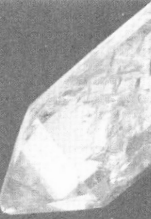




# TESTS

EXPLORING CREATION WITH  
**PHYSICAL  
SCIENCE**

3rd Edition





# TEST FOR MODULE I

1. Match the definition to the correct term.

- |                             |  |
|-----------------------------|--|
| a. Quantitative observation | Tentative explanation for an observation   |
| b. Qualitative observation  | A well-supported, in-depth explanation of a broad range of phenomena             |
| c. Hypothesis               | Observations made using 5 senses   |
| d. Variable                 | Observations made using numbers or measurements                                  |
| e. Scientific Theory        | Conclusions based on observations, previous knowledge, and available information |
| f. Inference                | Any factor that changes in an experiment   |

2. How are science and technology related?

3. What is the difference between independent and dependent variables in an experiment?

4. What is the difference between a scientific theory and a scientific law?

5. You are reading a scientist's notes and you notice a measurement that is listed as 12.3 kg. Does this measurement represent length, mass, or volume?

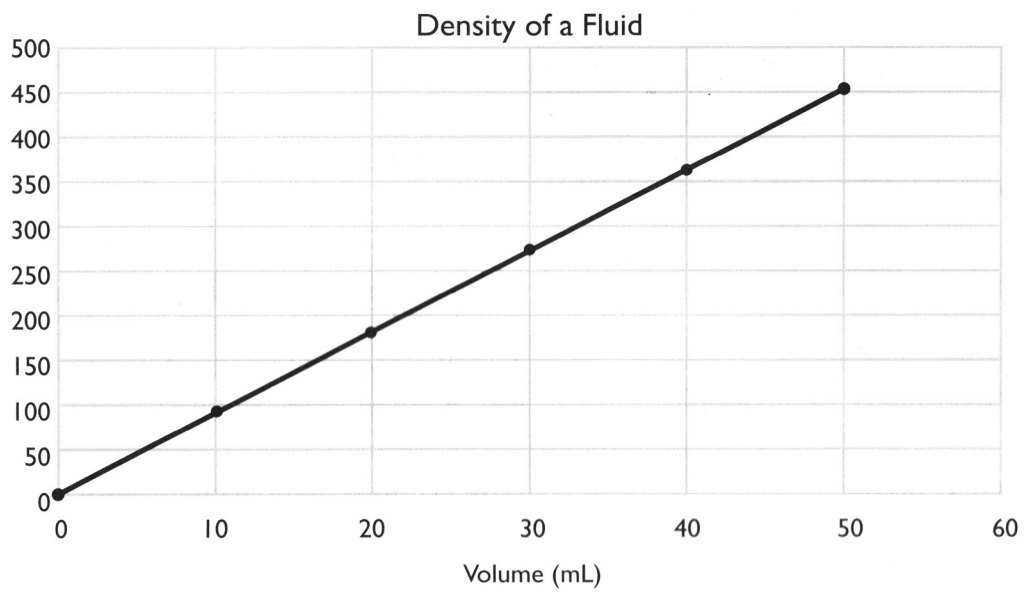
6. What metric prefix means 1,000?

7. How many centimeters are in 1.6 meters?

8. An object's volume is 0.12 kL. What is its volume in liters?

9. A room is measured to be 13.5 ft long. How long is it in meters? (1 ft = 0.30 m)

10. What type of relationship is there between mass and volume in the graph of Density of a Fluid?





## TEST FOR MODULE 2

- Which of the following are pure substances?
  - solutions
  - compounds
  - homogeneous mixtures
  - heterogeneous mixtures
- A substance that is made up of only one kind of atom is a(n)
  - compound.
  - homogeneous mixture.
  - element.
  - solution.
- If an unknown substance CANNOT be broken down into simpler substances, it is
  - made up of one kind of atom.
  - an element.
  - a compound.
  - both a and b
- Sugar is a substance made of three elements joined in a fixed proportion. Sugar is an example of a(n)
  - mixture.
  - atom.
  - compound.
  - solution.
- Which of the following have the highest viscosity?
  - corn syrup
  - water
  - vegetable oil
  - alcohol
- A material that is both malleable and conducts electricity easily is most likely
  - wood.
  - a metal.
  - ice.
  - vegetable oil.
- When a physical change in a sample occurs, which of the following does NOT change?
  - shape
  - size
  - volume
  - composition
- A substance that has high reactivity
  - easily combines chemically with other substances.
  - has a high boiling point.
  - is very malleable.
  - has a low density.

