EAST PAULDING HIGH SCHOOL - AP Biology – "Summer" Assignment

(modified from Boyer, Hagin, Passeggio, Pedersen & Raymond)

East Paulding High School – 2017-2018
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Welcome to AP Biology! I am excited you have chosen this course. AP Biology is designed to be the equivalent of a college-level introductory biology course. The intent of the course is to expose students to higher-level biological principles, concepts, and skills and allow them the opportunity to apply their knowledge to real-life applications. In the revised AP Biology course, the teacher serves as the facilitator while the students develop as independent thinkers and learners, especially through laboratory investigations. **PLEASE NOTE:** Some of the laboratory investigations we are required by The College Board to complete as part of AP Biology could take longer than our allotted 90 minutes of class time. As a result, on lab days, students will occasionally be expected to either come in early (~ 7:20 am) or stay late (~ 4:10) to complete the labs, depending on what period the class is offered. Specific dates will be conveyed to students with at least one week prior notice to ensure any conflicts can be resolved. This is not optional. Many concepts, that are now considered prerequisite knowledge for the course, can be reviewed as home study through the use of rich resources such as assigned websites, WebQuests, and journal articles. You will explore six of the textbook chapters The College Board now views as prerequisite knowledge through the following summer assignment.

"Summer" Assignment Instructions:

This project is worth 400 points. You can begin working on the following concepts during the summer, if you wish to get ahead. However, the academic assignments do not begin to be due until the end of the 1st week of school. As this course will be taught on a block schedule, pacing will be accelerated. Any time you choose to spend working this summer will assist you in determining the study habits needed for the course. (Note: when accessing information for this course online, be sure to access information designated as AP Biology and remember that the course was redesigned for 2012. Material dated before 2012 may be useful, however, keep in mind that the course has changed since that material was posted.) Please keep in touch with me via email over the summer if you have questions about this assignment or the course in general.

Part 1: Sign up for the AP Biology Remind 101 Updates: Due Date: ASAP!

Follow the instructions below to sign up for the AP Biology Remind Updates. I will utilize this throughout the summer to let you know of pertinent information regarding the class, new discoveries in the field and to help with any questions regarding the Summer Assignment.

To receive messages via text, text **@02196** to **(912) 472-2658**. You can opt-out of messages at anytime by replying, 'unsubscribe @02196'.

Or to receive messages via email, send an email to **02196@mail.remind.com**. To unsubscribe, reply with 'unsubscribe' in the subject line.

Part 2: LETTER OF INTRODUCTION (20 points): Due date: Monday, August 7th, 2017

We are going to spend a lot of time together next year, so it's best if I get a head start on learning a bit about you. Also we will use the Internet next year for this course, so let's get you used to communicating with me via e-mail. Your first digital assignment is to successfully send me an e-mail.

Draft an e-mail to me following these rules:

a. Use clearly written, **full sentences**. Do not abbreviate words like you are instant messaging 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!

b. Address it to me at: **mcurtis@paulding.k12.ga.us**

c. Make the **Subject**: "AP Bio: Introduction to <Insert Your Name Here>"
(Do not include the quote marks or the brackets, just the words)

d. Now introduce yourself (your name) and tell me a little bit about yourself, for instance:

· What do you like to do (hobbies, sports, music, interests, etc.)?
· Do you have a job?
· Tell me a little bit about your family (Mom? Dad? Guardian? Siblings? Pets?)
· Was there anything that you liked about your earlier biology class?
· What was the last book you read for fun?
- What would you want written on your tombstone? No, really.
- What made you want to sign up for AP Biology?
· What are you looking forward to the most in AP Biology?
· What are you most anxious about in AP Biology?
- What plans do you have for after high school?
- Do you plan on taking the AP test (highly recommended)?

e. End the e-mail with a **formal closing**: "Cordially", "Sincerely", "Warm regards", etc. and add your name as if you signed a letter.

Part 3: Read *Your Inner Fish* by Neil Shubin, Vintage Books, Random House, New York, 2009 (ISBN 978-0-307-27745-9) *This book can be purchased on Amazon.com for about $13.00.*

(200 points) Due Date: August 28, 2017

A.) **Overview questions** (You do not have to type these answers up. Just keep these in mind as you are reading the book as they serve to keep you focused.)

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?

B.) **Discussion Questions**:

- For each chapter of the book, there are discussion questions listed below.
- You should answer each chapter question as a measure of your understanding of the chapter's concepts. They should be answered in the following way:
    - Typed, 12pt Times New Roman or 12pt Calibri font.
    - You can copy and paste the questions into your document and then answer by typing below each question.
    - Use proper grammar and spelling. Be clear and concise. Answer in your own words.

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

1. Describe the “pattern” to the skeleton of the human arm that was discovered by Sir Richard Owen in the mid-1800s. Relate this pattern to his idea of exceptional similarities.
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?

Part 4 – Bozeman Videos (20 pts each)- DUE DATES LISTED BESIDE VIDEO:

Go to Mr. Curtis' website (www.curtisbiology.weebly.com) to download the reading guides for the Bozeman AP BIology videos. This information presented in these videos is considered prerequisite information. In other words, you should already have a good grasp of these topics from 9th grade. However, this is what we will cover during the first two weeks of school.

Bozeman Videos can be found at the following website:
http://www.bozemanscience.com/ap-biology/

Video 1 – Models and Representations – Monday August 7, 2017
Video 3 – Scientific Questioning – Monday August 7, 2017
Video 4 – Data Collection Strategies – Monday August 7, 2017
Video 5 – Analysis and Evaluation of Evidence – Wednesday August 9, 2017
Video 6 – Scientific Explanations and Theories – Wednesday August 9, 2017
Video 7 – Scales, Concepts & Representations – Wednesday August 9, 2017
Video 042 – Biological Molecules – Friday August 11, 2017
Video 043 – Cellular Organelles – Friday August 11, 2017
Video 044 – Cellular Specialization – Friday August 11, 2017