

## Chapter 01 - Chemistry - Methods and Measurement (Test Bank) KEY

1. Which is the summary of a large amount of scientific information?

- A. hypothesis
- B. theory
- C.** scientific law
- D. technology
- E. scientific method

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.01*  
*Subtopic: Scientific Method*  
*Topic: Study of Chemistry*

2. What method used by scientists is the systematic approach to the discovery of new information?

- A. analytical method
- B. hypothetical method
- C. chemical method
- D. technological method
- E.** scientific method

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.01*  
*Subtopic: Scientific Method*  
*Topic: Study of Chemistry*

3. What is a hypothesis?

- A. a fact that results from extensive experimentation and testing
- B. the summary of a large quantity of information
- C. the result of a single measurement or observation
- D.** an attempt to explain an observation, or a series of observations
- E. an observation of a chemical reaction

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.01*  
*Subtopic: Scientific Method*  
*Topic: Study of Chemistry*

4. Which statement concerning the scientific method is FALSE?

- A. The scientific method is an organized approach to solving scientific problems.
- B. The process of explaining observed behavior begins with a hypothesis.
- C. Experimentation is conducted to either support or disprove a hypothesis.
- D.** A hypothesis becomes a theory when a single experiment supports it.
- E. A theory explains scientific observations and data and can help predict new observations and data.

*Accessibility: Keyboard Navigation*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.01*  
*Subtopic: Scientific Method*  
*Topic: Study of Chemistry*

5. What type of change alters the appearance, but not the composition or identity of the substance undergoing the change?

- A. theoretical
- B.** physical
- C. analytical
- D. chemical
- E. nuclear

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Changes in Matter*  
*Topic: Study of Chemistry*

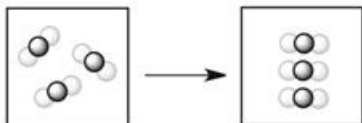
6. Which statement concerning changes in matter is FALSE?

- A. A physical change alters the appearance of a substance, but not its identity.
- B. A chemical change alters the identity of a substance.
- C. A chemical change always results in the production of a new substance.
- D. A chemical change is also called a chemical reaction.
- E.** Melting and freezing are chemical changes that change both the appearance of the substance as well as the identity of the substance.

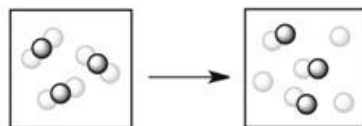
*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Changes in Matter*  
*Topic: Study of Chemistry*

7. Which process depicts a physical change?

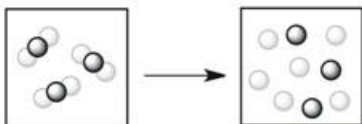
A.



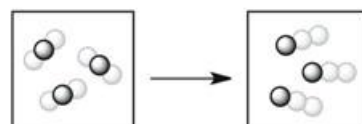
B.



C.



D.



E. None of the processes above depicts a physical change.

*Bloom's Level: 2. Understand*

*Difficulty: Medium*

*Gradable: automatic*

*Section number: 01.02*

*Subtopic: Changes in Matter*

*Subtopic: Classification and States of Matter*

*Topic: Study of Chemistry*

8. What statement best describes an intensive property?

A. A property of a substance that does not depend on the quantity of the substance present.

B. A property of a substance that depends on the quantity of the substance present.

C. A property of a substance that depends on the mass of the substance, but not the volume of the substance.

D. A property of a substance that depends on the physical state (solid, liquid, or gas) of the substance.

E. A property of a substance that changes based on the mass of the material that is present.

*Accessibility: Keyboard Navigation*

*Bloom's Level: 1. Remember*

*Difficulty: Easy*

*Gradable: automatic*

*Section number: 01.02*

*Subtopic: Properties of Matter*

*Topic: Study of Chemistry*

9. Which statement concerning the classification of matter is FALSE?

- A. All matter is either pure substance or a compound.
- B. An element is a pure substance that generally cannot be changed into a simpler form of matter.
- C. A compound is a pure substance made up of two or more different elements combined in a definite, reproducible way.
- D. A pure substance is composed of only one type of component.
- E. A mixture is the physical combination of two or more pure substances in which each substance retains its own identity.

*Accessibility: Keyboard Navigation*

*Bloom's Level: 1. Remember*

*Difficulty: Easy*

*Gradable: automatic*

*Section number: 01.02*

*Subtopic: Classification and States of Matter*

*Topic: Study of Chemistry*

10. When hydrogen (H<sub>2</sub>) and chlorine (Cl<sub>2</sub>) gases are mixed, hydrogen chloride (HCl) is produced. Hydrogen chloride is classified as what type of matter?

