



## Rainbow Water

This experiment provides a colorful and engaging way to demonstrate the concept of water density by creating a layered rainbow effect in water.

### Fun Facts/Information:

- Adding sugar to water increases its density.
- When liquids of different densities are carefully layered, they remain separated rather than mixing, allowing distinct colors to form a visible rainbow.

### Learning Objectives:

- Use the scientific property of density to create a layered rainbow.
- Observe how changes in density affect the behavior of liquids.



### Materials:

- 6 clear cups or containers
- 3 cups of warm water
- Red, yellow and blue liquid food coloring
- 5 tbsp white granulated sugar
- 5 spoons
- 1 pipette or dropper
- 1 tall, thin clear container (large test tube)

### Procedure:

1. Fill each clear cup with  $\frac{1}{2}$  cup of warm water. Warm water helps the sugar dissolve more efficiently.
2. Add 1–2 drops of food coloring to each cup to lightly tint the water:
  - Red
  - Orange (1 drop red, 1 drop yellow)
  - Yellow
  - Green (1 drop yellow, 1 drop blue)
  - Blue
  - Purple (1 drop blue, 1 drop red)

Note: This experiment works best when the water is lightly colored.

(cont'd)

### **Procedure (cont'd)**

3. Add sugar to each cup as follows:

- Red: No sugar
- Orange: 1 teaspoon
- Yellow: 2 teaspoons
- Green: 3 teaspoons
- Blue: 4 teaspoons
- Purple: 5 teaspoons

4. Stir each cup until all the sugar is fully dissolved.

Note: Use a different spoon for each cup to avoid mixing sugar amounts.

5. To begin creating the rainbow, use the pipette or dropper to add 1–3 droppers of the purple liquid to the tall, thin container.

6. Slowly add the blue liquid by placing the pipette close to the surface of the purple layer and gently releasing the liquid along the inside wall of the container.

### **Discussion Questions:**

- How does adding sugar to the water affect its density?
- Does the color of the water change its density?
- Are darker colors (such as blue and purple) more dense than lighter colors (such as yellow)? Why or why not?

### **Extensions:**

- Observe the rainbow closely and identify any new colors that appear where layers meet.
- Discuss why these colors may form.