

AP BIOLOGY SUMMER ASSIGNMENT 2026
MS. CASTAGNA & MRS. KACHMAR

Welcome to AP BIOLOGY! Prerequisite knowledge of specific chemical and physical concepts at the regents level is highly recommended for this course. Provided is a series of resources and topics students are responsible for learning. Information can also be found in any NYS regents chemistry review book. Students' understanding of this material will be assessed the second week of classes on the Unit 1 Pre-test exam. Please use the sample questions and answer key provided as a reference. Specific details will be provided on the first day of class.

Unit 1 Prerequisite Resources: *These notes will NOT be covered in-class. Students are responsible for reviewing independently.*

1. [Pre-test exam sample questions](#)
2. [Text: Campbell Biology pages 30 - 67](#) (Chapters 2-4)
3. [Slides: Campbell Chemical Context of Life](#)

Unit 1 AP Biology Slides: *These notes WILL be covered in-class. Students are strongly encouraged to preview independently.*

1. [Unit 1 Chemistry of Life slides](#)

Topics:

1. Periodic Table
 - a. Familiarity with general arrangement
 - b. Identification of the elements of life
 - c. Distinguish between atomic number and mass number
2. Structure of Atoms and Elements (identification and definitions)
 - a. Atom
 - i. Protons
 - ii. Neutrons
 - iii. Electrons
 1. Valence electrons (importance in bonding)
 2. Ground and Excited States
 - b. Isotopes
 - c. Pure substances
 - i. Elements
 - ii. Compounds
3. Formulas and Equations
 - a. Distinguish between empirical versus molecular formulas of compounds
 - b. Identification of reactants, products, coefficients, and subscripts
4. Bonding (identification and definitions)
 - a. Electronegativity

- b. Lewis dot diagrams (*students are not required to construct*)
- c. Covalent bonds
 - i. Nonpolar covalent
 - ii. Polar covalent
- d. Molecular substances
 - i. Polar molecules vs. polar bonds
 - ii. Nonpolar molecules vs. nonpolar bonds
 - iii. Molecular symmetry
- e. Ionic bonding
 - i. Ion formation
- 5. Intermolecular forces (identification and definitions)
 - a. Hydrogen bonding
 - b. Ionic interactions
 - c. Van der waals forces
 - d. Disulfide bridges
- 6. Units of measurement, concentration, and solutions
 - a. Distinguish solute and solvent
 - b. Distinguish concentration versus dilution
 - c. Essential concentration units (identification and definitions):
 - i. Molarity (M)
 - ii. mg/mL and g/L
 - iii. Parts per million (ppm)
 - d. Distinguish hydrophilic and hydrophobic molecules
 - e. Identification of SI Units
 - i. meter (m)
 - ii. liter (L)
 - iii. gram (g)
 - iv. Important prefixes:
 - 1. Kilo-
 - 2. Centi-
 - 3. Milli-
 - 4. Micro-
 - 5. Nano-
- 7. Properties of Water
 - a. Hydrogen bonding and its importance in emergent properties
 - b. Emergent properties (definitions and examples)
 - i. Cohesion
 - ii. Adhesion
 - iii. Surface tension
 - iv. High Specific heat

- v. Heat of vaporization and evaporative cooling
 - vi. Density of water
 - vii. Universal solvent
- 8. Kinetics and Equilibrium
 - a. Identify factors affecting reaction rate
 - b. Energy diagram (definitions)
 - i. Potential energy
 - ii. Kinetic energy
 - iii. Activation energy
 - iv. Endothermic and exothermic reactions
- 9. Oxidation - Reduction (definitions)
 - a. Oxidation
 - b. Reduction
- 10. Acids, Bases, and pH (definitions)
 - a. Electrolyte
 - b. Hydrogen ion
 - c. Hydroxide ion
 - d. Acid
 - e. Bases
 - f. Neutralization
 - g. Buffer
 - h. How to read the pH scale
- 11. Organic Chemistry (definitions)
 - a. Bonding of carbon atoms
 - b. Hydrocarbons
 - c. Isomers
 - d. Functional groups (*structure and function of all groups - see Unit 1 slides above for complete list*)
 - e. Combustion reaction
 - f. Explanation of why carbon forms diverse molecules

We are looking forward to meeting you all and a successful school year ahead!

Have a wonderful summer! ☀️