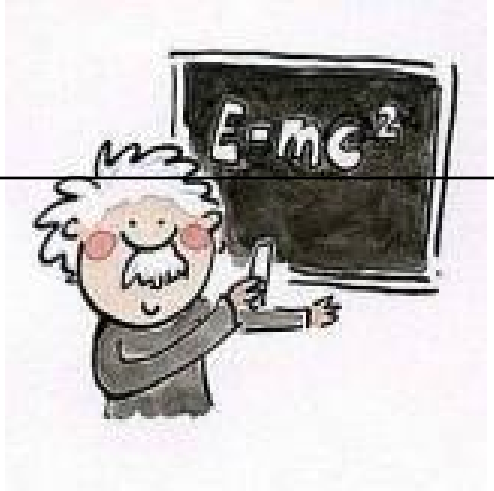
Weekly Schedule- November 17-21,2014

DAY 1	DAY 2	DAY 3
<u>Lab Demos:</u> Exploring Physical Changes • Evaporation • Boiling and Freezing • Sublimation	• Deposition and Solubility • Post-Lab: Physical Changes • Pre-Lab: Phase Changes	• Lab: Phase Changes • HW: Make a graph of the results.



DAY 1: PHYSICAL PROPERTIES 1

PART 1: STATIONS- Boiling 1 AND 2- Freezing

1. Collect samples of "Freezing" setup. Write your observations.
2. Within your group, share results for both **Station 1** and **Station 2**.
3. Discuss and answer questions. Write answers in your notebook or Google doc/slide.

PART 2: STATION 3- Evaporation

1. Read instructions. Discuss/explain instructions to your partner.
2. Make a hypothesis.
3. Perform mini-lab and record results.

PART 3: STATION 4- Sublimation

1. Read instructions. Discuss/explain instructions to your partner.
2. Perform mini-lab and record results.

PHYSICAL PROPERTIES 1

Boiling
Freezing
Evaporation
Sublimation/Deposition

Station 1: Boiling Point

Problem: Does water really boil at 100°C?

Procedure:

1. Boil 100 ml purified water and tap water in separate beakers.
2. Measure the temperature until you see signs of boiling?
3. Record results.

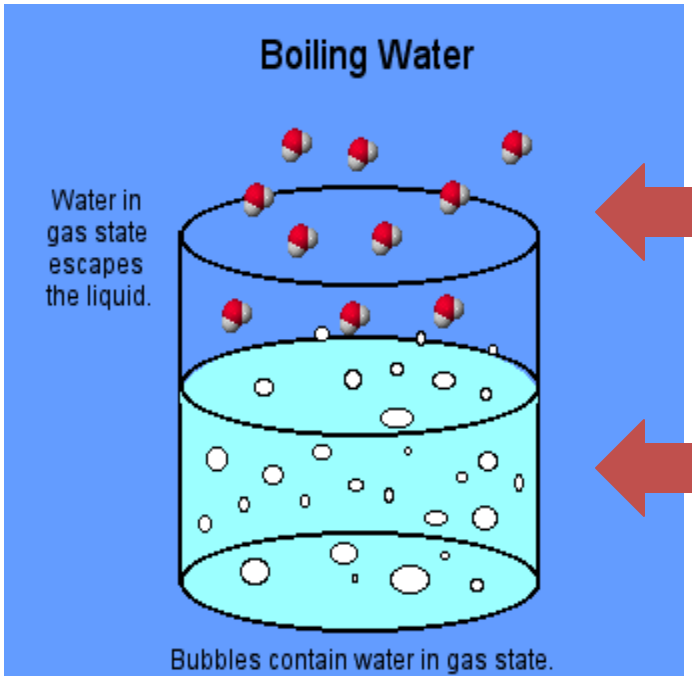
Observations:

Explanation:

What is boiling? How do you know when it is boiling?

Time (min)	Temperature
0	
10	
20	

BOILING POINT



Evaporation takes place at surface of liquids

Boiling takes place beneath surface of liquid

In a **liquid,** molecules are **packed** closely together. As a liquid is **heated**, the temperature is increased. As the temperature increases, the **kinetic energy increases** which causes increasing motion. Eventually **molecules break free** of liquid and become a gas. At the temperature of the **boiling point**, the ***liquid turns into a gas***.

This animation shows how water molecules are able to break the forces of attraction .

