**Chapter 01**

**Chemistry: The Central Science**

1. What is a unifying principle that explains a body of experimental observations?

A. Law

B. Hypothesis

**C**. Theory

D. Phenomena

E. Prediction

*Blooms: 2. Understand*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Scientific Method*

*Topic: Study of Chemistry*

2. Which of the following is a tentative explanation for a set of observations?

A. Law

**B**. Hypothesis

C. Theory

D. Phenomena

E. Prediction

*Blooms: 2. Understand*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Scientific Method*

*Topic: Study of Chemistry*

3. What is the term used for findings that are summarized based on a pattern or trend?

**A**. Law

B. Hypothesis

C. Theory

D. Phenomena

E. Prediction

*Blooms: 2. Understand*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Scientific Method*

*Topic: Study of Chemistry*

4. Which of the following activities is not a part of good science?

A. Proposing a theory

B. Developing a hypothesis

C. Making quantitative observations

D. Designing experiments

**E**. Indulging in speculation

*Blooms: 2. Understand*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Scientific Method*

*Topic: Study of Chemistry*

5. Which of the following is a ‘substance’ according to the definition given in your textbook?

A. Air

B. Tap water

C. Sea water

**D**. Water

E. Toothpaste

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

6. Which of the following cannot be separated into simpler substances by chemical means?

**A**. Element

B. Emulsion

C. Compound

D. Homogeneous mixture

E. Heterogeneous mixture

*Blooms: 4. Analyze*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

7. If a liquid contains 60% sugar and 40% water throughout its composition then what is it called?

A. Solute

B. Compound

**C**. Homogeneous mixture

D. Heterogeneous mixture

E. Solvent

*Blooms: 4. Analyze*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

8. Which of the following does not have a uniform composition throughout?

A. Element

B. Compound

C. Homogeneous mixture

**D**. Heterogeneous mixture

E. Solvent

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

9. Which of the following is not an SI base unit?

A. Meter

B. Ampere

C. Second

**D**. Gram

E. Kelvin

*Blooms: 2. Understand*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

10. The SI base unit of mass is

A. mg.

B. g.

**C**. kg.

D. metric ton.

E. lb.

*Blooms: 1. Remember*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

11. The SI prefix *mega*- (M) means

A. 10–6

B. 10–3

C. 103

**D**. 106

E. 109

*Blooms: 1. Remember*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

12. The SI prefixes *milli*- and *mega*- represent, respectively

A. 106 and 10–6

**B**. 10–3 and 106

C. 103 and 10–6

D. 10–3 and 109

E. 10–6 and 10–3

.

*Blooms: 1. Remember*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

13. How many micrograms are in 65.3 kg?

A. 0.653 μg

B. 6.53 × 107 μg

C. 6.53 × 104 μg

D. 6.53 × 10–8 μg

**E**. 6.53 × 1010 μg

*Blooms: 3. Apply*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

14. A dose of medication was prescribed to be 35 microliters. Which of the following expresses that volume in centiliters?

A. 3.5 × 105 cL

B. 3.5 × 104 cL

C. 3.5 cL

D. 3.5 × 10–4 cL

**E**. 3.5 × 10–3 cL

*Blooms: 3. Apply*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

15. How many milliliters is 0.0055 L?

A. 0.55 mL

**B**. 5.5 mL

C. 0.5 mL

D. 0.0000055 mL

E. 182 mL

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

16. How many hertz is 600.11 MHz?

A. 6.0011 × 10–4 Hz

B. 60.011 Hz

C. 6.0011 × 106 Hz

D. 6.0011 × 10–2 Hz

**E**. 6.0011 × 108 Hz

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

17. The distance between carbon atoms in ethylene is 134 picometers. Which of the following expresses that distance in meters?

