Lesson Plan: Magic Milk Color Explosions

Materials Needed:

- A shallow dish or plate with a lip (a pie pan works great)
- Whole milk (the higher the fat content, the better the reaction)
- Liquid food coloring (at least 2-3 different colors)
- Liquid dish soap
- A cotton swab or a toothpick
- Paper and crayons/markers for drawing (optional)

Lesson Plan (30 Minutes)

Part 1: Getting Ready & Making Predictions (5 minutes)

Goal: To spark curiosity and encourage scientific thinking (making a hypothesis).

1. **Set Up:** Pour a thin layer of milk into the dish, just enough to cover the bottom. Let it settle for a minute.
2. **Ask Questions:** Sit with your student and look at the materials. Ask some engaging questions:
    - "Here we have milk, food coloring, and soap. What do you think will happen if we add drops of color to the milk?"
    - "Do you think the colors will mix together, float on top, or sink?"
    - "What do you think the soap is for? What does soap usually do?"
3. **Make a Prediction:** Encourage your student to make a guess. There are no wrong answers! Say, "That's an interesting idea! Let's do the experiment and see what happens."

Part 2: The Experiment - Creating Color Explosions! (15 minutes)

Goal: To conduct a hands-on investigation and observe the results.

1. **Add the Color:** Carefully let your student add drops of food coloring to the milk. Encourage them to place the drops in different spots—some in the middle, some near the edge. They can use as many colors as they like. Notice how the colors stay mostly in place.
2. **Prepare the "Magic Wand":** Dip the very tip of the cotton swab into the liquid dish soap. You only need a tiny bit!
3. **The Magic Moment:** Now, have your student gently touch the soapy tip of the cotton swab to the center of the milk, right on top of a color drop. Hold it there for about 10-15 seconds.
4. **Observe!:** Watch what happens! The colors should burst and swirl away from the cotton swab, creating beautiful, moving patterns.
5. **Experiment More:** Let your student try dipping the soap into different areas of the milk. What happens if you add more drops of color? What happens if you just add a single drop of soap directly into the milk without the swab? Let them explore freely.

Part 3: Discuss, Draw, and Clean Up (10 minutes)

Goal: To reflect on the observations and express understanding creatively.

1. **Talk About It:** While the colors are still swirling, ask more questions:
    - "Wow! What happened when the soap touched the milk?"
    - "Did the colors move fast or slow?"

    - "What did the patterns look like to you? Fireworks? A galaxy? Tie-dye?"
2. **Simple Science Explanation:** You can explain it in very simple terms: "Milk has fat in it. The soap loves to chase the fat, and when it does, it pushes the milk and the colors all around. That's why everything started to move and swirl!"
3. **Creative Recap:** Get out the paper and crayons. Ask your student to draw a picture of their "Magic Milk Explosion." This helps them process and remember what they saw and did.
4. **Clean Up Together:** The milk mixture can be poured down the sink. Washing the dish together is a great way to reinforce the lesson about what soap does!

Extension Ideas (For Future Fun)

- **Variable Testing:** Try the experiment again with different types of milk (skim, 2%, heavy cream) or even water. Does it work the same way? Why or why not? (This teaches the importance of fat).
- **Art Project:** You can gently lay a piece of sturdy paper (like cardstock) on top of the swirling colors for a few seconds. Lift it carefully and let it dry to create a unique piece of marbled paper.