TABLE 3.4 **Specific Heat of Some Substances**

Substance	Specific Heat cal/g·°C	Specific Heat J/kg·K[a]
Water (liquid)	1.00	4.18×10^3
Aluminum (solid)	0.217	9.08×10^2
Lead (solid)	0.0310	1.30×10^2
Sugar (solid)	0.299	1.25×10^3
Silver (solid)	0.0570	2.38×10^2
Sodium chloride (salt, solid)	0.204	8.54×10^2

[a] See Section 2.7 for a discussion of exponents and scientific notation.

TABLE 12.1 **Heats of Vaporization or Condensation of Various Liquids at Their Normal Boiling Point and 1 Atm Pressure**

Liquid	Normal Boiling Point (°C)	Heat of Vaporization or Condensation cal/g	Heat of Vaporization or Condensation J/kg
Water	100	540	2.26×10^6
Alcohol	78.3	204	8.54×10^5
Heptane	98.4	76.5	3.20×10^5
Carbon tetrachloride	76.7	52.1	2.18×10^5
Benzene	80.1	94.1	3.94×10^5
Sodium chloride[a]	1465	698	2.92×10^6

[a] The extremely high values for the boiling point and heat of vaporization or condensation for sodium chloride over those values for the other liquids are due to the relatively strong attractive forces found in sodium chloride. These strong attractive forces are related to the ionic bonding in sodium chloride.

TABLE 12.3 **Heats of Fusion or Solidification of Various Solids at Their Melting Points**

Solid	Melting Point (°C)	Heat of Fusion or Solidification cal/g	Heat of Fusion or Solidification J/kg
Water	0	80	3.35×10^5
Alcohol	−117	24.9	1.04×10^5
Heptane	−91	33.7	1.41×10^5
Carbon tetrachloride	−23	5.09	2.13×10^4
Benzene	6	30.1	1.26×10^5
Sodium chloride[a]	804	124	5.19×10^5

[a] The high values for sodium chloride are again due to the strong attractive forces in the substance because of its ionic bonding. (See the footnote to Table 12.1).

Name_____ Chemistry Quiz, 12.5

1. _____ is the purifying of a liquid by heating it to the boiling point and cooling the vapors

2-3. The colorless droplets of water are called the _____; the impurities that remain are called the _____.

4. The petroleum industry uses _____ to refine gasoline.

---

5. What is chapter 12 about?

6. In this chapter, are the particles of matter still in motion to some degree?

7-9. Name the three ways that the molecules of liquids are different from those of gases.

10-15. Describe the 6 general characteristics of liquids.

16-27. Name and define two changes of state. Describe two conditions under which each take place. Classify and define what type of change each is.

28. Real gases act like ideal gases in what circumstance?

29. What is dynamic equilibrium?

30. What is vapor pressure?

31. What is the boiling point?

32. What will make the boiling point lower?

33. Will that make food take longer or shorter to cook?

34-5. Describe heat of vaporization and heat of condensation.

36-7. What units are used to measure those heats?

Name_____ Chemistry Quiz, 12.6

1. _____ is the property of a liquid that tends to draw the surface molecules into the body of the liquid and hence to reduce the surface to a minimum.

2. _____ is the property of a liquid that describes the resistance of a liquid to flow.

3-14. Name and define two changes of state. Describe two conditions under which each take place. Classify and define what type of change each is.

15. Real gases act like ideal gases in what circumstance?

16. What is dynamic equilibrium?

17. What is vapor pressure?

18. What is the boiling point?

19. What will make the boiling point lower?

20. Will that make food take longer or shorter to cook?

21-2. Describe heat of vaporization and heat of condensation.

23-4. What units are used to measure those heats?

25. What is distillation?

26-7. The colorless droplets of water are called the _____; the impurities that remain are called the _____.

28. The petroleum industry uses _____ to refine gasoline.

Name_____ Chemistry Quiz, 12.7

1. What was 12.7 about?

2. Name one of the three ways that the molecules in this section are different.

3-5. Describe 3 of the 6 general characteristics that they described.

6-17. Name and define two changes of state. Describe two conditions under which each take place. Classify and define what type of change each is.

