SCIENCE 8 – STATES OF MATTER WORKSHEET

NAME: _____

Vocabulary			
Contracts	Kinetic molecular theory	Move around quickly	State of matter
Expands	Mass	Slide past each other	Vibrate
Faster	Matter	Slower	Volume

Use your notes from pages 1 – 2 and the terms in the vocabulary box to fill in the blanks for the following nine questions. You will not need to use every term.

1) _____ is the amount of matter that makes up something.

2) _____ is the amount of space that a material takes up.

3) Anything that has mass and volume is called _____.

4) When you add energy to matter, the particles move _____ and the matter _____.

5) Particles in a solid are packed so close together they can only _____.

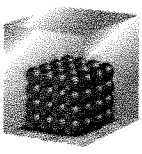
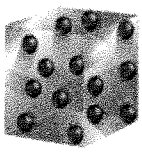
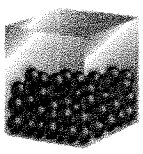
6) Particles in a liquid can _____.

7) Particles in a gas can _____.

8) When you remove energy from particles they move _____ and the matter _____.

9) The _____ explains how particles act when their spacing and movement change.

10) Match each **Term** on the left with the best **Descriptor** on the right. Each **Descriptor** may be used only once

Term		Descriptor					
	Mass	A.	Anything that has mass and volume				
	Solid	B.	Amount of space an object takes up				
	Gas	C.	Amount of matter in an object				
	Matter	D.		E.		F.	
	Liquid						
	Volume						

11) Complete the following table to describe three states of matter. The table has been partially completed to help you.

	Solid	**Liquid**	**Gas**
Shape		Not fixed; takes the shape of the container	
Volume	Fixed volume		
Spaces between particles			
Movement of particles			Can move freely and quickly in all directions in the container

12) Use your knowledge of the kinetic molecular theory to explain the following statements:

(a) Solids have a definite shape because _____

_____

_____

(b) Liquids and gases flow because _____

_____

_____

(c) Ice cubes form in the freezer because _____

_____

_____

(d) Ice cream melts quickly on a hot day because _____

_____

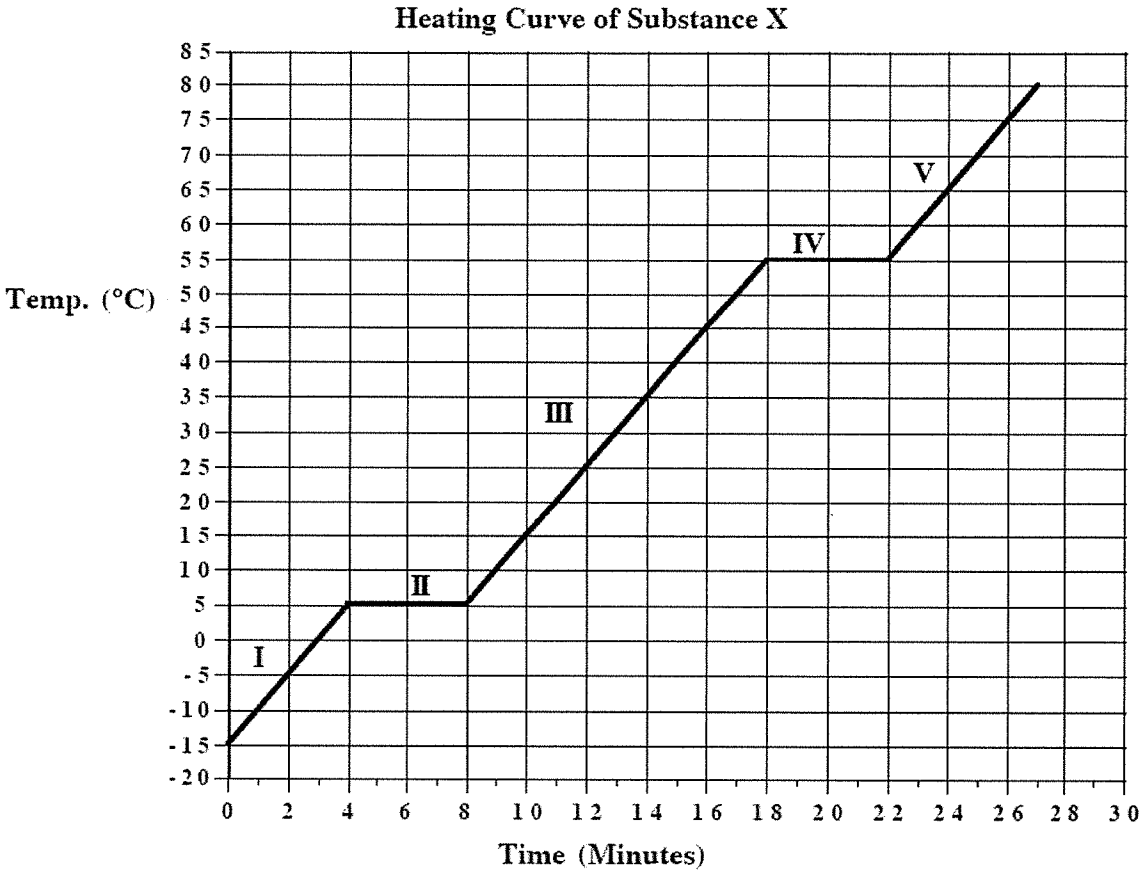
_____

(e) Gases do not have a definite shape because _____

_____

_____

Heating Curves Worksheet



The heating curve shown above is a plot of temperature vs time. It represents the heating of substance X at a constant rate of heat transfer. Answer the following questions using this heating curve:

