

AP Biology
Summer Assignment 2017-2018
Mr. Fuchs

There are **TWO** parts to this summer assignment.

- **Part 1** consists of a three question set called “Guided Readings” that cover the first three chapters in the AP Biology textbook. Do part 1 first.
 - **You will need to see Mr. Bremer in the summer (or me before the end of school) to check out a copy of the textbook.**
- **Part 2** consist of an article “A Cool Glass of Water: A Mystery” by Li-hsuan Yang. This article covers the scientific method and water, which is discussed in the first three chapters of your AP Biology textbook. Read the article and answer the questions that are found throughout the article.
 - Part 3 of the article requires you to conduct the experiment discussed in the article. It is a simple experiment that only requires everyday household items. Feel free to take pictures of your experiment and send them in along with your questions.☺

A few tips:

- Do not limit your answers to the available space with each question. You can extend the answer to any length. **Be thorough and complete with your answers!!**
- Make sure all work is **your own** unique product. **DO NOT** turn in identical copies and then tell me you worked with someone and that is why all is the same ☹. **Your own work..your own answers!!**

Grading

- **Part 1 and part 2 will be graded individually and will each count as a daily grade. I will also average part 1 and 2 together and count it as your first major grade.**

All documents (part 1 and 2) will be submitted via email attachment. Open the assignment as a word document. Then, type your answers directly into the document on the computer and remember to SAVE the work!!!! When you have completed the guided readings, send them as an email attachment to me at fuchsj@needvilleisd.com

This must be sent BEFORE August 1, 2017

Part 1(guided reading) and Part 2 (article) must be sent to me by August 1, 2017. If the assignments are not complete and turned in at that time, the assignment will be considered incomplete. You must complete the required summer work to remain in AP Biology.

If you have any questions during the summer, you can email me at fuchsj@needvilleisd.com. I will check this often and get back to you as soon as possible. If you need me to call you, please leave the number in the email and I will contact you that way. **It is advised that you not wait until the end of summer to begin the assignment.** Work on it throughout the summer in small pieces, it should go easier that way. See you in AUGUST!! ☺

Name _____

AP Biology: Chapter 1
Introduction: Themes in the Study of Life

1. Why do Biology courses build their content around themes and major concepts?
(hint: start with page 2 at bottom left...)

2. List and briefly describe the properties of life.

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____
- f. _____
- g. _____

3. List each major theme and briefly describe.

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____
- f. _____
- g. _____

4. Name, describe, and give an example of the two forms of feedback regulation?

5. List **and** give an example of the three domains.

a

b

c

6. Why is evolution the overarching theme in biology and accounts for the unity and diversity of life?

7. Discuss and simply explain the concept of Natural Selection and of descent with Modification as put forth by Charles Darwin.