18. Real gases act like ideal gases in what circumstance?

19. What is dynamic equilibrium?

20. What is vapor pressure?

21. What is the boiling point?

22. What will make the boiling point lower?

23. Will that make food take longer or shorter to cook?

24-5. Describe heat of vaporization and heat of condensation.

26-7. What units are used to measure those heats?

28. What is distillation?

29-30. The colorless droplets of water are called the _____ ; the impurities that remain are called the _____.

31. The petroleum industry uses _____ to refine gasoline.

32. What is surface tension?

33. What causes it?

34. What can be done to decrease surface tension?

35. What is viscosity?

36. What can be done to increase viscosity?

Name_____ Chemistry Quiz, 12.8-9

1. _____ solids consist of particles arranged in a definite geometric shape distinctive for that solid.

2. _____ solids consist of particles arranged in an irregular manner.

3. _____ is the temperature at which the particles of a liquid begin to form crystals of a solid.

4. _____ is the temperature at which the kinetic energy of some of the particles in a solid matches the attractive forces in the solid and the solid begins to liquefy.

5. _____ is the quantity of heat required to convert 1 g of a solid to liquid at the melting point.

6. _____ is the quantity of heat released by 1 g of a liquid as it becomes a solid.

7. What is distillation?

8-9. The colorless droplets of water are called the _____ ; the impurities that remain are called the _____.

10. The petroleum industry uses _____ to refine gasoline.

11. What is surface tension?

12. What causes it?

13. What can be done to decrease surface tension?

14. What is viscosity?

15. What can be done to increase viscosity?

16-8. Name the three ways that the molecules of solids are different.

19-24. Describe the 6 general characteristics of solids.

Name_____ Chemistry Quiz, 12.10

1. _____ is the direct conversion of a solid to a vapor without passing through the liquid state.

2. _____ is the direct conversion of a vapor to a solid without passing through the liquid state.

3-5. Name the three ways that the molecules of solids are different.

6-11. Describe the 6 general characteristics of solids.

12-6. Name and define two kinds of solids. What is special about one kind of solid?

17. _____ is the temperature at which the particles of a liquid begin to form crystals of a solid.

18. Is this endothermic or exothermic?

19. _____ is the temperature at which the kinetic energy of some of the particles in a solid matches the attractive forces in the solid and the solid begins to liquefy.

20. Is this endothermic or exothermic?

21. What will happen generally if pressure is raised?

22. What is the exception?

23. How much of an effect will pressure have?

24. What will 1 atm of pressure do to ice?

25. _____ is the quantity of heat required to convert 1 g of a solid to liquid at the melting point.

26. _____ is the quantity of heat released by 1 g of a liquid as it becomes a solid.

Name_____ Chemistry Quiz, 12.1 1

1. As heat is added to a solid, the temperature rises according to its _____.

2. As a solid melts, does its temperature change?

3-4. If you read the whole box about mercury, tell me two things about it.

5-7. Name the three ways that the molecules of solids are different.

8-13. Describe the 6 general characteristics of solids.

14-8. Name and define two kinds of solids. What is special about one kind of solid?

19. _____ is the temperature at which the particles of a liquid begin to form crystals of a solid.

20. Is this endothermic or exothermic?

21. _____ is the temperature at which the kinetic energy of some of the particles in a solid matches the attractive forces in the solid and the solid begins to liquefy.

22. Is this endothermic or exothermic?

23. What will happen generally if pressure is raised?

24. What is the exception?

25. How much of an effect will pressure have?

26. What will 1 atm of pressure do to ice?

27. _____ is the quantity of heat required to convert 1 g of a solid to liquid at the melting point.

28. _____ is the quantity of heat released by 1 g of a liquid as it becomes a solid.

29-30. What is sublimation? Is it endothermic or exothermic?

31-2. What is deposition? Is it endothermic or exothermic?

Name_____ Chemistry Quiz, 12.11b

1. What is chapter 12 about?

2. In this chapter, are the particles of matter still in motion to some degree?

3-5. Name the three ways that the molecules of liquids are different from those of gases.

6-11. Describe the 6 general characteristics of liquids.

12-23. Name and define two changes of state. Describe two conditions under which each take place. Classify and define what type of change each is.

24. Real gases act like ideal gases in what circumstance?

25. What is dynamic equilibrium?

26. What is vapor pressure?

27. What is the boiling point?

28. What will make the boiling point lower?

29. Will that make food take longer or shorter to cook?

30-1. Describe heat of vaporization and heat of condensation.