A. 1.34 × 10–13 m

B. 1.34 × 10–12 m

**C**. 1.34 × 10–10 m

D. 1.34 × 10–7 m

E. 1.34 × 10–6 m

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

18. Which of these quantities represents the largest mass?

A. 2.0 × 102 mg

B. 0.0010 kg

C. 1.0 × 105 μg

**D**. 2.0 × 102 cg

E. 10.0 dg

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

19. The mass of a sample is 550 milligrams. Which of the following expresses that mass in kilograms?

A. 5.5 × 108 kg

B. 5.5 × 105 kg

**C**. 5.5 × 10–4 kg

D. 5.5 × 10–6 kg

E. 5.5 × 10–1 kg

*Blooms: 3. Apply*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

20. The average distance between the Earth and the Moon is 240,000 miles. Express this distance in kilometers. (1 mi = 1609 m)

A. 6.1 × 105 km

B. 5.3 × 105 km

**C**. 3.9 × 105 km

D. 1.5 × 105 km

E. 9.4 × 104 km

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

21. How many inches are in 382.5 cm? (1 in = 2.54 cm)?

**A**. 150.6 in

B. 6.641 × 10–3 in

C. 151 in

D. 971.6 in

E. 972 in

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

22. How many cubic inches are in 1.00 liter? (1 in = 2.54 cm)

**A**. 61.0 in3

B. 155 in3

C. 394 in3

D. 1.64 × 104 in3

E. none of them

*Blooms: 3. Apply*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

23. How many inches are in 382.5 cm? (1 in = 2.54 cm)

**A**. 150.6 in

B. 6.641 × 10–3 in

C. 151 in

D. 971.6 in

E. 972 in

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

24. Given that 1 inch = 2.54 cm, 1.00 cm3 is equal to

A. 16.4 in3

B. 6.45 in3

C. 0.394 in3

D. 0.155 in3

**E**. 0.0610 in3

*Blooms: 3. Apply*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

25. A large pizza has a diameter of 15 inches. Express this diameter in centimeters. (1 in = 2.54 cm)

**A**. 38 cm

B. 24 cm

C. 18 cm

D. 9.3 cm

E. 5.9 cm

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

26. The average distance between the Earth and the Moon is 240,000 miles. Express this distance in meters. (1 mi = 1609 m)

A. 6.1 × 105 m

B. 5.3 × 105 m

**C**. 3.9 × 108 m

D. 1.5 × 105 m

E. 9.4 × 104 m

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

27. What is the volume in milliliters of a 32.0 fl oz can of juice? (1 fl oz = 29.6 mL)

A. 1.08 mL

**B**. 947 mL

C. 0.925 mL

D. 0.95 mL

E. 1.1 mL

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

28. How many mm3 are in 16.7 cm3?

A. 1.67 × 10–5 mm3

B. 1.67 × 10–8 mm3

C. 1.67 × 107 mm3

**D**. 1.67 × 104 mm3

E. 1.67 × 10–4 mm3

*Blooms: 3. Apply*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

29. If a patient in the hospital is running a temperature of 39.5°C, what is this in degrees Fahrenheit?

A. 99°F

B. 101.3°F

C. 102.4°F

**D**. 103.1°F

E. 104°F

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

30. If normal body temperature is 98.6°F then what is this in degrees Celsius?

A. 34°C

B. 35.5°C

C. 36.4°C

**D**. 37.0°C

E. 38.7°C

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

31. Express 122.0°F in °C.

**A**. 50.0°C

B. 64.4°C

C. 67.8°C

D. 162.0°C

E. 219.6°C

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

32. The boiling point for liquid helium is 4.0 K. What is the temperature in degrees Fahrenheit?

**A**. –452.5°F

B. –498.9°F

C. –237.2°F

D. 131.8°F

E. 530.9°F

*Blooms: 3. Apply*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

33. If the temperature is 38.0°F then what is the temperature in kelvins?

A. 3.33 K

B. 100.4 K

**C**. 276.5 K

D. 311.15 K

E. 235.15 K

*Blooms: 3. Apply*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

34. Dry ice (carbon dioxide) changes from a solid to a gas at –78.5°C. What is this temperature in °F?

A. –173°F

B. –12.6°F

**C**. –109°F

D. –75.6°F

E. None of them is within 2°F of the right answer.

*Blooms: 3. Apply*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

35. The boiling point for liquid nitrogen is 77 K. What is the temperature in degrees Fahrenheit?

A. –127°F

B. –289°F

**C**. –321°F

D. 177°F

E. 662°F

*Blooms: 3. Apply*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

36. Acetone, which is used as a solvent and as a reactant in the manufacture of Plexiglas®, boils at 56.1°C. What is the boiling point in degrees Fahrenheit?

