

Dear AP Biology Students,
Subject: Summer Assignment

April 27, 2010

I am really looking forward to next year and spending time with you in AP Biology. It's a very relevant course for careers in the medical field, but it is essential for everyone because our society is so technologically oriented. I am asking you to get started on the course over the summer because there is a lot we must cover in order for you to do well on the national test in May, and we will not have the month of May to work on it.

You will have a test on day two over the summer assignment outlined below and our first of 12 required labs will happen in the first week, so we are going to hit the ground running!

Let's get off to a good start by starting strong, and then keeping our focus throughout the year.

There are three things you need to do this summer.

First: Order your AP Biology Book; this will take some time to come in, so get this done early as you have a significant summer assignment to finish before school starts.

Second: Find your old Biology notes! We will be covering the same things, only in more detail. Having a basic understanding of the material will be important. You can read your old notes before we talk about the subject, as well as reading the chapter before you come to class. If you tossed them, try and get a friend's notes. **I will be giving review quizzes to start each unit that we cover to see where everyone is, and these will count for 10% of your grade.**

Third: Read chapters 1-4 and study it so that you will **be ready for a test over this material** on day 2 of our AP Biology class. We will have one review day before the test. The best way to do this is to read the four chapters in your book. Then go to the objective sheets in your packet and see if you can answer them. (Packets are at the front desk if you didn't get a chance to talk with me about it yet.) If not, go back and look up the answers. When you think you understand it, get together with someone else and explain it to them—be the teacher. Then, take the practice test at the end of the chapters in your study guide to test yourself. This would also be a great routine throughout the year.

The last handout in the packet is a list of medical suffixes, prefixes or root words. You will get one point per unit that can be added to any test, for a total of 5 points or 10 percentage points. You might want to get a head start on this during the summertime.

Have a great summer, may God richly bless you, and I'll see you next school year.

Best wishes,

Mr. DuWayne Worthington
AP Biology Teacher

EXPLORING LIFE

CHAPTER #1

1. Describe seven emergent properties associated with life.
2. List the hierarchy of biological organization from biomes to atoms.
3. Explain how emergent properties are formed as you move through the levels of biological organization.
3. Distinguish between prokaryotic and eukaryotic cells.
5. Explain how technological breakthroughs contributed to the formulation of the cell theory and our current knowledge of the cell.
6. Distinguish between holism and reductionism.
7. Explain how the two types of feedback allow a cell or organism to regulate its life processes.
8. List and distinguish between the three domains of life and the four kingdoms of domain Eukarya.
9. Briefly describe how Charles Darwin's ideas contributed to the conceptual framework of biology.
10. What is the difference between discovery science and hypothesis-based science.
11. Outline the scientific method, and explain the myth involved with the scientific method.
12. Briefly describe unifying themes that pervade the science of biology.
13. Explain, in your own words, what is meant by "form fits function".
14. Explain how science and technology are interdependent.

Atoms, Molecules and Chemical Bonds

CHAPTER #2

1. Know the difference between an atom, element and compound.
2. State 4 elements essential to life that make up 96% of living matter, and name the other 4 that make up most of the other 4%.
3. Identify the three subunits of an atom and give their charge.
4. Given the atomic number and mass number of an atom, determine the number of neutrons.
5. Explain why radioisotopes are important to biologists.
7. Explain how electron configuration influences the chemical behavior of an atom, and explain what valence means.
8. Explain the octet rule and predict how many bonds an atom might form.
9. Explain why the noble gases are so unreactive.
10. Define electronegativity and explain how it influences the formation of chemical bonds.
11. Distinguish between ionic, polar covalent, and nonpolar covalent bonds.
12. Describe the formation of a hydrogen bond and explain how it differs from a covalent or ionic bond.
13. Explain why weak bonds are important to living organisms.
14. Describe how the relative concentration of reactants and products affects a chemical reaction.

Water and the Fitness of the Environment

CHAPTER #3

1. Explain why life is not possible without water.
2. Explain what electronegativity is and how this applies to the water molecule.
3. Explain the relationship between the polar nature of water and its ability to form hydrogen bonds.
4. Describe the structure and geometry of a water molecule.
5. Explain how water's structure results in four important emergent properties.
6. Describe each emergent property and explain how it is important to life on earth.
7. Explain what polarity is, and why this makes water a versatile solvent.
8. Explain what the pH scale is and what it measures.
9. Using the bicarbonate buffer system as an example, explain how buffers work.
10. Describe the causes of acid rain, and explain how it adversely affects the fitness of the environment.

Carbon and the Molecular diversity of Life

CHAPTER #4

1. What is an “organic” compound?
2. Explain how carbon’s electron configuration can create so many different types of carbon skeletons.
3. Distinguish between the three types of isomers: structural, geometric and enantiomers.
4. Recognize the six major functional groups, and be able to recognize them as they attach to the carbon skeleton.
5. Recognize the difference between a ketone and an aldehyde.