32-3. What units are used to measure those heats?

34. What is distillation?

35-6. The colorless droplets of water are called the _____; the impurities that remain are called the _____.

37. The petroleum industry uses _____ to refine gasoline.

38. What is surface tension?

39. What causes it?

40. What can be done to decrease surface tension?

41. What is viscosity?

42. What can be done to increase viscosity?

43-5. Name the three ways that the molecules of solids are different.

46-51. Describe the 6 general characteristics of solids.

52-6. Name and define two kinds of solids. What is special about one kind of solid?

57. _____ is the temperature at which the particles of a liquid begin to form crystals of a solid.

58. Is this endothermic or exothermic?

59. _____ is the temperature at which the kinetic energy of some of the particles in a solid matches the attractive forces in the solid and the solid begins to liquefy.

60. Is this endothermic or exothermic?

61. What will happen generally if pressure is raised?

62. What is the exception?

63. How much of an effect will pressure have?

64. What will 1 atm of pressure do to ice?

65. _____ is the quantity of heat required to convert 1 g of a solid to liquid at the melting point.

66. _____ is the quantity of heat released by 1 g of a liquid as it becomes a solid.

67-8. What is sublimation? Is it endothermic or exothermic?

69-70. What is deposition? Is it endothermic or exothermic?

71. As heat is added to a solid, the temperature rises according to its _____.

72. As a solid melts, does its temperature change?

73. What equation tells how much heat it takes to warm or cool a substance?

Name_____ Chemistry Practice Test, Chapter 12

1. What is chapter 12 about?

2. In this chapter, are the particles of matter still in motion to some degree?

3-5. Name the three ways that the molecules of liquids are different from those of gases.

6-11. Describe the 6 general characteristics of liquids.

12-23. Name and define two changes of state. Describe two conditions under which each take place. Classify and define what type of change each is.

24. Real gases act like ideal gases in what circumstance?

25. What is dynamic equilibrium?

26. What is vapor pressure?

27. What is the boiling point?

28. What will make the boiling point lower?

29. Will that make food take longer or shorter to cook?

30-1. Describe heat of vaporization and heat of condensation.

32-3. What units are used to measure those heats?

34. What is distillation?

35-6. The colorless droplets of water are called the _____; the impurities that remain are called the _____.

37. The petroleum industry uses _____ to refine gasoline.

38. What is surface tension?

39. What causes it?

40. What can be done to decrease surface tension?

41. What is viscosity?

42. What can be done to increase viscosity?

43-5. Name the three ways that the molecules of solids are different.

46-51. Describe the 6 general characteristics of solids.

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59. _____ is the temperature at which the kinetic energy of some of the particles in a solid matches the attractive forces in the solid and the solid begins to liquefy.

60. Is this endothermic or exothermic?

61. What will happen generally if pressure is raised?

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64. What will 1 atm of pressure do to ice?

65. _____ is the quantity of heat required to convert 1 g of a solid to liquid at the melting point.

66. _____ is the quantity of heat released by 1 g of a liquid as it becomes a solid.

67-8. What is sublimation? Is it endothermic or exothermic?

69-70. What is deposition? Is it endothermic or exothermic?

71. As heat is added to a solid, the temperature rises according to its _____.

72. As a solid melts, does its temperature change?

73. What equation tells how much heat it takes to warm or cool a substance?

Problems (3 points each)

1. How much heat in kilocalories is given off when 19 g of steam condenses?

2. How much heat in kilojoules is needed to vaporize 285 g of water?

3. How much heat energy in kilojoules is required to vaporize .358 mol of water?

4. What is the melting point of ice when a pressure of 38 atm is exerted on it?

5. How much heat in kilocalories is required to convert 39 g of ice at 0 C to steam at 100 C?

6. How much heat in kilojoules is required to convert 59 g of ice at 0 C to steam at 100 C?

7. How many calories are needed to convert 39 g of ice at -15 C to steam at 120 C?

8. How many calories are given off when .347 kg of water freezes?

9. Calculate the mass of water in grams that can be heated from 0 C to 10 C by the heat given off on cooling 2 kg of water from 100 C to 40 C.