AP Biology Summer Work

AP Biology is exciting, fun, rigorous and includes topics covered in a college course. Be sure to join our google classroom page and review the curriculum and pacing guide.

Be advised that emphasis is placed heavily on the understanding and communication of information, and not on memorization! Passing the AP exam and the class requires strong reading comprehension, math, writing and critical thinking skills. This is because ALL exam questions are application-based. Furthermore, ALL exams are cumulative! Also, be prepared to design and conduct your own controlled experiments, analyze data statistically and communicate your results through presentation.

This course requires a very special commitment from you! One small part of this commitment is a summer assignment. The summer assignment will give you the chance to demonstrate that you have the best intentions of giving this course your dedication, study time, intelligence, and humor. This summer assignment will focus on Unit 1: Chemistry.

Know that time management is KEY in this class. Starting in September, you will need to put in at least 5-10 hours EVERY week, ALL year long, JUST on this class to be successful. Again, this is a college-level course. This means that the quality of work expected and demanded from you will be at that level ALL year long. So, you may have work to do over school breaks, on snow days and certainly on weekends.

If you truly are up to this challenge, then get started! There is no time like the present! We will check on you over the summer to see how you are doing. Set a goal for yourself to complete your masterpieces well BEFORE the due date which is also the date of your first exam. This occurs within the first few weeks of September and will be announced at the start of the school year.

Have fun!

Objectives of summer assignment:

1. Complete & watch assigned Khan Academy videos for Unit 1
   a. CLICK THIS LINK TO JOIN THE KHAN ACADEMY CLASS
   b. Complete all the assignments for unit 1(Videos, articles and quizzes)
   c. Create handwritten notes for each VIDEO (Should be a total of 24)

   d. I will be able to see how long you watched each video. Do not wait till the last minute. You will not get full credit if you do not watch the entire video in addition to the notes.

2. Students will construct and use authentic, creative foldables as study tools to prepare for the Unit 1: Chemistry test, which will be administered after the first 2 weeks of school.

Summer Work Assignment:

Part 1: *Khan Academy Assignments for Unit 1*

A. CREATE HANDWRITTEN NOTES THAT GO ALONG WITH EACH VIDEO

B. Complete all assignments on Khan Academy

Part 2: All About Water Foldable

Part 3: *Macromolecules Foldable*

Suggested Supply List:

- Cardstock or construction paper
- Plain white paper
- Colored pencils, crayons, or markers
- Pen or pencil
- Manila Folder
- Camera

Due Date:

The summer assignment is due on the day of class. ***50% of the total grade*** will be deducted for each late day.

Grading:

- ☐ 1 participation grade for completing the Khan Academy assignments
- ☐ 1 assessment grade for the notes
  - ☐ WE WILL TAKE A PRACTICE EXAM THE FIRST WEEK OF CLASS WHERE I WILL ALLOW YOU TO USE YOUR NOTES. DO THESE WELL

- ☐ 1 assessment grade for EACH OF THE FOLDABLES
  - ☐ All About Water Foldable
  - ☐ Macromolecule Foldable

Questions/Concerns:
If you have any questions or concerns, please email your teacher.

zsylvester@jacksonsd.org or GAntonelli@jacksonsd.org

PART 1 : KHAN ACADEMY VIDEO ASSIGNMENTS + NOTES

- ☐ Join the class with this link
- ☐ Take handwritten notes for the video only (There should be a total of 24)
  - ☐ You will be able to use these notes when you take your practice exam the first week of school so it is to you benefit to do these well
- ☐ complete the assigned videos, articles to gain credit.

PART 2A: ALL ABOUT WATER Foldable

INSTRUCTIONS:

You will construct an authentic booklet that describes, explains and illustrates key properties of water as related to biological systems. Your goal is to demonstrate that water is essential to biological systems and that the properties of water are actually observable in everyday life.

All work **must be handwritten** (NOT typed) in either blue or black pen AND in complete sentences. No exceptions! You may use any type of paper, though card stock is strongly recommended (any color). Your booklet may be of any size; however, keep in mind that it should be small enough to fit neatly in your binder but also large enough to fit pictures, descriptions and explanations. It is suggested that you collect all of your information BEFORE making the booklet as to best estimate the size of your booklet.

