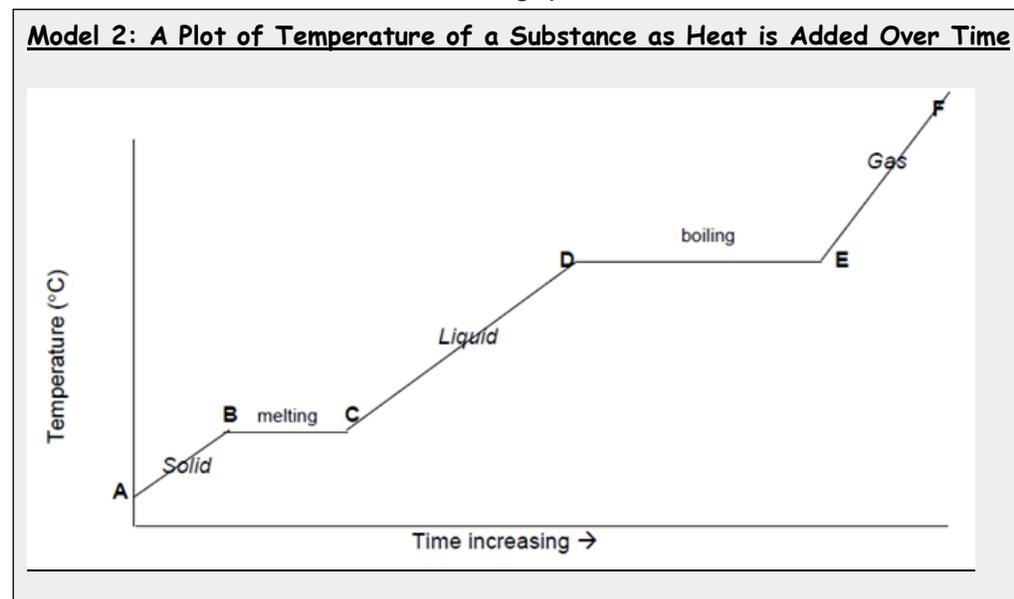




Name: \_\_\_\_\_

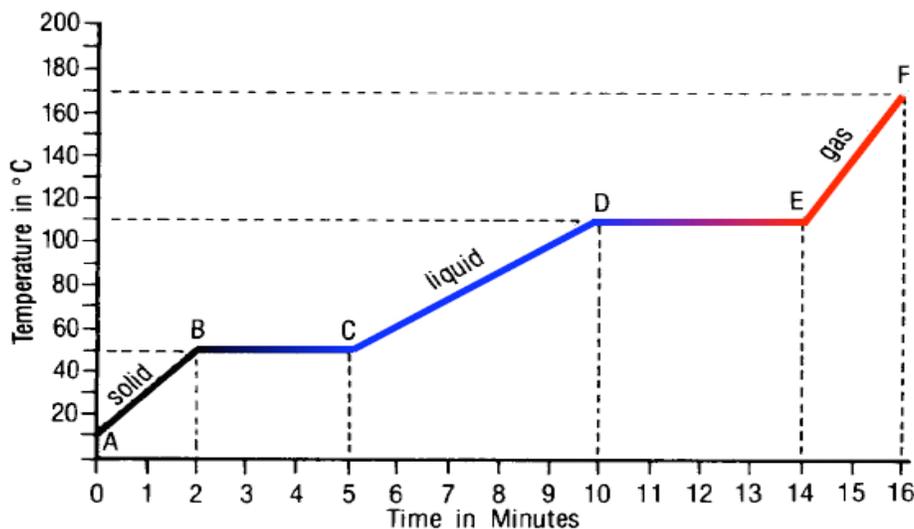
Refer to Model 2 to answer the following questions:



6. What is plotted on the x-axis and what is plotted on the y-axis of the graph?
7. During which line segments does temperature increase? \_\_\_\_\_
8. During which line segments is there no change in temperature? \_\_\_\_\_
9. If this substance were water, at what temperature would segment BC occur? \_\_\_\_\_
10. If this substance were water, at what temperature would segment DE occur? \_\_\_\_\_

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

(use p. 523 in textbook if you need help)



