

# Welcome to AP Biology

## “Summer of Biology 2013”

### **An evolving creation!**

Lakenheath High School

Mrs. Kathleen Douma

### Purpose:

As you wrap up the current school year, I'd like to begin to get you excited about next year, more specifically, AP Biology. The goal of AP Biology is to provide you with the conceptual framework, factual knowledge, and analytical skills necessary to deal critically with the rapidly changing science of Biology. This summer assignment has been designed to keep your mind sharp, and introduce you to some new information that I hope you will find fascinating! You will also make yourself familiar with the curriculum website, *Bio Portal*, and my website, [www.doumadowntherabbithole.com](http://www.doumadowntherabbithole.com). These websites will provide you with resources to support your learning and will also be a means of communication outside of the classroom. Your summer assignments are below. Instructions for accessing the websites are also in this document. All of the rest of the material that you will need is posted online.

### Due Date Schedule:

|  | <b>Assignment</b>                                    | <b>Due Date</b>  |
|--|--|--|
|  | Part 1: “Letter of Introduction” blog post online    | Post your Bio before Friday August 2, 2013 at <a href="http://www.doumadowntherabbithole.com">www.doumadowntherabbithole.com</a> under AP Biology. Read the other postings of your classmates. |
|  | Part 2: Content Reading                              | Reading Log due September 15, 2013   |
|  | Part 3: Text Book and BioPortal Website Introduction | Use the activation code your received from me to register and access your textbook   |
|  | Part 4: Safety Contract                              | Found on the rabbithole web site. Bring signed contract with you on the first day of school  |
|  | Part 5: Textbook Review                              | Instructions below and also posted on the rabbithole web site. Three-ring binder. Due September 8, 2013  |
|  | Part 6: Binder Set-up                                | By the first day of school August 26, 2013<br>Bring items to class with you!   |

## PART 1 – LETTER OF INTRODUCTION

### Welcome to AP Biology!

We are going to spend a lot of time together next year, so it's best if we get a head start on learning a bit about you. Also we will use the Internet and the Web a lot next year for this course, so let's get used to communicating via the class website and blog posts. Your first assignment is to successfully post your Bio (letter of introduction) to the Blog Post at [www.doumadowntherabbithole.com](http://www.doumadowntherabbithole.com) Click on AP Biology.

Rules for writing your Bio:

1. Use clearly written, **complete sentences**. Do not abbreviate words like you are texting with a friend. Use **spell check!** This is a professional communication like you would have with a college professor, so let's practice for your rapidly nearing future!
2. Make the **Subject: "AP Bio: Introduction to <Insert Your Name Here>"**
  - a. (Do not include the quote marks or the brackets, just the words)
3. Begin the e-mail with a **formal salutation**, like "Mrs. Douma," or "Dear Mrs. D.,"
4. Now introduce yourself (your name) and tell us a little bit about yourself, like:
  - a. What do you like to do (hobbies, sports, music, interests, etc.)? Do you have a job?
  - b. Was there anything that you liked about your earlier biology class?
  - c. What was the last book you read for fun?
  - d. What are you looking forward to the most in AP Biology?
  - e. What are you most anxious about in AP Biology?
  - f. Why did you decide to enroll in AP Biology? What are your future career plans?
5. End the e-mail with a **formal closing**: "Cordially", "Sincerely", "Warm regards", etc., and add your name as if you signed a letter.
6. After you have posted your Bio, read the other entries from your classmates. You may respond to the threads if you like.
7. You can contact me through this website by clicking on **Mrs. Douma** under the **Introduction** tab.

## PART 2 – CONTENT READING

### Purpose:

Perhaps the most important skill you are developing is critical thinking and writing. This skill will determine your success in college and in your future career. The next assignment is designed to help you practice and develop how to examine, interpret and analyze, and then communicate your understanding and present your ideas effectively. Analysis is the key underpinning of success in written communication. To write well from an informational, argumentative, or expressive perspective, you must use your analytical ability to focus your writing.

### Task:

You will read two books this summer and keep a reading journal that will be submitted and graded.