A. 159°F

**B**. 133°F

C. 101°F

D. 69.0°F

E. 43.4°F

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

37. Isopropyl alcohol, commonly known as rubbing alcohol, boils at 82.4°C. What is the boiling point in kelvins?

A. 387.6 K

**B**. 355.6 K

C. 323.6 K

D. 190.8 K

E. –190.8 K

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

38. Acetic acid boils at 244.2°F. What is its boiling point in degrees Celsius?

A. 382.0°C

B. 167.7°C

C. 153.4°C

**D**. 117.9°C

E. 103.7°C

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

39. What is the volume of a container that contains 14.3 g of a substance having a density of 0.988 g/cm3?

A. 14.1 cm3

B. 0.0691 cm3

**C**. 14.5 cm3

D. 141 cm3

E. 691 cm3

*Blooms: 4. Analyze*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

40. If you have a graduated cylinder containing 15.5 mL and this volume changes to 95.2 mL after a metal with a mass of 7.95 g is dropped into the graduated cylinder, then what is the density of this metal?

A. 0.0835 g/mL

B. 0.513 g/mL

C. 0.0718 g/mL

D. 10.0 g/mL

**E**. 9.97 × 10–2 g/mL

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

41. The density of mercury, the only metal to exist as a liquid at room temperature, is 13.6 g/cm3. What is that density in pounds per cubic inch? (1 in = 2.54 cm; 1 lb = 454 g)

A. 849 lb/in3

B. 491 lb/in3

C. 376 lb/in3

**D**. 0.491 lb/in3

E. 1.83 × 10–3 lb/in3

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

42. Radio waves travel at the speed of light, which is 3.00 × 108 m/s. How many minutes does it take for a radio message to reach Earth from Saturn if Saturn is 7.9 × 108 km from Earth?

A. 4.4 × 10–2 min

B. 1.6 × 105 min

C. 4.0 × 1015 min

**D**. 44 min

E. 2.6 min

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

43. The speed needed to escape the pull of Earth's gravity is 11.3 km/s. What is this speed in mi/h? (1 mile = 1609 m)

A. 65,500 mi/h

**B**. 25,300 mi/h

C. 18,200 mi/h

D. 1,090 mi/h

E. 5.02 × 10–3 mi/h

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

44. Radio waves travel at the speed of light, which is 3.00 × 108 m/s. How many kilometers will radio messages to outer space travel in exactly one year? (365.24 days = 1 y)

A. 9.46 × 1015 km

B. 7.30 × 108 km

C. 7.10 × 1010 km

**D**. 9.47 × 1012 km

E. 3.33 × 10– 3 km

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

45. The diameter of Earth is 12.7 Mm. Express this diameter in centimeters.

A. 1.27 × 105 cm

B. 1.27 × 106 cm

C. 1.27 × 107 cm

D. 1.27 × 108 cm

**E**. 1.27 × 109 cm

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

46. Some molecules move with speeds approaching the "escape velocity" from Earth, which is 7.0 miles per second. What is this speed in cm/h? (1 mi = 1609 m)

A. 313 cm/h

B. 4.1 × 105 cm/h

**C**. 4.1 × 109 cm/h

D. 1.1 × 106 cm/h

E. 1.6 × 109 cm/h

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

47. The city of Los Angeles is now approximately 2400 miles south of Anchorage, Alaska. It is moving slowly northward as the San Andreas fault slides along. If Los Angeles is to arrive near Anchorage in 76 million years, at what average rate will it have to move in mm per month? (1 mi = 1609 m)

