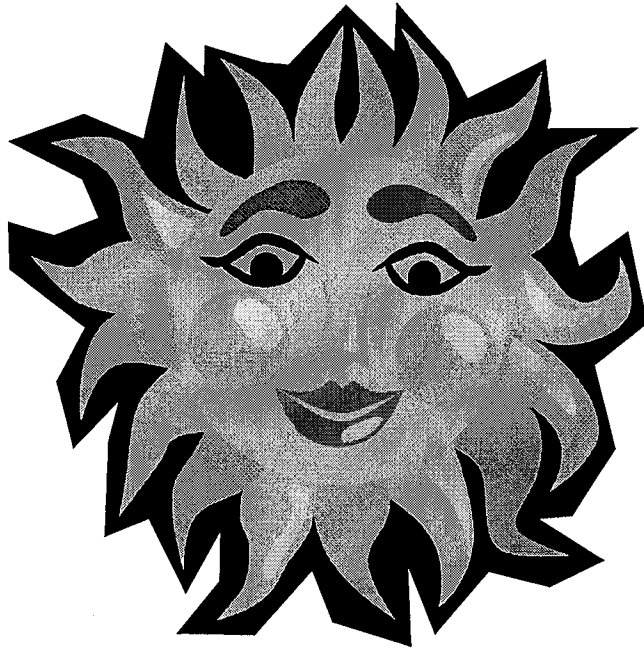


Attention AP Biology Students:

You must go to the Senior High Library to pick up a copy of “Your Inner Fish” by Neil Shubin in order to complete your summer assignment.

Ms. V



2015-2016~AP Biology
Summer Assignment and Course Reading Assignments

To all AP Biology Students and their Parents:

June 2015

Welcome to AP Biology. I have put together this Course Outline to help guide you through what will be a very challenging, yet rewarding, course. AP Biology is an extremely self-directed class that will require time management and organizational skills from everyone. We will be covering most of the material in a college level textbook and will be doing 12, in-depth, labs over the course of the school year.

What we have ahead of us is a demanding task. The course description, as set forth in the AP course handbook states: The AP Biology course is designed to be the equivalent of a college introductory biology course taken by biology majors during their first year. As a consequence we will be covering, on average, a chapter a week (sometimes more) out of a college level textbook for the entire year. The end result will be a much deeper knowledge of biology and (hopefully) a passing score on the AP Biology exam, that may lead to receiving college credit for all of your hard work.

Please understand that YOU, more than I, will determine your success in this course. This course moves at a rapid pace for the entire school year and nothing less than your full attention will be needed to keep your head above water.

I expect that all of you will have all of the required materials (see syllabus) on the first day of class and these materials will be brought to class daily. Please keep your AP Biology textbook at home in a very safe place. You should be reading the AP Biology textbook nightly so I do not expect you to carry it to and from school everyday. Should you need a textbook at school see me and I will lend you one for the day.

Attached you will find the AP Biology Summer Assignment. The AP Biology Summer Assignment is due the first day of class. There is a 10% penalty for each day this assignment is late. I will not accept the assignment past the 3 day mark. Over the summer, you should also read the Assigned chapters for Unit 1. You should be ready to discuss the information in these chapters on the first day of class.

If you have any questions about the AP Biology course, please stop by J-1 or email me at CVillanti@csh.k12.ny.us

Ms. Villanti

AP Biology Contact Information 2015-2016

Instructor Contact Information

Mrs. Christine Villanti

E-mail cvillanti@csh.k12.ny.us

Web Site: CSH home page

Textbook: Biology AP Edition~ Campbell & Reece (9th Edition)

Course Expectations

This is a course designed to prepare students for the College Board Advanced Placement Biology Examination and is based on the curriculum provided by College Board. Student will be provided the opportunity to experience laboratory investigations comparable to an introductory college level biology course, including inquiry based labs, and computerized data acquisition and analysis. The class requires learning at an accelerated pace due to the amount and complexity of requires material. Material will be covered through class activities, lectures, discussions and laboratories. A student's success will depend on the time and effort invested into this course.

Follow the Registration steps below to access your online textbook resources:

1. Register at <http://pearsonschool.com/access>
2. Enter the access code below
SSNAST-TRAIL-SKELF-TURVY-FIERI-MINES
3. Click on Covered Titles, click your title from the list: (Campbell, AP Biology 9th Edition)
4. Choose Student Registration
5. Click I accept at the bottom of the License Agreement page
6. Account Information- complete or verify your name and school information
7. Confirmation and Summary- list of websites where you can now log in
8. Log on to textbook resources at:
<http://wps.aw.com/bc> campbell biology 9 ap

YOU MUST ADD YOUR EMAIL ADDRESS TO MY SCHOOL WEB PAGE

Thank you,
Ms V

Textbook :

AP Biology Summer Assignment

The AP Biology Summer Assignment must be ORIGINAL work and neatly handwritten. This assignment is due at the start of class on the first day of class September 9, 2013.