Be creative and put forth your very best effort as this assignment will be a part of your study guide for the test. While each student's booklet will cover the same content, each booklet will all be unique to the student creating it!

***To make sure your photographs are in fact authentic, place one small object to appear in every single photograph (examples: coin, figurine, keychain, etc….).**

Cover Page (4 points)

- Hand-made booklet
- Your first and last name, printed in blue or black pen
- Class Period
- Authentic Pictures/Drawings (at least two)

Page 1– Cohesion and Adhesion (5 points)

- **Describe** cohesion and adhesion.
  Include 1 authentic photograph illustrating both cohesion and adhesion in everyday life.
- **Explain** how your photograph illustrates cohesion and adhesion.
- **Propose a model** for how plants transport water upwards, against gravity, without the use of energy (Hints: look up water potential and transpiration).
  Include an authentic, labeled drawing that supports your model.

Page 2– Moderation of Water Temperature (6 points)

- **Describe** moderation of temperature as it relates to water.
  Include 1 authentic photograph illustrating moderation of temperature.
- **Explain** how your photograph demonstrates moderation of temperature.
- **Discuss** the importance of moderation of temperature inside of living things.
- **Make a claim** that explains how moderation of water temperature lets aquatic organisms survive during the winter months.
  Justify your claim by illustrating (authentic drawing) moderation of temperature. Be creative!

Page 3– Universal Solvent (7 points)

- **Describe** how water is a universal solvent.
  Include 1 authentic photograph illustrating water as a universal solvent.
- **Describe** the role of hydration shells in dissolving particles.
- **Propose a model** that explains how soap works to remove dirt.
  Include an authentic, labeled drawing to support your claim.
- **Define** pH as it relates to water dissociation.
  Include an authentic drawing of the pH scale and the formula for pH. **Explain** how the formula relates to the pH scale. (Hint, as you move from one number to another on the pH scale, how much does the concentration of the solution increase?).

Page 4– Density (6 points)

- **Describe** the states of matter for water.
  Include 1 authentic photograph illustrating water density.
- **Describe** how water density at different states relates to the water cycle.
  Include 1 authentic, labeled drawing of the water cycle.

- **Make a claim** that explains how/why water density allows for aquatic organisms to survive during the winter months.
  Include 1 authentic, labeled drawing to support your answer. Be creative.

Page 5– Polarity (3 points)

- **Describe** the term polarity as it relates to water.
- **Make a claim** for why oil and water do not mix.
  Include 1 authentic photograph that supports your claim. Be sure to explain.

Page 6– High Specific Heat (4 points)

- **Describe** high specific heat as it relates to water.
  Include 1 photograph illustrating water's high specific heat.
- **Make a claim** for why living systems rely on water's high specific heat to maintain homeostasis.
  Include a labeled drawing to support your answer.

Booklet Grading Rubric

Content (35 points)

Neatness (5 points)

Creativity and Authenticity (10 points)

Total Points: /50

Macromolecules Foldable
AP Biology Summer Assignment, Part 2

INSTRUCTIONS:

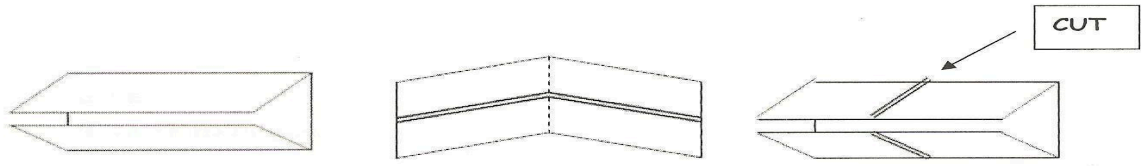
You will construct an authentic foldable that describes, explains and illustrates key properties of macromolecules as related to biological systems. Your goal is to demonstrate that macromolecules are the building blocks of biological systems.

