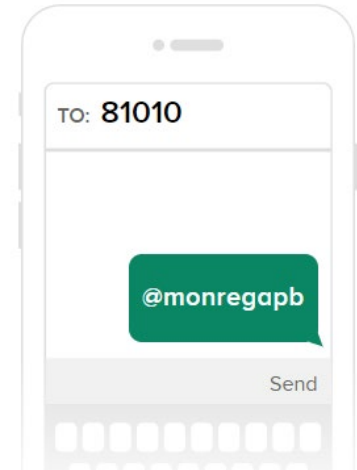


AP Biology Summer Work

What to do before the end of the school year:

1. Sign up for google classroom: **eqm5w24**
2. Sign up for our **Class Remind** (I promise not to bother you during the summer, it's more for you to quickly get in touch with me if needed)
Text : @monregapb to phone number: 81010
3. Pick up your text book in Room 704 (or main office for freshman)
4. Log into your GIZMOS account <https://gizmos.explorelearning.com/>



USERNAME: _____

PASSWORD: _____

Welcome to AP Biology!

I look forward to meeting you and/or seeing you again. My name is Mrs. Roach and I have been teaching at Monmouth Regional for fifteen years (but I'm sure we'll get to know more about each other as the course progresses). The two main goals of AP Biology are to help you develop a conceptual framework for modern biology and to gain a deeper appreciation of science as a process (as opposed to an accumulation of facts-though memorizing facts will also be a big part of the class)

Because of the rapid pace of discovery in the life sciences our primary emphasis is on developing an understanding of unifying concepts that connect the major topics of biology. The AP Biology Curriculum centers around the four Big Ideas and you will need to not only know these but also understand how they all relate:

-Big Idea 1: The process of evolution drives the diversity and unity of life.

-Big Idea 2: Biological systems utilize free energy and molecular building blocks to grow, to reproduce and to maintain dynamic homeostasis.

-Big Idea 3: Living systems store, retrieve, transmit and respond to information essential to life processes.

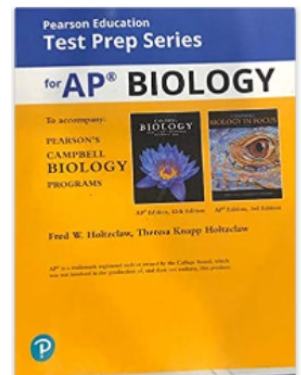
-Big Idea 4: Biological systems interact, and these systems and their interactions possess complex properties.

What to do before the first day of school:

1. AP Biology was designed by a select group of college professors and high school science teachers to be equivalent to an introductory college biology course. Visit the below College Board site to explore what an AP Biology course is like:

<https://apstudent.collegeboard.org/apcourse/ap-biology>

****You do NOT need to purchase a test prep book, the school is buying a class set that is aligned with our textbook ****



*It goes without saying that AP courses are designed to be stand-ins for an introductory college course. **As such, college level discipline will be required to be successful.** That includes summer work, homework and reading outside of class, being fully engaged while in class, coming after school for extra help when needed, completing assignments on time, and doing test prep on your own free time.*

2. Complete the summer assignment on the next pages! The chart below is a snap-shot of the five assignments and approx. time. How you will be assessed on them is also included. These assignments can be done in any order and should only take you about 4 hours total of your entire summer

Assignment	Why am I doing This?	Approx. Time	How It Will Be Assessed
Introductory Email	So I can get to know you and plan the class to your strengths	5 min	Just have to do it!
Biology Prefixes/Suffixes	It is impossible to learn every biology word- knowing roots is greatly helpful when decoding unfamiliar information	Varies- just have to memorize	Quiz
Chemistry Review	Basic concepts in chemistry we will not have time to formally go over in class. Chapter 2 and 3 in text	1-2 Hours (This will take the longest)	Just have to do it! We will review the answers in class do not stress if you're unsure of a question
GIZMOS Cell Parts/Functions	Cell parts and functions are vital to AP Bio success Also we use GIZMOS in class frequently and this will introduce you to them	30-45 min	Review in class; cell parts and functions Quiz first few weeks of school
OPTIONAL GIZMOS STEM Case: Diffusion	This one is <u>NOT mandatory</u> but gives you a chance to see an AP Level type case study in a simulation.	1 hour	We will be completing many of the GIZMOS STEM cases as part of our curriculum. This gives you a chance to do one on your own time GIZMOS will record your answers as you work through the simulation you do not have to complete it in one sitting

Assignment 1: Introductory Letter

We will engage in a great deal of collaborative learning. It is **important** that you now, as a young adult getting ready to enter college, work on email communication. I expect that you might struggle throughout the year, and I hope that you will keep an open line of communication with me.

