Name: ANSWER KEY - Page 1 Date: _____

Discover Dairy and Milk Safety
Color Explosion Lab

Directions: Answer the questions below in the spaces provided.

1. **What happened when you put the food coloring in the water?**

   It changes the color of the water.

2. **What happened when you put the food coloring in the whole milk?**

   It stays in place and does not expand. (Nutrients like fat, protein, and calcium keep it from spreading.)

3. **What happened when you dipped the clean cotton swab into the milk?**

   It absorbs the milk and/or food coloring. Nothing really happens.

4. **What happened when you dipped the coated cotton swab into the milk?**

   The food coloring disperses quickly in circles around the milk.

5. **Why did this happen to the whole milk?**

   Answers may vary. Detergent repels fat from milk. The reaction between the detergent and the fat forms micelles, which is how detergent helps to lift grease off of dirty dishes. As the micelles form, the pigments in the food coloring get pushed around. Eventually equilibrium is formed, but the swirling of the colors continue for quite awhile after stopping.

6. **How do you think the dishwashing detergent changed the way the milk reacted to the food coloring?**

   The detergent lowers the surface tension of the liquid so the food coloring is free to flow throughout the milk. The detergent reacts with the protein in milk, altering the shapes of those molecules and setting them in motion.

7. **Repeat the method using fat free milk. What happened when you dipped the coated cotton swab into this type of milk?**

   Answers may vary. Nothing happened. The cotton swab soaked in the color. The color didn't hold its shape as well.

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8. The fat-free milk had *different* **(same or different) reaction as the whole milk. Why do you think this is the case?**

Fat-free milk has no fat. Whole milk has fat in it. The fat in the whole milk makes the exploding reaction with the coated swab.

9. What changes could you make to this experiment to make the milk react differently?

Answers may vary. We could use milk with different fat levels or different colored food coloring. Sour milk or contaminated milk could also change the way the milk reacts in the experiment.

10. What other food products are made from milk?

Cheese, ice cream, yogurt, butter, sour cream, cottage cheese, cream cheese, kefir, etc.