**Must knows for next week**

**Chemical Context of Life**

* The three subatomic particles and their significance
* The types of chemical bonds and how they form
* The importance of hydrogen bonding to the properties of water
* Four unique properties of water, and how each contributes to life on Earth
* How changes in pH can alter biological systems
* The importance of buffers in biological systems

**Vocabulary**

Matter

Element

Compound

Atoms

Protons

Electrons

Neutrons

Isotopes

Atomic Number

Mass Number

Trace elements

C, H, O, N

***The formation and function of molecules depend on chemical bonding between atoms***

* Chemical bonds
* Covalent bonds
  + Nonpolar covalent bonds
  + Polar covalent bonds
* Ionic Bonds
  + Ion
* Hydrogen bonds
* Van der Waals interaction

***Chemical reactions make and break chemical bonds***

* Chemical reaction
* Reactants
* Products

***Water and its properties due to hydrogen bonding helps make life on Earth possible***

* Structure of water
* Polar
* Hydrogen bonds
  + Cohesion
    - Adhesion
    - Transpiration
* Specific Heat-Why important with water
* Insulation-how its important with water
* Solvent-How is it important with water
  + Solute
  + Hydrophilic
  + Hydrophobic
* Acid
* Base (other name for base)
* pH
* Buffers
* Carbonic acid

***Carbon and Molecular Diversity of Life***

**Must know**

* The properties of carbon that make it so important
* The role of dehydration reactions in the formation of organic compounds and hydrolysis in the digestion of organic compounds
* How the sequence and subcomponents of the four groups of organic compounds determine their properties
* The cellular functions of carbohydrates, lipids, proteins, and nucleic acids
* How changes in these organic molecules would affect their function
* The four structural levels of proteins and how changes at any level can affect the activity of the protein.
* How proteins reach their final shape (conformation), the denaturing impact that heat and pH can have on protein structure, and how these changes may affect the organism
* Directionality influences structure and function of polymers, such as nucleic acids (5’ and 3’ ends) and proteins (amino and carboxyl ends)

***Carbon and molecular diversity***

* Major elements of life
* Organic compounds-what are they , what is their structure like, what are some of their characteristics
* Isomers
* Functional groups
  + Know the Name and structure as well as the organic molecule with the functional group and items of note about the functional group

***Macromolecules are polymers, built from monomers***

* Macromolecule
* Polymer
* Monomers
* Dehydration reactions
* Hydrolysis

***Carbohydrates serve as fuel and building material***

* Carbohydrates
* Monosaccharide
* Polysaccharides
* Starches/Cellulose-know the ring formations and linkages between them
* Two functions of polysaccharides
  + Energy-Storage polysaccharides
    - Strach
    - Glycogen
* Structural Support polysaccharides
  + Cellulose
  + Chitin

***Lipids are dives group of hydrophobic molecules***

* Lipids
* Hydrophobic
* Fats
* Glycerol
* Fatty acids
* Saturated fatty acids
* Unsaturated fatty acids
* Functions of lipids
  + Energy storage
  + Protection of organs
  + Insulation
* Phospholipids
* Steriods
  + Cholesterol
  + Estrogen
  + Testosterone

***Proteins include a diversity of structures, resulting in a wide range of functions***

* Protiens
* Amino Acids
* Peptide bonds
* Four levels of protein structure
  + Primary structures
  + Secondary structure
    - Alpha helix
    - Beta pleated sheets
    - Tertiary structure
    - Quaternary structure
* Shape of proteins being crucial to protein function
* Denatured

***Nucleic Acids store and transmit, and help express hereditary information***

* DNA
* RNA
* Nucleotides
  + Nitrogenous base
  + Pentose sugar
  + Phosphate group
* Directionality of Nucleic Acids