Elements of the body

10% Hydrogen
18% Carbon
Nitrogen 3%
Oxygen 65%

Elements on the Periodic Table

a) Atomic Number
   a. Made up of protons
b) Atomic Mass
   a. Made up of protons & neutrons
c) Atomic Symbol
   Matter is made up of elements, which cannot be broken down into smaller substances.

The parts of an atom
Define and label the parts of the atom

- Protons: red, nucleus
- Neutrons: white, nucleus
- Electrons: electron cloud
Combining Matter

a. molecule
   a. 2 or more of the **same** atoms or molecules.

b. Compound
   a. 2 or more **different** atoms or molecules.

   **C₆H₁₂O₆**

   **Carbon Dioxide**

Mixtures

- A mixture: **2 or more components that are physically intermixed**
  - 3 types of mixtures
    - Solution
    - Colloids/Emulsion
    - Suspension

- Solution
  - A **homogeneous** solution is a mixture where particles are evenly distributed. True solutions are usually transparent.
    - Solvent: greater amount, add it to things
    - Solute: smaller amount, added to things

- Colloids
  - Also known as emulsions, are **heterogeneous** mixtures. Particles are unevenly distributed throughout the mixture.
    - do not settle out, large particles
    - cloudy, milky

- Suspension
  - A **heterogeneous** mixture
    - These mixtures do settle out
    - Biological example of a suspension, blood
Chemical Bonds

- Chemical bonds are "energy relationships" between electrons.
- Electrons: involved in all chemical reactions, determine if a chemical reaction will take place. All about the amount of electrons and the want to get its "perfect" octet!
  - Where are they located? electron shell / electron cloud
    - Shell 1?
    - Shell 2?
    - Outermost cell called? This shell has the most potential energy because they're farthest from the nucleus and are pulled the least toward it.
- Octet Rule:
  - How many electrons would satisfy the outer valence? 8e-
- Exceptions?
  - NOPE! have 8
- Types of Chemical Bonds
  - Ionic
  - Covalent
    - Polar
    - Non Polar
  - Hydrogen Bonds
- Covalent Bonds
  - Formed by sharing of electrons.
  - What kind of electrons are shared? valence e-
  - Sharing of 2 electrons
  - Sharing of 4 electrons
- Sharing of 6 electrons $\rightarrow$  \\
  - Is water Polar or non-polar? Why? 
  - Polar Covalent 
    - Why are the bonds polar? 
    - Electronegative & electropositive 
      - Electro neg: e- attracting ability 
      - Pos: less e- attracting ability 
  - Non-Polar Covalent 
    - Equal Sharing of electrons, equal pull 
    - No separation of charges 
  - Ionic Bonds 
    - Gain or loss of electrons, aka the transfer of valence e- 
    - Gaining of electrons (- charge) = anion 
    - Loss of electrons (+ charge) = cation 
    - Attraction of opposite charges results in an ionic bond 
  - Hydrogen Bonds 
    - True bond OR weak magnetic attraction ?? 
    - Intramolecular bonds 
    - What makes water liquid 
    - H- O, N, F 
      - Nearest!
Chemical Reactions

Sunlight energy

$6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

**Reactants**  **Products**

Types of Chemical Reactions

- **Synthesis**
- **Decomposition**
- **Exchange**

Synthesis Reaction

- Combination reaction
- Used in **anabolic** or **catabolic** reactions?

Decomposition

- Breakdown of molecule into smaller molecules/atoms.
- Reverse of synthesis reactions
- Used in **anabolic** or **catabolic** reactions?

Exchange

- Also called a **displacement** reaction.
- Involves both synthesis and decomposition

Label each reaction

a. $4 \text{Fe} (s) + 3 \text{O}_2 (g) \rightarrow 2 \text{Fe}_2\text{O}_3 (s)$ **Synthesis**

b. $\text{NaCl(aq)} + \text{AgNO}_3(aq) \rightarrow \text{NaNO}_3(aq) + \text{AgCl(s)}$ **Exchange**

c. $\text{H}_2\text{CO}_3 \rightarrow \text{H}_2\text{O} + \text{CO}_2$ **Decomposition**