You will write a letter of introduction to Mrs. Roach at jroach@monmouthregional.net. Please remember you're likely writing a letter that's making your first impression on a new teacher, so check for grammar/spelling and appropriate phrasing before sending. Please include the following:

Subject Line: AP Biology 2022-2023 and your name (example: AP Biology 2022-2023: Joe Smith)

Body: Greeting (Hello Mrs. Roach, etc.)

1. Introduce yourself:

- a. What's your name? Do you have a nickname that you go by? How do you pronounce your name?
- b. What grade are you in?
- c. What are your preferred pronouns?
- d. What do you like to do (hobbies, sports, music, shows, movies, interests, etc.)?
- e. Do you have a job or plan on getting a job next year? What kind?

2. Courses:

- a. What science classes have you taken so far, and who were your teachers for them?
- b. How many AP classes have you taken before this year?
- c. What subject area(s) are you most interested in continuing in college?
- d. Is there anything that you've especially liked or disliked about your earlier biology classes?

3. Learning:

- a. What are your personal strengths when it comes to learning new material?
- b. What causes you to struggle in a course? How do you address that challenge?
- c. What is the most effective way you've found to study for a test?
- d. How would you describe yourself as a learner?
- e. How would you describe yourself as a team or group member?

4. AP Bio:

- a. What are you looking forward to most in AP Biology?
- b. Do you have any concerns coming into AP Biology this year?
- c. Why are you taking AP Biology? What do you hope to accomplish/gain from this course?

Closing, your name

Assignment 2 : Biology Prefixes and Suffixes- Memorize Them

Knowing these will help you decode terms and concepts you are unfamiliar with. I will make digital Quizlet/Flashcards to help you study (Google Classroom)

Prefix	Meaning	Suffix	Meaning
Ecto-	<i>Outer</i>	-able	Capable of
Auto-	<i>Self</i>	-ase	Enzyme/Protein
Chloro-	<i>Green</i>	-carn	Meat or flesh
Chrom-	<i>Color</i>	-cellular	Related to Cells
Cyto-	<i>Cell</i>	-chem	Dealing with chemicals
Glyco-	<i>Sugar</i>	-chrom(e)	Color
Chemo-	<i>Chemicals</i>	-in	Protein
Hetero-	<i>Different (2+)</i>	-cyte	Cell
Homo-	<i>Same (1)</i>	-itis	Disease
Hydro-	<i>Water</i>	-kinesis	Movement, motion
Macro-	<i>Big</i>	-logy	Study of
Meso-	<i>Middle</i>	-lysis	To break
Micro-	<i>Small</i>	-ose	Sugar
Mono-	<i>One</i>	-philic	Love
Multi-	<i>Many</i>	-phobic	Hate
Iso-	<i>Equal</i>	-phyll	Leaf
Poly-	<i>Many</i>	-phyte	Plant
Hyper-	<i>Above, Over</i>	-plasm	Material forming cells
Therm-	<i>Heat</i>	-plast	Organized living material
Uni-	<i>One</i>	-sis	Condition, state
Zoo-	<i>Related to Animals</i>	-synthesis	To put together
Phyto/Photo-	<i>Sun/Light</i>	-troph	Food
Hypo-	<i>Below, lower</i>	-ic	acid (citric acid)
Endo-	<i>inside</i>	-ate	acid (citrate)same thing as "citric acid"

Assignment 3: AP Biology Essential Chemistry -

This is a review of basic chemistry- we will not spend a lot of class time on these concepts as they should have been learned in chemistry. **Please use Chapter 2 and 3** in your book (may also have to research online)