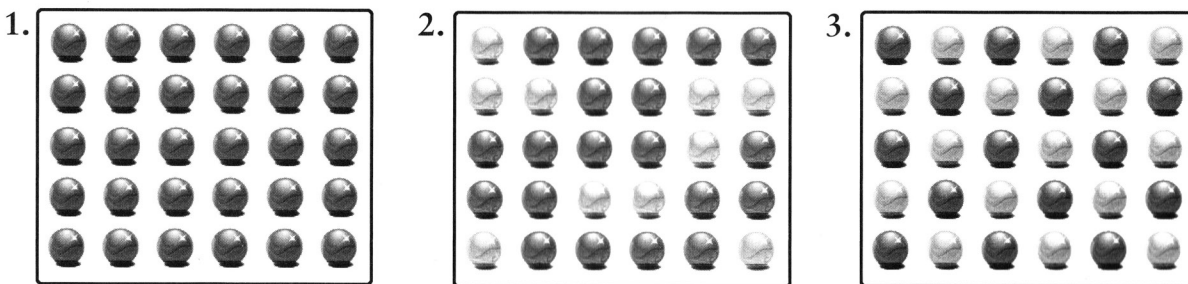
9. Which of the following is NOT a clue that a chemical change has occurred?
- change in color
  - production of a gas
  - change in size
  - formation of a precipitate
10. A substance that has little tendency to change into other substances is said to have low
- reactivity.
  - viscosity.
  - density.
  - conductivity.

Use the following to answer questions 11–13.


- a. solid(s).    b. liquid(s).    c. gas(es).    d. plasma.

11. Matter that has a definite volume, but no definite shape is a
12. Ninety-nine percent of all matter that can be observed in the universe is
13. Forces of attraction limit the motion of particles most in
14. What type of change occurs when water changes from a solid to a liquid?
- an irreversible change
  - a phase change
  - a physical change
  - both b and c
15. The phase change in which a solid changes directly into a gas without first becoming a liquid is called
- condensation.
  - evaporation.
  - deposition.
  - sublimation.

Use the drawings in Figure 2.37 to answer questions 16–17.



16. Which of the drawings could represent a homogeneous mixture?
- drawing 1
  - drawing 2
  - drawing 3
  - drawings 1 and 2

- 
17. Which of the drawings could represent an element?
- a. drawing 1      b. drawing 2      c. drawing 3      d. drawings 2 and 3
18. Suppose you have two small blocks that look the same (same size and shape) and you are told that the density of one block is  $11.3 \text{ g/cm}^3$  and the density of the other block is  $0.50 \text{ g/cm}^3$ . Describe an experiment (and the results) that will help you tell which is which knowing only the densities?
19. Suppose you mix two colorless liquids together and a purple solid settles to the bottom of the beaker. Explain two reasons why you might be confident that a chemical change has taken place.
20. Explain why paint on a steel car or bicycle prevents it from rusting and why when the paint comes off rust appears.




# TEST FOR MODULE 3

1. Who was the first to argue that all matter was made from indivisible particles called atoms?  
a. Democritus      b. Aristotle      c. Dalton      d. Rutherford
2. Which of the following is *not* part of John Dalton's atomic theory?  
a. All elements are composed of atoms.  
b. All atoms of the same element have the same mass.  
c. Atoms are made of subatomic particles.  
d. Compounds are made of atoms of more than one element.
3. What does the Law of Conservation of Mass state?
4. In Rutherford's atomic model with a nucleus, the positive charge is  
a. spread evenly throughout the atom.  
b. concentrated in the center of the atom.  
c. located outside the nucleus.  
d. located at several spots within the atom.
5. Which subatomic particle has a negative charge?  
a. nucleus      b. neutron      c. proton      d. electron
6. Which statement about subatomic particles is *not* true?  
a. An electron has far less mass than either a proton or neutron.  
b. Protons and neutrons have almost the same mass.  
c. Neutrons have no charge and no mass.  
d. Protons and electrons have opposite charges.
7. Which of the following is unique for each element?  
a. the number of protons      c. the number of electrons  
b. the number of neutrons      d. the number of nuclei

Put a T for true and an F for false for each statement about electrons and atomic orbitals in questions 8–12.

8. An electron has the same amount of energy in every orbital. \_\_\_\_\_
9. An orbital can contain a maximum of two electrons. \_\_\_\_\_
10. An electron cloud represents all the orbitals in an atom. \_\_\_\_\_
11. An atom's lowest energy level has only one orbital. \_\_\_\_\_
12. There are more electrons in the orbitals of an atom than there are protons in the nucleus of the atom. \_\_\_\_\_
  
13. Which of the following is true about the difference between an atom in the ground state and an atom in an excited state?
  - a. The atom in an excited state has one more electron than the atom in the ground state.
  - b. The atom in an excited state has one fewer electron than the atom in the ground state.
  - c. The atom in the ground state has less energy AND is less stable than the atom in an excited state.
  - d. The atom in an excited state has more energy AND is less stable than the atom in the ground state.
  