1. Read Chapter 1~Introduction: Themes in the Study of Life
 - While you read Chapter 1 Complete the Chapter 1 Active Reading Guide
2. Read Chapter 2~ The Chemistry of Life
 - While you read Chapter 2 Complete the Chapter 2 Active Reading Guide
3. Complete the AP Biology Essential Chemistry packet; make sure you answer all questions completely and legibly.

The Following is Optional (this material will be covered in the first 3 weeks of class)

Read Unit 1 ~Chapters 22,23,24,25,& 26

- There are many approaches to learning and you will need to develop your own strategies to master the concepts and the content of this course. One requirement for success is to be an **active learner**. Reading your text in a rush, or in a semiconscious daze, does not constitute "time studying". This textbook does an excellent job of presenting the material needed to be successful in AP Biology. When you are reading the assigned chapters, please take advantage of all that the textbook has to offer. Before reading a chapter, familiarize yourself with the Key Concepts of that chapter. As you read the chapter material, take time to look at the figures and tables presented in the text. Read the captions that accompany the figures and tables and allow yourself the time you need to digest the information presented. At the end of each section check your understanding of the material you just read by answering the Concept Check questions. At the end of each chapter there is a Summary of Key Concepts. Read this summary **BEFORE** you read the chapter to prepare yourself mentally for the concepts that will be presented. Then, read the Summary of Key Concepts **AFTER** completing the chapter to review what you have just read

Part II

AP Biology Summer Assignment: Your Inner Fish

DIRECTIONS

1. Read *Your Inner Fish* by Neil Shubin, Vintage Books, Random House, New York, 2009 (ISBN 978-0-307-27745-9)
2. **All students** will answer the Overview questions. Please site specific information in the book in answering each statement. This will be worth 50 points and is due the first day of class.
3. The discussion questions for the chapters listed below may be answered for an **optional** grade equivalent to 100 point test. This assignments needs to be typed and handed in the first day of class. No extensions.

DISCUSSION QUESTIONS

Overview questions (Keep these in mind as you are reading the book) Be complete with your answers and use examples. Write in full sentences and your answers should be about ½ a page double spaced.

1. Why should we care about evolution? Why is it important?
2. What does it mean to be human? Did your concept change after reading the book?
3. In what way do scientific explanations differ from other ways of knowing? What makes evolutionary biology a science?
4. What insights do we gain when we integrate molecular and fossil data?
5. Can we look to examples in the natural world to inform our conceptions of what is "normal" or ethical human behavior?

OPTIONAL QUESTIONS: Write your answers in complete sentences. These do not have to be long answers and most can be answered in just a couple of sentences.

Chapter 1 - Finding Your Inner Fish

1. Explain why the author and his colleagues chose to focus on 375 million year old rocks in their search for fossils. Be sure to include the types of rocks and their location during their paleontology work in 2004.
2. Describe the fossil Tiktaalik. Why does this fossil confirm a major prediction of paleontology?
3. Explain why Neil Shubin thinks Tiktaalik says something about our own bodies? (in other words – why the Inner Fish title for the book?)

Chapter 2 - Getting a Grip

2. How did Charles Darwin's theory explain these similarities that were observed by Owen?
3. What did further examination of Tiktaalik's fins reveal about the creature and its' lifestyle?

Chapter 3 - Handy Genes

1. Many experiments were conducted during the 1950s and 1960s with chick embryos and they showed that two patches of tissue essentially controlled the development of the pattern of bones inside limbs. Describe one of these experiments and explain the significance of the findings.
2. Describe the hedgehog gene.. Be sure to explain its' function and its' region of activity in the body.

Chapter 4 - Teeth Everywhere

1. Teeth make great fossils - why are they "as hard as rocks?"
2. What are conodonts?
3. Shubin writes that "we would never have scales, feathers, and breasts if we didn't have teeth in the first place." (p. 79) Explain what he means by this statement.

Chapter 5 - Getting Ahead

1. Why are the trigeminal and facial cranial nerves both complicated and strange in the human body?
2. List the structures that are formed from the four embryonic arches (gill arches) during human development.
3. What are Hox genes and why are they so important?
4. Amphioxus is a small invertebrate yet is an important specimen for study – why?

Chapter 6 - The Best Laid (Body) Plans

1. Early embryonic experiments in the 1800s led to the discovery of three germ layers. List their names and the organs that form from each.
2. Describe the blastocyst stage in embryonic development.
3. What is meant by "ontogeny recapitulates phylogeny?"
4. What type of gene is Noggin and what is its function in bodies?
5. Sea anemones have radial symmetry while humans have bilateral symmetry but they still have "similar" body plans – explain.