_____1. In what part of the curve would substance X have a definite shape and definite volume?

_____2. In what part of the curve would substance X have a definite volume but no definite shape?

_____3. In what part of the curve would substance X have no definite shape or volume?

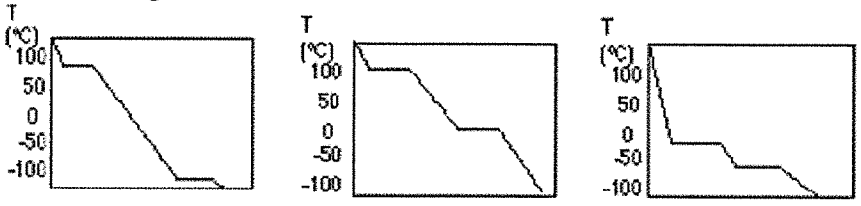
_____4. What part of the curve represents a mixed solid/liquid phase of substance X?

_____5. What part of the curve represents a mixed liquid/vapor phase of substance X?

_____6. What is the melting temperature of substance X?

_____7. What is the boiling temperature of substance X?

Circle the correct cooling curve for water.



_____8. In what part(s) of the curve would increasing kinetic energy be displayed?

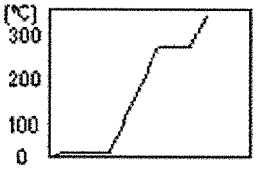
_____9. In what part(s) of the curve would increasing potential energy be displayed?

_____10. In what part of the curve would the molecules of substance X be farthest apart?

_____11. In what part of the curve would the molecules of X have the lowest kinetic energy?

_____12. In what part of the curve would the molecules of X have the greatest kinetic energy?

Substance	Melting/Freezing Point (°C)	Boiling/Condensation Point (°C)
ammonia	-77.7	-33.3
carbon dioxide	-78.5	-78.5
copper	1083.0	2566.0
ethanol	-114.4	78.5
glycerin	20.0	290.0
gold	1064.0	2807.0
iodine	113.5	184.4
mercury	-38.9	356.6
sodium chloride	801.0	1413.0
stearic acid	71.5	360.0
tin	232.0	2270.0
pure water	0.0	100.0

1.


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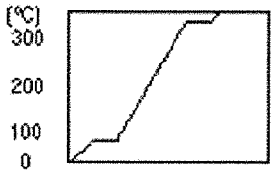

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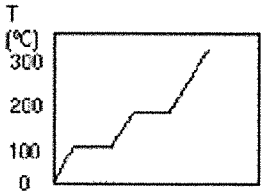


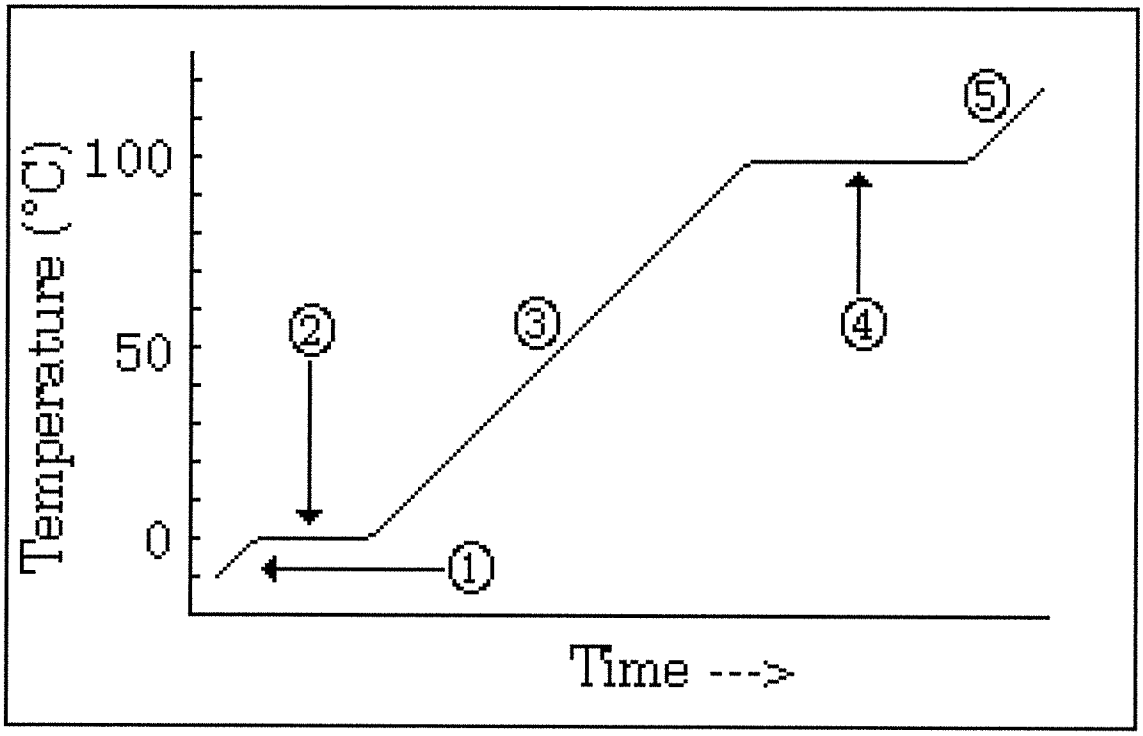
13. Which of the graphs above most likely represents iodine? _____