- A. an element
- B. a compound
- C. a homogeneous mixture
- D. a heterogeneous mixture
- E. a solution

*Accessibility: Keyboard Navigation*

*Bloom's Level: 2. Understand*

*Difficulty: Easy*

*Gradable: automatic*

*Section number: 01.02*

*Subtopic: Changes in Matter*

*Subtopic: Classification and States of Matter*

*Topic: Study of Chemistry*

11. Which of the following is NOT a type of mixture?

- A. homogeneous
- B. heterogeneous
- C. solution
- D. compound
- E. All of the choices are correct.

*Accessibility: Keyboard Navigation*

*Bloom's Level: 2. Understand*

*Difficulty: Easy*

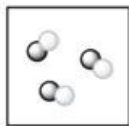
*Gradable: automatic*

*Section number: 01.02*

*Subtopic: Classification and States of Matter*

*Topic: Study of Chemistry*

12. Which of the following terms best describes the sample of matter in the diagram? Note: different colored circles represent atoms of different elements.



- A. homogeneous mixture
- B.** pure substance
- C. heterogeneous mixture
- D. solution
- E. None of the choices are correct.

*Bloom's Level: 2. Understand*

*Difficulty: Easy*

*Gradable: automatic*

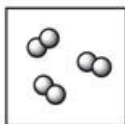
*Section number: 01.02*

*Subtopic: Classification and States of Matter*

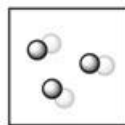
*Topic: Study of Chemistry*

13. Which diagram represents a mixture? Note: different colored circles represent atoms of different elements.

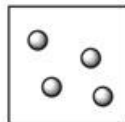
A.



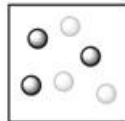
B.



C.



**D.**



*Bloom's Level: 2. Understand*

*Difficulty: Medium*

*Gradable: automatic*

*Section number: 01.02*

*Subtopic: Classification and States of Matter*

*Topic: Study of Chemistry*

14. Which of the following terms is most appropriate when classifying an apple?

- A. pure substance
- B. compound
- C.** heterogeneous mixture
- D. homogeneous mixture
- E. solution

Accessibility: Keyboard Navigation  
Bloom's Level: 2. Understand  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.02  
Subtopic: Classification and States of Matter  
Topic: Study of Chemistry

15. 1 milligram is equivalent to how many grams?

- A. 1000
- B. 100
- C. 0.1
- D. 0.01
- E.** 0.001

Accessibility: Keyboard Navigation  
Bloom's Level: 1. Remember  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.03  
Subtopic: Measurements (Metric and SI)  
Topic: Study of Chemistry

16. A typical aspirin tablet contains 5.00 grains of pure aspirin analgesic compound. The rest of the tablet is starch. How many aspirin tablets can be made from 50.0 g of pure aspirin? [Use: 1.00 g = 15.4 grains]

- A. 17 tablets
- B.** 154 tablets
- C. 250 tablets
- D. 649 tablets
- E. 770 tablets

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section number: 01.05  
Subtopic: Dimensional Analysis  
Topic: Study of Chemistry

17. A patient weighs 146 pounds and is to receive a drug at a dosage of 45.0 mg per kg of body weight. What mass of the drug should the patient receive? [1 pound = 454 g]

- A. 1.47 g
- B.** 2.98 g
- C. 3.24 mg
- D. 1470 mg
- E. 6570 mg

Accessibility: Keyboard Navigation  
Bloom's Level: 4. Analyze  
Difficulty: Hard  
Gradable: automatic  
Section number: 01.05  
Subtopic: Dimensional Analysis  
Topic: Study of Chemistry

18. A patient weighs 146 pounds and is to receive a drug at a dosage of 45.0 mg per kg of body weight. The drug is supplied as a solution that contains 25.0 mg of drug per mL of solution. What volume of the drug should the patient receive? [1 pound = 454 g]

- A. 0.579 mL
- B.** 119 mL
- C. 362 mL
- D. 579 mL
- E. 119 L

Accessibility: Keyboard Navigation  
Bloom's Level: 4. Analyze  
Difficulty: Hard  
Gradable: automatic  
Section number: 01.05  
Subtopic: Dimensional Analysis  
Topic: Study of Chemistry

19. If one atom of carbon-14 weighs 14.0 atomic mass units and one atomic mass unit is equal to  $1.66 \times 10^{-24}$  grams, what is the mass of 25 atoms of carbon-14 in grams?

- A.**  $5.81 \times 10^{-22}$
- B.  $5.81 \times 10^{-21}$
- C. 581
- D.  $2.11 \times 10^{26}$
- E.  $2.11 \times 10^{-21}$

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.05*  
*Subtopic: Dimensional Analysis*  
*Topic: Study of Chemistry*

20. A student records the measurement 4.8 m. What type of measurement was made?

- A. mass
- B. volume
- C.** length
- D. concentration
- E. time

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.03*  
*Subtopic: Measurements (Metric and SI Units)*  
*Topic: Study of Chemistry*

21. A patient needs 0.300 g of a solid drug preparation per day. How many 10.0 mg tablets must be given to the patient per day?