### Methods:

I suggest that you purchase a journal; a composition notebook will do fine and is inexpensive. Keeping a reading log is an active way to help retain the information you read. More importantly it becomes a record that you can go back to later to access information for writing a college paper. I hope you will discover that a reading log is much more useful than underlining text passages or taking formal notes.

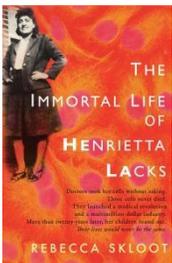
### Directions:

I'd like you to use a strategy I read about, called SPUNKI. It is an acronym for answering six questions: What part(s) do you find Surprising?, Puzzling?, Useful?, New?, Knew it already?, Interesting? By applying these prompts, you will respond personally to the material in a personally meaningful way.

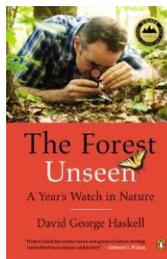
For each book:

1. Write down the title, author, publisher and date of the book.
2. Journal as you read...don't wait until you have finished the book to write down your responses.
3. Begin all your entries with the date.
4. For each written response, include the chapter and page numbers/chapter.
5. If appropriate, quote the passage or you may summarize the content you are responding to.
6. Be guided by one of the prompts (SPUNKI)
7. Don't hesitate to note new vocabulary or questions that you may develop as a result of your reading
8. When you have completed the book, summarize your overall reaction in a paragraph: Did the book may a personal connection? How did it make you feel? Was it a good read? Would you recommend it to others? Does it prompt you to investigate further?

### Reading List:



*The Immortal Life of Henrietta Lacks*  
By Rebecca Skloot



*The Forest Unseen: A Year's Watch in Nature*  
By David George Haskell

### PART 3 – Principles of Life: Textbook and Website Introduction

Go to the website: [www.doumadowntherabbithole.com](http://www.doumadowntherabbithole.com) and click on *AP Biology*. You will find a *student user guide* on how to register and use the BioPortal website. The registration link is in the user guide. You will find your textbook there as an e-text. Familiarize yourself with the curriculum resources on this site.

### PART 4 – Safety Contract

Go to the website: [www.doumadowntherabbithole.com](http://www.doumadowntherabbithole.com) and click on AP Biology. You will find a safety contract that you will need to print and read. Sign this contract and have your parents sign it as well. Bring it with you on the first day of school.

### PART 5 – Principles of Life: Review

This assignment is long but not really difficult. The answers can be found in the text (mainly), in other resources, and/or online. What you get out of this class will be based on what you are willing to put into the class. Students who have performed the most successfully on the AP exam are those students who are willing to work steadily throughout the summer and school year and who are willing to work independently. There isn't time to thoroughly cover all necessary topics in class alone, so outside work is a necessity.

This part of your summer assignment should be placed in a **one-inch diameter three-ring notebook** with tabbed and labeled dividers separating each of the eight parts. You should type all of the questions and write your answers, **by hand**, below the questions. **DO NOT PUT THE QUESTIONS ON ONE PAGE AND THE ANSWERS ON ANOTHER PAGE.** An electronic copy of the assignment is available on the website: [www.doumadowntherabbithole.com](http://www.doumadowntherabbithole.com). (**Suggestion: look over the questions first and estimate the amount of space that you will need for each answer. Then, insert spaces between the questions before you print them.**) Write neatly; if I can't read your writing I can't give you credit for your answers.

#### **Additional Information:**

Start the summer assignment early and do not try to do the whole project at one time! A better strategy is to do smaller parts of the project over a longer period of time. You should get in the habit now of spending some time each day on AP Biology.

#### **Grading rubric:**

Sections will be scored as shown on the rubric. You will earn points for detail, completeness, and depth of thought. To earn the full points, you will need to have adequately addressed all parts of each question.

***Please print the grading rubric and use it as the title page for your notebook. I will not grade your notebook without this page.***

Proper format includes the following:

- Notebook and dividers as described above
- rubric in front
- typed questions with **hand-written** answers
- All questions and answers presented in numerical order within each section
- Neatness

The major purpose of this summer assignment is to familiarize you with your textbook and other relevant resources that you may be using throughout the year and to review basics that you learned in high school biology class. This book contains a LOT of information. We will not be covering EVERYTHING in the book so don't get overwhelmed as you work your way through the text.