All work **must be handwritten** (NOT typed) in either blue or black pen AND in complete sentences. No exceptions! You need to use a folder (manila suggested).

Be creative and put forth your very best effort as this assignment will be a part of your study guide for the test. While each student's foldable will cover the same content, each booklet will all be unique to the student creating it!

***To make sure your photographs are in fact authentic, place one small object to appear in every single photograph (examples: coin, figurine, keychain, etc….).**

Fold and cut one piece of plain paper as shown below to make 4 tabs:



FRONT SIDE OF TABS:(5 points)

1. Name each macromolecule.
2. Take a *picture* for each macromolecule. Be creative!

Tab A
CARBOHYDRATE

TAB B
LIPID

TAB C
PROTEIN

TAB D
NUCLEIC ACID

INSIDE OF EACH TAB:

TAB A – Carbohydrates (12 points)

1. Identify the *elements* that make up carbohydrates (ex: C, H. O, N, P,S)
2. Identify the specific *monomer* for carbohydrates. Give **two** *examples*.
3. Draw the general shape of a carbohydrate monomer.
4. Name the type of covalent bond found in carbohydrate polymers.
5. List **four** polysaccharides and their *importance*.
6. List **two** key *functions* of carbohydrates in living systems.

TAB B – Lipids (10 points)

1. Identify the *elements* that make up lipids.
2. Lipids do <u>not</u> contain true polymers. Explain how lipids are *classified*.
3. List **two** key *functions* of lipids.
4. Draw the general shape of a saturated AND unsaturated fatty acid.
5. What are phospholipids and where are they found in cells?
6. Why are human sex hormones considered lipids? Give one example.

TAB C – Proteins (12 points)

1. Identify the *elements* that make up proteins.
2. Identify the *monomer* for proteins. *Draw* the general structure for the monomer.
3. List **3** key *functions* of proteins.
4. Identify and explain the *four* levels of protein folding.
5. Identify the chemical bonds involved at each stage of protein folding.
6. What are enzymes?

TAB D – Nucleic Acids (7 points)

1. Identify the *elements* that make up nucleic acids.
2. The *monomer* for nucleic acids is a nucleotide. Draw and label the parts of a *nucleotide*.
3. Identify the **two** types of nucleic acids and their roles in heredity. Compare their structures.
4. Identify the nitrogenous bases found in both types of nucleic acids.
5. Name the specific type of covalent bond found in nucleic acids.

*Take the foldable and paste it into the manila folder on the left hand side.

On a second sheet of white paper, complete the tasks below.

Chapter 2 The Chemical Context of Life (10 points)

1. Create a chart that alphabetizes then defines and/or pictures the following terms:

   elements, compounds, essential elements (list them), trace elements (list them), atom, atomic number, atomic mass number, isotope, radioactive isotope, half life, electron shells, valence electrons, valence shell, orbital, chemical bond, molecule, electronegativity, nonpolar covalent bond, polar covalent bond, ion, ionic bond, ionic compound, hydrogen bond, van der Waals interactions, chemical reaction, reactant, products

Chapter 4 Carbon and the Diversity of Life (10 points)

1. Write a *paragraph* explaining how the chemical structure of the carbon atom has allowed for such diversity of organisms on Earth. Include labeled drawings to support your answer. Be sure to include the mass and atomic numbers for carbon as well as the number of valence electrons it has.

Chapter 5 Synthesis and Breakdown of Polymers (10 points)

1. Do a bit of research on two types of chemical reactions: DEHYDRATION SYNTHESIS and HYDROLYSIS.
2. Explain each type of reaction in detail.
3. Draw diagrams showing the following examples:
   a) The condensation reaction for joining 2 amino acids to form a dipeptide. Be sure to indicate the amino groups, the peptide bond and the carboxyl groups.
   b) The hydrolysis reaction of a disaccharide.

Paste this sheet of paper into the manila folder on the right hand side.

Foldable Grading Rubric

Front Cover (5 points)
-Your first and last name
-Your class period
-At least 2 authentic drawings
-A creative title

Content (76 points)

Neatness (4 points)

Creativity and Authenticity (5 points)

Total Points: 90