



Density Lab

Name: _____

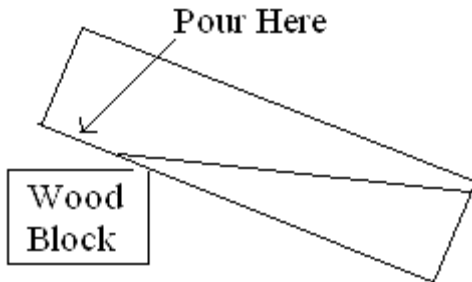
Objective: Understand how salinity and temperature affect the density of water.

Materials: Clear, plastic box Stirring Rod
Wood Block Beaker Salt
Graduated Cyclinder Food Coloring

Hypothesis: What factors do you think affect the density of a sample? _____

Procedure:

1. Set up a clear plastic box as shown in the figure below. Place the wood block at one to incline the box.



2. Add about 800.00 mL of room temperature water to the box. Let the water calm down.
 3. Next, place 25.0 mL of room temperature water in a small beaker.
 4. Add one level teaspoon of salt and one drop of food coloring to the water and stir until the salt dissolves.
 5. Carefully and slowly pour the solution into the raised end of the box. You may need to put the beaker into the box.
 6. Observe what happens to the solution. Describe what occurs. _____
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7. Place 25.0 mL of ice water in a beaker, and stir in a drop of blue food coloring. Do NOT POUR it into the box yet. Predict what will happen when you pour the blue ice water into the box: _____

8. Now, carefully and slowly pour the blue ice water into the raised end of the box. Describe what happens: _____

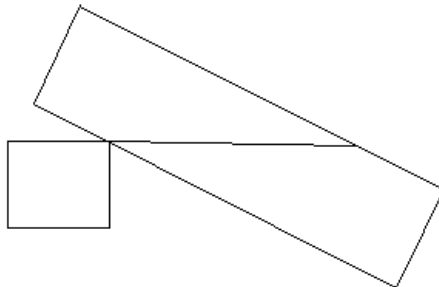
9. RINSE and refill your beaker with 25.0 mL of hot tap water, and stir in a drop of red food coloring. Predict what will happen when this solution is poured into the box: _____

10. Carefully and slowly pour the hot water into the raised end of the box. Describe what happens. _____

11. From what you have observed so far, which solution has a higher density (Circle each): Saltwater or water that isn't salty? Warm water or cold water? Explain: _____

12. Next, add a level spoonful of salt and a drop of green food coloring to 25.0 mL of water.
13. Stir until the salt completely dissolves.
14. Carefully, pour the solution into the raised end of the box. Describe what happens: _____

15. Use colored pencils to fill in the diagram below, showing the relative positions of each of the solutions in the box following each step:

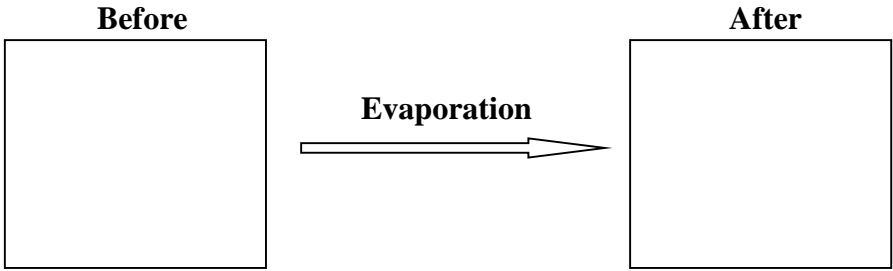


Analysis:

1. What is density?

2. How would an increase in evaporation affect the density of ocean water? _____

3. Draw what a beaker of salt water would look like before and after an increase in evaporation (use dots to represent salt molecules):



4. Which would contain more water molecules (compared to salt molecules)? Explain.

- a. A beaker containing 100 mL of hot water or
- b. A beaker containing 100 mL of cold water

5. Thinking about question 3, what is density on a molecular (atomic) level? _____

6. Why does the density of liquid water increase as it cools?

7. Based on what you have learned today, why does ice float in seawater? (Think of icebergs!) _____

8. When seawater freezes in polar regions, most of the salt is left behind. How would this effect the density of the water that is left unfrozen?

9. If freshwater and saltwater were mixed, (think of a river (freshwater) flowing into the sea (saltwater)) what do you think would happen?

10. How might an increase in freshwater input into the Arctic Ocean have an impact on life in the ocean? Explain.

11. Any questions on density and salinity?
