**Build a Thermometer**

**Objectives**:

We will build a thermometer to find out what will happen when the thermometer, with room temperature water, is placed in hot water and then in cold water.

**Question:**

1. What happens to water when it is heated?
2. What happens to water when it is cooled?

**Hypothesis**:

I think… (Read Question 1 and 2, then write what you think will happen when the thermometer is placed in hot water then cold water. Be sure to use either ***Expands*** (gets bigger) or ***Contract***s (gets smaller) to describe how the water will react to the temperature change)

**Experiment**

To prove my hypothesis, I will work with my group to build a thermometer using a small glass bottle, room temperature (colored) water, a stopper with a hole and a small straw. We will observe how the room temperature water in the thermometer reacts when placed in a container of hot water. Next, we will observe how the room temperature water in the thermometer reacts when placed in a container of cold water. I will document my results on my ***Build a Thermometer*** worksheet.

**Materials**

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| --- |
| * 1 tray |
| * 1 Shammy |
| * 1 small glass bottle |
| * 1 rubber stopper #1 with hole |
| * 1 thin, transparent straw |
| * 2 large plastic cups (12oz) |
| * 1 cup of green, room temperature water (see teacher) |
| * 1 cup of hot water (see teacher) |
| * 1 cup of cold water (see teacher) |
| * 1 permanent marker |
| * 1 real thermometer (teacher use only) |
| * Student Worksheet No. 6 ***Build a Thermometer*** |
| * 1 Green color pencil per person |
| * 1 pencil sharpener |

**Procedure Pt 1 (Hot Water)**

1. Document your Hypothesis.
2. Get the materials (see Materials List).
3. Cover the tray with the shammy cloth.
4. Place the transparent straw into the hole on the wide side of the stopper.
5. Fill the glass bottle with room temperature green (food coloring) water.
6. (gently)Push the narrow end of the stopper with the straw into the top of the glass bottle.
7. Twist the stopper until the green water fills the straw half way.
8. Mark the straw with the permanent marker to indicate the green water level.
9. Fill one plastic container with hot water (adult assistance required).
10. Hold the glass bottle by the neck and place it into the hot water bath.
11. Observe the water in the straw to see how it reacts to the hot water.
12. Mark the straw with the permanent marker to indicate the new green water level.
13. Document your observations on the ‘Build a Thermometer’ work sheet.

**Procedure Pt 2 (Cold Water)**

**See Procedure Pt 1, steps 1-8**

9. Fill one plastic container with cold (ice) water

10. Hold the glass bottle by the neck and place it into the cold water bath.

11. Observe the water in the straw to see how it reacts to the cold water.

12. Mark the straw with the permanent marker to indicate the new green water level.

13. Document your observations on the ‘Build a Thermometer’ work sheet.