- A. 3 tablets
- B.** 30 tablets
- C. 33 tablets
- D. 300 tablets
- E. 330 tablets

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.05*  
*Subtopic: Dimensional Analysis*  
*Topic: Study of Chemistry*

22. What is the number 0.0062985632 written in scientific notation to three significant figures?

A. 0.006

B.  
 $6.00 \times 10^{-3}$

C.  
 $6.29 \times 10^{-3}$

D.  
 $6.299 \times 10^{-3}$

E.  
 $6.30 \times 10^{-3}$

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.04*  
*Subtopic: Scientific Notation and Significant Figures*  
*Topic: Study of Chemistry*

23. What is the number 3,000 written in scientific notation using the proper number of significant figures?

A.  $0.003 \times 10^{-3}$

B.  $0.3 \times 10^4$

C.  $3 \times 10^3$

D.  $3 \times 10^{-3}$

E.  $3.000 \times 10^3$

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.04*  
*Subtopic: Scientific Notation and Significant Figures*  
*Topic: Study of Chemistry*



24. What is the number 0.9050 written in scientific notation using the proper number of significant figures?

- A.  $0.9 \times 10^4$
- B.  $9 \times 10^{-1}$
- C.  $9.05 \times 10^{-1}$
- D.  $9.050 \times 10^4$
- E.  $9.050 \times 10^{-1}$

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.04*  
*Subtopic: Scientific Notation and Significant Figures*  
*Topic: Study of Chemistry*

25. How should the result of the calculation below be reported using scientific notation and the proper number of significant figures?  $(4.3169 \times 10^4) \div (2.02 \times 10^3) = ?$

- A.  $2.14 \times 10^1$
- B.  $2.1371 \times 10^1$
- C.  $2.14 \times 10^2$
- D.  $2.14 \times 10^7$
- E.  $2.1371 \times 10^9$

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.04*  
*Subtopic: Scientific Notation and Significant Figures*  
*Topic: Study of Chemistry*

26. Which of the following measured volumes has the most uncertainty?

- A. 10 mL
- B. 10.0 mL
- C. 10.00 mL
- D. 10.000 mL
- E. All values have the same degree of uncertainty.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.04*  
*Subtopic: Scientific Notation and Significant Figures*  
*Topic: Study of Chemistry*

27. Where is the uncertainty in the number 101.2°C?

- A. in the ones place
- B. in the tens place
- C.** in the tenths place
- D. in the hundredths place
- E. There is no uncertainty in this number.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.04*  
*Subtopic: Scientific Notation and Significant Figures*  
*Topic: Study of Chemistry*

28. A flask contains 145.675 mL of a saline solution. If 24.2 mL of the saline solution are withdrawn from the flask, how should the volume of the saline solution that remains in the flask be reported?

- A. 121.475 mL
- B. 121.4 mL
- C.** 121.5 mL
- D. 122 mL
- E. 121 mL

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.04*  
*Subtopic: Scientific Notation and Significant Figures*  
*Topic: Study of Chemistry*

29. Which physical property of an astronaut will change depending on whether he or she is on Earth or in orbit?

- A. mass
- B.** weight
- C. volume
- D. all would change
- E. none would change

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.03*  
*Subtopic: Measurements (Metric and SI Units)*  
*Topic: Study of Chemistry*

30. What is the basic unit of volume in the metric system?

- A. milliliter
- B. cubic centimeter
- C.** liter
- D. gram
- E. millimeter

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.03*  
*Subtopic: Measurements (Metric and SI Units)*  
*Topic: Study of Chemistry*

31. Which statement concerning energy is FALSE?

- A.** Energy is the amount of heat content in an object.
- B. Potential energy is stored energy due to composition or position.
- C. Kinetic energy is the energy associated with movement.
- D. Heat, light, and electricity are different forms of energy.
- E. Conversion of energy from one form to another is possible.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.06*  
*Subtopic: Measurements (Metric and SI Units)*  
*Topic: Study of Chemistry*

32. Which temperature would feel the hottest?

- A.** 100°C
- B. 100°F
- C. 100 K
- D. All temperatures would feel equally hot.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 4. Analyze*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.06*  
*Subtopic: Measurements (Metric and SI Units)*  
*Subtopic: Temperature*  
*Topic: Study of Chemistry*

33. A chemical reaction releases 44.3 kJ of heat. What is the equivalent amount of heat expressed in calories? [1 cal = 4.18 J]

- A. 10.6 cal
- B. 106 cal
- C. 185 cal
- D.** 10,600 cal
- E. 18,500 cal

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.06*  
*Subtopic: Dimensional Analysis*  
*Subtopic: Measurements (Metric and SI Units)*  
*Topic: Study of Chemistry*

34. A bolder at the top of a hill breaks free and rolls down the hill. Which statement best represents the change in energy that occurs in this process?