This is what is happening inside the gas bubble as it is rising to the surface to break and release the water gas molecules.

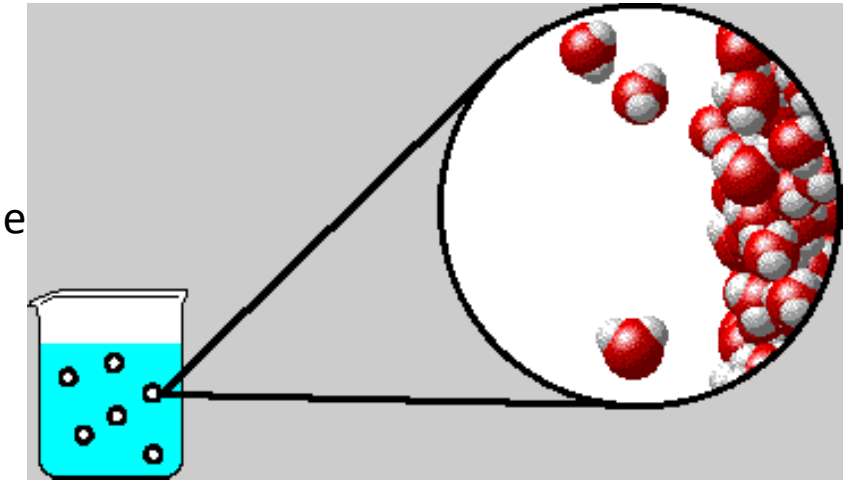


Image source: http://www.elmhurst.edu/~chm/vchembook/163boilingpt.html

Animated GIF "Boiling" - Courtesy of General Chemistry Help - Purdue University

Station 2: Freezing

Problem: Which of the following liquids will freeze? Water, Mineral Oil, Alcohol, Soda, Coolant?

Hypothesis: Write a hypothesis (If, then, because… statement)

Procedure:

1. Place 5ml of each liquid in a test tube. Label each test tube.
2. Place the test tubes in a test tube rack and place it inside the freezer.
3. Observe the following day.

Observations:

Explanation:

FREEZING POINT

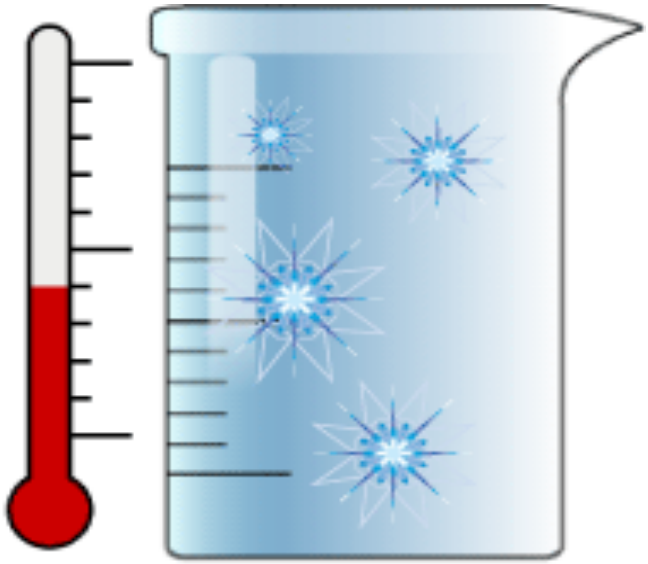
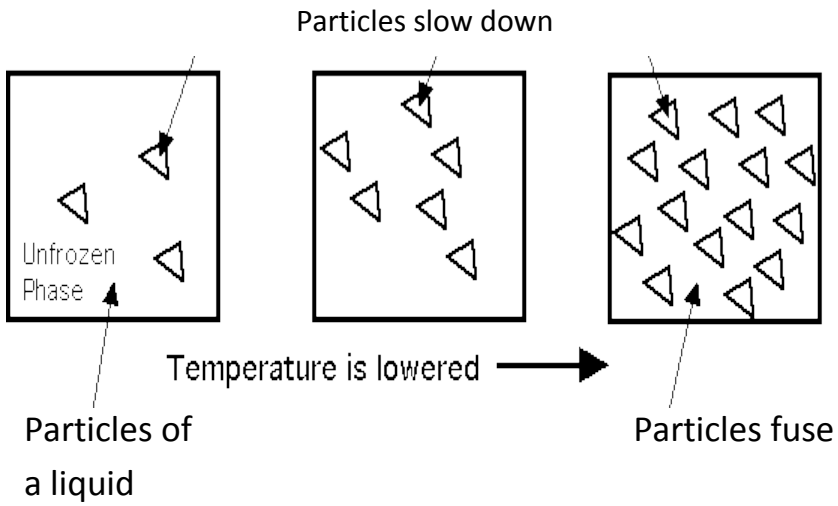


