



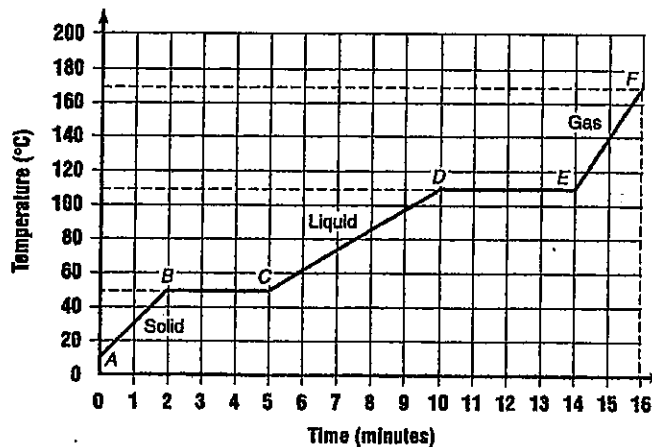
Study Guide

States of Matter

Chapter

9

Directions: Look carefully at the graph. It was drawn from the data collected when a substance was heated at a constant rate. To heat at a constant rate means to add heat evenly as time passes. Use the graph to complete the paragraphs that follow.



At the start of observations, Point A, the substance exists in the 1. _____ state. The temperature at this point is 2. _____. As energy is absorbed, the temperature of the substance rises at a constant rate for two minutes. At Point B, the temperature is 3. _____, and the solid begins to 4. _____. The temperature remains constant until the change from solid to 5. _____ is complete. It has taken three minutes to add enough energy to melt the solid completely. From Point C to Point D, the substance is in the 6. _____ state. Its temperature rises at a constant rate to 7. _____. The temperature remains constant while the liquid changes to a 8. _____. At Point E, the substance exists as a 9. _____. Its temperature rises evenly as energy is added.

When the gaseous substance is allowed to cool, it releases energy. The cooling curve will be the reverse of the warming curve. Energy will be released as the substance changes from a 10. _____ to a 11. _____ and also from a 12. _____ to a 13. _____. The amount of energy released during condensation will be the same as the amount absorbed during vaporization.



Study Guide

Transferring Thermal Energy

Chapter

9

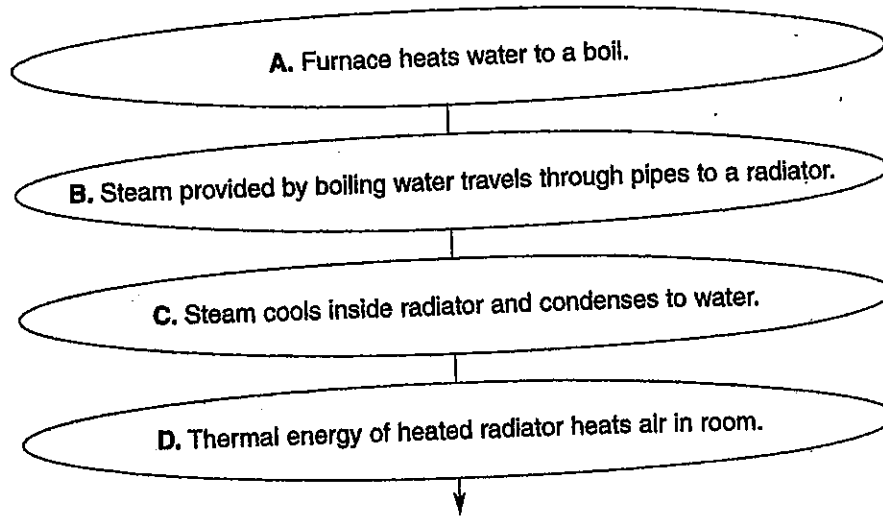
Directions: Determine whether the italicized term makes each statement true or false. If the statement is true, write **true** in the blank. If the statement is false, write in the blank the term that makes the statement true.

- _____ 1. Materials that are poor conductors are *poor* insulators.
- _____ 2. The transfer of energy through matter by direct contact of its particles is *convection*.
- _____ 3. The transfer of energy in the form of invisible waves is *conduction*.
- _____ 4. Solids usually conduct heat *better* than liquids and gases.
- _____ 5. Air is a *poor* heat conductor.
- _____ 6. Wind and ocean currents are examples of *conduction* currents.
- _____ 7. Energy is usually transferred in fluids by *radiation*.
- _____ 8. As water is heated, it expands, becomes *less* dense, and rises.
- _____ 9. Dark-colored materials absorb *less* radiant energy than light-colored materials.

Directions: Circle the object in each pair that will take in more heat. In the blank, explain why that object will take in more heat.

10. a silver spoon _____
a wooden log _____
11. a white shirt _____
a red shirt _____
12. foil in the sunlight _____
a sidewalk in the sunlight _____
13. single-pane window _____
double-pane window _____

Questions: Answer the following questions about the heating system represented in the flowchart.



Is the system in the flowchart a hot-water system or a steam-heating system?

How does the furnace get the energy needed to heat the water?

Is the furnace an internal or external combustion engine?

How is the thermal energy produced by the furnace transferred to the water?

Why do the pipes carrying the steam to the radiator need to be insulated?

How is the thermal energy from the steam transferred to the radiator?

How is the thermal energy of the radiator transferred to the surrounding air?

What happens to the steam as it gives up thermal energy inside the radiator?

How is heat from the air surrounding the radiator transferred to the air in the rest of the room?