

Phase Change Freezing

Name _____ Date _____ Period ___ Group ___

Problem: Once you know the freezing point of a substance, could it help you to identify the substance ?

Hypothesis: _____

Variables: By the time you finish this experiment ,you will need to identify the different types of variables present in this investigation. Consult your notes for definitions of the types of variables.

Independent Variables: _____

Dependent Variables: _____

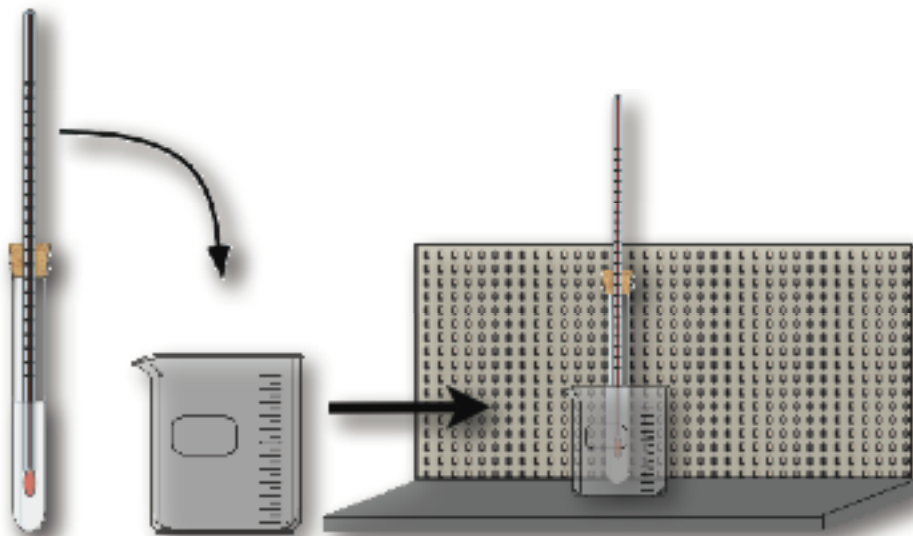
Controlled Variables: _____

Procedures:

- 1- Using a plastic 250 ml beaker, get a test tube containing the melted solid with a thermometer immersed in the liquid, from your teacher, and place this test tube in the beaker you are holding.
- 2- Holding the beaker with one hand and the test tube with the other hand, carefully carry them back to your table.
- 3- As soon as possible, carefully push the test tube into the clamp which is already on your pegboard, and begin to record the temperature of the substance every 1/2 minute (30 seconds) and continue to record the temperature until about 4-5 minutes remain in the class.
- 4- **When you first notice the melted solid forming crystals (it may look like frost on a window), put a LARGE asterisk (*) in the data chart next to the temperature reading!**
- 5- When it is time to clean up, carefully carry the test tube with the now frozen substance and thermometer and give it back to your teacher.
- 6- Use your data to construct a continuous line graph showing the change in temperatures for the substance. Compare your graph with others to find any similarities or differences in the graphs.
- 7- The freezing point of your **substance** should be the temperature in the middle of your longest plateau.

Materials: See diagram.

Safety: Wear safety glasses while carrying your substance in its liquid form. Proper footwear should be worn. Be careful with the thermometers. When the solid freezes (turns solid), the thermometers will be embedded in the solid, so **DO NOT** attempt to remove the thermometers from the test tubes after the solid freezes .