8. Define the following terms:.

Biology-

Emergent property-

Eukaryotic-

Prokaryotic-

Genome

Ecosystem-

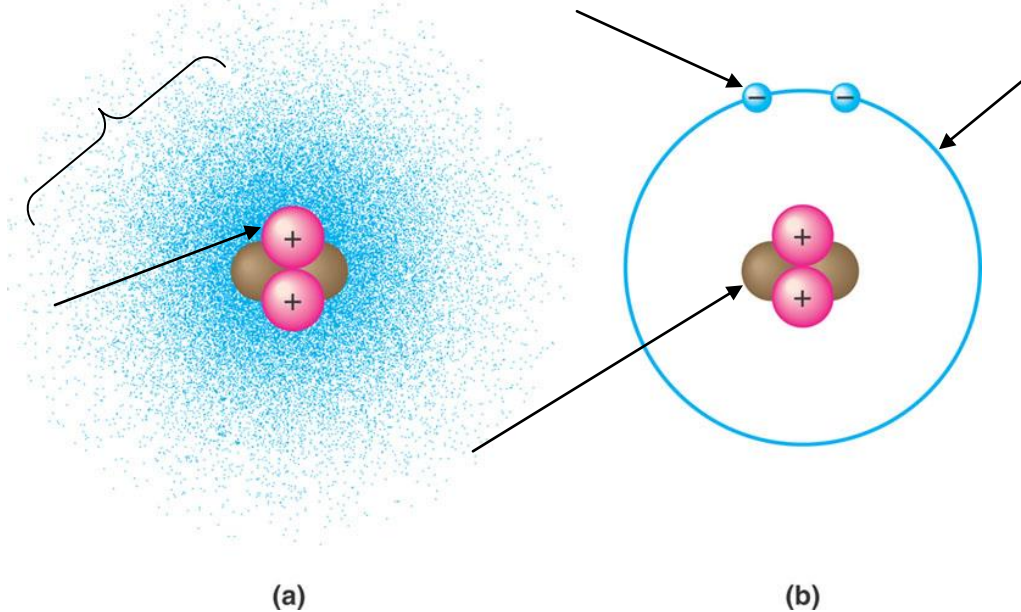
Adaptations -

Population-

AP Biology
Chapter 2 Guided Reading

Name _____

1. Contrast the term element with compound.
2. Label the diagram below and define the terms that you label.



3. Contrast the terms atomic mass and atomic number.
4. What is the difference between the terms mass number and atomic number?
5. What is an isotope and what is “special” about radioactive isotopes?

Explain how radioactive tracers are used in science?

6. What determines interactions between atoms?

Why are valence electrons important?

7. **Define the following terms:**

a. Chemical bond-

b. Covalent bond-

What creates a single covalent bond **and** what creates a double covalent bond?

c. Valence-

d. Electronegativity -

Explain the role of electronegativity in forming a non-polar covalent bond.

Explain how electronegativity creates a polar covalent bond.
Use a water molecule as an example of a polar molecule.

8. What is the difference between a structural and molecular formula?

(Use hydrogen, oxygen, and water to illustrate)

9. Using a salt molecule, **explain how** an ionic bond forms.

What is a cation?

What is an anion?

Identify each of these in a salt molecule.

10. Explain how a hydrogen bond forms.

AP Biology
Chapter 3 Guided Reading

Name _____

1. For each of the below listed properties of water –
 - a. briefly **define the property**
 - b. **explain how** water's polar nature and polar covalent bonds contribute to each of the water properties listed
 - c. **Include an example in nature** to illustrate the importance of each property.
 - a. Cohesion
 - b. Adhesion
 - c. Surface tension
 - d. High specific heat

e. Heat of vaporization

f. Evaporative cooling

2. What is “heat”?

What is temperature?

Using these two concepts, explain how an ice cube cools your drinks.

3. **Define the following terms:**

a. Solute

b. Solvent

c. Aqueous solution

d. Hydrophilic

Give an example of a hydrophilic substance _____

e. Hydrophobic

Give an example of a hydrophobic substance _____

f. Hydration shell

4. What defines an acid and a base?

5. Why are “apparently” small changes in pH so important in biology?

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

A Cool Glass of Water: A Mystery

by

Li-hsuan Yang, Department of Education, University of Michigan—Flint



Part I—A Surprise

In an undergraduate science course, a group of student teachers just finished some experiments using salt and ice. They had observed that salt made ice melt at temperatures below its normal melting point.

“That makes sense—remember how we use salt to melt ice on the sidewalk? Salt helps the ice to melt,” said Marian to her group members. They all agreed.

The instructor then introduced them to a teaching project. She announced, “Now I want you to take a look at the state curriculum standards. Try to find a science concept that is interesting to you and your group members. You are asked to put together a lesson to teach that concept to elementary school students. Feel free to use the knowledge you have acquired in this class for your teaching project.”

Marian: Why don't we teach children the three states of water? We can do experiments with them, like melting ice cubes.

John: Yeah, we can ask children to predict which ice cube will melt first, the one in salt water or the one in fresh water. That will catch their attention.

Gail: Good idea. Then we can do the experiment with them to check their predictions.

Sally: Let's try the experiment first ourselves.

Gail: I'll make some salt water and measure out 200 milliliters of salt water and fresh water. John, can you measure their temperatures to make sure they are the same?

John: Yes, they are; they're at room temperature, 22 degrees Celsius.