Image source: http://www.factfrenzy.com/what-is-the-freezing-point-of-water/



Change in phase from liquid to solid

Why?
When energy is taken out from a liquid, particles slow down until forces of attraction cause them to fuse and form a solid.


BLOCK D

Substance	Freezing Point (degrees Celsius)
Water	0
Diet Soda	Slightly lower than 0
Regular Soda	Lower than 0 (b/n -15 to -20)
Coolant	-37
Alcohol (Isopropyl)	- 88
Vegetable Oil	Above 0

Station 3: Evaporation

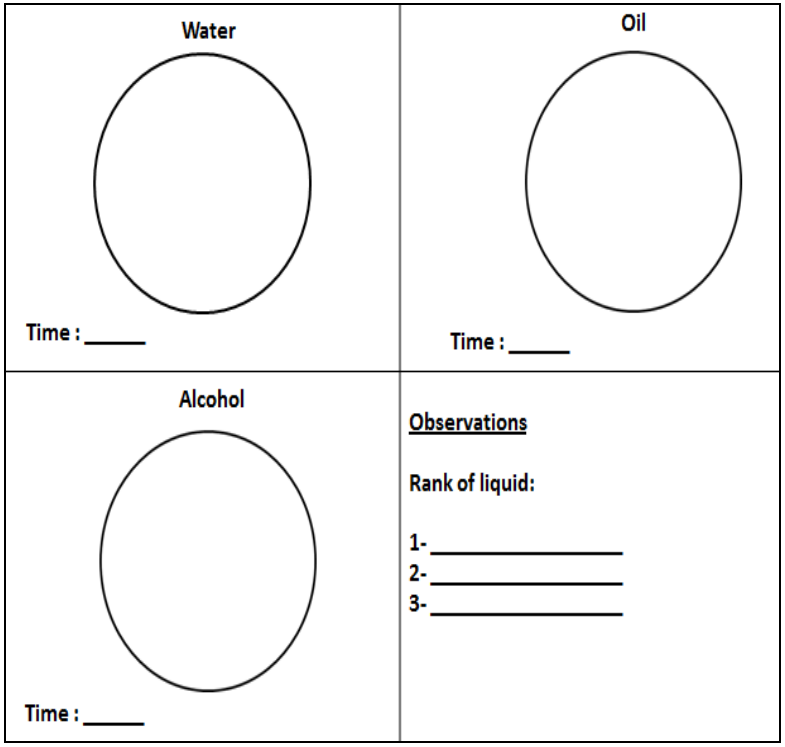
Problem: Which liquid will evaporate fastest? **water, oil, or alcohol?**

Hypothesis: Write a hypothesis (If, then, because… statement)

Procedure:

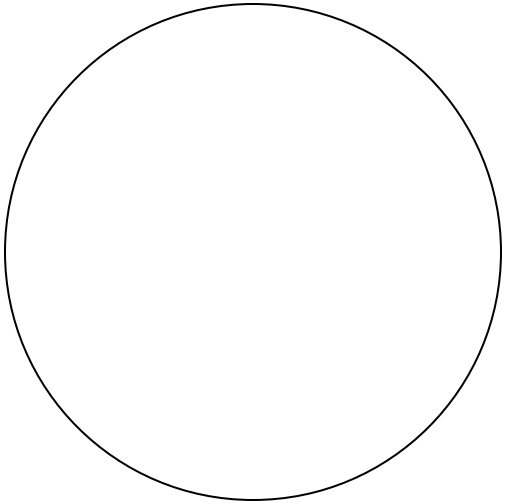
Paper Test

1. Place a drop of liquid on the appropriate circle in the handout.
2. Measure the time it takes for each liquid to dry out.
3. Record your observations.



