

# MiSP Phase Changes Worksheet #1a L1

Name \_\_\_\_\_

Date \_\_\_\_\_

## Key Question:

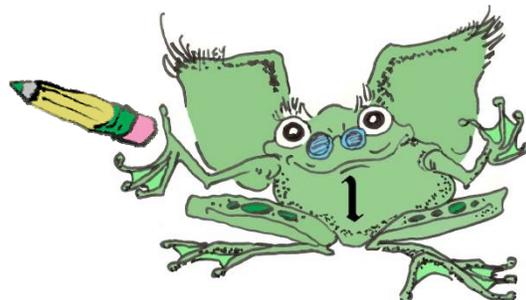
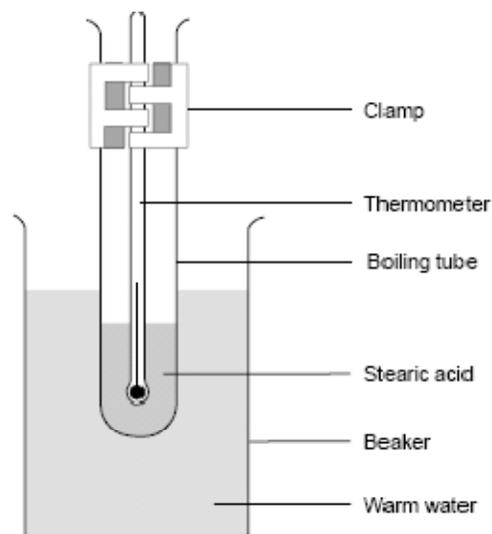
How does the temperature change as a liquid loses heat and becomes a solid?

## Introduction:

In this experiment your teacher will melt a solid called stearic acid and then cool it to determine its freezing point.

## The demonstration:

1. The apparatus is shown on the right.
2. The setup will be heated until the stearic acid is completely melted and the temperature is between  $75^{\circ}\text{C}$  and  $80^{\circ}\text{C}$ .
3. The tube will be removed from the hot water. On the chart below, record the temperature every 0.5 ( $\frac{1}{2}$ ) minute as the stearic acid cools. Note on the chart when solid is first observed and when the liquid has all become solid.

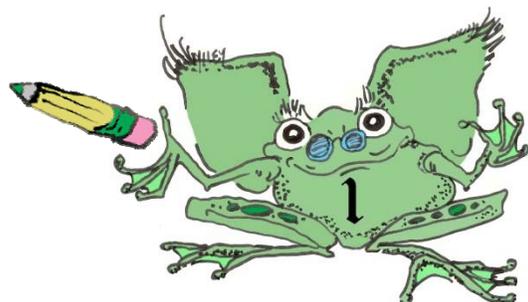




## Graph your data:

Graph the data on the next page to show the relationship between time (minutes) and temperature ( $^{\circ}\text{C}$ ).

- Label the  $x$ -axis.
- Label the  $y$ -axis.
- Using your notes on the data chart, circle the data points when solid stearic acid was first observed and when the liquid was totally solidified. Draw a best-fit line between those two points. Label this line “solidifying.”
- Draw a best-fit line between the first temperature reading data point and the data point when solid stearic acid was first observed. [Note: It may be necessary to ignore the first one or two data points because the cooling of the liquid may not have started due to leftover heat in the glass of the tube.] Label this line “liquid cooling.”





## Discussion Questions:

1. Water has a freezing/melting point (temperature) of  $0^{\circ}\text{C}$ . Based on your observations of the stearic acid, what is its freezing point?

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

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3. In which part of the graph (liquid cooling OR solidifying) did the temperature change (decrease) the most?

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4. Your classroom temperature is approximately  $20^{\circ}\text{C}$ . So, during the whole time the tube was removed from the beaker, the stearic acid was losing heat surrounding, cooler environment. Why did the temperature not continue to decrease at the same rate after the stearic acid started to solidify?

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- 5a. Your teacher will give you Phase Changes Worksheet# 1b, which has a graph of stearic acid cooling made in a professional laboratory. How is your graph like the one on Worksheet #1b? How is it different?

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- 5b. From the labeled graph on Worksheet #1b, what happens to the temperature of a substance when it is losing heat and changing from a liquid to a solid?

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