Do a good job on this assignment. The grade can be a **big boost** to your first quarter grade and it will also be a good review foundation for some of the difficult concepts to come.

Name \_\_\_\_\_ Date \_\_\_\_\_

### AP Biology Book Review Summer 2013 Grading Rubric

| Units                                 | Comments | Points Possible | Points Earned |
|---------------------------------------|----------|-----------------|---------------|
| Principles of Life                    |          | 20              |               |
| Unit 1<br>Cells                       |          | 60              |               |
| Unit 2<br>Genetics                    |          | 60              |               |
| Unit 3<br>Evolution                   |          | 30              |               |
| Unit 4<br>Diversity                   |          | 50              |               |
| Unit 5<br>Plant Form<br>and Function  |          | 10              |               |
| Unit 6<br>Animal Form<br>and Function |          | 20              |               |
| Unit 7<br>Ecology                     |          | 10              |               |

**Part I – Principles of Life (START EACH UNIT ON A NEW PAGE)**

1. Write the key concepts listed at the beginning of the chapter (always included the concept number). For each concept, write a SHORT supporting paragraph with examples to support each statement.
2. Do the web activities on the BioPortal.

**Unit 1 - Cells**

1. Chapter 2 - Write the key concepts from chapter 2 (don't forget the concept number)
  - a. Use illustrations to describe how the structure of a water molecule allows it to form hydrogen bonds with other water molecules.
  - b. Use illustration to describe electron behavior in ionic, covalent and hydrogen bonds. Which is strongest and why?
  - c. We are called "carbon-based life-forms." What about the carbon atom makes it an ideal atom to form the "backbone" or skeleton for most biological compounds?
  - d. What are functional groups? Create a chart and draw each of the 7 functional groups; alongside write out the properties of each group and describe what type of molecule(s) contain this group. You do not have to draw an example, but take the time to understand the how these groups give properties to the molecule and how that is directly related to the functioning of the molecule
  - e. Fill in the blanks in the table below, describing the 4 main groups of organic compounds in living things.
  - f. In your own words explain the laws of thermodynamics. Connect your explanation to your understanding of the two basic types of energy and the two basic types of metabolism. This is a very important concept that is essential to understanding how life exists! Make sure you cement this block well into your foundational knowledge pyramid.

| Compound                                    | Carbohydrates | Lipids | Proteins | Nucleic Acids |
|---|---------------|--------|----------|---------------|
| Elements found in all members of this group |               |        |          |               |
| Major purposes                              |               |        |          |               |
| Examples                                    |               |        |          |               |

2. Chapter 3 – What is metabolism?
  - a. Draw a molecule of ATP and explain how it functions as an energy carrier. You may need to do some extra searching for this. (Skip to Chapter 6.1)
  - b. What are enzymes and how are they important in metabolism? Draw a model diagram of an enzyme functioning during a reaction. Use the terms ‘substrate’, ‘product’, ‘reactants’, ‘active site’, ‘active’ and ‘inactive enzyme’. Explain how **“form is the basis of function”**. *You will hear me use this phrase over and over this coming year. It is another “light-bulb” concept that runs through the study of life. When we study matter at a molecular level, it works because the parts function together following the chemical and physical properties that define each atom. It is a perfect organic machine.*
  - c. Draw a labeled graph showing a catalyzed and un-catalyzed chemical reaction.
  - d. Draw labeled graphs showing endergonic and exergonic reactions. Think about the energy flow. Where does the energy needed to drive the reaction come from and where does the energy released go? (Hint: go back to 4.a)
3. Chapter 4- Describe the similarities and differences between prokaryotic and eukaryotic cells. Then, select three eukaryotic cell organelles that you think you will enjoy studying. For each one, draw and explain the function of this organelle and tell what you find most interesting about it.
4. Chapter 5- Draw and label the molecular structure of the cell membrane called “the fluid mosaic model”. Again, explain how “form is the basis of function”.
  - a. Describe the differences between passive and active transport. For each of these types of cell transport, describe several different examples.
  - b. Draw a labeled diagram and explain the movement of water molecules during osmosis into and out of a cell. Use the terms hypotonic, isotonic, and hypertonic and include in your explanation the reason for the directional movement of the water molecules. Also, include in your explanation why the water moves, but other substances don’t.
5. Chapter 6 – Write the key concepts for Chapter 6
  - a. What is the purpose of cellular respiration? Summarize the anaerobic and aerobic metabolic pathways. Explain how oxygen provides greater efficiency in energy capture.
  - b. Use a flow chart and trace the biochemical pathway by which a carbon atom in a starch molecule can end up in a muscle protein.
  - c. Write the chemical equation for cellular respiration. Under that, write the chemical equation for photosynthesis. Explain the relationship between the two.
  - d. Photosynthesis can be described in two parts: The conversion of light energy to chemical energy, and the movement of energy from a temporary carrier to a long term storage molecule. Draw a model diagram that summarizes these two processes.
  - e. Why is photosynthesis important to life on earth?
  - f. When making wine and beer it is critical that the process occurs under anaerobic conditions. Why does fresh air inhibit the formation of alcohol by yeast cells?

