

Chap 1: Biology Themes, Evo Intro and Inquiry

Chap 1

List the 5 themes we will focus on in this biology class.

Define the term *emergent properties*.

List and **Explain** the 10 levels of organization in biology, include their emergent properties (go smallest to largest)?

Explain the Central Dogma of biology (gene expression)?

Differentiate between *Energy flow* and *Chemical flow* in ecosystems.

Explain two examples of interactions between systems...

1) at the cellular level

2) at the ecological level.

Define the term *evolution*.

Explain two examples that demonstrate the *Unity in the Diversity of Life*.

List and **Describe** Charles Darwin's three observations about natural selection.

Define the terms *hypothesis* and *theory*, then **Differentiate** between the two terms.

Define the terms *inductive reasoning* and *deductive reasoning*, then **Differentiate** between the two terms.

Define the terms *independent variable* and *dependent variable*, then **Differentiate** between the two terms.

Chap 2: Basic Chemistry (Review)

Chap 2

This chapter is mostly definitions. You should be able to define any of these words from memory at any point in this class. If you are taking chemistry concurrently this year with AP biology, some of these terms will be new to you.

You will not have to officially define these terms in this chapter, however you are responsible for their meaning and understanding. Fair Warning!

Important Vocabulary:

- Element
- Compound
- Essential Element (understand table 2.1 in the book)
- Atom
- Nucleus
- Neutron
- Proton
- Electron
- Valence Electron
- Electron Shell
- Electron Orbital
- Atomic Number
- Atomic Mass
- Isotope
- Half-life
- Radiometric Dating
- Energy
- Ion
- Period
- Group
- Covalent Bond
- Single Bond
- Double Bond
- Triple Bond
- Ionic Bond
- Hydrogen Bonds
- Van der Waals Interactions
- Chemical Reaction
- Reactant
- Product
- Chemical Equilibrium

Chap 3: Water and Life

Chap 3

Define the term *polar covalent bonds*.

Explain what polar molecules are.

Explain how polar covalent bonds help water be the universal solvent.

List and **Explain** the four emergent properties of water.

Differentiate between *cohesion* and *adhesion*.

Explain how water's high specific heat helps to regulate temperatures on both an *organismal* and *ecological* scale.

Explain why ice float on liquid water?

Explain what would happen if solid water was more dense than liquid water during something like an ice age.

Differentiate between *hydrophobic* and *hydrophilic*.

Define the terms *solvent*, *solute* and *solution*.

Define the terms *hydration shell* and **Draw** an example of it at the molecular level.

Define the terms *acid* and *base* and **Differentiate** between the two terms.

Explain what is being measured for pH.

Be able to calculate concentration from pH and vice versa.

Define the term *buffer* and **Explain** how buffers affect the pH of solutions.

Explain how increasing CO₂ levels in the atmosphere can cause destruction of coral reefs.

Chap 4: Carbon and Molecular Diversity

Chap 4

Define the term *organic* in reference to chemistry.

Draw a diagram of the Miller-Urey experiment setup and **Explain** the conclusion of this experiment. (Eventually we will tie this in to chap 25)

Explain why carbon's versatility is important for life on Earth.

Diagram and **Describe** the seven functional groups for biological chemistry in figure 4.9 (pg. 63)

Chap 5: Biomolecules

Chap 5

Define the terms *monomer* and *polymer* then **Differentiate** between the two terms.

Diagram and **Explain** the two processes that either synthesize polymers or breakdown polymers.

List and **Describe** the four groups of carbon compounds. (***Understand all bolded terms in this chapter***)

Differentiate between which groups have a monomer/polymer structure and which one does not.

Explain the two major roles of carbohydrates in biological systems.

List the name of the bond that connects monosaccharides to make a polysaccharide for carbohydrates, proteins and nucleic acids then **Draw** a diagram of each.

Diagram and **Explain** the difference between α and β glucose polysaccharides.

Differentiate between *starch*, *cellulose*, *glycogen* and *chitin*.

Define the term *hydrocarbon* from chapter 4.

Describe three molecular roles of lipids in biological systems.

Differentiate between *saturated fats* and *unsaturated fats*.

Diagram a phospholipid molecule and **Describe** how it is used in cells.

Diagram a steroid molecule (Ex: Testosterone, Estrogen, Cholesterol) and **Explain** their role in biological systems.

List and **Describe** the 8 roles of proteins.

Diagram a generalized amino acid molecule, **Label** the α carbon and the *R group side chain*.

State how many different amino acids there are in biological systems.

Define the terms *enzyme* and *catalyst*, then **Differentiate** between the two terms.

State the name for the bond between the amino acids in a polypeptide.

List and **Describe** the 4 levels of protein structure.

Diagram a *nucleotide molecule* and **Label** the three main regions.

Describe the main roles of nucleic acids.

State the name for the bond between the nucleotides in nucleic acids.

Diagram the five nucleotides. **Designate** which ones are used in DNA and which ones are used in RNA.

Explain the meaning of the term *antiparallel*. (A diagram will help in this explanation)

Chap 6: Organelles

Chap 6

Describe the functions of the following organelles: (* are VERY IMPORTANT structures)

- Cytosol *
- Plasma membrane *
- Nucleus *
- Nucleolus
- Ribosome *
- ER (smooth and rough)
- Golgi apparatus/complex
- Vesicles/vacuoles
- Lysosome
- Mitochondrion *
- Chloroplast *
- Cytoskeleton
- Cell wall

Define and **Differentiate** between the terms *prokaryotic cell* and *eukaryotic cell*.

List and **Explain** at least 3 uses of vacuoles.

Explain the *endosymbiotic theory* and how it applies to chloroplasts and mitochondria organelles.

Explain the purpose of *motor proteins*.

List and **Describe** the three components of the cytoskeleton. (Table 6.1, pg. 113 - 117)

Describe the *extra cellular matrix*.

List and **Differentiate** between the cell junctions present in plant cells vs. animal cells.