

## ***Amphiphilic Liquid Lab***

<https://www.scientificamerican.com/article/surfactant-science-make-a-milk-rainbow/>

Name \_\_\_\_\_

### **Problem**

What happens when milk is mixed with an amphiphilic liquid?

### **Materials**

*Milk (whole or 2%)*

*Dinner plate*

*Food coloring (red, yellow, green, blue)*

*Dishwashing liquid (Dawn works best)*

*Cotton Swabs*

### **Procedure**

1. Pour enough milk in the dinner plate to completely cover the bottom to a depth of 1cm. Allow the milk to settle.
2. Add one drop of each of the four colors of food coloring (red, yellow, blue, green) to the milk. Keep the drops close together in the center of the plate of milk.
3. Predict what will happen when you touch the tip of the cotton swab to the center of the milk. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Without stirring the milk, touch the milk with just the tip of the cotton swab. Describe what happened.

---

---

---

---

---

---

---

5. Place a drop of dish soap on the other end of the cotton swab. Place the soapy end back in the middle of the milk and hold it there for 10-15 seconds.
6. Add another drop of soap to the tip of the swab and try it again. Experiment with placing the cotton swab at different places in the milk. Notice the colors in the milk continue to move even when the swab is removed.



4. What happened chemically with the soap molecule and the fats in the milk?

5. Predict what will happen if you replace the milk with water.

6. Once you make your prediction, repeat the experiment using water. Record what you saw.

7. What would your results be if you used skim milk instead of whole milk? What about heavy cream?

8. How does the fat content of the milk affect the reaction?

9. Why do you think the colors swirled the way they did when the soap was added?

10. Why did the colors stop swirling after a while?