

Basics You Should Know

All of chemistry is based on measurements of some sort to determine how much of something is present. This dates back to the 1700's when Lavoisier discovered the Law of Conservation of Mass.

Law of Conservation of Mass: The total mass remains constant during a chemical reaction. No mass is lost or gained.

Examples:

a. 12.4 grams of oxygen reacts with hydrogen to produce 14.0 grams of water. How **many grams of hydrogen** reacted with the oxygen?

Mass in = mass out

12.4 g oxygen + g hydrogen = 14.0 g water
g hydrogen = 14.0 g water – 12.4 g oxygen = 1.6 g hydrogen

b. If 22.4 g of phosphorus reacts with 153.9 g of chlorine, **how many grams of product** are formed?

22.4 g + 153.9 g = 176.3 g of product.

Matter

States of matter:

Solid- definite shape and volume (neither changes)

Liquid- indefinite shape but definite volume (liquids conform to the shape of

their container) Gas- indefinite shape and volume (gases conform to the shape and volume of their container)

Changes in matter

Physical change- A change that does not alter the chemical compound present.

Examples: Boiling, Freezing, dissolving, distilling

Chemical change - A change that does alter the compounds present. Examples: Any type of chemical reaction. Burning, decomposing

Physical property- a property that can be determined by observing a substance and does not require a chemical change. Examples: Color, temperature, hardness

Chemical property- a property that does require a chemical change to determine. Examples:

Does or does not react with a chemical

Pure Substances- A kind of matter that cannot be separated into its constituents by physical processes.

Two kinds of substances:

Elements-simplest type of substance. Comprised of only one kind of atom. Cannot be separated into any components by physical or chemical processes.

Compound- A chemical combination of two or more elements. Can be broken down by chemical

processes.

Law of definite proportions – A chemical compound will always have the same ratio of elements in it regardless of its source. For example, water will always contain 88.81% oxygen and 11.19% hydrogen. This is true if the water come from a biological process or an industrial one.

Mixtures- a kind of matter that can be separated by physical processes. Two kinds of Mixtures:

Homogeneous-A mixture that has uniform properties throughout

Examples: Air, sugar water, milk (the kind bought in stores)

Heterogeneous- a mixture in which the properties change from one point in the mixture to the next.

Examples: Sewage, concrete, gravel