

Chapter 15: Classification of Matter

Section 1: Composition of Matter

Matter: anything that has mass and takes up space

- What are some examples? Solid? Liquid? Gas?

Substance: type of matter with a fixed composition

- Element or compound
 - Water is always H_2O while Hydrogen Peroxide is H_2O_2

Atom: the basic unit from which all matter is made

- Made of positive nucleus and surrounded by a negative cloud

Element: substances that are made up of only one type of atom

- Hydrogen, Helium, Lithium, Beryllium
- Atom and element are very similar
 - Think of a writing utensil
 - Pencil - Mechanical or regular
 - Pen – blue, black, or red
- Writing elements
 - First letter is ALWAYS CAPITAL
 - Second letter is always lowercase and the rest of the letters (see above)

- Writing symbols
 - First letter is ALWAYS CAPITAL
 - Second letter (if it has a second letter) is always lowercase
 - Examples
 - Just 1 letter symbol
 - H for Hydrogen, C for Carbon, N for Nitrogen
 - First and second letter in the name
 - He for Helium, Ne for Neon, Ca for Calcium
 - First and third (or fourth) letter in the name
 - Rb for Rubidium, Mg for Magnesium, Cr for Chromium
 - Latin names
 - Na for Sodium (actual name is Natrium)

Compound: a substance made of two or more elements that are chemically combined in a set ratio

- Water (H₂O), Salt (NaCl)
- Cannot be separated by physical means

Counting Atoms – you can find the number of elements and the quantity of the substance by looking at the subscript – when there is a parenthesis you multiply the number outside the parenthesis times the number inside the parenthesis

- H_2O
 - H = Hydrogen = 2
 - O = Oxygen = 1 (no subscript means there is 1)
- $\text{Ca}_3(\text{PO}_4)_2$
 - Ca = Calcium = 3
 - P = Phosphorus = $1 \times 2 = 2$
 - O = Oxygen = $4 \times 2 = 8$

Mixtures: made up of two or more substances that are together in the same place, but their atoms are not chemically bonded

- Each substance in a mixture keeps its own properties
 - Ex. Supreme pizza – sausage, pepperoni, green peppers, onions, cheese
- **Homogenous mixtures:** the mixture is uniform throughout and has particles that are so small that it cannot be seen without a microscope
 - Solution: another term for a homogenous mixture
 - Ex. Gatorade or dry ingredients for baking (flour, sugar, salt, baking soda)

- **Heterogenous mixture:** the mixture is not uniform throughout or different materials remain distinct throughout
 - Ex. Zesty Italian Dressing or Ranch
 - **Suspension:** made from a liquid and solid particle that settles out.
 - Ex. muddy water if allowed to sit the solid will settle out
 - **Colloid:** similar to a suspension but the particle don't settle out
 - Ex. milk, fog, and smoke