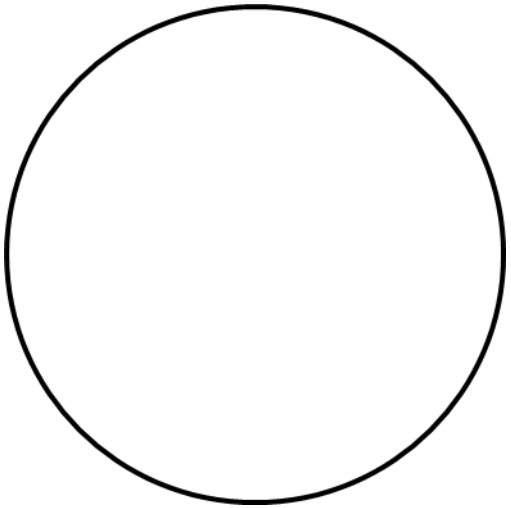
Explanation: *Provide a summary statement to explain the results.*

Water



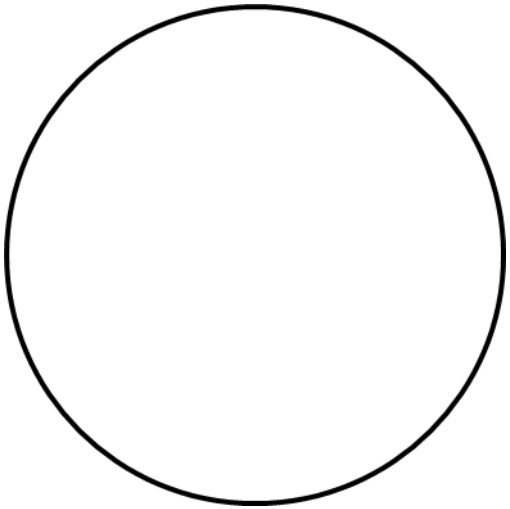
Time : _____

Oil



Time : _____

Alcohol



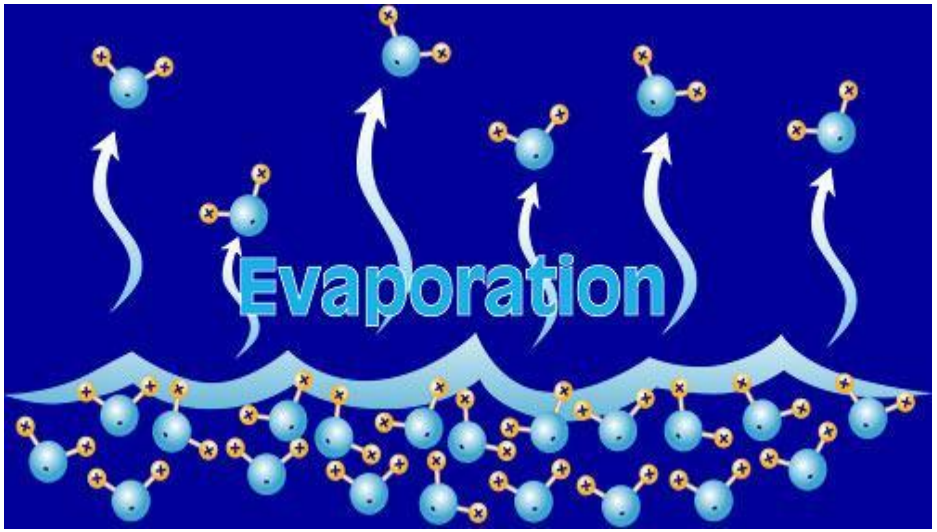
Time : _____

<u>Observations</u>

Rank of liquid:

1- _____
2- _____
3- _____

Evaporation of Liquids



Evaporation happens when atoms or molecules escape from the liquid and turn into a vapor.

Describe what happens to the particles during this process. Explain why this happens.

Station 4. Sublimation of Dry Ice

Procedure:

1. Measure the mass of a flask and balloon.
2. Add a small chunk of dry ice into a flask. Cover the flask (top) with the balloon.
3. Measure the mass of the dry ice and the flask with balloon.
4. Observe what happens to the dry ice.
5. After a few minutes, measure the mass of the beaker and what remains of the dry ice.

