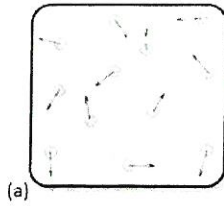


Name: \_\_\_\_\_

Date: Key Period: \_\_\_\_\_

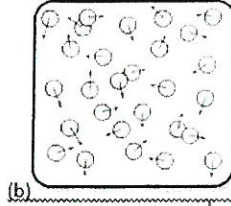
## Energy and Phase Changes Worksheet

Use the following 3 images to answer the questions.



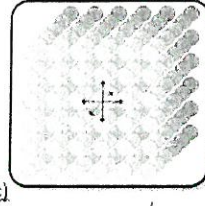
(a)

Gas



(b)

liquid



(c)

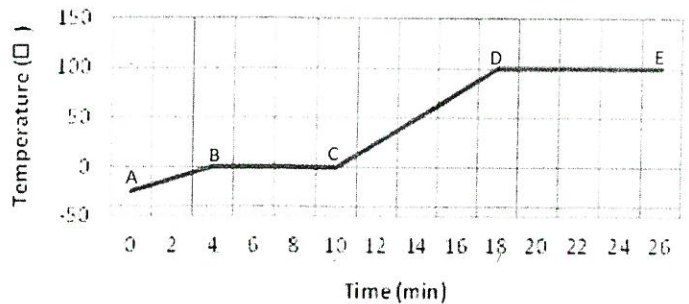
Solid

1. In the lines above, label each image as being a solid, liquid or gas.
2. What image above shows molecules moving the slowest? C Why are they moving so slow?  
It has very little thermal energy.
3. What image would contain the highest amount of thermal energy?  
A
4. If you wanted to change a substance from A to B, what would need to happen? What is this process called?  
Thermal energy needs to be removed. (Condensation)
5. If you wanted to change a substance from C directly to A, what would need to happen? What is this process called?  
Almost all the thermal energy needs to be added  
\* Sublimation
6. What is happening to the thermal energy as you move from A to B to C?  
Thermal energy is being removed
7. What is happening to the temperature as you move from A to B to C?  
Temperature is decreasing

### Reading a phase change graph:

8. During what time interval(s) is the thermal energy of the water increasing?  
All of them
9. At what intervals is the temperature increasing?  
A to B, C to D
10. What happens from the 4<sup>th</sup> minute to the 10<sup>th</sup> minute?  
Melting
11. What happens from the 18<sup>th</sup> minute to the end of the data collection?  
Boiling
12. What state of matter is the water between interval A and B? How do you know?  
solid  
Temperatures are below zero.
13. At what degree is the water melting? 0°C At what degree is the water boiling? 100°C

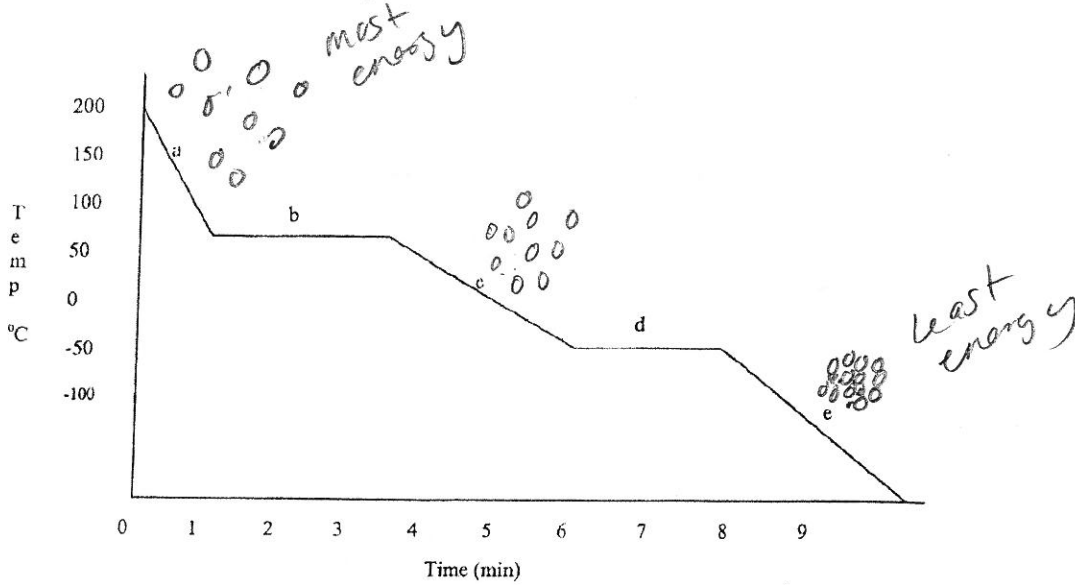
Temperature vs. Time for Heating Water



14. What intervals show a phase change?

B to C + D to E

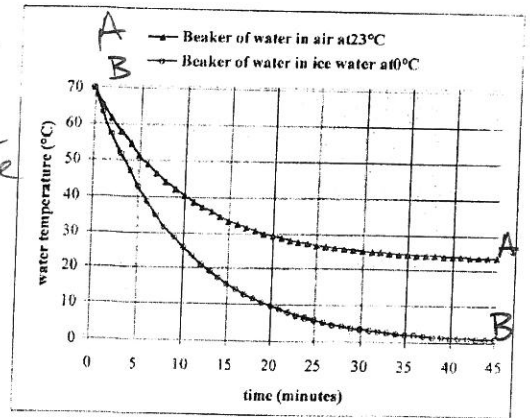
Use the following graph to answer the questions below.



15. Is heat being added or removed from this substance? Removed
  16. What segment represents the point during which the gas is turning into a liquid? B
  17. Which segment represents the point during which the liquid is turning into a solid? D
  18. What process is occurring between minutes 1 and 3? Condensation
  19. What state of matter is the substance in at the end of segment b? liquid
  20. What process is occurring between minutes 6 and 8? Freezing
  21. What state of matter is the substance in at letter e? Solid
- \* On the graph, draw what the substance molecules would look like.

Use this graph to answer the following questions.

22. Which beaker of water starts off at higher temperature? same T.
23. Which beaker of water ends up at a higher temperature? Water in Air
24. Which beaker of water had a larger temperature drop overall? Water in ice
25. After 10 minutes, what are the temperature of the two beakers of water? Beaker A = 22°C Beaker B = 1°C
26. After 10 minutes, what was the drop in temperature of the two beakers of water? Beaker A dropped = 48°C Beaker B dropped = 69°C



Use the graph to answer the following questions.

27. At what temperature does object A start? 70°C
28. At what temperature does object B start? 5°C
29. Over time, what happens to the temperature of object B? Temperature increase
30. Over time, what do you notice about the temperature for both objects? They end up at the same temperature

