AP BIOLOGY SUMMER READING

Readings:  Biology in Focus, AP edition by Campbell
One of the Following:
1. Hot Zone by Richard Preston
2. The Immortal Life of Henrietta Lacks by Rebecca Skloot
3. The Chimp and The River by David Quammen

This summer, you need to read the Chapters 1- in Campbell concerning the nature of biology, basic chemistry and the properties of water. These topics should be a review for you. Be prepared to discuss these topics when you return in August. We will have three days for questions and you will take a test on these chapters on the fourth day of class. (For example, if the first day of class is on a Monday, your test will be on that Thursday)

Written Assignments:  Due by the first day of class.

- Write a 2-page (typed, double-spaced) summary and review of one of the novels at the top. 1½ page summary and ½ page review of the book.
- Prepare answers to the study guide questions in a Word document. You will probably also want to bring a hard copy of this with you to class because we will go over any questions that you may have.
- Write a short (one-page) summary and reaction of what you think is the top science story of the summer. One good source of ideas is Science News or you can use another source. Include the source/date of the story or article, in correct citation format (APA).
- Email all 3 assignments to me when you are finished at the address below.

I am very pleased that you will be in AP Biology this year. In addition to helping you prepare for your AP exams, my main goal is to help give you a broad, solid foundation in the principles of biology so that you can either receive advanced placement in college or feel very comfortable taking those first college biology classes.

I recommend a 3-ring binder for taking notes.

If you are going to take the AP Biology test, you will need to pay for it in February. The cost of the AP exam will be around $100.

Please call me, text, or e-mail me if you have any questions.

Cell #: (334) 524-4173  Email: afbagwell@auburnschools.org
Study guide for summer reading: Prepare answers to these questions in electronic form.

The Bohr models (electron shell models) that I ask for in some questions should be drawn on a separate sheet to be turned in on the first day of school.

Chapter 1: Introduction: Evolution and the Foundations of Biology

1. List and describe the levels in the hierarchy of the organization of living things.

2. What is an emergent property give an example of an emergent property as you move up the hierarchy?

3. List and describe the characteristics or properties that you think are shared by all living things.

4. State the cell theory. List the scientists who contributed to this theory and tell their contributions to the theory. (Not in Book)

5. Briefly describe the two types of cells in living things.

6. Basically how do genes control what goes on in cells?

7. What is the genome of an organism? What advancements have made the study of genomics possible?

8. Matter and energy are both moved through an ecosystem. What is the basic difference with how these two things are moved through an ecosystem?
   a. Describe the main three types of energy involved in energy transfer through an ecosystem.
   b. What group of organisms are essential for the recycling of chemicals for an ecosystem?

9. Name the three domains of life and give examples of organisms in each domain.

10. What observations lead Charles Darwin to his original hypothesis of evolution by natural selection?

11. State Darwin’s theory in your own words.

12. Looking at figure 1.16: What organism is closest in relation to the “Vegetarian finch”? Defend your answer.

13. Differentiate between the 2 types of data that can be collected. When would each type be appropriate?

14. Look at the Case Study: Investigating Coat Coloration in Mouse Populations:
   a. Identify the questions that the scientist are trying to answer.
   b. What hypothesis have the scientists developed?
   c. What are the independent and dependent variables of the experiment?
d. What is the purpose of a control group when carrying out an experiment? What experimental controls would be necessary for this experiment to be valid?
e. Was the scientist hypothesis proven right? Explain.

**Chapter 2: The Chemical Context of Life**

1. What elements are found in living things? Underline the main 4.

2. How many electrons are found in the 1st 4 energy level.

3. Describe how and why ions are formed.

4. Fill in the chart below:

<table>
<thead>
<tr>
<th>Element</th>
<th>Atomic Number</th>
<th>Atomic Mass</th>
<th>Protons</th>
<th>Neutrons</th>
<th>Electrons</th>
<th>Ion Formed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium</td>
<td>3</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>-1</td>
</tr>
<tr>
<td>Magnesium</td>
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<tr>
<td>Oxygen</td>
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<td>Calcium</td>
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<td>Phosphorus</td>
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<tr>
<td>Na</td>
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</tbody>
</table>

5. What is a radioactive isotope and how is one used in biology?

6. Describe chemical bonding. Differentiate between ionic and covalent bonds. Which one is more prevalent in living things?

7. How many covalent bonds do will each of the following atoms form?
   a. Oxygen
   b. Carbon
   c. Nitrogen
   d. Hydrogen

8. Describe polar and nonpolar covalent bonds. What makes a molecule polar?

9. Differentiate between hydrogen bonds and Van der Waals interactions.

10. Which bonds are stronger: covalent or hydrogen? Explain.

11. Why is molecular shape important in biology? (How can we use this to our advantage?)

12. Explain the following properties of water and their importance to life on earth:

<table>
<thead>
<tr>
<th>Property</th>
<th>Importance</th>
</tr>
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<tbody>
<tr>
<td>a. Cohesion</td>
<td></td>
</tr>
<tr>
<td>b. High heat of vaporization</td>
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<tr>
<td>c. Adhesion</td>
<td></td>
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<tr>
<td>d. Density of solid water (ice) compared to liquid water</td>
<td></td>
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<tr>
<td>e. Surface tension</td>
<td></td>
</tr>
<tr>
<td>f. Evaporative Cooling</td>
<td></td>
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<tr>
<td>g. High specific heat</td>
<td></td>
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</tbody>
</table>
13. At what temperature is water the densest? Explain why this is the case. Why is this an important part of life?

14. Explain the difference between hydrophilic and hydrophobic molecules and the differences in how they behave in water.

15. Explain the dissociation of water and the pH scale. What does the designation of “pH of 5” literally mean?

16. How great a difference is there in the hydrogen ion concentration between a pH of 6 and a pH of 8?

17. What pH values are acidic or basic?

18. How does a buffer system work? Use the carbonic acid-bicarbonate system as an example.

19. How is acid forming a threat to oceans.

**Drawings on another sheet of paper:**

1. Bohr models of:
   a. Potassium
   b. Hydrogen 1: protium
   c. Hydrogen 2: deuterium
   d. Hydrogen 3: tritium

2. 3 molecules of water. Label the following:
   a. Partial charges of each molecule
   b. Polar covalent bonds
   c. Hydrogen bonding between each molecule

3. Water as a solvent: Show the hydration shell formed for the following ions.
   a. Na+
   b. Cl-