Phase Change Worksheet

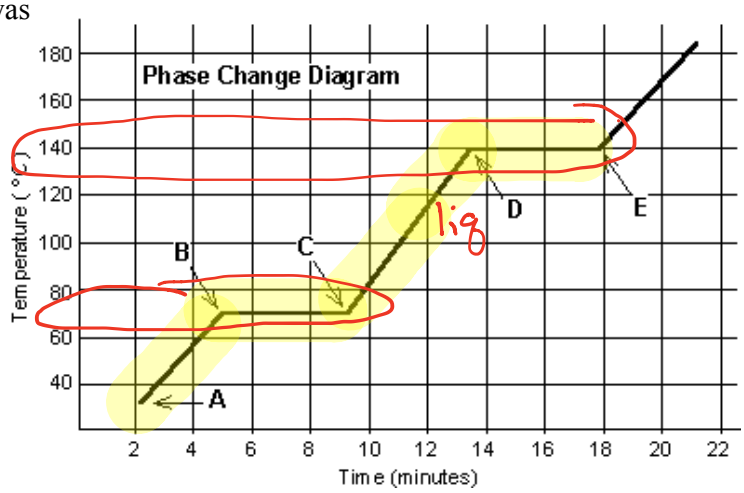
Name:_____
Date:_____Period:_____

The graph was drawn from data collected as a substance was heated at a constant rate.

Use the graph to answer the following questions 1-23.

freeze evaporate
Condensation

Melting deposition
Sublimation

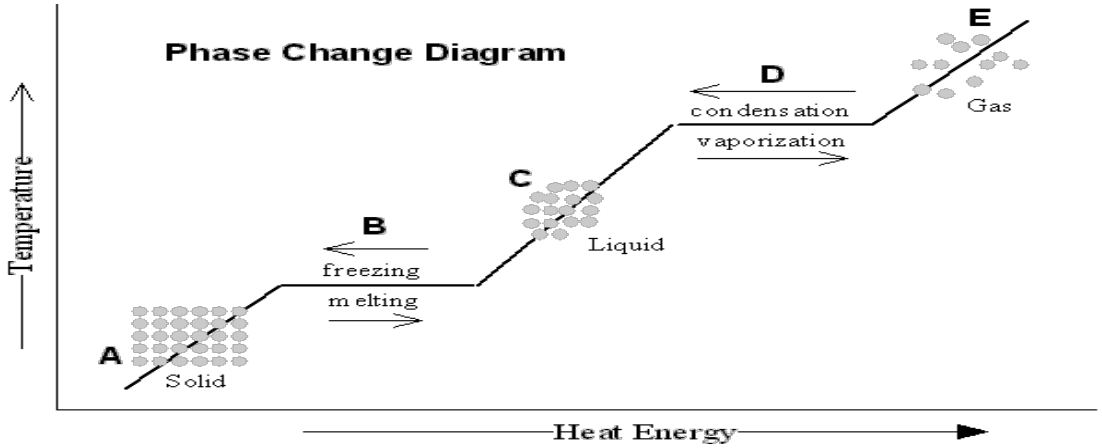


1. – 22. At **point A**, the beginning of observations, the substance exists in a solid state. Material in this phase has (1)__definite__ volume and (2)__definite__ shape. With each passing minute, (3)__heat__ is added to the substance. This causes the molecules of the substance to (4)__move__ more rapidly which we detect by a (5)__temperature__ rise in the substance. At **point B**, the temperature of the substance is (6)__70__ °C. The solid begins to (7)__Melt__. At point C, the substance is completely (8)__Melted__ or in a (9)__liquid__ state. Material in this phase has (10)__definite__ volume and (11)__indefinite__ shape. The energy put to the substance between minutes 5 and 9 was used to convert the substance from a (12)__Solid__ to a (13)__liquid__.

Between 9 and 13 minutes, the added energy increases the (14)__temp__ of the substance. During the time from **point D to point E**, the liquid is (15)__evaporating__. By **point E**, the substance is completely in the (16)__gas__ phase. Material in this phase has (17)__indef__ volume and (18)__indef__ shape. The energy put to the substance between minutes 13 and 18 converted the substance from a (19)__liq__ to a (20)__gas__ state.. Beyond **point E**, the substance is still in the (21)__gas__ phase, but the molecules are moving (22)__faster__ as indicated by the increasing temperature.

23. Which of these three substances was likely used in this phase change experiment?

Substance	Melting point	Boiling point
Bolognium	~~20 °C~~	~~100 °C~~
Unobtainium	~~40 °C~~	~~140 °C~~
Foosium	70 °C	140 °C



24. Does the temperature increase during melting? no

25. Is Energy required for each phase change? yes

26. Can both liquid water and steam exist at 100°C? yes

27. What must be changed, temperature or heat energy, during condensation? heat energy

28. How would you describe the change in the arrangement of particles as heat energy and temperature increase? arrangement becomes less organized (spreads out)

29. Label the graph with solid. x2

30. Label the graph with liquid. x2

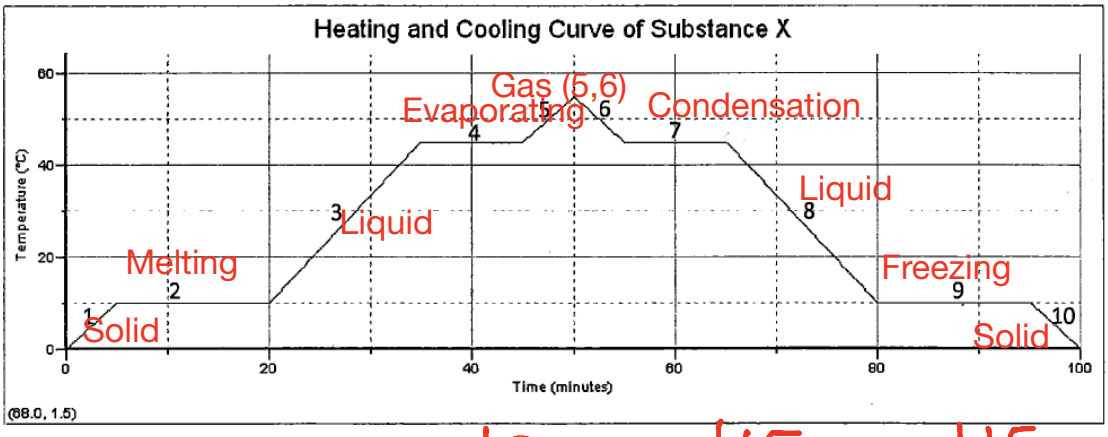
31. Label the graph with gas. x2

32. Label the graph with vaporization.

33. Label the graph with melting.

34. Label the graph with freezing.

35. Label the graph with condensation.



36. At what temperature does substance X freeze? 10 boil? 45 melt? 45

37. What is happening to the substance during section 3? temp ↑

38. What is happening to the substance during section 7? changing from gas → liq

39. What is happening to the substance during section 10? temp ↓

40. During which section is energy being released? 50 min – 100 min being added? 0 min – 50 min