# Table of content

*Introductory Chemistry, 6e* **(Tro)**
**Chapter 1 The Chemical World**

## 1.1 True/False Questions

1) Chemicals make up everything around you, including your own body.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.1
Learning Outcome: 1.1
Global Outcome: G1

2) Chemists study the properties of substances and the particles that compose those substances.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.1
Learning Outcome: 1.1
Global Outcome: G1

3) When a sealed can of soda pop is opened, the carbon dioxide gas fizzes out because the pressure is released.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.1
Learning Outcome: 1.2
Global Outcome: G2

4) Different molecules can have different shapes.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.1
Global Outcome: G1

5) The properties of water do not depend on how the atoms are bonded together in the molecule.
Answer: FALSE
Diff: 1 Var: 1 Page Ref: 1.1
Learning Outcome: 1.2
Global Outcome: G1

6) Both carbon dioxide molecules and water molecules consist of three atoms bonded together in a straight line.
Answer: FALSE
Diff: 1 Var: 1 Page Ref: 1.1
Learning Outcome: 1.2
Global Outcome: G1

7) Molecules are responsible for scattering light which causes the colors of the sunset.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.2
Learning Outcome: 1.2
Global Outcome: G1

8) All things are made of atoms or molecules.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.3
Learning Outcome: 1.2
Global Outcome: G1

9) Atoms and molecules determine how matter behaves.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.3
Learning Outcome: 1.2
Global Outcome: G1

10) Chemistry is the science that seeks to understand what matter does by studying living organisms.
Answer: FALSE
Diff: 1 Var: 1 Page Ref: 1.3
Learning Outcome: 1.3
Global Outcome: G1

11) The scientific method emphasizes reason as the way to understand the world.
Answer: FALSE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G5

12) A hypothesis can never be proven as wrong.
Answer: FALSE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1

13) A theory is always true and can never be proven as wrong.
Answer: FALSE
Diff: 1 Var: 1 Page Ref: 1.4
Global Outcome: G1

14) Theories can be tested and validated through experimentation.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.4
Global Outcome: G9

15) If experimental results contradict a hypothesis, the hypothesis must be either revised or discarded.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.4
Global Outcome: G1

16) The Greek philosophers used observation and experimentation to understand the world.
Answer: FALSE
Diff: 1 Var: 1 Page Ref: 1.4
Global Outcome: G1

17) A scientific law is a brief statement that summarizes past observations and predicts future ones.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.4
Global Outcome: G1

18) The law of conservation of mass states, "In a chemical reaction matter can be created and destroyed."
Answer: FALSE
Diff: 1 Var: 1 Page Ref: 1.4
Global Outcome: G1

19) Antoine Lavoisier observed that burning objects in a closed container resulted in a loss of mass.
Answer: FALSE
Diff: 1 Var: 1 Page Ref: 1.4
Global Outcome: G1

20) A scientific theory describes the underlying reasons for observations and laws.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1

21) The scientific method ensures that poor theories are eliminated over time and good theories remain.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1

22) A theory is the equivalent of an opinion.
Answer: FALSE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1

23) Antoine Lavoisier proposed the atomic theory.
Answer: FALSE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1

24) John Dalton proposed the atomic theory.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1

25) The first step in acquiring scientific knowledge is often the observation or measurement of some aspect of nature.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1

26) If a hypothesis is *falsifiable,* it means that the hypothesis was once considered true but is now considered false.
Answer: FALSE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1

27) Observations from experiments are used to test theories.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1

28) A theory can only exist after many experiments have validated a hypothesis.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1

29) Scientific theories are also called *models*.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1

30) The atomic theory explains why the law of conservation of mass is true.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G2

31) An established theory is the pinnacle of scientific understanding.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1

32) Quantification is an important tool in understanding chemistry.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.5
Learning Outcome: 1.3
Global Outcome: G1

33) Lavoisier developed the law of conservation of mass.
Answer: FALSE
Diff: 1 Var: 1 Page Ref: 1.5
Learning Outcome: 1.3
Global Outcome: G1

34) Combustion means burning.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1

35) The phlogiston theory of combustion is still considered correct today.
Answer: FALSE
Diff: 1 Var: 1 Page Ref: 1.5
Learning Outcome: 1.3
Global Outcome: G1

36) Quantification involves measurement as part of an observation.
Answer: TRUE
Diff: 1 Var: 1 Page Ref: 1.5
Learning Outcome: 1.3
Global Outcome: G1

## 1.2 Multiple Choice Questions

1) Which of the following statements about soda pop is FALSE?
A) Soda pop is a chemical mixture of mostly sugar, water and carbon dioxide.
B) The molecules important to fizzing are carbon dioxide and water.
C) The carbon dioxide is forced to mix with the water by the presence of sugars.
D) When a can is opened, the pressure release allows carbon dioxide to form bubbles.
E) All of the above statements are true.
Answer: C
Diff: 1 Var: 1 Page Ref: 1.1
Learning Outcome: 1.2
Global Outcome: G2

2) Which of the following items does NOT contain chemicals?
A) drain cleaner
B) organically grown vegetables
C) air
D) insecticides
E) All of the above contain chemicals.
Answer: E
Diff: 1 Var: 1 Page Ref: 1.2
Learning Outcome: 1.2
Global Outcome: G2

3) A good definition of chemistry is:
A) the science that seeks to understand what matter does by studying what atoms and molecules do.
B) the science that seeks to understand what living organisms do by studying the molecules that make up the organism.
C) the science that seeks to understand what the universe does by studying interactions of molecules with atoms.
D) the science that seeks to understand the interactions of molecules for the sake of advancing human control over nature.
E) none of the above
Answer: A
Diff: 1 Var: 1 Page Ref: 1.3
Learning Outcome: 1.3
Global Outcome: G2

4) Which statement about the scientific method is TRUE?
A) The scientific method emphasizes reason as the way to understand the world.
B) The scientific method emphasizes observation and reason as the way to understand the world.
C) The scientific method emphasizes observation and experimentation as the way to understand the world.
D) The scientific method emphasizes scientific laws as the way to understand the world.
E) All of the above statements are false.
Answer: C
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G2

5) Which of the statements below is NOT part of the scientific method?
A) observation and measurement
B) formation of a hypothesis
C) testing of a hypothesis by experimentation
D) refinement of a hypothesis as needed
E) All of the above steps are part of the scientific method.
Answer: E
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1

6) Which statement about a hypothesis is TRUE?
A) It is a tentative interpretation or explanation.
B) It has the potential to be proven wrong.
C) It can be tested by experiments.
D) It is part of the scientific method.
E) All of the above statements are true.
Answer: E
Diff: 1 Var: 1 Page Ref: 1.4
Learning Outcome: 1.3
Global Outcome: G1