A. Write your initial observations.

Mass of flask + balloon _____

Mass of Dry Ice + flask+ balloon (before sublimation) _____

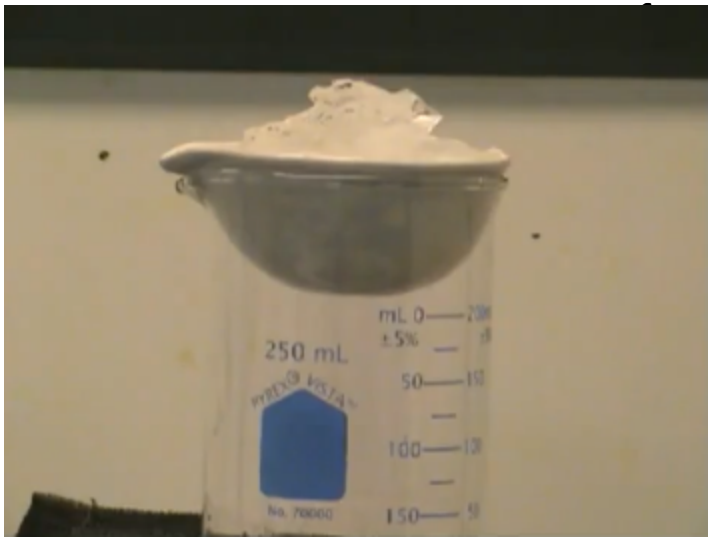
Mass (after sublimation) _____

B. Describe what happens to the mass of the flask with the dry ice during this process. Explain why this happens.

Lab Demo. Sublimation of Iodine

Iodine Test

Procedure:



Describe the appearance of the iodine crystals.

What happens when a few pieces of iodine crystals are heated?

Summary: *What is sublimation?*

http://www.youtube.com/watch?v=4fAOI6BeMZY

DAY 2: PHYSICAL PROPERTIES 2

PART 1: Deposition and Solubility- Teacher led Demo

1. Write observations and answer questions.

PART 2: Post-Lab Discussion

1. Write an operational definition of physical change.

2. Summary: Each group will be assigned one of the following concepts.

Boiling	Evaporation	Solubility
Freezing	Sublimation	Deposition

a. Write a summary statement explaining the concept.
b. Provide an example (diagram or a brief skit).

PART 3. PRE-LAB- PHASE CHANGES

Lab Demo. A Soluble Problem

Define the terms solute and solvent, soluble and insoluble, dissolve, solution

soluble

soluble

dissolve

solution

solvent

insoluble

Lab 1: SOLUBILITY

What are solutes, solvents and solutions? Does stirring help solutes to dissolve?

	Time (sec)
Dissolving	
Mixing	
Chewing	

METHOD

1. Place one of the candy pieces in your mouth without chewing or moving your tongue around.
2. Record the time that it takes for this candy piece to dissolve.
3. Place a second candy piece in your mouth, this time moving your tongue, but not chewing.
4. Record the time it takes to dissolve this candy piece.
5. Place the third piece of candy in your mouth and chew it.
6. Record the time to dissolve this third piece of candy.

2. Copy and complete the following sentences using the words below:

Solution solvent solute saliva dissolves exposed saliva

The candy dissolves in the ……..in your mouth to form a liquid ……..
Solutions contain two parts, a …….. and a ……..

The **solvent** is …….. and the **solute** is the candy. The solute…….. by spreading out evenly throughout the solvent. The candy can quickly dissolve when it is …… to chewing and stirred by moving it around with the tongue.

It All Depends on the Temperature

Aim: Why do many substances form solutions more easily in hot water than cold water?

Materials: 2 small beakers
hot water food coloring

METHOD

1. Fill one beaker with cold water.
2. Fill the other beakers with hot water.
3. Wait one minute for the water to calm.
4. Add one drop of food coloring to each.
5. **Record your observations over the next 5 minutes.**

Note: DO NOT MOVE THE BEAKERS

GUIDE QUESTIONS:

1. How does the temperature seem to affect the rate of mixing?

2. How is the warm solution different from the cold one?

3. Describe what is happening in terms of particle movement.

4. Draw a dot sketch of each solution. Use more dots to show areas where there is a high concentration of food coloring and fewer dots for low concentration.

Teacher Demo:

A Soluble Problem

Aim: To find out the difference between soluble and insoluble solids.

Equipment: 2 samples of water (A and B) safety goggles
2 evaporating dishes

Method:

1. Look at each sample closely. Do they look at all different?
2. Place 1 ml of sample A on an evaporating dish. Label this as dish A.
3. Place 1 ml of sample B on another evaporating dish. Label this as dish B.
4. Heat the 2 samples using a hot plate.
5. Once the dish is dry, look inside. Is anything left?

