**Science 7 – Chemistry – States of Matter (Change of State)**

**Experiment: Solid – Liquid – Gas, The Change of State of Water. v2**

Purpose:

1. Practice doing experiments in Science (lab safety, lab write-ups).

2 Study the energy requirements for a change of state.

3. Practice creating a graph of data.

Observation:

On Earth, we observe water (Di-Hydrogen Oxide, ☺) in three states; solid, liquid, and gas. When you heat water, it changes from a solid (ice) to a liquid (water), to a gas (water vapour/steam).

Hypothesis:

When you add heat to water, it will change state, moving from a solid to a liquid and finally to its gaseous state.

Materials:

|  |  |  |
| --- | --- | --- |
| Beaker (400 ml) | Source of heat (hot plate) | Recording paper, pencil |
| Solid H2O (in the form of) | Thermometer | Wall clock / wrist watch  |
| Liquid water | Retort Stand and clamp | Safety glasses, apron |

Method:

-Before you begin, PREDICT what the graphs will look like. **Record your predictions as a “graph” sketched on your rough notes paper**.

-Set up the lab station, as per teacher directions.

-Fill the beaker with DRY SNOW (no liquid water) up to the 400 ml level. Gently pack it down as you fill it.

-Quickly place the beaker of snow on the stand and insert the thermometer into it so that the ball of the thermometer is at the level of the 100 ml mark in the beaker. **The ball of the thermometer must NOT touch the bottom of the beaker**.

-Wait 1 minute, the measure the temperature of the snow. Record this temperature and observations about what is happening to the beaker and its contents.

-Turn the HOT PLATE on to “4” and start timing.

-Every 30 seconds record the temperature of the SLUSH / WATER. Record your observations (amount of water verses slush for example).

- When the water is boiling, carefully lift the thermometer bulb out of the boiling water (about 1 cm out of the water) and into the steam. Record the temperature of the steam.

Observations:

1. How long did it take for all the snow to melt?

2. How long did it take to go from 0 degrees to boiling?

3. What did you see on the outside of the beaker?

4. What is happening to the temperature while the solid water melts, while the liquid water gets hot, and as the water is boiling?

5. Beginning temperature of the solid water (no liquid) was?

6. Temperature of the SLUSH?

7. In a perfect world, there should be 5 different parts to your graph of the water as it melts and then boils. Can you identify them?

8. How did the temperature of the boiling water and the steam directly above the surface of the water compare?

Conclusions:

1. Tell me what you think was the role of energy in the form of HEAT to a ‘change of state’?

2. Describe the shape of the graph for the water.

3. Where your predictions correct?

4. Try to explain what you see on your graph.

To be submitted:

A ‘lab write-up’, as follows;

Copy each of the following sections of this lab outline exactly as they are written here (titles, underlines, layout, -everything!)

-Purpose

-Observation

-Hypothesis

-Materials

-Method

For the section labeled OBSERVATIONS, answer each of the given questions in sentence / paragraph form. Your ROUGH NOTES and your GRAPH goes into this section of your report.

For the section labeled CONCLUSIONS, answer each of the given questions in sentence / paragraph form.

Drawing your graph PENCIL ONLY:

1. You may consider whether to do the graph in Portrait or Landscape mode.

2. LABELS must be; Vertical axis – “TEMPERATURE (degrees Celsius)”. Horizontal axis – “TIME (sec)”.

3. Scale,

VERTICAL (temperature);

-You must be able to fit from -10 degrees to +120 degrees on it.

-130 units, so each little square must equal how many degrees?

HORIZONTAL (time);

-Begin at ‘0’ minutes, and have a scale for every 30 seconds up to ‘?’ minutes?

4 This is a LINE GRAPH!!!!!

5. RULER!!!!