14. What are the rows and columns of the periodic table called?
  - a. rows are called groups and columns are called periods
  - b. rows are called lines and columns are called chutes
  - c. rows are called periods and columns are called groups
  - d. rows are called properties and columns are called families
  
15. In the nucleus of an atom, there are 17 protons and 18 neutrons.
  - a. What is the atomic number? \_\_\_\_\_
  - b. What is the atomic mass? \_\_\_\_\_
  - c. How many electrons are there? \_\_\_\_\_

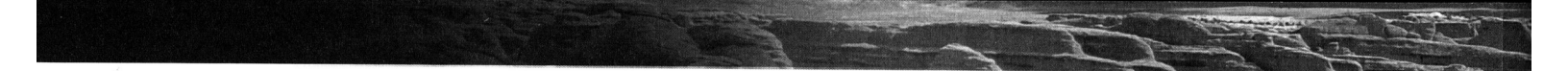


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16. The nuclei of isotopes contain different numbers of \_\_\_\_\_.
17. If an atom of gallium has a mass number of 68 and an atomic number of 31, how many neutrons are in its nucleus?
18. What determines an element's chemical properties?
19. Which group of elements on the periodic table are the most reactive?
20. Sodium chloride (table salt) is a compound of sodium (1 valence electron) and chlorine (7 valence electrons). Which of these elements is the alkali metal, and which is the halogen? Why?


TEST FOR  
**MODULE 4**

- Match the following terms and definitions:
  - Ionic bond                      A chemical bond in which two atoms share one or more pairs of valence electrons
  - Covalent bond                      A molecule that has slight positive and negative charges due to an imbalance in the way electrons are shared
  - Polar molecule                      The force of attraction between molecules of different substances so that they tend to stick together
  - Cohesion                      A chemical bond formed between oppositely charged ions
  - Adhesion                      The force of attraction between molecules of the same substance so that they tend to stay together
- When an atom loses an electron it forms a(n)
  - anion.
  - cation.
  - neutral ion.
  - covalent bond.
- Chlorine is a Group 7A element. What is the charge on a chloride ion?
  - 1<sup>+</sup>.
  - 1<sup>-</sup>.
  - 2<sup>+</sup>.
  - 2<sup>-</sup>.
- Which pair have the same electron configuration? (You may use the periodic table in the front of the text if you need to.)
  - Cl<sup>-</sup> and Ar
  - Cl and Ar
  - Cl<sup>-</sup> and Ar<sup>-</sup>
  - Cl<sup>+</sup> and Ar
- A chemical bond that forms when atoms share electrons is always a(n)
  - polar bond.
  - ionic bond.
  - metallic bond.
  - covalent bond.
- What is the chemical formula for water?
- What are subscripts used for in chemical formulas? What are coefficients used for in chemical equations?

- 
8. Carbon dioxide ( $\text{CO}_2$ ) is one of the gases that we exhale when we breathe. Carbon monoxide (CO) is a poisonous gas associated with burning things under conditions of low oxygen. How many atoms are in one molecule of  $\text{CO}_2$ ? How many atoms are in one molecule of CO?
  9. An important component of gasoline is octane, which is composed of molecules that have eight carbon atoms (C) and eighteen hydrogen atoms (H). What is the chemical formula of octane?
  10. Why are water molecules polar?
  11. What is a stable electron configuration?
  12. What does each dot in an electron dot diagram represent?
  13. Balance the following equation:  $\text{AlBr}_3 + \text{K} \longrightarrow \text{KBr} + \text{Al}$



# TEST FOR MODULE 5

1. Fluorine, F, forms a binary ionic compound with lithium, Li. What is the name of this compound?
  - a. fluorine lithium
  - b. lithium fluorine
  - c. lithium fluoride
  - d. fluorine lithide
2. What does the name iron (III). indicate that a compound contains?
  - a. iron ions with a  $111^+$  charge
  - b. iron ions with a  $3^+$  charge
  - c. iron ions with a  $2^-$  charge
  - d. three types of iron ions
3. Beryllium, Be, and chlorine, Cl, form a binary ionic compound with a 1:2 ratio of beryllium ions to chloride ions. What is the formula for the compound beryllium chloride?
  - a.  $\text{BeCl}_2$
  - b.  $\text{Be}_2\text{Cl}$
  - c.  $2\text{BeCl}$
  - d.  $\text{Be}_2\text{Cl}_2$
4. What does the prefix of the second word in the name carbon dioxide indicate?
  - a. a molecule of carbon dioxide contains 2 carbon atoms
  - b. a molecule of carbon dioxide contains 2 oxygen atoms
  - c. a molecule of carbon dioxide contains 2 carbon and 2 oxygen atoms
  - d. a molecule of carbon dioxide is a polyatomic ion
5. What are the substances that are present before a reaction takes place called?
  - a. products
  - b. reactants
  - c. elements
  - d. subscripts
6. Hydrochloric acid (HCl). is added to solid sodium hydroxide (NaOH). At the end of the reaction salt (NaCl). is dissolved in water. What are the products of this chemical reaction?
  - a. NaOH and HCl
  - b. NaOH and  $\text{H}_2\text{O}$
  - c. HCl and NaCl
  - d. NaCl and  $\text{H}_2\text{O}$

