

I. Chemical Reactions

- a. Chemical reactions occur when atoms are _____, _____ or _____ to form new products.
- b. As reactants are converted to products, the bonds holding the atoms together are _____ and _____ are _____.
- c. In a reaction, one or more substances (_____) change into one or more new substances (_____).
- d. Atoms of one element never change into atoms of another element. Why?
- e. What is the left hand side of the reaction called and what is the right hand side of the reaction called?
- f. In writing reactions, what symbol separates the reactants from the products?

II. Writing Chemical Equations

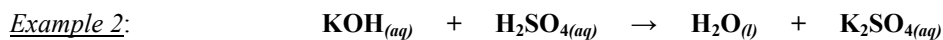
- a. A chemical equation describes and identifies the _____ and _____.
- b. Chemical equations can be described in three ways: _____, _____ & _____.
- c. Rules for writing equations:
 1. When writing a chemical equation you must include the physical states of each reactant or product.

(Aqueous means “dissolved in water”).
 2. Some elements in chemical equations ONLY appear as diatomic molecules.

 3. Some reactions require the help of a catalyst.
 - What is a catalyst? _____
 4. The chemical formula for the catalyst must always be written _____ or _____ the arrow in a chemical equation.
Example:
 5. If heat is a catalyst in a reaction, it is symbolized by a _____, and is always written _____ the arrow in a chemical equation.
Example: _____ *Example:* _____

A. Written Words





- The phrase “**reacts with**” separates two reactants and the word “**and**” separates two or more products.

B. Word Equation

Solid sodium reacts with water to produce aqueous sodium hydroxide and hydrogen gas.

A (+) symbol is used to separate two reactants or two products.

C. Skeleton Chemical Equation

- A Skeleton equation is a chemical equation that does not indicate the relative amounts of the reactants and products involved in the reaction.
 - It only shows the type of atoms.

Example 1:

Manganese (IV) oxide catalyzes the decomposition of aqueous hydrogen peroxide into water vapor and oxygen gas.

Example 2:

Solid sodium reacts with water to produce aqueous sodium hydroxide and hydrogen gas.

Example 3:

Solid sodium hydrogen carbonate reacts with a solution of hydrochloric acid to produce aqueous sodium chloride, water and carbon dioxide gas.

You Try It - Write a skeleton equation for this chemical reaction (include appropriate symbols from Table 8.1)

1. An open flame catalyzes oxygen gas to react with hydrogen gas to form water vapor.

2. Carbon burns in oxygen to form carbon dioxide.