A. 2.0 × 10–10 mm/mo.

B. 6.6 × 10–6 mm/mo.

**C**. 4.2 mm/mo.

D. 9.5 mm/mo.

E. 51 mm/mo.

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

48. Which of the following speeds is the greatest? (1 mi = 1609 m)

**A**. 40 mi/h

B. 2.0 × 105 mm/min

C. 40 km/h

D. 0.74 km/min

E. 400 m/min

*Blooms: 5. Evaluate*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

49. Iron has a density of 7.87 g/cm3. What mass of iron would be required to cover a football playing surface of 120 yds × 60. yds to a depth of 1.0 mm? (1 inch = 2.54 cm)

A. 76 kg

**B**. 47 Mg

C. 7.6 × 105 g

D. 4.7 × 108 g

E. 1.9 × 107 g

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

50. The recommended daily allowance (RDA) of calcium is 1.2 g. Calcium carbonate contains 12.0% calcium by mass. How many grams of calcium carbonate are needed to provide the RDA of calcium?

A. 0.10 g

B. 0.14 g

C. 1.2 g

**D**. 10. g

E. 14 g

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

51. One of the common intravenous fluids, called physiological saline, is a homogeneous mixture of NaCl in water. In this mixture, 0.89% of the mass is contributed by the NaCl. What mass of NaCl is found in 450. mL of physiological saline? ((Density of physiological saline = 1.005 g/cm3)

A. 2.0 g

**B**. 4.0 g

C. 5.1 g

D. 508 g

E. 400 g

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

52. An empty flask's mass is 17.4916 g, and its mass is 43.9616 g when filled with water at 20.0°C (density = 0.9982 g/mL). The density of “heavy water” at 20.0°C is 1.1053 g/mL. What is the mass of the flask when filled with heavy water at 20.0°C?

A. 29.2573 g

**B**. 46.8016 g

C. 46.7489 g

D. 29.3100 g

E. 43.9140 g

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

53. A flask has a mass of 78.23 g when empty and 593.63 g when filled with water. When the same flask is filled with concentrated sulfuric acid, H2SO4, its mass is 1026.57 g. What is the density of concentrated sulfuric acid? (Assume water has a density of 1.00 g/cm3 at the temperature of the measurement.)

A. 1.992 g/cm3

**B**. 1.840 g/cm3

C. 1.729 g/cm3

D. 1.598 g/cm3

E. 0.543 g/cm3

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

54. Talc is a mineral with low conductivity for heat and electricity which is not attacked by acid. It is used in talcum powder and face powder. Suppose a sample of talc weighs 13.65 g with a density of 1.75 g/cm3 in mineral oil. If this same sample of talc in air weighs 35.97 g, assuming no volume change, what is the density of the talc sample in air?

**A**. 4.61 g/cm3

B. 2.82 g/cm3

C. 2.63 g/cm3

D. 2.44 g/cm3

E. 1.61 g/cm3

*Blooms: 4. Analyze*

*Difficulty: Hard*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

55. Which of the following is an example of an *observation*?

A. Gases expand as their temperature increases because the gas molecules are moving more rapidly.

**B**. Paraffin wax begins to melt at 57°C.

C. Three samples of wax are heated to 75°C.

D. The force acting on an object is equal to its mass times its acceleration.

E. Will all waxes melt at the same temperature?

*Blooms: 2. Understand*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Properties of Matter*

