

MiSP Phase Changes Worksheet #2a L1

Name _____

Date _____

Key Question:

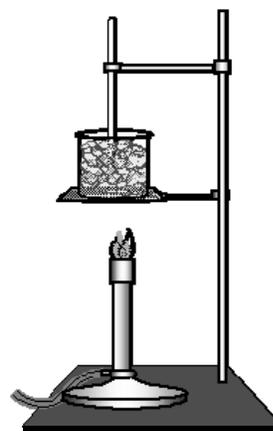
How does the temperature change as water gains heat and boils?

Safety:

- Wear goggles.
- Use caution—the hot plate, Bunsen burner, and heated water will be very hot.

Materials:

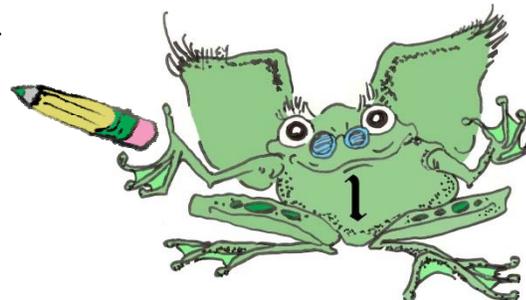
- 250 ml beaker
- Bunsen burner or hot plate (if using a Bunsen burner, you will need:
 - ring stand and
 - iron ring wire gauze)
- thermometer and clamp
- goggles



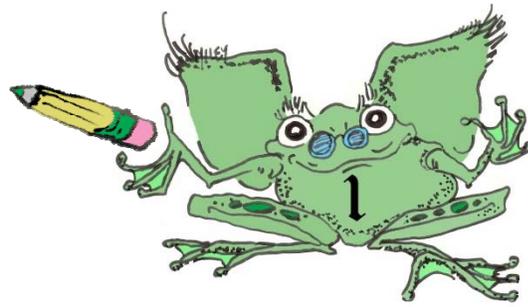
Procedure:

Check off each step as you complete it.

- 1. Prepare a heating setup: EITHER a Bunsen burner, ring stand, iron ring, and wire gauze OR a hot plate. Your teacher will tell you which setup to prepare and give any special instructions needed. Put on goggles.
- 2. Put 200 ml of cold tap water into a beaker.
- 3. Take the temperature of the water immediately and record that reading as the temperature at time 0 (zero) on the data chart.
- 4. Begin heating the water with the Bunsen burner or hot plate. ONCE YOU START HEATING, DO NOT CHANGE THE SETTING ON THE BUNSEN BURNER OR THE HOT PLATE. THE EXPERIMENT MUST HAVE A CONSTANT AMOUNT OF HEAT BEING ADDED. Take the temperature every 1 minute while you are heating the water. Stir the water with the thermometer before each reading and take the temperature in the middle of the water in the beaker. Write each reading on the data chart and note when the water begins to boil rapidly (comes to a “rolling” boil).



- 5. After the water begins to boil rapidly, continue taking the temperature at 1-minute intervals for 5 more minutes. Write this data on the data chart.
- 6. At the end of the 5 minutes, shut off your burner. Let the setup cool. Your teacher will tell you how to clean up your lab materials.



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Large grid area for graphing or drawing.

Vertical empty rectangular box for student name or class information.

Empty rectangular box for student name or class information.

Discussion Questions:



1. Water has a boiling point (temperature) of 100°C at sea level. According to your thermometer (school thermometers are often inaccurate), what is the boiling point of the water in your experiment? Look at your data chart and graph, too.

2. Which line on the graph (liquid heating OR boiling) has the steepest slope (the greatest angle)?

3. In which part of the graph (liquid heating OR boiling) did the temperature change (increase) the most?

4. The temperature of your Bunsen burner or hot plate was 200°C or more. Yet once the water was boiling, the temperature changed little, if at all. So, at the boiling temperature, what is the heat that is still being added to the water doing?

5a. Your teacher will give you Phase Changes Worksheet #2b. It has a labeled ideal graph that shows the heating curve (from solid to gas) of any substance. How does your graph compare to the liquid heating (warming) to boiling part of the ideal graph?

5b. From the labeled graph on Worksheet #2b, what happens to the temperature of a substance when it is gaining heat and changing from a

solid to a liquid (melting)? _____

liquid to a gas (boiling)? _____



5c. According to the labeled ideal graph on Worksheet #2b, what happens to the temperature of a substance when it is gaining heat in the

solid state (phase)? _____

liquid state (phase)? _____

gas state (phase)? _____