Chapter 7 - Adventures in Bodybuilding

1. Refer to the timeline on p.121 – what is most interesting to you about the timescale? Explain your reason.
2. What is the most common protein found in the human body? Name it and describe it.
3. Explain how cells "stick" to one another; give one example.
4. How do cells communicate with one another?

5. What are choanoflagellates and why have they been studied by biologists?
6. What are some of the reasons that “bodies” might have developed in the first place?

Chapter 8 - Making Scents

1. Briefly explain how we perceive a smell
2. Jawless fish have a very few number of odor genes while mammals have a much larger number. Why does this make sense and how is it possible?

Chapter 9 - Vision

1. Humans and Old World monkeys have similar vision – explain the similarity and reasons for it.
2. What do eyeless and Pax 6 genes do and where can they be found?

Chapter 10 - Ears

1. List the three parts of the ear; what part of the ear is unique to mammals?
2. An early anatomist proposed the hypothesis that parts of the ears of mammals are the same thing as parts of the jaws of reptiles. Explain any fossil evidence that supports this idea.
3. What is the function of the Pax 2 gene?

Chapter 11 - The Meaning of It All

1. What is Shubin’s biological “law of everything” and why is it so important?
2. What is the author trying to show with his “Bozo” example?
3. This chapter includes many examples of disease that show how humans are products of a lengthy and convoluted evolutionary history. Choose one of the problems listed below and briefly explain how ancient ancestors’ traits still “haunt” us:

- Obesity
- Heart disease
- Hemorrhoids
- Sleep apnea
- Hiccups
- Hernias
- Mitochondrial diseases

Afterword (new findings re: Tiktaalik)

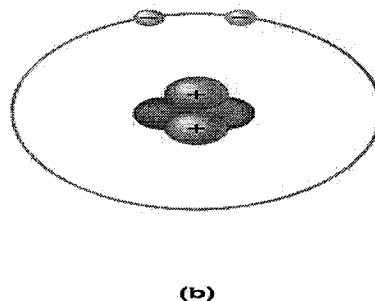
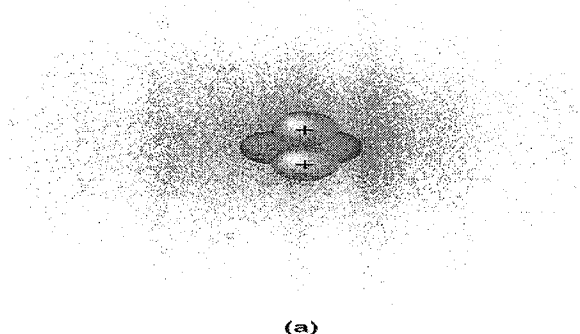
1. Tiktaalik was a fish that lacked an operculum – what does this tell us about the animal?
2. Tiktaalik had a true neck – what did this allow the animal to do (advantages?)
3. How was Tiktaalik able to survive in the cold Arctic environment?

AP Biology Essential Chemistry

Name: _____

This is a review of basic chemistry – we will not spend any class time on these concepts as they should have been learned in chemistry. Please make sure that you know them and if not, be sure to make the time to learn them. **Complete the following questions. You will hand this in on the first day of school for a homework grade! (There will also be a test on this information the first full week of school)**

1. Contrast the term element with compound.
2. Know the symbols of the following elements and their charge:
 - a. Carbon
 - b. Hydrogen
 - c. Oxygen
 - d. Nitrogen
 - e. Phosphorus
 - f. Sulfur
3. Label the diagram below and define the terms that you label.



4. Contrast the terms atomic mass and atomic number.
5. What is the difference between the terms atomic mass and atomic weight?
6. What is an isotope and what is "special" about radioactive isotopes?

7. What determines interactions between atoms? Why are valence electrons important?
8. Define the following terms:
- a. Chemical bond
 - b. Covalent bond
 - c. Single bond
 - d. Double bond
 - e. Electro negativity
 - f. Nonpolar covalent bond
 - g. Polar covalent bond
9. What is the difference between a structural and molecular formula?
10. Know both the molecular and structural formula for the following compounds.
- a. Oxygen gas
 - b. Carbon dioxide
 - c. Glucose
 - d. Phosphate
 - e. Ammonia
 - f. Water (you would be surprised at how many people missed this!!!)
11. How do ionic bonds compare with covalent bonds?