*Subtopic: Scientific Method*

*Topic: Study of Chemistry*

56. Which of the following is a *chemical* change?

A. Boiling water

B. Melting wax

**C**. Broiling a steak on a grill

D. Condensing water vapor into rainfall

E. Carving a piece of wood

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

57. Which of these is an example of a *physical* property?

A. Corrosiveness of sulfuric acid

B. Toxicity of cyanide

C. Flammability of gasoline

D. Neutralization of stomach acid with an antacid

**E**. Lead becomes a liquid when heated to 601°C.

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

58. Which one of these represents a *physical* change?

**A**. Water, when heated, forms steam.

B. Bleach turns hair yellow.

C. Sugar, when heated, becomes brown.

D. Milk turns sour.

E. Apples, when exposed to air, turn brown.

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

59. Which one of these represents a *chemical* change?

A. Boiling water to form steam

**B**. Turning hair yellow with bleach

C. Melting butter

D. Mixing powdered charcoal and oxygen at room temperature

E. Cutting a bar of sodium metal into pieces with a knife

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

60. Which of the following is an *extensive* property of oxygen?

A. Boiling point

B. Temperature

C. Average kinetic energy of molecules

D. Density

**E**. Mass

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

61. When the value of something does not depend on the amount of the matter then what is this called?

A. Empirical property

**B**. Intensive property

C. Inclusive property

D. Extensive property

E. Exclusive property

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

62. Which of the following is an *extensive* property?

A. Density

B. Temperature

**C**. Mass

D. Specific Heat

E. Pressure

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

63. The number 1.050 × 109 has how many significant figures?

A. 2

B. 3

**C**. 4

D. 9

E. 13

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

64. After carrying out the operation (13.7 + 0.027) ÷ 8.221, how many significant figures are appropriate to show in the result?

A. 1

B. 2

**C**. 3

D. 4

E. 5

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

65. How many significant figures are in 0.006570?

A. 3

**B**. 4

C. 5

D. 6

E. 7

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

66. The result of (3.8621 × 1.5630) – 5.98 is properly written as

**A**. 0.06.

B. 0.056.

C. 0.0565.

D. 0.05646.

E. 0.056462.

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

67. Select the answer with the correct number of decimal places for the following sum: 13.914 cm + 243.1 cm + 12.00460 cm =

A. 269.01860 cm

B. 269.0186 cm

C. 269.019 cm

D. 269.02 cm

**E**. 269.0 cm

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

68. How many significant figures does the sum 8.5201 + 1.93 contain?

A. 1

B. 2

C. 3

**D**. 4

E. 5

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

69. Select the answer that expresses the result of this calculation with the correct number of significant figures.

13.602 x 1.90 x 3.06

--------------------------------

4.2 x 1.4097

A. 13.3568

B. 13.357

C. 13.36

D. 13.4

**E**. 13

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

70. Which is correct if 0.01234 is rewritten in scientific notation?

A. 1.234 × 10–3

B. 12.3 × 104

C. 1 × 10–1

D. 1.234 × 102

**E**. 1.234 × 10–2

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

71. You prepare 1000. mL of tea and transfer it to a 1.00 quart pitcher for storage. Which of the following statements is true? (1 L = 1.0567 qt)

A. The pitcher will be filled to 100% of its capacity with no tea spilled.

B. The pitcher will be filled to about 95% of its capacity.

C. The pitcher will be filled to about 50% of its capacity.

**D**. The pitcher will be completely filled and a small amount of tea will overflow.

E. The pitcher will be completely filled and most of the tea will overflow.

*Blooms: 5. Evaluate*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Topic: Study of Chemistry*

72. Which is correct if 52.068881 is rewritten in scientific notation and rounded to three significant figures?

A. 5.21 × 10–1

B. 5.20 × 10–1

**C**. 5.21 × 101

D. 5.20 × 101

E. 5.21 × 102

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

73. Which is correct if 15,390,000 is rounded to two significant figures?

A. 15

B. 1.5 × 10–7

C. 1.5 × 108

D. 15,400,000

**E**. 15,000,000

*Blooms: 3. Apply*

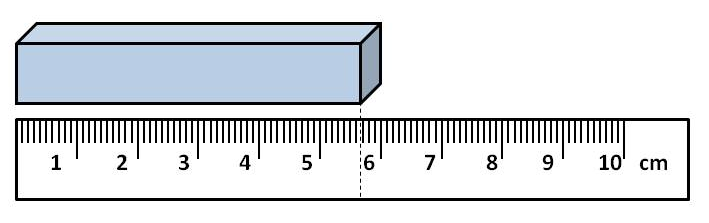
*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

74. What is the length of the box, using the proper number of significant figures and units?



A. 5.5 cm

B. 5 cm

C. 6 cm

**D**. 5.67 cm

E. 5.6 cm

*Blooms: 4. Analyze*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

75. The dark meat of a 20-pound turkey requires an internal temperature of 180°F to be fully cooked. What minimum temperature reading should be displayed on a food thermometer that only measures in degrees Celsius?