7. Which of the following is a chemical equation that accurately describes what happens when nitrogen and hydrogen react to form nitrogen trihydride (ammonia).
- Nitrogen and hydrogen react to form nitrogen trihydride.
  - $\text{N}_2$  and  $\text{H}_2$  produce  $\text{NH}_3$ .
  - $\text{N}_2 + \text{H}_2 \longrightarrow \text{NH}_3$
  - $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$
8. In a compound, where is the chemical energy stored?
- nuclei of the atoms
  - valence electrons
  - bonds
  - neutrons
9. How many particles are there in 1 mole of any substance?
- 84.5 particles
  - $6.02 \times 10^{23}$  particles
  - $1.20 \times 10^{23}$  particles
  - $1.02 \times 10^{24}$  particles
10. All of the following statements about a synthesis reaction are always true, *except* for one. Which one?
- Only one product is formed.
  - Only one reactant is used.
  - A reactant might be a compound or an element.
  - The general formula is  $\text{A} + \text{B} \longrightarrow \text{AB}$ .
11. One of the following statements is true about what happens during a chemical reaction. Which one?
- Bonds of the reactants are formed, and bonds of the products are broken.
  - Bonds of the reactants are broken, and bonds of the products are formed.
  - The bonds of both the reactants and products are formed.
  - The bonds of both the reactants and products are broken.

12. The total amount of energy before and after a chemical reaction is the same. Thus, energy is

- a. created.
- b. destroyed.
- c. conserved.
- d. the same as volume.

13. In terms of energy, how would you classify the following chemical reaction?



- a. exothermic
- b. endothermic
- c. both endothermic and exothermic
- d. neither endothermic nor exothermic

14. Which of the following is an example of a single replacement reaction?

- a.  $2\text{Ag} + \text{S} \longrightarrow \text{Ag}_2\text{S}$
- b.  $\text{Zn} + 2\text{HCl} \longrightarrow \text{ZnCl}_2 + \text{H}_2$
- c.  $\text{FeCl}_2 + \text{Na}_2\text{CO}_3 \longrightarrow 2\text{NaCl} + \text{FeCO}_3$
- d.  $2\text{H}_2\text{O}_2 \longrightarrow 2\text{H}_2\text{O} + \text{O}_2$

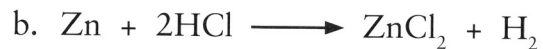
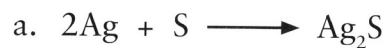
15. Which of the following is an example of a double replacement reaction?

- a.  $2\text{Ag} + \text{S} \longrightarrow \text{Ag}_2\text{S}$
- b.  $\text{Zn} + 2\text{HCl} \longrightarrow \text{ZnCl}_2 + \text{H}_2$
- c.  $\text{FeCl}_2 + \text{Na}_2\text{CO}_3 \longrightarrow 2\text{NaCl} + \text{FeCO}_3$
- d.  $2\text{H}_2\text{O}_2 \longrightarrow 2\text{H}_2\text{O} + \text{O}_2$

16. Which of the following is an example of a synthesis reaction?

- a.  $2\text{Ag} + \text{S} \longrightarrow \text{Ag}_2\text{S}$
- b.  $\text{Zn} + 2\text{HCl} \longrightarrow \text{ZnCl}_2 + \text{H}_2$
- c.  $\text{FeCl}_2 + \text{Na}_2\text{CO}_3 \longrightarrow 2\text{NaCl} + \text{FeCO}_3$
- d.  $2\text{H}_2\text{O}_2 \longrightarrow 2\text{H}_2\text{O} + \text{O}_2$

17. Which of the following is an example of a decomposition reaction?



18. What element is always present as a reactant in a combustion reaction?

19. Butane burns as shown in the balanced chemical equation



If 2 moles of butane are burned, how many moles of carbon dioxide are produced?

20. The chemical formula for calcium chloride,  $\text{CaCl}_2$ , shows that the compound contains two \_\_\_\_\_ ions for every \_\_\_\_\_ ion.

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