12. Compare and contrast hydrogen bonds and van der Waals interactions.
13. Define a dynamic chemical equilibrium in terms of quantities of reactants and products. This is a critical concept!
14. Why is water considered a polar molecule?
15. 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.
- a. Cohesion
 - b. Adhesion
 - c. Surface tension
 - d. High specific heat
 - e. Heat of vaporization
 - f. Evaporative cooling
16. What is special about water and density?
17. Explain how these properties of water are related to the phenomena described in the statements below. More than one property may be used to explain a given phenomenon.
- a. 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.
 - b. Many substances—for example, salt (NaCl) and sucrose—dissolve quickly in water.
 - c. When you pour water into a 25-ml graduated cylinder, a meniscus forms at the top of the water column.
 - d. Sweating and the evaporation of sweat from the body surface help reduce a human's body temperature.

- e. Water drops that fall on a surface tend to form rounded drops or beads.
- f. 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.
- g. 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.

18. Define the following terms:

- a. Solute
- b. Solvent
- c. Aqueous solution
- d. Hydrophilic
- e. Hydrophobic
- f. Molarity

19. MOLARITY

A. Concentration – *comparison of solute to solvent* (solute : solvent)

- a. Concentrated – *large ratio of solute to solvent*
- b. Dilute – *small ratio of solute to solvent*

B. Molarity –

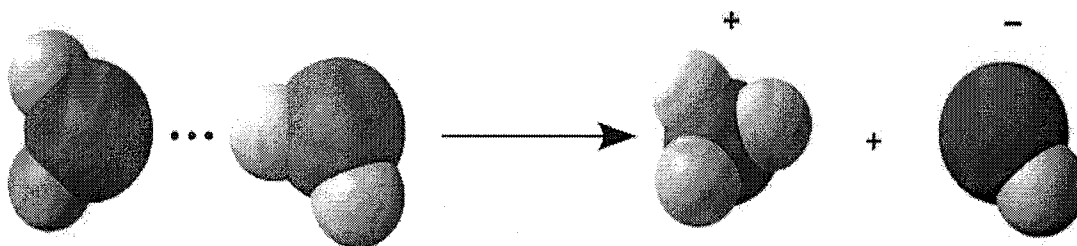
- a. Symbol – M
 - b. Equation – in reference table
- $$M = \frac{\text{moles of solute}}{\text{L of solution}} \qquad M = \frac{\text{mass}}{\text{molar mass}} \frac{1}{\text{L of solution}}$$

C. Example Problems

1. What is the molarity of a solution formed by mixing 10.0 g of H ₂ SO ₄ with enough water to make 0.100 L of solution?	2. To prepare 10.5 L of a 2.50 M solution of KOH, how many grams of potassium hydroxide must be used?
3. How many moles of LiBr must be added to .650 L of water to make a 2.0 M solution?	4. What is the molarity of the solution produced when 145 g of NaCl is dissolved in sufficient water to prepare 2.75 L of solution?

5. How many grams of KCl are needed to prepare 0.750 L of a 1.50 M solution?	6. What is the molarity of the solution produced when .594 mol of HCl is dissolved in 0.385 L of water?
7. To produce 3.00 L of a 1.90 M solution of sodium hydroxide, how many grams of NaOH must be dissolved?	8. If 8.77 g of KI are dissolved in enough water to make 4.75 L of solution, what is the molarity of the solution?

20. Label the diagram below to demonstrate the dissociation of the water molecule and then relate this diagram to the term pH.



21. What defines an acid and a base?

22. Why are small changes in pH so important in biology?

23. What is a buffer? Give an example on how they would work in a living organism.

24. What is acid precipitation and why is it important to living organisms?

25. Why is organic chemistry so important in the study of biology?

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

27. Describe and contrast the three types of isomers. Draw a sketch of each

- a. Structural –
- b. Geometric –
- c. Enantiomers –

28. Be familiar with each of the following functional groups – know it's chemical compound and the functional properties

- a. Hydroxyl
- b. Carbonyl
- c. Carboxyl
- d. Amino
- e. Sulfhydryl
- f. Phosphate

Remember macromolecules “the building block of life” from your prior biology class. Review the following about macromolecules are polymers, built from monomers

29. The large molecules of all living things fall into just four main classes. Name them.

30. Circle the three classes that are called macromolecules. Define macromolecule.

31. What is a polymer?

.a monomer?

32. Monomers are connected in what type of reaction? What occurs in this reaction?

33. Large molecules (polymers) are converted to monomers in what type of reaction?

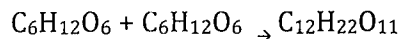
34. The root words of hydrolysis will be used many times to form other words you will learn this year. **I would advise you to be familiar with science root words, it will help you greatly! You can find a list for biology root words online....print it out and study them!**

What does each root word mean?

hydro-

lysis

35. Consider the following reaction:



a.) The equation is not balanced; it is missing a molecule of water. Write it in on the correct side of the equation.

b.) So, what kind of reaction is this?

c.) Is $\text{C}_6\text{H}_{12}\text{O}_6$ (glucose) a monomer, or a polymer?

d.) To summarize, when two monomers are joined, a molecule of _____ is always removed.