- A. The potential energy of the bolder increases.
- B.** The potential energy of the bolder is converted to kinetic energy.
- C. The kinetic energy of the bolder is converted to potential energy.
- D. The chemical energy of the bolder is converted to kinetic energy.
- E. No change in energy occurs; energy cannot be converted from one form to another.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.06*  
*Subtopic: Measurements (Metric and SI Units)*  
*Topic: Study of Chemistry*

35. What kind of energy is stored as the result of position or composition?

- A. kinetic energy
- B. activation energy
- C.** potential energy
- D. theoretical energy
- E. static energy

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.06*  
*Subtopic: Measurements (Metric and SI Units)*  
*Topic: Study of Chemistry*

36. The concentration of a patient's blood sugar was determined to be 4850 micrograms per milliliter. Which correctly represents this measurement?

- A. 4850  $\mu\text{g}$  /ML
- B. 4850 mg/mL
- C. 4850 Mg/mL
- D.** 4850  $\mu\text{g}$ /mL
- E. 4850 mg/ML

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.06*  
*Subtopic: Measurements (Metric and SI Units)*  
*Topic: Study of Chemistry*

37. What is density?

- A. the ratio of the number of particles of a substance to the volume of the solution in which it is dissolved
- B.** the ratio of the mass of a substance to the volume of the substance
- C. the ratio of the volume of a substance to the mass of the substance
- D. the ratio of the moles of a substance to the volume of the solution in which it is dissolved
- E. the measure of the amount of heat an object contains

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.06*  
*Subtopic: Density and Specific Gravity*  
*Topic: Study of Chemistry*

38. If the density of blood is 1.060 g/mL, what is the mass of 6.56 pints of blood? [1 L = 2.113 pints]

- A.** 3.29 kg
- B. 329 g
- C. 2.93 g
- D. 2930 g
- E. 2.93 kg

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.06*  
*Subtopic: Density and Specific Gravity*  
*Subtopic: Dimensional Analysis*  
*Topic: Study of Chemistry*

39. What is the density of a solid object that has the following measurements?

mass = 189.6 g, length = 9.80 cm, width = 46.6 mm, height = 0.111 m.

- A. 0.267 g/mL
- B.** 0.374 g/mL
- C. 2.67 g/mL
- D. 3.74 g/mL
- E. 50.7 g/mL

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.06*  
*Subtopic: Density and Specific Gravity*  
*Subtopic: Measurements (Metric and SI Units)*  
*Topic: Study of Chemistry*

40. Air has an average density of 0.001226 g/mL. What volume of air would have a mass of 1.0 lb? [454 g = 1 pound]

- A. 37 mL
- B. 370 mL
- C. 557 mL
- D.  $2.7 \times 10^{-6}$  mL
- E.**  $3.7 \times 10^2$  L

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.06*  
*Subtopic: Density and Specific Gravity*  
*Subtopic: Dimensional Analysis*  
*Topic: Study of Chemistry*

41. Which branch of science primarily involves the study of matter and the changes it undergoes?

- A. biology
- B. technology
- C. physics
- D.** chemistry
- E. All of the choices are correct.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.01*  
*Subtopic: Classification and States of Matter*  
*Topic: Study of Chemistry*

42. Which of the following terms is defined as anything that has mass and occupies space?

- A. chemistry
- B. element
- C.** matter
- D. compound
- E. volume

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.01*  
*Subtopic: Classification and States of Matter*  
*Topic: Study of Chemistry*

43. In which state does matter have an indefinite shape and definite volume?

- A. solid
- B.** liquid
- C. gas
- D. All of the choices are correct.
- E. None of the choices are correct.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Classification and States of Matter*  
*Topic: Study of Chemistry*

44. In which state of matter are forces between particles least dominant?

- A. solid
- B. liquid
- C.** gas
- D. All of the choices are correct.
- E. None of the choices are correct.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Classification and States of Matter*  
*Topic: Study of Chemistry*

45. Conversion of ice to liquid water or liquid water to steam is an example of what kind of change?

- A.** physical
- B. chemical
- C. molecular
- D. analytical
- E. Both physical and chemical are correct.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Changes in Matter*  
*Topic: Study of Chemistry*

46. What type of change is represented by the decay of a fallen tree?

- A. physical
- B.** chemical
- C. molecular
- D. analytical
- E. All of the choices are correct.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Changes in Matter*  
*Topic: Study of Chemistry*

47. The green color of the Statue of Liberty is due to a(an) \_\_\_\_\_ change to the copper metal.

- A. elemental
- B. physical
- C. state
- D.** chemical
- E. None of the choices are correct.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Changes in Matter*  
*Topic: Study of Chemistry*

48. What type of property of matter is independent of the quantity of the substance?

- A. chemical
- B. physical
- C. extensive
- D.** intensive
- E. nuclear

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Properties of Matter*  
*Topic: Study of Chemistry*