14. Which of the graphs above most likely represents steric acid? _____

15. Which of the graphs above most likely represents glycerin? _____

Heating Curve and Phase Diagram Worksheet **Name:**_____**period:**_____

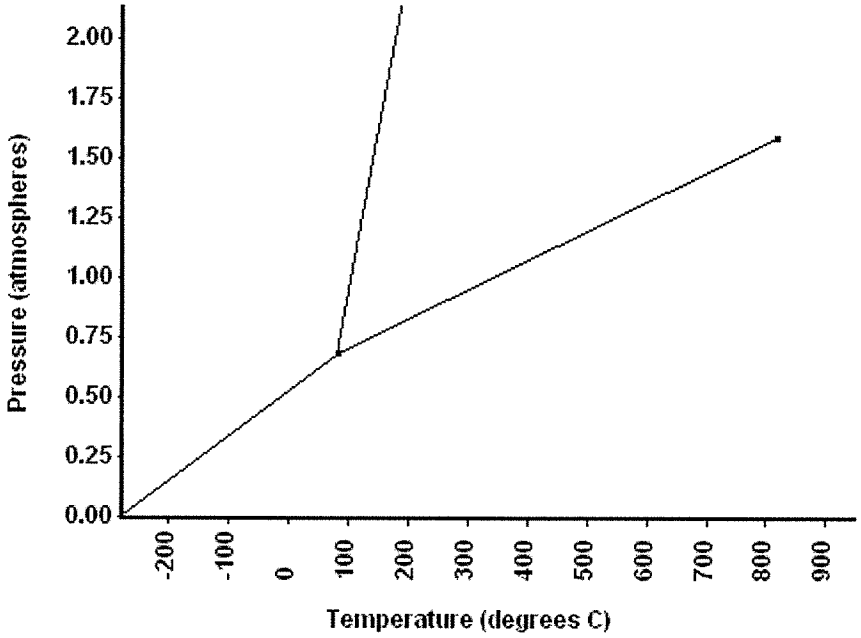
The diagram below is a plot of temperature vs. time. It represents the heating of what is initially ice at -10°C at a near constant rate of heat transfer.



1) a)What phase or phases are present during segment (1) _____
   b) What is happening to the energy being absorbed from the heat source?
   _____
   _____
   c) What phase change, if any, is taking place? _____
2) a)What phase or phases are present during segment (2) _____
   b) What is happening to the energy being absorbed from the heat source?
   _____
   _____
   c) What phase change, if any, is taking place? _____
3) a)What phase or phases are present during segment (3) _____
   b) What is happening to the energy being absorbed from the heat source?
   _____
   _____
   c) What phase change, if any, is taking place? _____
4) a)What phase or phases are present during segment (4) _____
   b) What is happening to the energy being absorbed from the heat source?
   _____
   _____
   c) What phase change, if any, is taking place? _____
5) a)What phase or phases are present during segment (5) _____
   b) What is happening to the energy being absorbed from the heat source?
   _____
   _____
   c) What phase change, if any, is taking place? _____
6) What is the melting point of this substance?_____
7) At what temperature would this sample finish boiling?_____
8) When this substance is melting, the temperature of the ice-water mixture remains constant because:

Phase Diagram Worksheet

Refer to the phase diagram below when answering the questions on this worksheet:



On the graph above label the following: solid phase, liquid phase, gas phase, triple point, critical point

1) What is the normal freezing point of this substance? _____

2) What is the normal boiling point of this substance? _____

3) What is the normal freezing point of this substance? _____

4) If I had a quantity of this substance at a pressure of 1.25 atm and a temperature of 300^0 C and lowered the pressure to 0.25 atm, what phase transition(s) would occur?

5) At what temperature do the gas and liquid phases become indistinguishable from each other?

_____

6) If I had a quantity of this substance at a pressure of 0.75 atm and a temperature of -100^0 C, what phase change(s) would occur if I increased the temperature to 600^0 C? At what temperature(s) would they occur?