

# *Magic Milk Explained!!!*

## Method:

1. Pour enough milk in the dinner plate to completely cover the bottom to the depth of about  $\frac{1}{4}$  inch. Allow the milk to settle before moving on to the next step.
2. Add one drop of each of the four colours of food colouring—or whatever you have—to the milk. Keep the drops close together in the centre of the plate of milk.
3. Find a clean cotton bud for the next part of the experiment. Predict what will happen when you touch the tip of the cotton bud to the centre of the milk. It's important not to stir the mix—just touch it with the tip of the cotton bud. Go ahead and try it.
4. Now place a drop of washing up liquid on the other end of the cotton bud. Place the soapy end of the cotton bud back in the middle of the milk and hold it there for 10 to 15 seconds. Look at that burst of colour!
5. Add another drop of washing up liquid to the tip of the cotton bud and try it again. Experiment with placing the cotton bud at different places in the milk. Notice that the colours in the milk continue to move even when the cotton bud is removed. What makes the food colouring in the milk move?

## How does it work?

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

The molecules of fat from the milk bend, roll, twist, and contort in all directions as the soap molecules race around to join up with the fat molecules. This causes the crazy patterns! During all of this, the food colouring molecules are bumped and shoved everywhere, providing an easy way to observe all this activity. As the soap becomes evenly mixed with the milk, the action slows down and eventually stops. This is why milk with a higher fat content produces a better explosion of colour—there are just more fat molecules to 'stick' to those soap molecules.

Try adding another drop of washing up liquid to see if there's any more movement. If so, you discovered there are still more fat molecules that haven't found a partner at the big colour dance. Add another drop of soap to start the process again!!!

## **CHALLENGE / Extension:**

Repeat the experiment using water in place of milk. Will you get the same eruption of colour? What kind of milk produces the best swirling of colour, skimmed or whole milk? Why? Do you see any pattern in your observations?