49. What are the two classes of pure substances?

- A. elements and atoms
- B. compounds and molecules
- C.** elements and compounds
- D. chemical and physical
- E. homogeneous and heterogeneous

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Classification and States of Matter*  
*Topic: Study of Chemistry*

50. What does the prefix "centi-" mean?

- A.  $10^{-1}$
- B.**  $10^{-2}$
- C.  $10^{-3}$
- D.  $10^2$
- E.  $10^3$

Accessibility: Keyboard Navigation  
Bloom's Level: 1. Remember  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.03  
Subtopic: Measurements (Metric and SI Units)  
Topic: Study of Chemistry

51. How many centimeters correspond to 15.68 kilometers?

- A.**  $1.568 \times 10^6$  cm
- B.  $1.568 \times 10^5$  cm
- C.  $1.568 \times 10^{-4}$  cm
- D. 1568 cm
- E. 1.569 cm

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section number: 01.05  
Subtopic: Dimensional Analysis  
Subtopic: Measurements (Metric and SI Units)  
Topic: Study of Chemistry

52. How many pounds are represented by 764.6 mg? [1 pound = 454 g]

- A. 347.1 lb
- B.  $3.471 \times 10^8$  lb
- C.**  $1.684 \times 10^{-3}$  lb
- D. 1.684 lb
- E. 0.7646 lb

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section number: 01.05  
Subtopic: Dimensional Analysis  
Topic: Study of Chemistry

53. If a person smokes 10.0 packs of cigarettes a week and each cigarette contains 5.00 mg of tar, how many years will she have to smoke to inhale 0.250 pounds of tar? [20 cigarettes = 1 pack, 1 pound = 454 g and 1 year = 52 weeks]

- A.** 2.18 y
- B.  $2.18 \times 10^{-2}$  y
- C. 1.06 y
- D. 28.6 y
- E. 0.556 y

Accessibility: Keyboard Navigation  
Bloom's Level: 4. Analyze  
Difficulty: Hard  
Gradable: automatic  
Section number: 01.05  
Subtopic: Dimensional Analysis  
Topic: Study of Chemistry



54. The cost of a drug is 125 francs per gram. What is the cost in dollars per ounce? [ $\$1 = 6.25$  francs and  $1$  ounce =  $28.4$  g]

- A.  $\$0.70/\text{oz}$
- B.**  $\$568/\text{oz}$
- C.  $\$27.5/\text{oz}$
- D.  $\$2.22 \times 10^4/\text{oz}$
- E.  $\$4.65/\text{oz}$

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section number: 01.05  
Subtopic: Dimensional Analysis  
Topic: Study of Chemistry

55. How many significant figures does the number  $5.06305 \times 10^4$  contain?

- A. 4
- B. 5
- C.** 6
- D. 7
- E. 9

Accessibility: Keyboard Navigation  
Bloom's Level: 2. Understand  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.04  
Subtopic: Scientific Notation and Significant Figures  
Topic: Study of Chemistry

56. Provide the answer to the following problem using scientific notation and the proper number of significant digits:  $(6.00 \times 10^{-2})(3.00 \times 10^{-4}) = ?$

- A.  $1.8 \times 10^{-5}$
- B.**  $1.80 \times 10^{-5}$
- C.  $1.80 \times 10^{-4}$
- D.  $18.00 \times 10^{-4}$
- E.  $2 \times 10^{-5}$

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section number: 01.04  
Subtopic: Scientific Notation and Significant Figures  
Topic: Study of Chemistry

57. A student measures the mass of three separate samples of a solid: 104.45 g, 0.838 g, and 46 g. If the student mixes all three samples together, how should the total mass be properly reported?

- A. 151.288
- B. 151.28
- C. 151.29
- D.** 151
- E.  $1.5 \times 10^2$

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section number: 01.04  
Subtopic: Scientific Notation and Significant Figures  
Topic: Study of Chemistry

58. Which measurement represents the largest volume?

- A.** 4.6 L
- B.  $4.6 \times 10^{-3}$  L
- C. 46 cL
- D. 460 mL
- E. All represent the same volume.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 4. Analyze*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.03*  
*Subtopic: Dimensional Analysis*  
*Subtopic: Measurements (Metric and SI Units)*  
*Topic: Study of Chemistry*

59. What term is used to describe the summary of a large quantity of information?

- A. hypothesis
- B. theory
- C.** law
- D. model
- E. result

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.01*  
*Subtopic: Scientific Method*  
*Topic: Study of Chemistry*

60. Which state of matter has neither a definite shape nor a definite volume?

- A. liquid
- B. solid
- C. gas
- D. vapor
- E.** Both gas and vapor are correct.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 1. Remember*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Classification and States of Matter*  
*Topic: Study of Chemistry*