## Unit 2 - Genetics

1. Chapter 7 - Compare and contrast sexual and asexual reproduction and list the advantages and disadvantages of each type of reproduction.
  - a. Review an illustration of the steps of a normal eukaryotic cell cycle. Read the article at <http://www.nature.com/scitable/topicpage/cell-cycle-control-by-oncogenes-and-tumor-14191459> Then, describe how cancer and the cell cycle are related.
  - b. Explain the purpose of meiosis. Compare and contrast meiosis and mitosis. Explain the importance of crossing over and independent assortment.
2. Chapter 8 – Explain how Mendel developed his two laws of heredity and relate those laws to the current ‘Chromosome theory of inheritance’.
  - a. Describe a eukaryotic chromosome. How is it different from a prokaryotic “chromosome”?
  - b. Describe a genetic condition (such as Down Syndrome) that can result when chromosomes don’t separate correctly during meiosis.

3. Chapter 9 – Draw and label model of DNA.
  - a. Describe its structure and parts.
  - b. Relate the four key features of its structure and how those features are relevant to its function. (There's that 'form is the basis of function' again!)
  - c. What is the role of DNA in living things?
  - d. Explain what is meant by 'semiconservative replication'. Why is this important?
  - e. What is a mutation? Describe mutations in terms of the effect on the phenotype. Then, explain the difference between a point mutation and a chromosomal mutation. Describe (using a picture if you wish) the four types of chromosomal mutations.
4. Chapter 10 - Describe the relationship between genes and proteins.
  - a. Compare and contrast the structures and functions of DNA and RNA.
5. Chapter 12 – What is genome sequencing? This is the newest technology in the area of bio science. Write a short essay on the applications of this technology.
6. Chapter 14 – Explain what is meant by the key concept 14.1: development involves distinct but overlapping processes.
  - a. Describe how mammals can be cloned. (You might want to check out the website: <http://learn.genetics.utah.edu/content/tech/cloning/> )
  - b. So far, humans have not been successfully cloned. Do you think we should try to clone humans? Defend your position.

### Unit 3 - Evolution

1. Chapter 15 – This is the introductory chapter for the evolution unit. Look through the topics covered in this chapter and describe the ones that you think will be most interesting to study. Explain your choices.
2. Chapter 16 – What is phylogeny and how is it used
3. Chapter 17 – What is the biological species concept?
  - a. **Briefly** discuss speciation and how it occurs. (just a summary...we will study this in detail later in the year)
  - b. Reproductive isolation is one of the major processes that keeps species separate from each other. Distinguish between pre-zygotic and post-zygotic barriers that contribute to reproductive isolation and provide an example of each.