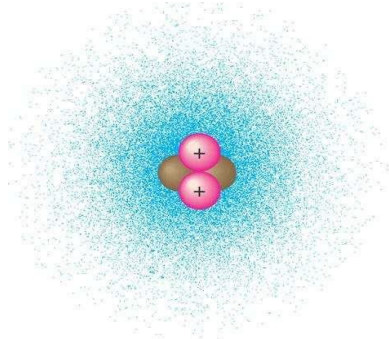
1. Circle the **COMPOUNDS** below

Na Cl₂ NaCl MgO₂ N₃ C₆H₁₂O₆

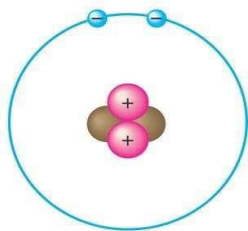
- 2.

Element	Symbol	Charge/Oxidation Number	Found in (Circle all that apply)
Carbon			Carbohydrates Fats/Lipids Proteins Nucleic Acids
Hydrogen			Carbohydrates Fats/Lipids Proteins Nucleic Acids
Oxygen			Carbohydrates Fats/Lipids Proteins Nucleic Acids
Nitrogen			Carbohydrates Fats/Lipids Proteins Nucleic Acids
Sulfur			Carbohydrates Fats/Lipids Proteins Nucleic Acids
Phosphorus			Carbohydrates Fats/Lipids Proteins Nucleic Acids

3. Label the diagram below and define the terms that you label.



(a)



(b)

4. Contrast the terms atomic mass and atomic number.
5. What determines interactions between atoms? (circle one)
- Protons
 - Neutrons
 - Electron
 - Valence Electrons

6. Match the following terms:

___1. Chemical bond
another

___2. Covalent bond

___3. Single bond

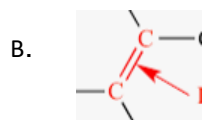
___4. Double bond

___5. Electronegativity

___6. Nonpolar covalent bond

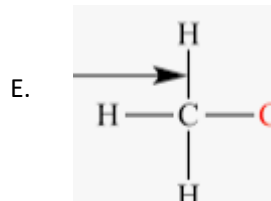
___7. Polar covalent bond

A. the ability of an atom to attract to itself an electron pair shared with
atom in a chemical bond.

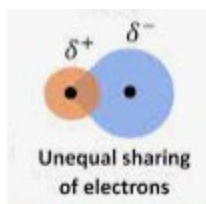


C. the interatomic linkage that results from the sharing of an electron pair
between two atoms.

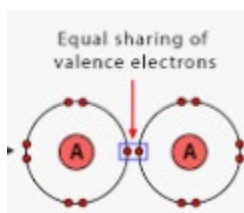
D. the attraction between two or more atoms that allows them to be able to
form a stable chemical compound.



F.



G.



7. Write the molecular formulas for the following molecules.

Molecule	Molecular Formula
Oxygen gas	O ₂
Carbon dioxide	
Glucose	
Phosphate	
Ammonia	
Water	

8. How do ionic bonds compare with covalent bonds?

9. Why is water considered a polar molecule?

10. For each of the below listed properties of water - briefly define the property and then explain how water's polar nature and polar covalent bonds contribute to the water special property.

http://www.youtube.com/watch?v=HVT3Y3_gHGg&list=PL6C159EF1A62143A2&index=11

a. Cohesion

b. Adhesion

c. Surface tension

d. High specific heat

e. Heat of vaporization

f. Evaporative cooling

11. Circle the properties of water that describe each phenomenon below. You may circle more than one

Phenomenon	Properties of Water (circle all that apply)
During the winter, air temperatures in the northern United States can remain below 0°C for months; however, the fish and other animals living in the lakes survive.	Cohesion Adhesion Surface tension High specific heat Heat of vaporization Evaporative cooling Polarity
Many substances-for example, salt (NaCl) and sucrose-dissolve quickly in water.	Cohesion Adhesion Surface tension High specific heat Heat of vaporization Evaporative cooling Polarity
Sweating and the evaporation of sweat from the body surface help reduce a human's body temperature.	Cohesion Adhesion Surface tension High specific heat Heat of vaporization Evaporative cooling Polarity
Water drops that fall on a surface tend to form rounded drops or beads.	Cohesion Adhesion Surface tension High specific heat Heat of vaporization Evaporative cooling Polarity
Water drops that fall on your car tend to bead or round up more after you polish (or wax) the car than before you polished it.	Cohesion Adhesion Surface tension High specific heat Heat of vaporization Evaporative cooling Polarity
If you touch the edge of a paper towel to a drop of colored water, the water will move up into (or be absorbed by) the towel.	Cohesion Adhesion Surface tension High specific heat Heat of vaporization Evaporative cooling Polarity
When you pour water into a 25-ml graduated cylinder, a meniscus forms at the top of the water column	Cohesion Adhesion Surface tension High specific heat Heat of vaporization Evaporative cooling Polarity

