

1. Does each of the following phenomena describe a physical change, chemical change or nuclear transformation? (2)

- a) Decomposition of Uranium-235 to harness energy. \_\_\_\_\_
- b) Fermentation of cocoa beans to make chocolate. \_\_\_\_\_
- c) Dissolving sugar in a cup of coffee. \_\_\_\_\_
- d) Sulfur oxides react with water to produce acid rain. \_\_\_\_\_

2. For each case below, write one observation that indicates that a chemical change has occurred. (2)

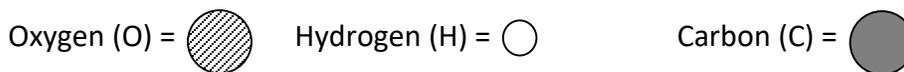
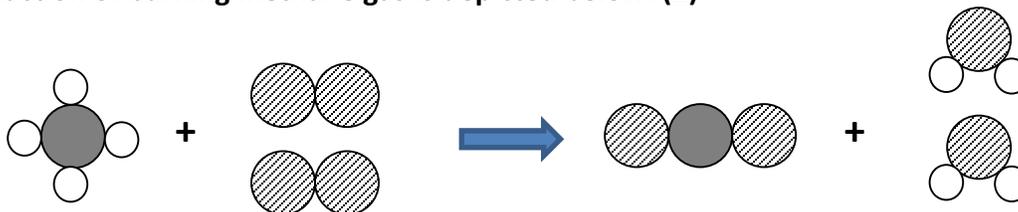
- a) Fireworks explode in the night sky. \_\_\_\_\_
- b) Hydrogen peroxide bubbles when placed on a cut. \_\_\_\_\_
- c) Two clear liquids mix to form a solid. \_\_\_\_\_
- d) Iodine turns a starch solution from clear to black. \_\_\_\_\_

3. Which of the following is not an oxidation reaction? (2)

- a) Photosynthesis
- b) Cellular respiration
- c) Rusting
- d) A campfire

Answer #3

4. The reaction of burning methane gas is depicted below. (2)



Which reaction correctly represents the reaction above?

- A)  $CH_4 + O_4 \rightarrow 2 CO_2 + 2 H_2O$
- B)  $CH_4 + 2 O_2 \rightarrow CO_2 + H_2O$
- C)  $CH_4 + 2 O_2 \rightarrow 2 CO_2 + H_2O$
- D)  $CH_4 + 2 O_2 \rightarrow CO_2 + 2 H_2O$

Answer #4

5. Represent the following reaction using the particle model. (4)



**6. Represent each of the following reactions with a chemical equation. Indicate the physical state of each substance, namely; solid, liquid, gas or aqueous. (8)**

- a) One molecule of a hydrochloric acid solution (HCl) reacts with one molecule of a potassium hydroxide (KOH) solution to form one molecule of potassium chloride (KCl) in solution and one molecule of water.
  
- b) Two solid aluminum (Al) atoms react with 3 molecules of copper chloride (CuCl<sub>2</sub>) in solution to form 3 atoms of solid copper (Cu) and 2 molecules of aluminum chloride (AlCl<sub>3</sub>) solution.
  
- c) Two molecules of potassium iodide (KI) in solution and one molecule of lead nitrate (Pb(NO<sub>3</sub>)<sub>2</sub>) in solution react to form one molecule of solid lead iodide (PbI<sub>2</sub>) and two molecules of potassium nitrate (KNO<sub>3</sub>) in solution.
  
- d) Two molecules of acetylene gas (C<sub>2</sub>H<sub>2</sub>) react with five molecules of oxygen gas to form four molecules of carbon dioxide gas and two molecules of liquid water.

**7. Which part of the fire triangle are firefighters affecting in each of the situations below? (3)**

- a) Firefighters at an airport spray foam over a pool of flammable liquid spilled by an airplane.

\_\_\_\_\_

- b) Firefighters spray water onto the roofs and sides of two houses next to a blaze.

\_\_\_\_\_

- c) During a forest fire, firefighters begin clear-cutting a threatened area ahead of the blaze.

\_\_\_\_\_

**8. Kitchen fires are often caused by a pan of oil left unsupervised on a stove. (2)**

- a) Which type of combustion occurs in this situation?      circle one:      rapid, slow or spontaneous

- b) Explain why the oil can ignite without a spark?

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