61. Which of the following is NOT a physical property of matter?

- A. odor
- B. compressibility
- C.** flash point
- D. melting point
- E. color

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Properties of Matter*  
*Topic: Study of Chemistry*

62. The distance between two hydrogen atoms in a hydrogen molecule (H<sub>2</sub>) is  $7.461 \times 10^{-11}$ . What is the equivalent distance expressed in inches? [2.54 cm = 1 in]

- A.  $2 \times 10^{-9}$  in
- B.  $1.895 \times 10^{-12}$  in
- C.  $294 \times 10^{-11}$  in
- D.**  $2.937 \times 10^{-9}$  in
- E.  $2.94 \times 10^{-8}$  in

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.05*  
*Subtopic: Dimensional Analysis*  
*Topic: Study of Chemistry*

63. What kind of change always results in the formation of new materials?

- A. molecular
- B. exothermic
- C. endothermic
- D. physical
- E.** chemical

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Changes in Matter*  
*Topic: Study of Chemistry*

64. Which of the following is a chemical property?

- A.** flammability
- B. color
- C. hardness
- D. temperature
- E. melting point

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Properties of Matter*  
*Topic: Study of Chemistry*

65. Which one of the following is an example of an extensive property?

- A. density
- B. specific gravity
- C.** mass
- D. hardness
- E. boiling temperature

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Properties of Matter*  
*Topic: Study of Chemistry*

66. Which one of the following is an example of a pure substance?

- A. ethyl alcohol
- B. sugar water
- C. salt and pepper
- D. milk
- E. sand

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Classification and States of Matter*  
*Topic: Study of Chemistry*

67. Air is a/an

- A. element.
- B. compound.
- C. mixture.
- D. molecule.
- E. pure substance.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Classification and States of Matter*  
*Topic: Study of Chemistry*

68. The speed of light is 186,000 miles per second. What is its speed in centimeters per second? [5280 feet = 1 mile; 12 inches = 1 foot; 2.54 cm = 1 inch]

- A.  $3.01 \times 10^{11}$  cm/s
- B.  $3.15 \times 10^{10}$  cm/s
- C.  $6.06 \times 10^{12}$  cm/s
- D.  $3 \times 10^{11}$  cm/s
- E.  $2.99 \times 10^{10}$  cm/s

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.05*  
*Subtopic: Dimensional Analysis*  
*Topic: Study of Chemistry*

69. 1 centimeter equals how many millimeters?

- A.  $10^{-6}$
- B.  $10^{-3}$
- C.** 10
- D.  $10^4$
- E.  $10^6$

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.03*  
*Subtopic: Dimensional Analysis*  
*Subtopic: Measurements (Metric and SI Units)*  
*Topic: Study of Chemistry*

70. Round 0.052018 to three significant figures.

- A. 0.05
- B. 0.052
- C.** 0.0520
- D. 0.05201
- E. 0.05202

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.04*  
*Subtopic: Scientific Notation and Significant Figures*  
*Topic: Study of Chemistry*

71. Select the answer that best expresses the result of the following calculation:  $1.86 + 246.4 - 79.9208 = ?$

- A. 168
- B.** 168.3
- C. 168.34
- D. 168.339
- E. 168.3392

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.04*  
*Subtopic: Scientific Notation and Significant Figures*  
*Topic: Study of Chemistry*

72. What is the appropriate number of significant figures necessary to express the result of the calculation below?  $(51.6) \times (3.1416)$

- A. 1
- B. 2
- C.** 3
- D. 4
- E. 5

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.04*  
*Subtopic: Scientific Notation and Significant Figures*  
*Topic: Study of Chemistry*

73. What Celsius temperature corresponds to  $-4.6^{\circ}\text{F}$ ?

- A.  $-20^{\circ}\text{C}$
- B.  $-20.3^{\circ}\text{C}$**
- C.  $-23.0^{\circ}\text{C}$
- D.  $-10.9^{\circ}\text{C}$
- E.  $-68.4^{\circ}\text{C}$

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.06*  
*Subtopic: Temperature*  
*Topic: Study of Chemistry*

74. What Fahrenheit temperature corresponds to  $-40.0^{\circ}\text{C}$ ?

- A.  $-8^{\circ}\text{F}$
- B.  $16.8^{\circ}\text{F}$
- C.  $-36.9^{\circ}\text{F}$
- D.  $-40.0^{\circ}\text{F}$**
- E.  $-1.94^{\circ}\text{F}$

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.06*  
*Subtopic: Temperature*  
*Topic: Study of Chemistry*

75. What Kelvin temperature corresponds to  $98.6^{\circ}\text{F}$ ?

- A. 310 K
- B. 310.2 K**
- C. 31.00 K
- D. 132.0 K
- E. 199 K

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.06*  
*Subtopic: Temperature*  
*Topic: Study of Chemistry*

