

BEADS IN A BOTTLE

OBJECTIVE: Apply your understanding of the polarity of solutions and density to explain observations about immiscible liquids and objects suspended in them to explain the Beads in a Bottle activity. *(That was a hint!!)*

MATERIALS

Bottle and cap, 1 per student	Tap water
3 plastic cups per group	Kosher salt
White UV beads, 11 per student	91% Isopropyl alcohol
Blue pony beads, 11 per student	Funnel

PROCEDURE – Part 1

1. In a small plastic cup, prepare a salt brine solution by combining 22 g of kosher salt in 100 mL of water. Use a stirring rod to mix until all the salt dissolves.
2. While you are waiting for the solution to dissolve, prepare a second cup and add 100 mL of 91% Isopropyl alcohol. In a third cup, add **50 mL** of tap water.
3. In each of the small plastic bottles, use a funnel to add **25 mL** of the salt brine solution you just made. Measure the salt brine solution with a graduated cylinder. Rinse thoroughly and dry BOTH the graduated cylinder and the funnel.
4. Next, use the rinsed and dried funnel to add **28 mL** of 91% isopropyl alcohol from your second cup to both bottles. Use a graduated cylinder to measure the alcohol for both bottles. Observe closely for 1 – 2 minutes or until there is no change. Record your observations. What do you notice? (Look closely at the middle!)

5. Add **10** white UV beads and **10** blue pony beads to each of the bottles and tightly replace the caps on each bottle.
6. Shake the bottles containing beads 4 - 5 times up and down, and observe them for 2 minutes. Use labelled diagrams to record your observations.

7. Based on your observations, form a hypothesis to explain the Beads in a Bottle activity.

PROCEDURE – Part 2

1. Add 2 white UV beads and 2 blue pony beads to each cup with the remaining liquids. You may need to stir the beads to make sure there are no air bubbles on them. Do the beads sink? Float?

Salt water:

91% Isopropyl alcohol:

Water:

2. Water has a density of 1.0 g/mL. What can you infer about the densities of the beads and the *other* liquids?

White UV beads:

Blue pony beads:

Salt water:

91% Isopropyl alcohol:

3. Pour the 91% isopropyl alcohol into the salt brine solution and stir. Observe for 2 minutes. Record your observations.

4. What other information could you use to answer the Beads in the Bottle demo? Describe the experiment that you will perform, and then record your observations.

Experiment:

Observations:

CONCLUSION: Use your observations to explain the Beads in a Bottle activity. *(Don't forget the hint!)*