3:30-4:30 PM) - Meet & Greet NASA Astronaut and Maine native, Dr. Jessica Meir and preview the 2016 Maine Science Festival. Pre-register today and join us for these two very special events! FMI- www.astronaut.org