76. Which temperature scale does not use a degree sign?

- A. Celsius
- B.** Kelvin
- C. Centigrade
- D. Fahrenheit
- E. Absolute zero

Accessibility: Keyboard Navigation  
Bloom's Level: 2. Understand  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.06  
Subtopic: Temperature  
Topic: Study of Chemistry

77. If the density of carbon tetrachloride is 1.59 g/mL, what is the volume in L, of 4.21 kg of carbon tetrachloride?

- A. 0.149 L
- B. 0.378 L
- C.** 2.65 L
- D. 6.69 L
- E. 6690 L

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Hard  
Gradable: automatic  
Section number: 01.06  
Subtopic: Density and Specific Gravity  
Subtopic: Dimensional Analysis  
Topic: Study of Chemistry

78. What is the specific gravity of an object that weighs 13.35 g and has a volume of 25.00 mL? The density of water under the same conditions is 0.980 g/mL.

- A. 1.335
- B. 0.545 g/mL
- C. 0.534 g/mL
- D.** 0.545
- E. 0.980

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section number: 01.06  
Subtopic: Density and Specific Gravity  
Topic: Study of Chemistry

79. Which of the following is FALSE concerning the gas state?

- A. Gases have no definite shape.
- B. Gases have no definite volume.
- C. Particles are far apart from each other.
- D.** Particles are usually in a regular or organized pattern.
- E. When gas molecules collide, they do not lose energy.

Accessibility: Keyboard Navigation  
Bloom's Level: 1. Remember  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.02  
Subtopic: Classification and States of Matter  
Topic: Study of Chemistry

80. Which of the following is an example of physical change?

- A.** boiling water
- B. burning paper
- C. a metal losing electrons to become a cation
- D. cooking eggs
- E. lighting a match

Accessibility: Keyboard Navigation  
Bloom's Level: 2. Understand  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.02  
Subtopic: Changes in Matter  
Topic: Study of Chemistry

81. Which statement is FALSE?

- A. Mass is an example of an extensive property.
- B. Volume is an example of an extensive property.
- C. Temperature is an example of an intensive property.
- D. An intensive property is one that does not depend upon the amount of the substance.
- E.** An extensive property is synonymous with a physical property.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Properties of Matter*  
*Topic: Study of Chemistry*

82. NaCl is best classified as a/an

- A. pure substance.
- B. element.
- C. compound.
- D. homogeneous mixture.
- E.** Both pure substance and compound are correct.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.02*  
*Subtopic: Classification and States of Matter*  
*Topic: Study of Chemistry*

83. Which of the following numbers has only one significant figure?

- A.  $3.0 \times 10^1$
- B.** 0.003
- C. 3.00
- D. 30.0
- E. All of the choices are correct.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.04*  
*Subtopic: Scientific Notation and Significant Figures*  
*Topic: Study of Chemistry*



84. Give the answer to the following calculation to the correct number of significant figures.  $(5.0 \times 10^{-4}) - (6 \times 10^{-5}) = ?$

- A.  $4.4 \times 10^{-4}$
- B.  $4.4 \times 10^{-5}$
- C.  $4 \times 10^{-4}$
- D.  $4 \times 10^{-5}$
- E.  $4.40 \times 10^{-4}$

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.04*  
*Subtopic: Scientific Notation and Significant Figures*  
*Topic: Study of Chemistry*

85. The area of a rectangle is determined by the formula: area = length  $\times$  width. If a rectangle has a length of 32.6 cm and a width of 72.6 cm, what is the area of the rectangle to the correct number of significant figures?

- A. 2,400 cm<sup>2</sup>
- B.** 2,370 cm<sup>2</sup>
- C. 2,367 cm<sup>2</sup>
- D. 2,366.8 cm<sup>2</sup>
- E. 2,366.76 cm<sup>2</sup>

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 3. Apply*  
*Difficulty: Medium*  
*Gradable: automatic*  
*Section number: 01.04*  
*Subtopic: Scientific Notation and Significant Figures*  
*Topic: Study of Chemistry*

86. Consider the following set of numbers. If the true value is 12.6 cm<sup>2</sup>, which of the following best describes the set of numbers? 12.6 cm<sup>2</sup>, 12.5 cm<sup>2</sup>, 12.6 cm<sup>2</sup>

- A. accurate but not precise
- B. not accurate but precise
- C.** accurate and precise
- D. neither accurate nor precise
- E. More information is needed to determine if the measurements are accurate.