Sally: I'll have to find two ice cubes with the same size and shape. Okay, I have them. Ready? Get set; go!

Sally put one ice cube in each of the two liquids at the same time while Gail started the stop watch to measure the time elapsed. Both ice cubes floated in the liquid. To their surprise, the ice cube in fresh water melted much more quickly than the one in salt water.

“*How come?!*” said everyone.

Part II—Related Phenomena

That afternoon, the group members went home thinking about this mystery. Marian wanted to bake some cookies for her family. As she poured some water and oil in the measuring cup, she noticed that the oil was sitting on top of the water. She thought about that for a moment. Then suddenly she exclaimed, “I know what happened with the ice cubes! I must tell my group the first thing next Monday.”

John went to a hot air balloon show that evening. As he was watching the hot air balloons rising, John said to himself, “I guess I might have an idea to solve the problem involved in our experiment.”

Gail’s family went on a vacation that weekend. As Gail went swimming in the ocean, she noticed that her body seemed to float higher in ocean water than in fresh water. She thought, “I bet I know why that ice cube in the salt water took so long to melt.”

Sally accidentally knocked over a glass of iced tea on the counter of her bathroom. She noticed that the brown iced tea seemed to go to the bottom of the bath tub filled with warm water. “I wonder if that has anything to do with our experiment.”

The four of them saw each other on Monday. After exchanging ideas, they thought they now had a perfect explanation for the mystery. They wanted to test their idea. They made colored ice cubes by putting several drops of food coloring in the water before freezing it into ice. Then they repeated the original experiment with the colored ice cubes. They couldn’t wait to see if the test would confirm their idea or not.