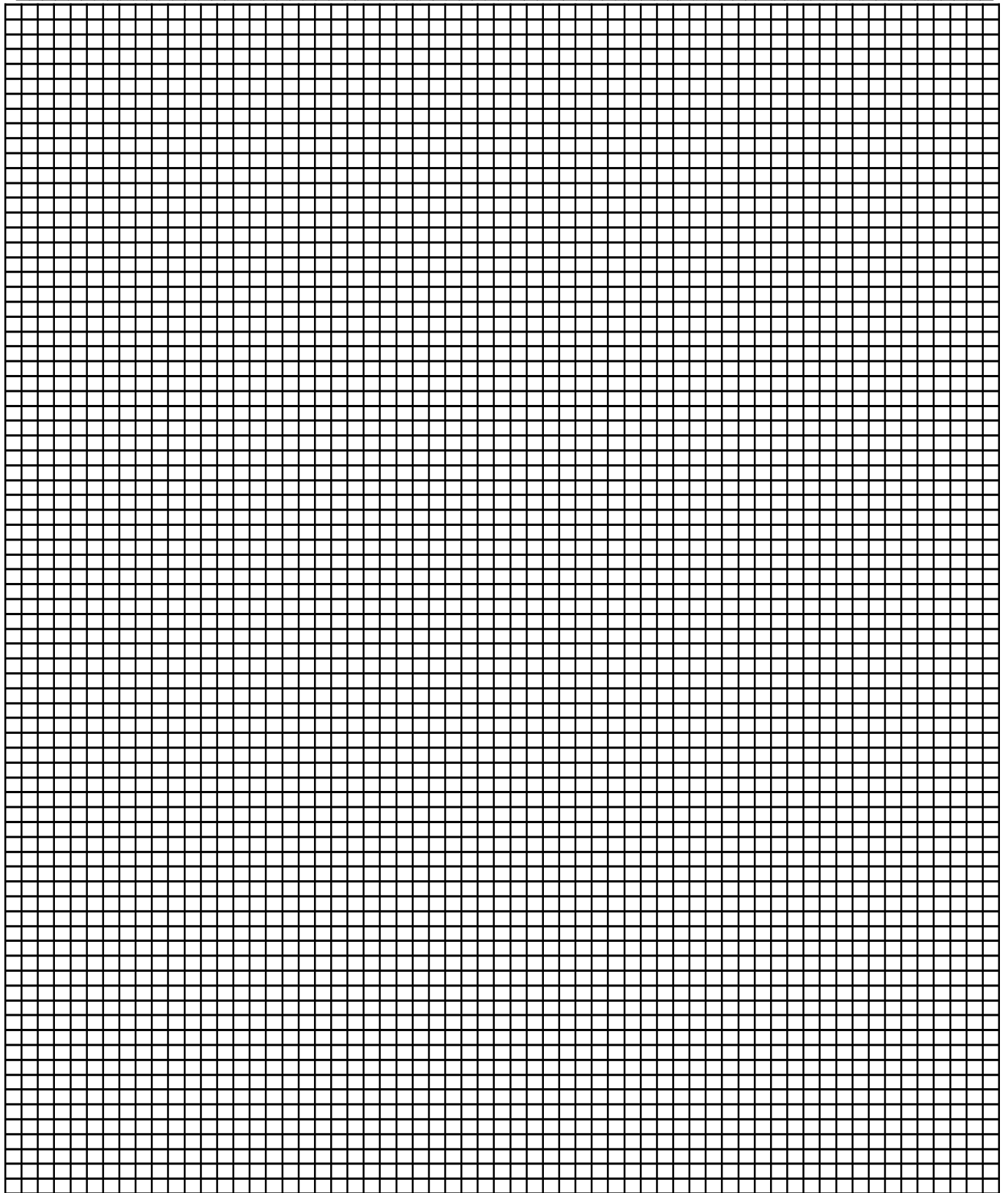


Observations: Record your temperatures in the chart below, and do so to the nearest 0.1°C.

Name of Solid Used _____

Time in minutes	Temperature in °C to 0.1°C	Time in minutes	Temperature in °C to 0.1°C
0		15.5	
.5		16	
1		16.5	
1.5		17	
2		17.5	
2.5		18	
3		18.5	
3.5		19	
4		19.5	
4.5		20	
5		20.5	
5.5		21	
6		21.5	
6.5		22	
7		22.5	
7.5		23	
8		23.5	
8.5		24	
9		24.5	
9.5		25	
10		25.5	
10.5		26	
11		26.5	
11.5		27	
12		27.5	
12.5		28	
13		28.5	
13.5		29	
14		29.5	
14.5		30	
15		30.5	

Title



Class Results

Group	Freezing Point °C (Liquid X used)	Group	Freezing Point °C (Liquid Y used)
1		2	
3		4	
5		6	
7		8	
9		10	
11		12	
13		14	
15			
	Range of Data	Range of Data	
	Mode(s)	Mode(s)	

Answer questions 1 through 3 **after** constructing the graph !

1. What did the temperatures for the solid do as the solid was in the process of freezing (turning solid) ?

2. Did most other students have something similar on their graphs ? (You'll need to look at their graphs before answering.)

3. Based on all of the results from the class, what is the most likely freezing point for the solid(s)?
