

AP Biology Summer Prep Guide

There are some things that you can brush up on that will make this year start easier and be more productive. You will want to be conversant (be able to hold an interactive conversation with me) on these topics. If you need some work to get to that level check the links. For some helpful video clips on the MANY topics in AP Biology check out the Bozeman Science AP Biology website.

<http://www.bozemanscience.com/ap-biology/>

This document will probably grow this summer as I work on plans for the year. Check my website or email me (john.hook@fotbendis.com) for updates.

Properties of water

Things to consider:

What causes water to be polar? Take this to the level of atomic behavior in the molecule.

What does solid water float in liquid water and why would we care?

Why does water have a high specific heat, and what is specific heat anyway?

What causes water to demonstrate capillary action and why is that important?

Water really isn't a universal solvent but so many solutes dissolve in it that it seems that way.

What causes this?

What causes water to have a moderating effect on Earth's climate?

<https://watereducation.utah.gov/waterscience/Properties/default.asp>

Biological macromolecule structure, behavior and function

Things to consider:

What are the 4 major types?

What elements do they have in common and which ones are unique to each type?

Why are proteins polypeptides but polypeptides are not (necessarily) proteins?

How do they interact with water?

How do their structural formulas differ?

Each are polymers so what are their monomers?

What is the primary function(s) of each type?

How are the monomers linked and separated?

<https://www.khanacademy.org/science/biology/macromolecules>

The importance of carbon

Things to consider:

Carbon chemistry

What is an organic molecule?

Why is carbon such a versatile component in organic molecules?

Describe the covalent bonding options available with carbon.

Which elements are most likely to be bonded to carbon in organic molecules?

The name similarity would make you think that hydrocarbons and carbohydrates would be nearly the same but there are major behavioral differences due to the difference in abundance of oxygen. Why does that matter?

Carbon isomers have the same molecular formulas but behave very differently. Why?

Amino, methyl, sulfhydryl, phosphate, hydroxyl, carbonyl and carboxyl are all very common and important parts of organic molecules. What types of biomolecules contain them?

Why is silicon often used as the base element for extraterrestrial life in science fiction movies?

<http://www.ck12.org/biology/Significance-of-Carbon/lesson/The-Significance-of-Carbon-Advanced-BIO-ADV/>

Membranes and Organelles

Describe the structure of a phospholipid bilayer membrane.

What causes this membrane to be selectively permeable?

Describe how osmosis moves water across this membrane.

How are solids moved across this membrane?

List the common plant and animal organelles and describe their functions.

What organelles to prokaryotes and eukaryotes have in common?

<https://www.khanacademy.org/test-prep/mcat/cells/cell-membrane-overview/v/cell-membrane-introduction>

<https://www.khanacademy.org/test-prep/mcat/cells/eukaryotic-cells/a/organelles-article>

Photosynthesis and cellular respiration

What is accomplished by photosynthesis and cellular respiration?

Describe the function of the enzyme ATP synthase in both systems.

Describe 2 reasons why is it technically inappropriate to say that glucose is **THE** end product for photosynthesis.

While the chloroplast and mitochondrion are very different organelles they manage to build ATP using very similar mechanics. Describe these similar systems.

<https://www.khanacademy.org/science/biology/photosynthesis-in-plants/introduction-to-stages-of-photosynthesis/v/photosynthesis>

<https://www.khanacademy.org/science/biology/cellular-respiration-and-fermentation>