**A**. 82°C

B. 354°C

C. 261°C

D. –192°C

E. –310°C

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

76. 50.0 grams of acetic acid are required for an experiment. What volume, in milliliters, of a 1.105 g/cm3 acetic acid solution must be measured for the experiment?

A. 0.0452 mL

**B**. 45.2 mL

C. 55.3 mL

D. 0.452 mL

E. 4.52 mL

*Blooms: 4. Analyze*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

77. A geology student found an irregularly shaped rock, with a mass of 28.63 grams, and placed it into a graduated cylinder containing 13.31 mL of water. If the water level increased to 19.73 mL after the rock was placed in the cylinder, what is the density of the rock, in g/mL?

**A**. 4.46 g/mL

B. 4460 g/mL

C. 2.20 g/mL

D. 0.455 g/mL

E. 44.6 g/mL

*Blooms: 4. Analyze*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

78. An average Mastiff puppy weighs 2.72 kilograms. How many pounds is an average Mastiff puppy?

(1lb = 453.6 g)

A. 1.24 lb

B. 10.0 lb

C. 59.8 lb

**D**. 6.00 lb

E. 72.0 lb

*Blooms: 4. Analyze*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

79. If the density of corn syrup is 1.380 g/mL and a sample of corn syrup has a mass of 32 grams, what is the volume of corn syrup, in liters?

A. 43 L

B. 23 L

C. 0.043 L

**D**. 0.023 L

E. 2.3 L

*Blooms: 4. Analyze*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

80. A smart phone has dimensions of 4.9 inches (height), 2.3 inches (width) and 8.0 millimeters (depth). What is the volume of the smart phone in cubic centimeters? (1 in = 2.54 cm)

**A**. 58 cm3

B. 1.7 x 105 cm3

C. 90 cm3

D. 3.4 cm3

E. 34 cm3

*Blooms: 4. Analyze*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

81. There are 58 counties in California and about 660,000 people in each county. How many million people live in California?

A. 383 million people

**B**. 38 million people

C. 40 million people

D. 58 million people

E. 11 million people

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Topic: Study of Chemistry*

82. Which of the following represents the greatest mass?

A. 2.0 x 103 mg

B. 10.0 dg

C. 0.0010 kg

D. 1.0 x 106 μg

**E**. 3.0 x 1012 pg

*Blooms: 5. Evaluate*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

83. Walking fast can consume 5.0 kcal per minute. How many hours of exercise are required to consume 450 kcal, the energy in a large candy bar?

A. 7.5 hr

B. 1.25 hr

C. 1.75 hr

**D**. 1.5 hr

E. 1 hr

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Topic: Study of Chemistry*

84. A laboratory technician analyzed a sample three times for percent iron and got the following results: 22.43% Fe, 24.98% Fe, and 21.02% Fe. The actual percent iron in the sample was 22.81%. The analyst's

**A**. precision was poor but the average result was accurate.

B. accuracy was poor but the precision was good.

C. work was only qualitative.

D. work was precise.

*Blooms: 2. Understand*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

85. The density of magnesium is 1.7 g/cm3, and the density of iron is 7.9 g/cm3. Consider a block of iron with a mass of 819 g. What is the mass of a block of magnesium that has the same volume as the block of iron?