12. Match the following terms:

- | | |
|------------------------|---|
| ___1. Solute | a. Particles that are dissolved in a solution |
| ___2. Solvent | b. is a solution in which the solvent is water. It is mostly shown in chemical equations by appending (aq) to the relevant chemical formula |
| ___3. Aqueous solution | c. is the amount of a substance in a certain volume of solution (M) |
| ___4. Hydrophilic | d. Not soluble in water (water fearing) |
| ___5. Hydrophobic | e. Substance able to dissolve other substances (usually water) |
| ___6. Molarity | f. Soluble/ able to dissolve in water (water loving) |

A. Molarity - <http://www.wikihow.com/Calculate-Molarity>

a. Symbol:

b. Equation:

c. What does "Concentrated" mean? (circle one) High Solute Low Solvent Low Solute High Solvent

d. What does "Dilute" mean? (circle one) High Solute Low Solvent Low Solute High Solvent

13. Circle whether the following compounds are ACIDS or BASES

Compound	Acid or Base? (circle)	
H ₂ SO ₄	ACID	BASE
NaOH	ACID	BASE
CH ₃ COOH	ACID	BASE
KOH	ACID	BASE
NH ₃	ACID	BASE

14. What is special about carbon that makes it the central atom in the chemistry of life

15. Match the functional group with its molecular structure

1. ___Hydroxyl

2. ___Carbonyl

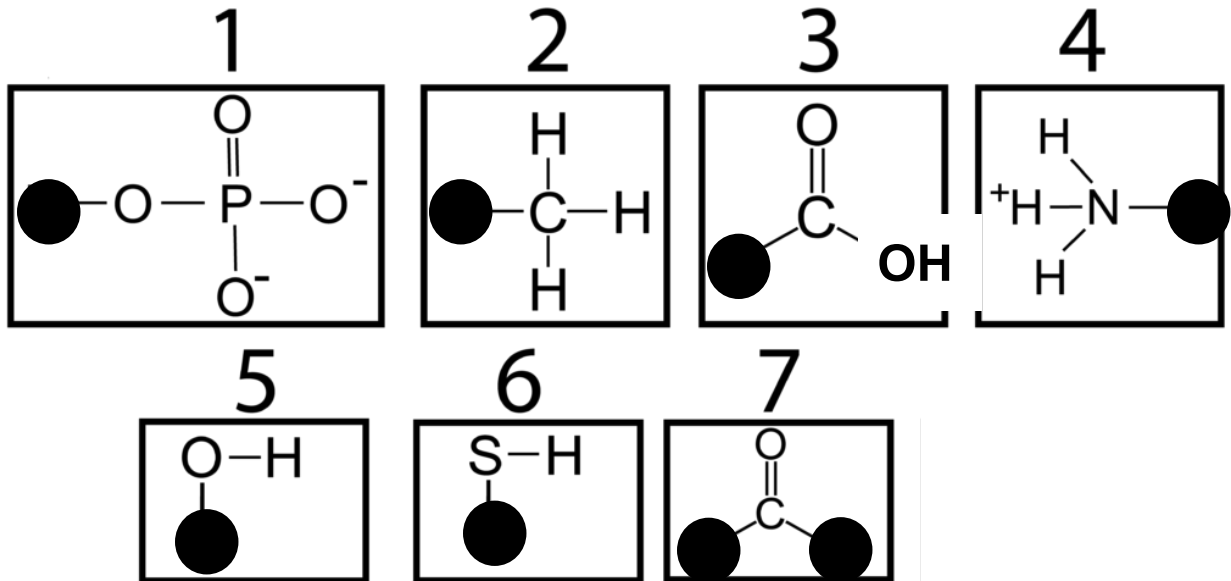
3. ___Carboxyl

4. ___Amino

5. ___Sulfhydryl

6. ___Phosphate

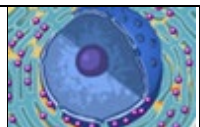
7. ___Methyl




Assignment 4: AP Biology Cell Structure and Function GIZMOS

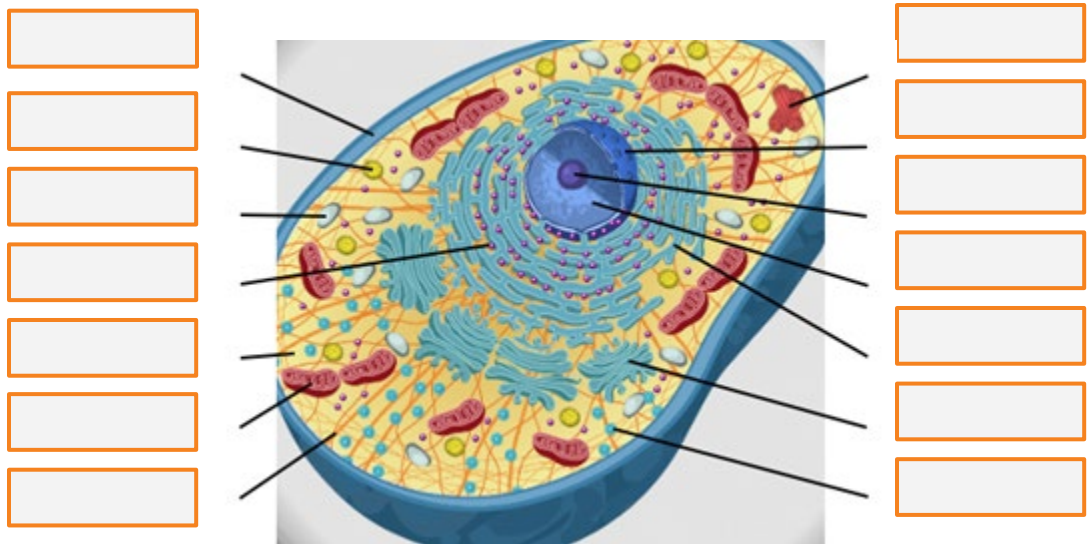
Student Exploration: Cell Structure (click for GIZMO or go to Google Classroom for the Link)

Directions: Follow the instructions to go through the simulation. Respond to the questions and prompts in the orange boxes.

<p>Activity A: Animal cells</p>	<p><u>Get the Gizmo ready:</u></p> <ul style="list-style-type: none"> • Check that an Animal cell is mounted on the microscope. 	
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Question: **Organelles** are specialized structures that perform various functions in the cell. What are the functions of the organelles in an animal cell?


1. Label: Locate each organelle in the animal cell.  Label the organelles in the diagram below. (Double-click on each box, then add the text to the box and click **Save and Close**.)