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| ▪ Be able to apply what they have learned to the world around them. |
| ▪ Link any of the ideas talked about with one of the major 8 themes in the course. |

COURSE BENCHMARKS

The student will be able to:

- Understand the difference between truth, fact, theory and assumption.
- Conduct investigations using the scientific method and metric measurements; organize, interpret and analyze data to communicate experimental findings.
- Demonstrate safe practices and proper use of equipment; use and dispose of materials in a safe, appropriate manner while performing biological investigations.
- Recognize and appreciate the contributions of historical and current scientists.
- Be a power user with compound and dissecting microscopes.
- Compare and contrast structures of biomolecules and their functions in living organisms.
- Identify characteristics of enzymes, how they work, and why they are essential to life on earth.
- Explain how the structure of water is essential to life on earth.
- Identify cell structures and their functions, including transport of materials in and out of the cell.
- Compare how different cells can communicate with each other.
- Compare and contrast energy flow in cellular respiration and photosynthesis and explain the significance of ATP in cellular activities.
- Describe how limiting factors can affect rates of photosynthesis and how various plant structures can enhance photosynthesis despite their geographical location.
- Distinguish between mitosis and meiosis in cell reproduction and sexual reproduction.
- Explain how enzymes are involved in the formation of protein, and how mutations can affect the DNA code and change the organism's phenotype.
- Know the genetic principles discovered by Gregor Mendel and identify, as well as analyze these principles in plants and animals. Apply these principles to patterns of inheritance.
- Use the Castle-Hardy-Weinberg equations to calculate genotype, phenotype, and allele distributions in a population.
- Explain the structure and function of DNA and RNA and why cancer forms.
- Explain how recombinant DNA technology, and electrophoresis methods work.
- Understand the principles of taxonomy and illustrate general characteristics of kingdoms, phyla, and classes of phyla chordata.
- Be able to place an organism in a particular classification (down to class) based on shared characteristics.
- Examine the evidence for special creation and the evidence for evolution and compare and contrast both through a Biblical worldview.
- Identify the structure and function of human body systems and the effects of a healthy and non-healthy lifestyle on each system.
- Investigate and understand the dynamic equilibrium in our environment and the Biblical worldview of stewardship
- Understand the cycling of matter and energy throughout the environment, and how people can alter this delicate balance.
- Describe the different types of animal behavior, and decide if they are innate or learned.
- Compare and contrast how organisms interact with each other in various types of ecosystems.

TEXTS/SUPPLEMENTAL INSTRUCTIONAL MATERIALS

TEXT: Neil Campbell and Jane Reece's "Biology: Eighth Edition". ISBN #: 0-8053-6777-2
Biology: Eighth Edition Study Guide
The College Board's "AP Biology Lab Manual for Students"; Order this from the

CLASS EXPECTATIONS AND REQUIREMENTS:

Preparation: I will provide you with month-at-a-glance and year-at-a-glance calendars, objective sheets, and reading assignments so that you can adequately prepare and space your work requirements. I expect you to take an active part in your own learning, and read for understanding outside of class. As a guideline, you should expect to spend about 5 hours/week reviewing concepts we have covered, reviewing your notes from General Biology, and reading the material we will be covering. I highly recommend that you form study groups outside of class and get together often for help, accountability, and support. It will really help your understanding if you take turns explaining concepts to each other during this time. Especially focus on the major concepts in each unit, and look for examples of each of the eight major themes. If you get stuck, don't hesitate to come and talk with me.

Labs: By signing up for this class, you have also signed up for a double block period so that we will have the time it takes to do college level labs. Labs will occur during one of these double periods and may go after school until the lab is finished. We may also start during lunch on those days, or before school starts. The day after the lab, you will answer the questions in the AP lab manual and any additional ones I've given you, and you will analyze and interpret the data you collected the day before. On average, there will be one major hands-on lab every two weeks. We will do all twelve of the College Board's labs, as well as other hands-on labs throughout the course in this fashion. Some College Board labs have been modified, but what we do in its place will still answer each College Board objective and use their questions. Some labs will require you to follow the procedures listed for you, and other labs will require you to design the experiment yourself. You will normally be working in groups of 2. Labs will account for about 25-30% of our time together.

Attendance: You are expected to be in your seat and READY TO WORK when class starts. If not, you are tardy and will get a minus participation point. Ready to work means that all of your belongings are stowed away, and your notes are out and ready to go. During labs, make sure you are on task at all times. If you are absent, it is your responsibility to see me and arrange a time to finish it. I will also not accept an attempt to just take a zero for late work. All assigned work must be done.

Academic Dishonesty: This will not be tolerated. Not only is it against our rules, but you rob yourself, and ultimately get others in trouble as well. Be proud of what you can do on your own and honor yourself, your parents, and God by only taking credit for what you personally do. The following are a few examples of academic dishonesty but this is not intended to be exhaustive.