**From this diagram identify the following:**

1. The melting point temperature: \_\_\_\_\_
2. The boiling point temperature: \_\_\_\_\_
3. The line segment where heat is being added, causing a change in the temperature of the **solid** phase: \_\_\_\_\_
4. The segment where heat is being added, causing a change in the kinetic energy of the particles when they are in the **liquid** phase: \_\_\_\_\_
5. The segment where heat is being added, causing a change in the speed of the particles when they are in the **gas** phase: \_\_\_\_\_
6. The segments where heat is being added but temperature is NOT changing: \_\_\_\_\_ & \_\_\_\_\_
7. The segments where heat is being added but kinetic energy is NOT changing: \_\_\_\_\_ & \_\_\_\_\_
8. The segments where added heat causes an increase in potential energy: \_\_\_\_\_ & \_\_\_\_\_
9. The segment where heat is added, and might be called the "Heat of Fusion": \_\_\_\_\_
10. The segment where heat is added, and might be called the "Heat of Vaporization:" \_\_\_\_\_
11. List all segments that represent exothermic processes: \_\_\_\_\_
12. List all segments that represent endothermic processes: \_\_\_\_\_
13. Is this substance water? \_\_\_\_\_ How do you know? \_\_\_\_\_
14. List all segments where particle attractions are decreasing: \_\_\_\_\_
15. List all segments where particle attractions are increasing: \_\_\_\_\_
16. Name the following phase changes:  
BC \_\_\_\_\_ CB \_\_\_\_\_ DE \_\_\_\_\_ ED \_\_\_\_\_

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

## Heating/Cooling Curve

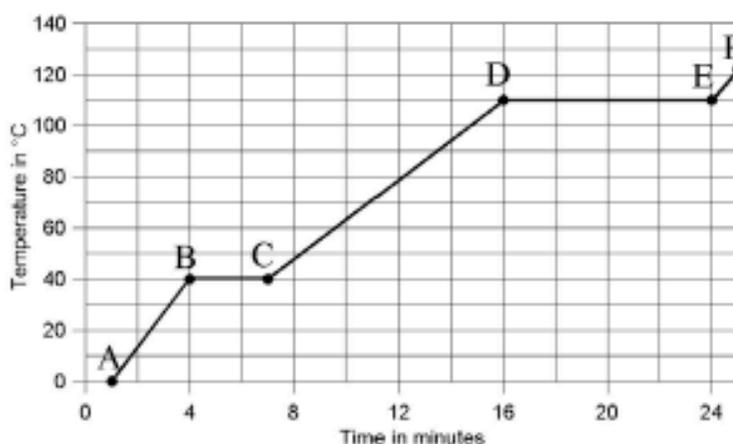
As a substance is heated, its particles begin to move faster and spread apart. The speed of the particles is related to their kinetic energy. The relative position of the particles is related to their potential energy. As solids, liquids, and gases are heated, most of the energy that is absorbed is converted into kinetic energy and the temperature goes up. But as a substance melts or vaporizes, its particles spread out tremendously. As a result, the energy absorbed produces changes in the potential energy of the particles, so the temperature does not change as the phase changes. For that reason, the freezing point and the boiling point of a substance are the same.

Base your answers to the following questions on the graph which shows 10.0 kg of a substance that is a solid at 0°C and is heated at a constant rate of 60 kilojoules per minute.

1. \_\_\_\_\_ What is the temperature at which the substance can be both in the solid and the liquid phase?

2. \_\_\_\_\_ During which lettered intervals is the internal potential energy of the substance increasing?

3. \_\_\_\_\_ During which lettered intervals is the kinetic energy of the particles increasing?



4. \_\_\_\_\_ How much heat is added to the substance from the time it stops melting to the time it begins to boil?

5. \_\_\_\_\_ What is the total heat needed to melt the substance (starting at time 0)?

6. \_\_\_\_\_ What is the total heat needed to vaporize the substance (starting at time 0)?

7. \_\_\_\_\_ What is the heat of vaporization of the substance?

8. \_\_\_\_\_ During which lettered intervals is the substance solid?

9. \_\_\_\_\_ During which lettered intervals is the substance in the liquid phase?

10. \_\_\_\_\_ During which lettered intervals is the substance in the vapor phase?

11. \_\_\_\_\_ What is the temperature at which the substance can be both in the liquid and the vapor phase?

12. Which segments represent an increase in kinetic energy? \_\_\_\_\_

13. Which segments represent kinetic energy staying the same? \_\_\_\_\_

14. Which segments represent an increase in potential energy? \_\_\_\_\_

15. Which segments represent potential energy staying the same? \_\_\_\_\_

16. Potential energy is stored energy. Where in a molecule is energy stored? \_\_\_\_\_