2. Match: Read about each organelle. Then match each organelle to its function/description.

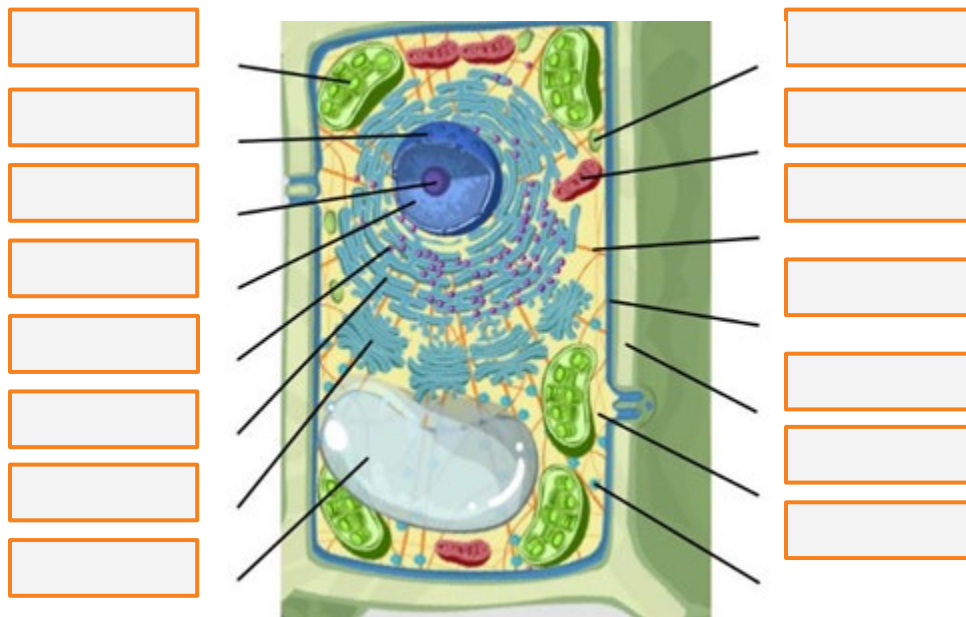
	Cytoplasm	A. Structure that organizes motion of chromosomes.
	Lysosome	B. Stack of membranes that packages chemicals.
	Mitochondria	C. Membrane that protects the nucleus.
	Centriole	D. Membrane that surrounds and protects the cell.
	Endoplasmic reticulum	E. Sac filled with digestive chemicals.
	Vacuole	F. Structures that convert nutrients to energy.

	Cell membrane	G. Passageways where chemicals are made.
	Nucleus	H. Jelly-like substance within the cell membrane.
	Cytoskeleton	I. Structure that manufactures ribosomes.
	Ribosome	J. Structure that contains DNA and regulates genes.
	Nuclear membrane	K. Package created by the Golgi apparatus.
	Golgi apparatus	L. Small structure that synthesizes proteins.
	Vesicle	M. Sac that stores water, nutrients, or waste products.
	Nucleolus	N. Tubules and filaments that give the cell its shape.

Activity B: Plant cells	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> Select the PLANT CELL tab, and click Sample. 	
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Question: What functions do the organelles in a plant cell perform?

1. Label: Locate each organelle in the plant cell. Label the organelles in the diagram below. (Double-click on each box, then add the text to the box and click **Save and Close**.)



2. Compare: What structures are present in an animal cell, but not in a plant cell?

2. Match: Read about each organelle. Then match each organelle to its function/description.

	Capsule	A. Hair-like structure that the cell uses for movement.
	Nucleoid	B. Hair-like structure that attaches the cell to a surface and can transfer genetic material from one cell to another.
	Plasmid	C. Region inside the cell that contains genetic material but is not surrounded by a nuclear membrane.
	Flagellum	D. Outermost layer of the cell that provides protection.
	Pilus	E. Circular piece of genetic material.

3. Compare: What structures are present in a bacterial cell, but not in a plant or animal cell?

What structures are present in plant and animal cells, but not in a bacterial cell?

What structures inside plant and animal cells look like bacteria?

****OPTIONAL NOT MANDATORY****

AP Biology STEM Case: Diffusion

Please login into <https://gizmos.explorellearning.com> and under our class (AP Bio) Click on the Diffusion STEM Case to begin

1. It will autosave all of your work
2. You DO NOT have to complete it in one shot. You can leave and come back to it at anytime
3. You cannot go back and edit most answers so be certain of what you want to say/click before you do
4. You must complete the entire Handbook before you can proceed with the case. Once you complete the handbook you can go back and reference it any time you like

The screenshot displays the Gizmos Diffusion STEM Case interface. The main content area features a video titled "Steroid Treatment" showing a healthcare professional in blue scrubs and gloves administering a steroid injection to a patient. The interface includes a navigation menu on the right with options like "Case Handbook", "Background", "Patient History", "Diffusion Data", "Treatment Order", "Treatment 1", "Treatment 2", "Treatment 3", "Steroid Treatment", "Analyze", "Final Revision", "Review", and "Conclusions". At the bottom, there are three interactive panels: "O₂ Levels (mmHg)" showing a graph of alveolar and blood entering lung levels, "Membrane Thickness (micrometers)" showing a graph of alveolar and blood levels, and "Surface Area (cm²)" showing a 3D model of an alveolus.