**Vocabulary: Chemical Changes**

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**Vocabulary**

* Acid – a compound that donates protons (H+ ions) to a base.
  + Acids are often sour in taste, can burn the skin and eyes, and react with a base to produce a salt and water.
  + The chemical formula of an acid usually begins with “H.” Examples are hydrochloric acid (HCl), sulfuric acid (H2SO4), and nitric acid (HNO3).
* Base – a chemical compound that accepts protons (H+ ions) from an acid.
  + Bases such as detergent and bleach are bitter in taste, have a slippery texture, and react with acids to produce a salt and water. Strong bases can cause burns.
  + The chemical formula of a base always ends with “OH.” Examples are sodium hydroxide (NaOH), potassium hydroxide (KOH), and calcium hydroxide (Ca(OH)2).
* Catalyst– a substance that increases the rate of a chemical reaction without being permanently altered by the reaction.
  + A catalyst usually lowers the energy required to start the reaction.
* Chemical change – a change that results in the formation of new substances.
  + Chemical changes may be indicated by changes in appearance, color, texture, state, temperature, or other clues.
  + When a chemical change occurs, bonds holding atoms together are broken and new bonds are formed.
  + Chemical changes are also known as chemical reactions.
* Coefficient – a number that multiplies a term in an equation.
  + In a chemical equation, the coefficients indicate the number of each type of molecule. For example, 6H2O means that there are six water molecules.
* Conservation of matter – a scientific law that states that the total amount of matter in a closed system remains constant.
  + No atoms are created or destroyed when a chemical reaction occurs. Therefore, the total mass of the *products* is equal to the total mass of the *reactants*.
* Decomposition – a chemical reaction in which a single substance is broken down into two or more products.
  + For example, salt (NaCl) is decomposed into sodium (Na) and chlorine gas (Cl2).
* Dissolve – to pass into solution. For example, salt or sugar can dissolve into water.
  + When a salt such as NaCl dissolves in water, it separates into Na+ and Cl– ions. Most chemists consider this to be a chemical change.
  + When sugar dissolves in water, it separates into individual sugar molecules. Because each sugar molecule remains whole, this is not a chemical change.
* Double replacement – a reaction in which two compounds exchange elements or molecules with one another.
  + For example, sodium sulfide (Na2S) and hydrochloric acid (HCl) react to form salt (NaCl) and hydrogen sulfide (H2S).
* Endothermic– a process that absorbs heat energy.
  + In an endothermic reaction, the temperature of the system decreases.
* Exothermic– a process that releases heat energy.
  + In an exothermic reaction, the temperature of the system increases.
* Indicator – a substance that changes color when in contact with an acid or base.
  + For example, phenol red turns yellow in an acid, orange in a neutral solution, and reddish pink in a base.
* Ion – a charged atom or molecule that results from gaining or losing electrons.
  + Atoms or molecules that gain electrons have a negative charge, such as Cl–.
  + Atoms or molecules that lose electrons have a positive charge, such as H+.
* Physical change – a change that affects the shape or phase of a substance but does not produce new substances. For example, ice melting into water is a physical change.
* Product – a substance that results from a chemical reaction.
* Reactant – a substance that takes part in and is changed by a chemical reaction.
* Single replacement – a reaction in which an element reacts with a compound to form a new compound and a different element.
  + For example, aluminum (Al) can react with hydrochloric acid (HCl) to form aluminum chloride (AlCl3) and hydrogen gas (H2).
* Subscript – a number representing the number of atoms of an element in one molecule.
  + For example, the subscript “2” in H2O indicates that there are two hydrogen atoms in a water molecule. (If there is no subscript, there is one atom of that element in the molecule.)
* Synthesis– a chemical reaction in which two or more reactants form a single product. Synthesis reactions are also called “combination” reactions.
  + For example, hydrogen (H2) combines with oxygen (O2) to form water (H2O).