### Unit 4 - Diversity

1. Chapter 19 – Why were all prokaryotes once considered “equal” and what findings led to the establishment of Bacteria and Archaea as separate domains?
  - a. How do we classify bacteria?
  - b. What is a virus? Why is it not classified as a living organism?
2. Chapter 20 – Describe how scientists think the first eukaryotic cells were formed (endosymbiosis theory).
  - a. Protists are the most nutritionally diverse of all eukaryotic organisms. Describe some of the methods by which different protists get their food? Read through the chapter to get an idea about the great diversity of this group.
3. Chapter 21 - Members of the plant kingdom range from very simple to very complex organisms. Order these groups of plants from simplest to most complex and give a brief description of each group as well as at least one example of each group: angiosperm, bryophyte, gymnosperm, chlorophyte, lycophyte
4. Chapter 22 – Fungi are heterotrophs that feed by absorption and they are very important to humans. Name and describe 2 types of pathogenic fungi and 2 beneficial uses of fungi.

5. Chapter 23 – Describe the concept of “animal” –briefly mention nutritional mode, cell structure and specialization, reproduction and development.
  - a. What is an invertebrate animal? If you had to be locked in a room with an invertebrate, which phylum would you MOST like to be with and which phylum would you LEAST like to be with? Justify your selections.
  - b. You are a vertebrate animal in the class Mammalia. If you could be any other type of non-mammalian vertebrate animal, what would you be? Explain why.
  - c. A number of characteristics distinguish humans from other hominids. Describe these characteristics.

#### **Unit 5 – Plant Form and Function**

1. Chapter 24-28 - Look through these 4 chapters and find TWO concepts that you think you will enjoy studying. Briefly describe this concept and explain why it appeals to you. (only 2 – not 2 per chapter!)

#### **Unit 6 – Animal Form and Function**

1. Chapter 29 – 41 – Look through these chapters (during the year, we will cover some parts of these chapters but not all.) Select FOUR chapters that you think you will most enjoy studying. For each chapter, briefly describe the purposes and major structures of the body systems featured. Also, describe what it is about these particular chapters that appeals to you.

#### **Unit 7 - Ecology**

1. Chapter 42 - 46 – Ecology is the study of interactions between organisms and the environment. These interactions are critical to life. Look through each chapter and list the single concept within each chapter that you think is the most important concept in the chapter (for each chapter, write the concept and the concept number).

#### **Part II – Big Ideas in Biology**

You have just finished looking through your entire textbook. There are four major themes running through this textbook. For each of the Chapters you reviewed think about how it is related to the big ideas. Under each big idea, list each chapter that you think contains topics that exemplify that big idea. Write a specific, justification for why you think these particular chapters should be included under that big idea. You do not need to write a justification for each individual chapter, but summarize why you chose that group of chapters and cite a few specific examples. You may find that a chapter goes with more than one big idea.

**Big Idea 1: The process of evolution drives the diversity and unity of life.** Evolution is a change in the genetic makeup of a population over time, with natural selection its major driving mechanism.

**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.**

Genetic information provides for continuity of life and, in most cases, this information is passed from parent to offspring via DNA.

**Big Idea 4: Biological systems interact, and these systems and their interactions possess complex properties.** All biological systems are composed of parts that interact with each other. These interactions result in characteristics not found in the individual parts alone. In other words, “the whole is greater than the sum of its parts.”

## Part 6 – NOTEBOOK SET-UP

In order to save some class time, you will be creating your class notebook and bringing it with you on the first day of class.

### Required Items: (approximate cost)

1. A two-three inch 3- Ring Binder \$5 – 10
2. A one inch 3-Ring Binder \$2 – 3 (for your summer assignment)
3. Two packages of dividers-- \$2 – 3 Label the tabs with the following:
  - a. Notes
  - b. Pre-Lab work
  - c. Study Guides
  - d. Classwork/Assignments
  - e. Quizzes/ Tests
  - f. Free Response
4. Loose Leaf Paper-- College rule preferred \$1 – 2
5. Pack of Pencils (Mechanical or Regular doesn't matter) \$2 – 4
6. Pack of Colored Pencils \$2 – 5
7. Notecard Box - \$2 – 4
8. Index cards – 3x5 (at least 100 cards) \$1
9. Composition Notebook - \$1 - 3
10. Reading Journal - \$1 - ?

**Total Cost:** \$20 to \$25

### Optional Items that will come in handy:

1. Pack of Pens (Multiple colors- Blue, Black, Red, and Green)
2. Pencil Pouch for your binder

**Bring all materials with you to school on the first day of class**

