Welcome to AP Biology!

The following is an important list of word parts that are essential to learning AP biology. **We will have a quiz over the following word parts the first week of school.** Learning the meanings of word parts will make conceptual learning much easier throughout the year. Without understanding the language of biology, it is impossible to understand biology. I highly recommend making a Quizlet, flashcards, games etc. and practicing just 5 minutes a day (on an airplane, on the beach sipping a fruity drink, in between binge watching Grey's Anatomy 😉) . By the end of the summer you will be well prepared to begin AP biology.

Affix & Root Word Table

Affix/Root	Meaning	Biology Example
A- / An-	Not, without, lacking	**A**biotic (non-living), **An**aerobic (without oxygen)
Bio-	Life	**Bio**sphere (the zone of life on Earth)
Chem-	Chemistry / Chemical	**Chem**otaxis (movement in response to chemicals)
Co- / Com-	Together, with	**Co**dominant (both alleles expressed together)
De-	Away from, down, undo	**De**nature (to unfold a protein or undo its structure)
Ecto- / Exo-	Outside, external	**Exo**cytosis (moving substances out of a cell)
Endo-	Inside, internal	**Endo**cytosis (bringing substances into a cell)
Glyco-	Sugar, sweet	**Glyco**lysis (the breakdown of sugar)

Hetero-	Different, other	**Hetero**zygous (having two different alleles)
Homo- / Homeo-	Same, alike	**Homeo**stasis (maintaining a constant internal state)
Hydro-	Water	**Hydro**philic (water-loving)
Hyper-	Above, over, excess	**Hyper**tonic (having a higher solute concentration)
Hypo-	Below, under, deficient	**Hypo**thesis (under-thesis / an explanation below a law)
Iso-	Equal, same	**Iso**tonic (having equal solute concentration)
Macro-	Large	**Macro**molecule (a very large molecule, like DNA)
Micro-	Small	**Micro**scope (instrument used to view small objects)
Mono-	One, single	**Mono**mer (a single molecular building block)
Phago-	To eat, consume	**Phago**cytosis (cellular eating)
Philic *(suffix)*	Loving, attracted to	Hydro**philic** (attracted to water)
Phobic *(suffix)*	Fearing, repelled by	Hydro**phobic** (repelled by water)
Poly-	Many	**Poly**mer (a molecule made of many monomers)

Sacchar-	Sugar	Mono**sacchar**ide (a single sugar molecule)
Synthesis	To make, build, compose	Photo**synthesis** (making compounds using light)
Troph-	Nourishment, food	Auto**troph** (self-feeding organism)
-Lysis *(suffix)*	To split, break down, dissolve	Hydro**lysis** (breaking a bond using water)
-Ase *(suffix)*	Forms the name of an **enzyme**	Polymer**ase** (an enzyme that builds polymers like DNA)

Part 2: Incoming Vocabulary

Before diving into AP Biology, you need a firm grasp of these foundational concepts from standard biology and chemistry **(these are also fair game for showing up on a beginning of the year quiz).**

1. Cellular Foundation

- **Prokaryote:** A simple, single-celled organism that lacks a nucleus and membrane-bound organelles (e.g., bacteria).
- **Eukaryote:** A more complex organism whose cells contain a nucleus and specialized membrane-bound organelles (e.g., plants, animals, fungi).
- **Organelle:** A structural subunit within a cell that performs a specific function (e.g., mitochondria, ribosome).
- **Ribosome:** The cellular site of protein synthesis.

2. Basic Biochemistry

- **Macromolecule:** Large organic molecules essential for life: Carbohydrates, Lipids, Proteins, and Nucleic Acids.
- **Hydrogen Bond:** A weak chemical bond formed when a slightly positive hydrogen atom is attracted to a slightly negative atom (crucial for water

properties and DNA structure).
- **Covalent Bond:** A strong chemical bond involving the sharing of electrons between atoms.
- **pH:** A scale measuring hydrogen ion concentration; indicates how acidic or basic a solution is.

3. Energy and Life

- **ATP (Adenosine Triphosphate):** The primary energy currency used by cells to perform work.
- **Autotroph:** An organism that produces its own food using light or chemical energy (a producer).
- **Heterotroph:** An organism that must consume other organisms for energy (a consumer).
- **Enzyme:** A biological catalyst (usually a protein) that speeds up chemical reactions by lowering activation energy.

4. Heredity & Continuity

- **DNA (Deoxyribonucleic Acid):** The molecule that carries genetic instructions for the development and functioning of all living organisms.
- **Genotype:** The genetic makeup of an organism (the specific alleles, e.g., Bb).
- **Phenotype:** The observable physical traits of an organism (e.g., brown eyes).

Summer Assignment

Objective: To familiarize yourself with the vocabulary of biology and observe how these concepts exist in the real world around you.

Task 1: Word Decoding (The Greek/Latin Root)

Using only the root word table in Part 1, breakdown and predict the definition of the following biology terms. *Do not look them up.* Write what you think they mean based on their pieces.

1. **Polymerase** (Hint: *-ase* usually means it's an enzyme)
2. **Glycoprotein**
3. **Endoparasite**

4. **Monosaccharide**
5. **Hydrophobic tail**
6. **Dehydrogenase** *(Hint: Look at the prefix, the middle root for a specific element, and the new suffix.)*
7. **Phagocyte** *(Hint: -cyte means cell.)*
8. **Glycolysis**
9. **Hydrolysis**
10. **Exocytosis** *(Hint: -osis often denotes a cellular process or condition. Focus on the prefix.)*

Task 2: Biological Scavenger Hunt (Photo Journal)

You will find **5** items from the list below in your everyday life (your backyard, a park, your kitchen, etc.). For each item:

1. Take a picture of it.
2. Write a **2-3 sentence description** using at least *two* vocabulary words from Part 1 or Part 2, explaining how your photo represents that biological concept.

Choose 5 items to find:

- An autotroph
- Evidence of decomposition (macromolecules breaking down)
- A carbohydrate/saccharide source
- A hydrophobic substance
- An organism displaying homeostasis (e.g., an animal panting, sweating, or basking in the sun)
- A eukaryotic organism

> **Example Entry:** *[Photo of a green leaf]* **Item:** An autotroph. **Description:** This plant is an **autotroph because** it uses **photosynthesis** to make its own food. The green color comes from chloroplasts, which are **organelles** inside its **eukaryotic** cells that capture sunlight.

Task 3: Concept Synthesis Short Answer

Answer the following prompt in a well-constructed paragraph (4–6 sentences).

> *Water is often called the molecule of life. Explain how **hydrogen bonds** allow plants to move water from their roots all the way up to their highest leaves, and why a change in environmental **pH** or temperature might disrupt a plant's internal balance (**homeostasis**).*