Results: Copy this data table into your notebook:

Dish Sample	OBSERVATIONS		Interpretation
	Before Heating	After Heating	
A			
B			

PHYSICAL CHANGE

A change that alters the form or appearance of a material but does not convert the material into new substances.

Image source: http://ifox.commons.hwdsb.on.ca/homework-questions/social-studies/

Physical properties can be observed or measured without changing the composition of matter. Physical properties are used to observe and describe matter.

Physical properties include:

appearance, texture, color, odor, melting point, density boiling point, solubility, and many others.

Image source:
http://hohoku.org/hohoku/Teacher%20Web%20Pages/Mrs.%20Nicholson/

Transformation of Water

Pre-Lab: 15 min

1. Settle down, be prepared for lab work.
2. Read and study the handout. Review the aim and procedure with your group.
3. Write a hypothesis (passive voice-3rd person)
4. Review safety rules. Wear safety glasses and apron.
5. Prepare the set-up. Check necessary materials.
6. Assign roles. You need a person to
   a. measure temp
   b. check time
   c. record observations
   d. check procedure/take photos

Lab proper: 50 min **Note:** Make sure you copy results from your recorder.

Post Lab: HW Make a graph of your results

DAY 3: LAB- PHASE CHANGES

Change of State Laboratory Activity (Ice to Water to Steam)

Safety: You will need laboratory aprons and safety glasses/goggles. You will NOT be touching the surface of the digital hot plate and you will NOT be touching the beaker or the thermometer. You CAN be scalded by steam late in the procedure, so make sure you do not get too close to the beaker.

Materials:

1) Laboratory stand
2) Thermometer clamp
3) Timer
4) Crushed Ice
5) Centigrade thermometer
6) 500 ml Beaker
7) Notebook, ruler, and pencil
8) Digital Hot Plate

Roles:

Timer
Observer (Measure Temperature)
Recorder/Photographer

Methods:

1) Add ice to a 500 ml beaker up to the 250 ml mark with crushed ice then position the beaker in the center of the digital hot plate.
2) Attach the thermometer clamp to the laboratory stand and clamp the thermometer such that the bulb of the thermometer is positioned about 1.5 cm above the bottom of the beaker and centered in the crushed ice.
3) Allow the system to equilibrate (5 minutes) such that the starting temperature is about 0° C. THIS MAY NOT BE THE READING, DEPENDING ON THE THERMOMETER YOU ARE USING, BECAUSE OF WHAT IS CALLED SYSTEMATIC ERROR. MAKE SURE THAT YOU ARE READING THE THERMOMETER AT EYE LEVEL EACH TIME.

Steps 1 to 3 may be performed by your teacher, before you arrive at the laboratory, in order to save time.

4) Start the timing device when the digital hot plate is turned on and set by your teacher to 230° C. Do not change the setting.
5) The first temperature reading is at time 0 (that is when the digital hot plate was turned on). Record the temperature each minute until the teacher checks the work and turns off the hot plate. Record the data in the data table.

Analysis:

Record the data on the back of this sheet.

Plot the data with time on the X axis and temperature on the Y axis. The units of measurement should be given. The graph title should be appropriate and descriptive, such that any reader can understand it.

Time (min)	Temp (°C)	Observations	Time (min)	Temp (°C)	Observations
0			31		
1			32		
2			33		
3			34		
4			35		
5			36		
6			37		
7			38		
8			39		
9			40		
10			41		
11			42		
12			43		
13			44		
14			45		
15			46		
16			47		
17			48		
18			49		
19			50		
20			51		
21			52		
22			53		
23			54		
24			55		
25			56		
26			57		
27			58		
28			59		
29			60		
30					

Important Observations:

1) At what time and temperature do you observe that there is no more solid ice?

   Time _____ Temp _____

2) Estimate the volume of water at the time given in #1 above. Volume = _____

3) Estimate the volume of water every 5 minutes after the time given in #1, and make sure to write that in the data table (Observations) as well.

4) At what temperature do you see a STEADY stream of bubbles rising from the bottom of the beaker?

   Temp _____

5) Based on your data and observations, is it always true that the change of state of water from liquid to vapor occurs at 100° C? _____.