**A**. 1.8 x 102 g

B. 61 g

C. 2.8 x 103 g

D. 3.8 x 103 g

E. None of the.

*Blooms: 5. Evaluate*

*Difficulty: Difficult*

*Gradable: automatic*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

86. The ripening of fruit, once picked, is an example of physical change.

**FALSE**

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

87. When applying the scientific method, it is important to avoid any form of hypothesis.

**FALSE**

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Scientific Method*

*Topic: Study of Chemistry*

88. When applying the scientific method, a model or theory should be based on experimental data.

**TRUE**

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Scientific Method*

*Topic: Study of Chemistry*

89. Matter is anything that has mass and occupies space.

**TRUE**

*Blooms: 4. Analyze*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

90. The density of a substance is an intensive property.

**TRUE**

*Blooms: 4. Analyze*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

91. The volume of a substance is an intensive property.

**FALSE**

*Blooms: 4. Analyze*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

92. Boiling point and melting point are extensive properties.

**FALSE**

*Blooms: 4. Analyze*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

93. The rusting of a piece of iron under environmental conditions is a physical change.

**FALSE**

*Blooms: 4. Analyze*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

94. The number 6.0448, rounded to 3 decimal places, becomes 6.045.

**TRUE**

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

95. A scoop of vanilla ice cream is a pure substance.

**FALSE**

*Blooms: 4. Analyze*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

96. A particular temperature in degrees Celsius is larger than the temperature in kelvins.

**FALSE**

*Blooms: 4. Analyze*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

97. Zero kelvin 0 K < 0°F < 0°C.

**TRUE**

*Blooms: 4. Analyze*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

98. 77 K is colder than 4 K.

**FALSE**

*Blooms: 4. Analyze*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

99. The juice from an orange is a mixture.

**TRUE**

*Blooms: 4. Analyze*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

100. \_\_\_\_\_\_\_\_\_\_\_\_ tells how close a measurement is to the true value.

**Accuracy**

*Blooms: 3. Apply*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

101. Melting ice is a \_\_\_\_\_\_\_\_\_\_ change.

**physical**

*Blooms: 4. Analyze*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

102. Burning wood in a fireplace is a \_\_\_\_\_\_\_\_\_\_ change.

**chemical**

*Blooms: 4. Analyze*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

103. A(n) \_\_\_\_\_\_\_\_\_\_\_\_ is a substance composed of atoms of two or more elements chemically united in fixed proportions.

**compound**

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

104. A(n) \_\_\_\_\_\_\_\_\_\_ is a substance that cannot be separated into simpler substances by chemical means.

**element**

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

105. A(n) \_\_\_\_\_\_\_\_\_\_ is a combination of two or more substances in which the substances retain their distinct identities.

**mixture**

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

106. A(n) \_\_\_\_\_\_\_\_\_\_ is something that has a definite composition.

**pure substance**

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

107. \_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_ are the three states of matter.

**liquid, solid, and gas**

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

108. A(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ has a uniform composition throughout.

**homogeneous mixture**

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

109. A(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ does not have a uniform composition throughout.

**heterogeneous mixture**

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: automatic*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

110. \_\_\_\_\_\_\_\_\_\_\_ tells how closely multiple measurements of the same thing are to one another.

**Precision**

*Blooms: 2. Understand*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

111. \_\_\_\_\_\_\_\_\_\_\_ is the term used to indicate a measuring device is accurate. (Hint: Often used when measuring the volume of a liquid.)

**Graduated or Calibrated**

*Blooms: 2. Understand*

*Difficulty: Medium*

*Gradable: automatic*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

112. What is something that has a definite composition?

pure substance

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

113. What is a combination of two or more substances in which the substances retain their distinct identities?

mixture

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

114. What is a substance that cannot be separated into simpler substances by chemical means?

element

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

115. What is a substance composed of atoms of two or more elements chemically united in fixed proportions?

compound

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

116. Give examples of three physical properties.

(Answers will vary.) Melting point, boiling point, density, color

*Blooms: 2. Understand*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

117. Give an example of an *extensive* property.

(Answers will vary.) Mass, length, and volume

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

118. Give an example of an *intensive* property.

(Answers will vary.) Temperature, density, melting point, boiling point

*Blooms: 3. Apply*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

119. Identify this process as a *physical* or *chemical* change: Bacteria convert milk to yogurt.

Chemical

*Blooms: 4. Analyze*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

120. What is the equation for the conversion of Celsius temperatures to Kelvin temperatures?

°C + 273.15 = K

*Blooms: 2. Understand*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Dimensional Analysis*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

121. If two numbers are added together, one which has 2 digits after the decimal point and the other which has 1 digit after the decimal point, explain how to round the answer.

The answer will have 1 digit after the decimal point because the least number of digits after the decimal point in the two numbers used in the calculation was 1. Use the least number of digits after the decimal point.

*Blooms: 2. Understand*

*Difficulty: Medium*

*Gradable: manual*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

122. If two numbers are multiplied together, one which has 3 significant figures and the other which has 4 significant figures, explain how to round the answer.

