**Water as Ice**

**Objectives**:

Students will discover if frozen water has the same ***volume*** and density as room temperature, liquid water.

**Question:**

1. How does water volume change when it gets frozen?
2. How does water density change when it gets frozen?

**Hypothesis**:

I think… (Read the Question 1 and Question 2, then write what you think will happen when water is frozen. Be sure to think about the ***volume*** of liquid compared to frozen water. Do you think they are the same? Also think about what you already know about water density and how it will impact frozen water. Be sure to use either ***denser*** or ***less dense*** to describe how the water will react to the temperature change)

1. I think frozen water has ***more volume /less volume*** than the same amount of room temperature (liquid) water.
2. I think frozen water is ***denser***/***less dense*** than room temperature (liquid) water.

**Experiment**

To prove my hypothesis, my group and I will test the ***volume*** of frozen water by freezing a measured about of clear, room temperature water over night. We will observe how water changes when frozen. My group and I will compare a measured amount of frozen water to the same amount of liquid water using a balancer. My group and I will also observe how frozen colored (blue) water reacts when placed into separate a cup of room temperature water. I will complete the related worksheets and document our results on in my science notebook.

**Materials**

|  |  |
| --- | --- |
| * 1 tray
 | * 1 Celsius thermometer
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| * 1 Shammy
 | * 2 large vials with lids
 |
| * 1 large plastic cup
 | * 1 syringe
 |
| * 3 small plastic cup
 | * 1 rubber band
 |
| * 1 large plastic container (1L)
 | * 1 masking tape
 |
| * 1 bottle of blue colored water\*
 | * 1 pitcher of room temperature water\*
 |
| * 1 blue color pencil per person
 | * 1 red color pencil per person
 |
| * 1 pencil sharpener
 | * Ice tray (teacher)
 |
|  |  |

\*see teacher for water mixed with blue food coloring.

**Investigation Prep**

We will put vials and syringes filled with water into the freezer.

***Fill two vials***:

1. Submerge the vial in a 1 L container of water to fill it to the brim. Make sure there are **NO** air bubbles.
2. Lift the vial out of the water and put it on a paper towel.
3. Push the cap on. Don't spill any water!

***Fill one syringe:***

1. Start with the syringe's plunger all the way down.
2. Submerge the tip in a cup of water.
3. Draw up 50 mL.
4. Point the tip upward, and carefully push out any air in the syringe.
5. Point the syringe into the water container.
6. Push in the plunger until the bottom of the rubber tip on the plunger is directly at the 40 mL mark on the syringe.