Copying answers on a test, not writing your own answers to a group lab using group data, changing answers while correcting tests.

Class atmosphere: Please respect each other, work together, and pull your own weight when working as a group. Let's have a great time and be focused on learning in this wonderful facility that God has given us.

EVALUATION/ASSESSMENT PROCEDURES

Grading: I do use a curve, but it is a small one, and only on tests. It is possible for everyone to get an A in this class, provided you are willing to put in the effort.

1. Tests are 40 multiple-choice questions with one 10-point essay and occur roughly once every two weeks. Each essay is a former National AP Test question, and will be scored in the same way the AP graders would have scored it. In this way, you will get ample practice writing free-response questions as a way to prepare for the National AP Test. These

essays will be graded as a class together so you will understand how to get points on the AP test, and then I will grade them again to make sure they are done correctly.

AP National Test: Besides writing AP level essays on every test, you will also take the scantron portion of three different previous AP Tests. These are the 1999, and 2002, 2006 released exams. They will occur during final exams of the first semester, spring break of the second semester, and on Saturday morning two weeks before the National AP Biology exam. After taking the exams, we will analyze each one to see which areas you are weak in. This will help you plan your review time better. We will also spend the final week before the exam reviewing the units and the major themes in the units. This test is mandatory.

2. Labs are graded and returned before the test so that concepts learned in lab will be helpful on the test.

3. Participation will also be graded. If you show up and pay attention, you get a C. If you pay attention and take notes, you get a B. If you pay attention, take notes, and get involved in the discussion, you get an A. You can also get participation points by seeing me outside of class to discuss any questions that you have. 2. Make sure you raise your hand to get permission to speak, ask, or to answer a question.

4. Present all work and answer all questions in complete sentences unless otherwise instructed. Writing and verbal presentation assignments will be evaluated according to your understanding of scientific concepts, organization of the material, grammar, spelling and neatness.

5. If your test score/class grade is below 70%, parents will get a phone call.

6. If tests, labs or reflections are late, you will lose 10% of the overall score for the assignment. You can track how well your doing with this by checking the "Accountability" category.

LATE WORK POLICY

Students need to take upon themselves the responsibility of meeting deadlines and due dates. Each assigned item of coursework, with the exception of quizzes/tests, that is collected by a teacher will receive two grades: The first grade is an evaluation of the student's performance on that particular assignment. The second grade is an accountability grade for that assignment. This accountability grade is worth 10% of the total Semester Coursework points as defined in the grading policy section below. If the assignment is handed in on time, then the student will receive all of the accountability points for that assignment. If the student hands in his/her assignment the next day (not class) they will earn one-half of the accountability points. If the assignment is more than one day late, they will earn a zero for the accountability points. Students will be given two weeks in which to submit any late assignment for credit.

EXTRA CREDIT

Valor Christian High School does not support "Extra Credit" opportunities that provide students with grade recovery. A student should not expect to neglect assignments, and then look for alternative ways to make up those lost points with an "Extra Credit" assignment. Nor should a student approach a teacher asking for an extra assignment in hopes of raising his/her grade. However, if a student performs poorly on an assignment, test, or quiz, a "Grade Redemption" opportunity may exist in the form of a re-take of the same assignment, or one with similar content. The purpose of this assignment is to improve understanding and mastery of the concept, not grade inflation. Any grade redemption opportunity will be offered to the entire class, not individual students, and at the discretion of the teacher.

Additionally, during the semester there will be up to two enrichment opportunities per

class. These enrichment activities are provided at the discretion of the teacher, offered to the entire class, and will be directly related to the content and material being covered in class. For students to take advantage of these Enrichment Opportunities for points they must have a majority of their regular class work completed as it is meant to "enrich" the learning, not substitute for assignments. Students should understand that "Enrichment" activities will not be used to replace missing work, but can impact 2% of a student's overall class grade.

GRADING POLICY

Grade Categories	Category Weight
Semester Coursework	80%
Final Exam	20%

Semester Coursework Breakdown	Category Weight
Test	40%
Labs/Homework/papers/projects	25%
Participation	15%
Reflection	10%
Accountability Grade	10%

GRADING PERCENTAGE

Letter Grade	Numeric Grade	Unweighted GPA	Weighted GPA
A+	97-100	4.3	5.3
A	93-96	4.0	5.0
A-	90-92	3.7	4.7
B+	87-89	3.3	4.3
B	83-86	3.0	4.0
B-	80-82	2.7	3.7
C+	77-79	2.3	3.3
C	73-76	2.0	3.0
C-	70-72	1.7	2.7
D+	67-69	1.3	1.3
D	63-66	1.0	1.0
D-	60-62	0.7	0.7
F	0-59	0.0	0.0