The answer will have 3 significant figures because the least number of significant figures in the two numbers used in the calculation was 3.

*Blooms: 2. Understand*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

123. What is the equation used to calculate the mass from the density?

mass = density × volume or *m* = *dV*

*Blooms: 2. Understand*

*Difficulty: Medium*

*Gradable: manual*

*Subtopic: Dimensional Analysis*

*Topic: Study of Chemistry*

124. Briefly explain the relationship between hypothesis and experiment in the scientific method.

A hypothesis should be capable of leading to a prediction which is testable by an experiment. If the experimental result differs from the prediction, the hypothesis should be modified.

*Blooms: 2. Understand*

*Difficulty: Medium*

*Gradable: manual*

*Subtopic: Scientific Method*

*Topic: Study of Chemistry*

125. Explain the difference between quantitative measurements and qualitative measurements.

A quantitative measurement is expressed with a number, whereas a qualitative measurement does not require an explicit measurement.

*Blooms: 2. Understand*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Scientific Method*

*Topic: Study of Chemistry*

126. Explain the difference between a physical property and a chemical property.

A physical property can be observed and measured without changing the identity of the substance, whereas a chemical property requires a chemical change from one substance to another substance.

*Blooms: 2. Understand*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

127. Explain the difference between an extensive property and an intensive property.

An extensive property depends on the amount of matter, whereas an intensive property does not depend on the amount of matter.

*Blooms: 2. Understand*

*Difficulty: Medium*

*Gradable: manual*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

128. Explain the rule for significant figures for addition and subtraction.

The answer cannot have more digits to the right of the decimal point than any of the original numbers used in the calculation.

*Blooms: 2. Understand*

*Difficulty: Medium*

*Gradable: manual*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

129. Explain the rule for significant figures for multiplication and division.

The number of significant figures in the final product or quotient is determined by the original number that has the smallest number of significant figures.

*Blooms: 2. Understand*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Scientific Notation and Significant Figures*

*Topic: Study of Chemistry*

130. Explain the difference between a heterogeneous mixture and a homogeneous mixture.

A homogeneous mixture has a uniform composition throughout, whereas a heterogeneous mixture does not have a uniform composition throughout.

*Blooms: 2. Understand*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Classification and States of Matter*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

131. Discuss the benefits of using the metric system for measurements.

All measurements in the metric system are a multiple of 10, so it makes it easy to move the decimal point. Additionally, the use of the seven base units with prefixes to denote decimal fractions and decimal multiples of the SI units enables scientists to tailor the magnitude of a unit to a particular application.

*Blooms: 2. Understand*

*Difficulty: Easy*

*Gradable: manual*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

132. Explain the difference between a hypothesis and a theory.

A hypothesis is a tentative explanation for observations made, whereas a theory is a unifying principle that explains a body of experimental observations and the laws that are based on them.

*Blooms: 2. Understand*

*Difficulty: Medium*

*Gradable: manual*

*Subtopic: Scientific Method*

*Topic: Study of Chemistry*

133. Explain the difference between accuracy and precision.

Accuracy tells us how close a measurement is to the *true* value, whereas precision tells us how closely multiple measurements of the same thing are to one another.

*Blooms: 2. Understand*

*Difficulty: Medium*

*Gradable: manual*

*Subtopic: Measurement (SI Units)*

*Topic: Study of Chemistry*

*Category # of Questions*

Blooms: 1. Remember 3

Blooms: 2. Understand 24Blooms: 3. Apply 65

Blooms: 4. Analyze 37

Blooms: 5. Evaluate 4

Difficulty: Difficult 1

Difficulty: Easy 54

Difficulty: Hard 26

Difficulty: Medium 52

Gradable: automatic 111

Gradable: manual 22

Subtopic: Classification and States of Matter 27

Subtopic: Dimensional Analysis 53

Subtopic: Measurement (SI Units) 63

Subtopic: Properties of Matter 39

Subtopic: Scientific Method 10

Subtopic: Scientific Notation and Significant Figures 65

Topic: Study of Chemistry 133