AP Biology
Unit 1 – Intro to Biology, Chemistry, Macromolecules

Topic	- Guiding Questions
Ch 1 Introduction	1. Is a lawnmower alive? Which properties of life does it have? Lack? 2. Starting with an atom, what are the levels of biological organization? 3. Describe how living things are classified using KPCOFGS. 4. How have the categories for the domains of life changed over time? 5. What are the unifying themes of biology? 6. What theme or themes are exemplified by the sharp spines of a porcupine, the cloning of a plant form a single cell, and a hummingbird using sugar to power its flight? 7. What are the components of a strong lab experiment?
Ch 2 Chemistry Review	8. How does the composition of subatomic particles in an atom relate to the atom's atomic number, mass number, and charge? 9. Why are atomic weights on the periodic table not integer values? 10. Why do elements in the same period often have similar characteristics? 11. How is HONC useful in our study of the chemistry of living things? 12. What is the difference between nonpolar covalent, polar covalent, and ionic bonds? Give an example of each. What elements are often involved in each? 13. Under what circumstances do hydrogen bonds form? van der Waals interactions?
Ch 3 Water	14. Use the term "electronegativity" to explain why a water molecule is polar. 15. Explain how each of the following unique properties of water is a direct result of hydrogen bonding: cohesion/adhesion, temperature stabilization, ice expansion, water as the universal solvent. 16. What characteristics would you expect from a substance that is hydrophilic? Hydrophobic? 17. At the atomic level, how are basic, neutral, and acidic solutions different? What are some common examples of each?
Ch 4 Carbon	18. Explain how carbon's electron configuration allows it to form the backbone of a variety of diverse and complex organic molecules. 19. How many hydrogen atoms are in a molecule made of a 5 sided carbon ring with no double bonds? 20. Name, draw, describe and give the molecular formulas for the functional groups. 21. Would you expect molecules with a phosphate group to be hydrophobic or hydrophilic?Why?
Ch 5 Polymers	22. How are dehydration synthesis and hydrolysis reactions related? 23. Which of the four macromolecules are impacted by the reactions described in the question above? 24. Which of the macromolecules are chain like polymers?
Carbohydrates	25. What are the building blocks of carbohydrates? Name and describe the common monosaccharides and disaccharides. 26. What are the biological roles for each of the following polysaccharides: starch, glycogen, cellulose, chitin?
Lipids	27. How do each of the above compare on the molecular level? 28. What are the building blocks of lipids? 29. Explain how the chemical structure of saturated fatty acids is related to its chemical properties and how this compares to an unsaturated fatty acid. 30. Why are human sex hormones considered lipids? 31. Explain why phospholipids spontaneously self-assemble into micelles or bilayers in aqueous environments.
Proteins	32. What are the building blocks of proteins? Draw one monomer. 33. How many dehydration synthesis reactions are needed to form a protein 500 aa long? 34. How are the terms polypeptide, protein, and amino acid chain related? 35. How are the monomers of proteins similar yet different from each other? 36. What repeating pattern can be identified in the backbone of a polypeptide?
Nucleic Acids	37. What are the building blocks of nucleic acids? 38. Using base-pairing rules, how could you predict the percentage of each base in a segment of double-stranded DNA, if you know the segment is 30% thymine? 39. Name two ways DNA and RNA are similar. Name two ways they are different.