**Science 7 - Heat and Temperature Thermos Lab Name:**

Now that you are much more knowledgable about heat and temperature you can now apply those concepts to build a better thermos. Before you do that you should first reflect on your first design and discuss where you went wrong.

**Problem:** How can we use certain materials to create a thermos that insulates the contents inside from the environement outside?

**Hypothesis:**

**Variables:**

Control Variable: ( 3-4 variables)

Manipulated Variable:

Responding Variable:

**Material List:**

* 2 plastic cups
* 5 straws
* 1 foot of tinfoil
* 2 styrofoam plates
* 1 meter of tape
* 1 thermometer
* Steel wool
* 1 sponge

**Procedure:**

1. With your group gather your materials and return to your workstation/ table
2. You have 30 minutes to assemble your thermos from the materials given to you. Make sure an ice cube can be put into the thermos, and that it is water tight. Leaks should be prevented!
3. Once the thermos is assembled add a hole for the thermometer, insert the thermometer so it reaches the bottom of your thermos
4. Add 2 ice cubes to your thermos, with 50 ml of water
5. Read the initial temperature of the water inside your thermos, record this temperature in your observation table.
6. Insert the thermos into the hot water bath, record in your table the temperature reading of the thermometer every five minutes until the 30 minute mark.
7. After pour out the water, and disassemble the thermos and dispose it in the bin.
8. Clean up your work station.

**Observation table**

| Time (Minutes)  | Temperature (Celsius)  |
| --- | --- |
| 1 min |  |
| 2 min |  |
| 5 min |  |
| 10 min |  |
| 15 min |  |
| 20 min |  |
| 25 min |  |
| 30 min |  |

Bath water temperature: \_\_\_\_\_\_

Did the thermos leak: Yes / No

**Observations** (Create a line graph on a seperate sheet of paper)

**Analysis:**

1. What is thermal energy, and how is it different from temperature?

2. Using the particle model theory/ explain how the liquid inside the thermometer rises (hint: thermal expansion)

3. Matter changing state from solid to gas is called \_\_\_\_\_\_\_\_\_\_\_, and matter changing state from liquid to solid is called\_\_\_\_\_\_\_\_\_\_\_\_\_?

4. What state of matter do particles have the most amount of space between them, which state of matter has the least amount of space between particles?

**Reliability:**

**Validity:**

**Conclusion:**

**Sources:**