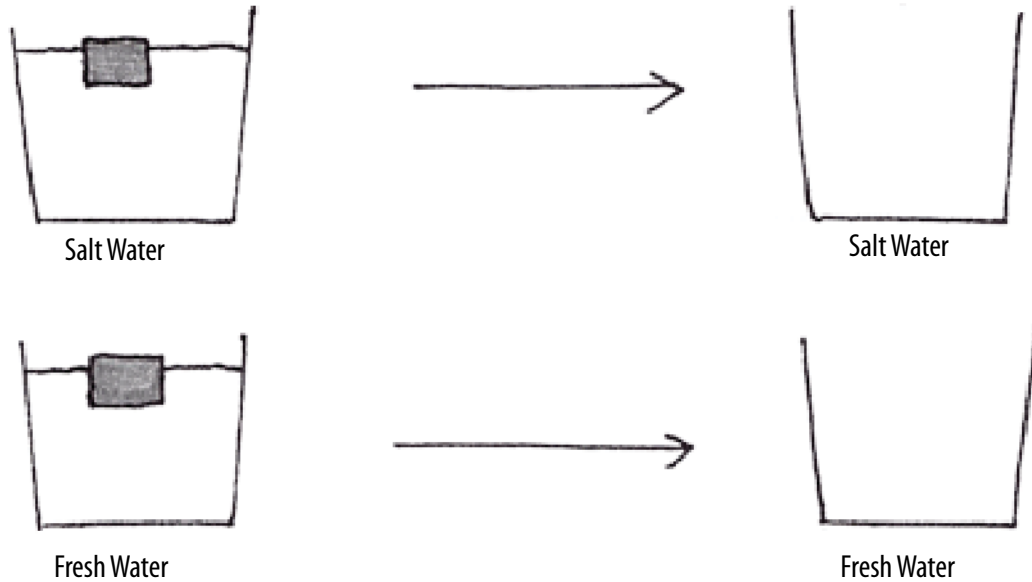
Question

1. What do you think might be the explanation they are trying to test with the colored ice cubes?

Part III— Predictions and Observations

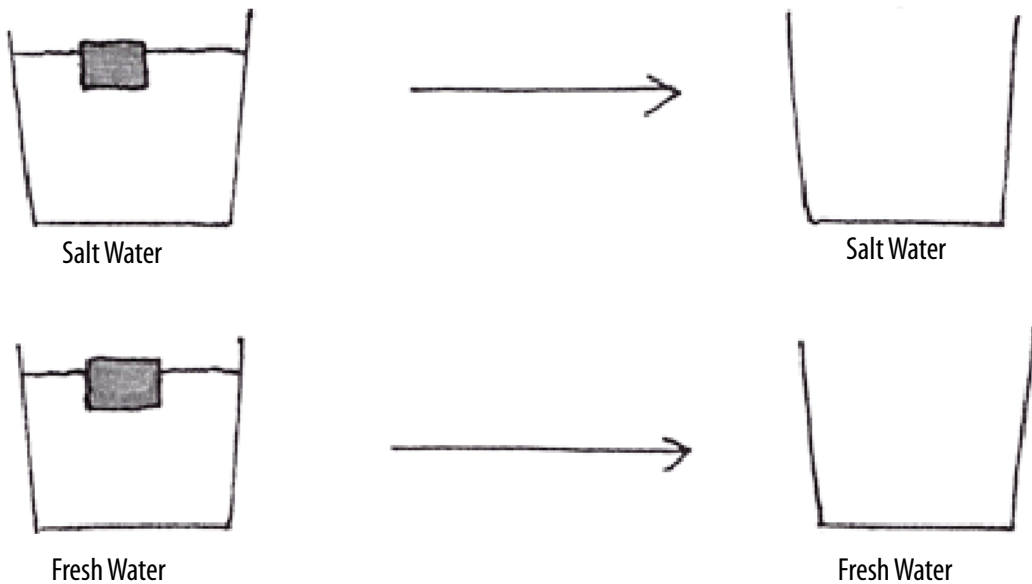
If their explanation were correct, draw what you would expect to see in the experiment with colored ice cubes.

Figure 1—Predictions for colored ice melting.



After you have drawn your predictions and shared them with your group members, do the experiment and record your observations. Are the observations consistent with your predictions?

Figure 2—Observations of colored ice melting.



Part IV—Experimental Design and Explanation

As Marian, John, Gail, and Sally were doing the experiment, they noticed that the two ice cubes not only melted at different rates, they also melted in different ways.

Sally: Look! This one in fresh water is becoming smaller and smaller all around, but that one in salt water seems to be staying the same size if you look at it from above.

Marian: But actually the one in salt water is also melting, just more slowly. It's becoming thinner and thinner.

John: It looks like it's not melting from the sides. Do you think it's melting from the top down or from the bottom up?

Gail: I'm not sure. What do you think?

Figure 3—Fresh water observations.

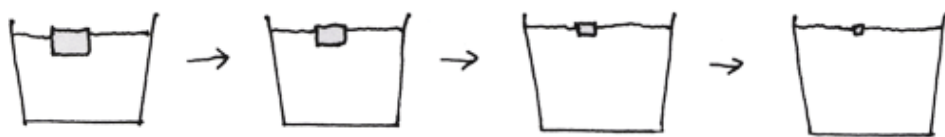
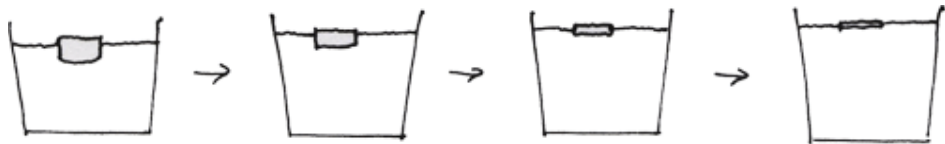


Figure 4—Salt water observations.



Questions

1. Do you think the ice cube in salt water is melting from the top down or from the bottom up?
2. Why do you think so?
3. What test would you do to verify your idea?
4. How would you explain what you see in the test?
5. How does the density of an object or a fluid affect its floating or sinking behavior in another fluid? Can you think of examples of this principle at work in everyday experience?
6. What are the two ways that heat is transferred from a region of higher temperature to a region of lower temperature in this example of an ice cube in a glass of water? Is there yet another way that heat could be transferred between two objects?
7. Can you think of examples of heat transfer in everyday experiences? Which way(s) of heat transfer is (are) involved in each example?

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