*Accessibility: Keyboard Navigation*  
*Bloom's Level: 2. Understand*  
*Difficulty: Easy*  
*Gradable: automatic*  
*Section number: 01.04*  
*Subtopic: Scientific Notation and Significant Figures*  
*Topic: Study of Chemistry*

87. How many cm are in  $3.5 \times 10^{-2}$  km?

- A.  $3.5 \times 10^{-1}$  cm
- B.  $3.5 \times 10^{-7}$  cm
- C.  $3.5 \times 10^2$  cm
- D.  $3.5 \times 10^5$  cm
- E.**  $3.5 \times 10^3$  cm

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section number: 01.05  
Subtopic: Dimensional Analysis  
Subtopic: Measurements (Metric and SI Units)  
Topic: Study of Chemistry

88. Tire pressure in the U.S. is measured in  $\text{lb}/\text{in}^2$ . Convert  $25 \text{ lb}/\text{in}^2$  to  $\text{g}/\text{cm}^2$ .  $454 \text{ g} = 1 \text{ lb}$ ,  $2.54 \text{ cm} = 1 \text{ in}$

- A.  $0.39 \text{ g}/\text{cm}^2$
- B.**  $1.8 \times 10^3 \text{ g}/\text{cm}^2$
- C.  $4.7 \times 10^3 \text{ g}/\text{cm}^2$
- D.  $3.0 \times 10^4 \text{ g}/\text{cm}^2$
- E.  $2.4 \times 10^2 \text{ g}/\text{cm}^2$

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section number: 01.05  
Subtopic: Dimensional Analysis  
Topic: Study of Chemistry

89. What volume, in milliliters, will 2.00 g of air occupy if the density is 1.29 g/L?

- A.**  $2.72 \times 10^3$  mL
- B. 2.20 mL
- C. 1.43 mL
- D.  $1.55 \times 10^3$  mL
- E.  $4.59 \times 10^2$  mL

Accessibility: Keyboard Navigation  
Bloom's Level: 3. Apply  
Difficulty: Medium  
Gradable: automatic  
Section number: 01.06  
Subtopic: Density and Specific Gravity  
Topic: Study of Chemistry

90. Concentration is a measure of the number or mass of particles of a substance that are contained in a specified volume.

**TRUE**

Accessibility: Keyboard Navigation  
Bloom's Level: 1. Remember  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.06  
Subtopic: Measurements (Metric and SI Units)  
Topic: Study of Chemistry

91. Hypotheses are not acceptable in the scientific method.

**FALSE**

Accessibility: Keyboard Navigation  
Bloom's Level: 2. Understand  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.01  
Subtopic: Scientific Method  
Topic: Study of Chemistry

92. In the scientific method, a law carries more weight than a hypothesis.

**TRUE**

*Accessibility: Keyboard Navigation  
Bloom's Level: 2. Understand  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.01  
Subtopic: Scientific Method  
Topic: Study of Chemistry*

93. Each piece of data is the individual result of a single measurement.

**TRUE**

*Accessibility: Keyboard Navigation  
Bloom's Level: 2. Understand  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.01  
Subtopic: Scientific Method  
Topic: Study of Chemistry*

94. The presence of some error is a natural consequence of any measurement.

**TRUE**

*Accessibility: Keyboard Navigation  
Bloom's Level: 2. Understand  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.04  
Subtopic: Scientific Notation and Significant Figures  
Topic: Study of Chemistry*

95. The number 0.0680 has 3 significant figures.

**TRUE**

*Accessibility: Keyboard Navigation  
Bloom's Level: 2. Understand  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.04  
Subtopic: Scientific Notation and Significant Figures  
Topic: Study of Chemistry*

96. The terms mass and weight are identical.

**FALSE**

*Accessibility: Keyboard Navigation  
Bloom's Level: 2. Understand  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.03  
Subtopic: Measurements (Metric and SI Units)  
Topic: Study of Chemistry*

97. Mass is the force resulting from the pull of gravity upon an object.

**FALSE**

*Accessibility: Keyboard Navigation  
Bloom's Level: 1. Remember  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.03  
Subtopic: Measurements (Metric and SI Units)  
Topic: Study of Chemistry*

98. Equal masses of glass and steel at the same temperature will have different heat energies.

**TRUE**

*Accessibility: Keyboard Navigation  
Bloom's Level: 2. Understand  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.06  
Subtopic: Temperature  
Topic: Study of Chemistry*

99. Energy may be defined as the heat content of an object.

**FALSE**

*Accessibility: Keyboard Navigation  
Bloom's Level: 1. Remember  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.06  
Subtopic: Temperature  
Topic: Study of Chemistry*

100. One calorie is the amount of energy needed to raise the temperature of one gram of water one degree Celsius.

**TRUE**

*Accessibility: Keyboard Navigation  
Bloom's Level: 1. Remember  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.06  
Subtopic: Temperature  
Topic: Study of Chemistry*

101. Density and specific gravity can be expressed in the same units.

**FALSE**

*Accessibility: Keyboard Navigation  
Bloom's Level: 2. Understand  
Difficulty: Easy  
Gradable: automatic  
Section number: 01.06  
Subtopic: Density and Specific Gravity  
Topic: Study of Chemistry*

**Chapter 01 - Chemistry - Methods and Measurement (Test Bank)****Summary**

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