



THE KNOX SCHOOL

Honors Biology 2020 Summer Assignment

Directions: Below you will find assignments that will help you create a solid foundation of knowledge and skills that will be vital to your success throughout the school year.

Due Date: First day of your Biology class.

Week 1.

1. Define the following terms and select 6 of them to create a paragraph with. After you create your paragraph containing them please underline or highlight the terms used.
 - a. Biology, independent variable, dependent variable, control group, experimental group, hypothesis, accuracy, precision, qualitative, quantitative, mass, volume, constants, observation, and inference.
2. What is the field of biology that deals with the relations of organisms to one another and to their physical surroundings?
3. What field of biology involves the study of genes, genetic variation, and heredity in living organisms?
4. What field of biology has a focus on cell structure and function, and it revolves around the concept that the cell is the fundamental unit of life?
5. What field of biology studies the process by which different kinds of living organisms are thought to have developed and diversified from earlier forms?

Week 2.

1. Go to https://www.sciencedaily.com/news/plants_animals/biology/. Once you are there read any story from the top headlines of the day and provide the following information.
 - a. What is the date?
 - b. What is the topic of the article?
 - c. What field of Biology does this article relate to?
 - d. Write a paragraph summary of what you learned and found interesting about the article.
 - e. Could we use this topic as a potential lab activity during the school year?
2. Explain the process of the Scientific Method and give an example of when it might be used in your everyday lives.

Week 3.

1. LiveScience is a resource that provides information on a variety of different topics in biology and in other branches of science. Please read the article here; <https://www.livescience.com/44549-what-is-biology.html>, this article discusses different aspects of biology as a whole.
 - a. Please describe a field of biology that you have not heard of yet.
 - b. Please discuss a discovery in the field of biology that surprised you.
 - c. After reading the article please state one reason why you believe biology is an important part of our everyday lives.
 - d. Find something in the article that you would want to complete an experiment on or a research project on?
 - e. Please state either a hypothesis for an experiment or the question you would want to research.

Week 4.

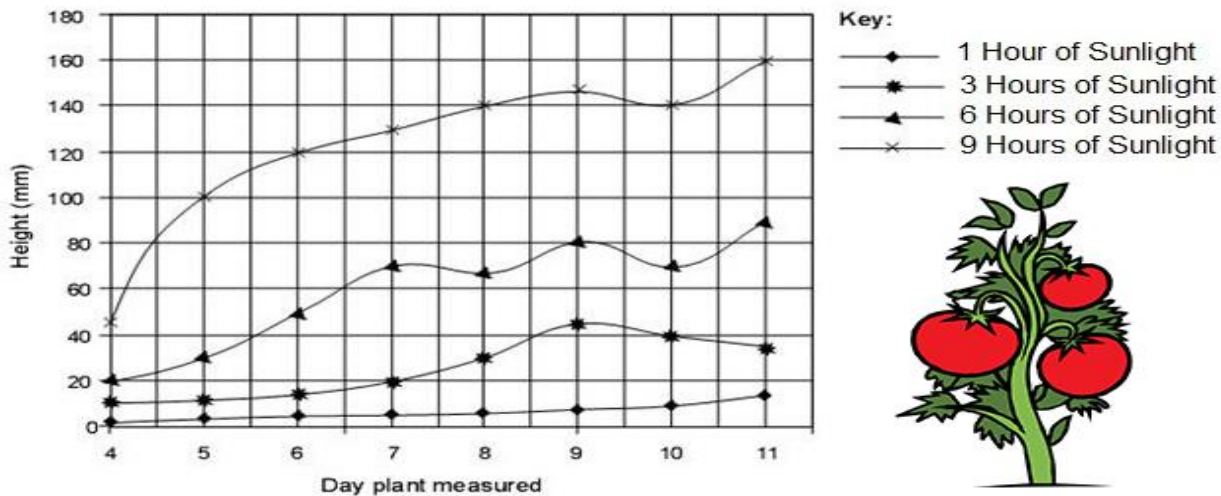
1. Below you will read as a scenario and will be asked to identify parts of the scientific method.
 - a. Scenario: Connor and Miguel want to investigate if the type of fertilizer changes the color of their hydrangea flowers. They select 10 hydrangea bushes and plant them in the same yard with the type of soil. Every bush gets 3 cups of fertilizer, but each receiving a different brand. One bush gets no fertilizer. All bushes receive morning sunlight and no afternoon sunlight. All bushes are watered the same amount every other morning. After four weeks, the boys observe the color of the blooms on each bush.
 - b. Please identify the following from the scenario detailed above:
 - i. Independent variable:
 - ii. Dependent variable:
 - iii. Hypothesis:
 - iv. Control group:
 - v. Experimental group:
 - vi. Constants:

Week 5.

1. Please visit the biology section of the ScienceMag website at (<https://www.sciencemag.org/category/biology>) a read through one of the recent articles posted. When you are finished please complete the following tasks:
 - a. Please state the date.
 - b. Please state the title of the article.
 - c. Please summarize the main idea of the article.
 - d. Please state something that you found interesting about the article.

Week 6.

1. This week we are going to work on interpreting graphs. Below you will find a graph that contains information on the growth of plants in comparison to the amount of sunlight that they received.



- a. On Day 7, the plants kept in the sun for 3 hours were how tall? _____
 - b. On Day 8, the plants kept in the sun for 6 hours were how tall? _____
 - c. On Day 9, the plants kept in the sun for 9 hours were how tall? _____
 - d. Based on the graph, the plant grows best in what amount of sunlight? _____
2. How would you set up a similar experiment in comparison to the experiment shown above but instead of sunlight you are testing the amount of water on plant height. Please include the following information:
 - a. Hypothesis:
 - b. Independent variable:
 - c. Dependent variable:
 - d. Experimental groups:
 - e. Control group:

Week 7.

1. This week we are going to work on creating our own line graph when given a data table.

Day	Sprouts Plant A	Sprouts Plant B
1	8	3
2	16	7
3	22	13
4	30	20
5	35	21
6	42	25

2. What is the independent variable?
3. What is the dependent variable?
4. These two plants were given everything the same besides fertilizer. Plant A received fertilizer and plant B did not. What is one observation you could make regarding the number of sprouts of these plants in relation to the fertilizer.
5. What if I told you that a massive drought struck the area that these plants call home. You went to look at the plants and noticed that all of Plant A's sprouts have dried up, yet Plant B was still surviving. What could you hypothesize about Plant B and its ability to survive in this harsh environment?

Week 8.

1. This week we are going to focus on some review from what you learned in your middle school life science course. Please define the following vocabulary: Macromolecule, monomer, polymer, carbohydrate, monosaccharides, polysaccharides, lipids (fats), fatty acid, proteins, amino acids, nucleic acids, nucleotides.
 - a. I want you to research why it is important to have proteins, carbohydrates and lipids (fats) in your diet and summarize your findings.

Week 9.

1. Please fill out the table based on the information you gathered last week regarding the macromolecules.

Macromolecule Name	Monomer	Major Function	Example in our diets
Protein			
Carbohydrate			
Lipids (fats)			
Nucleic Acid			N/A

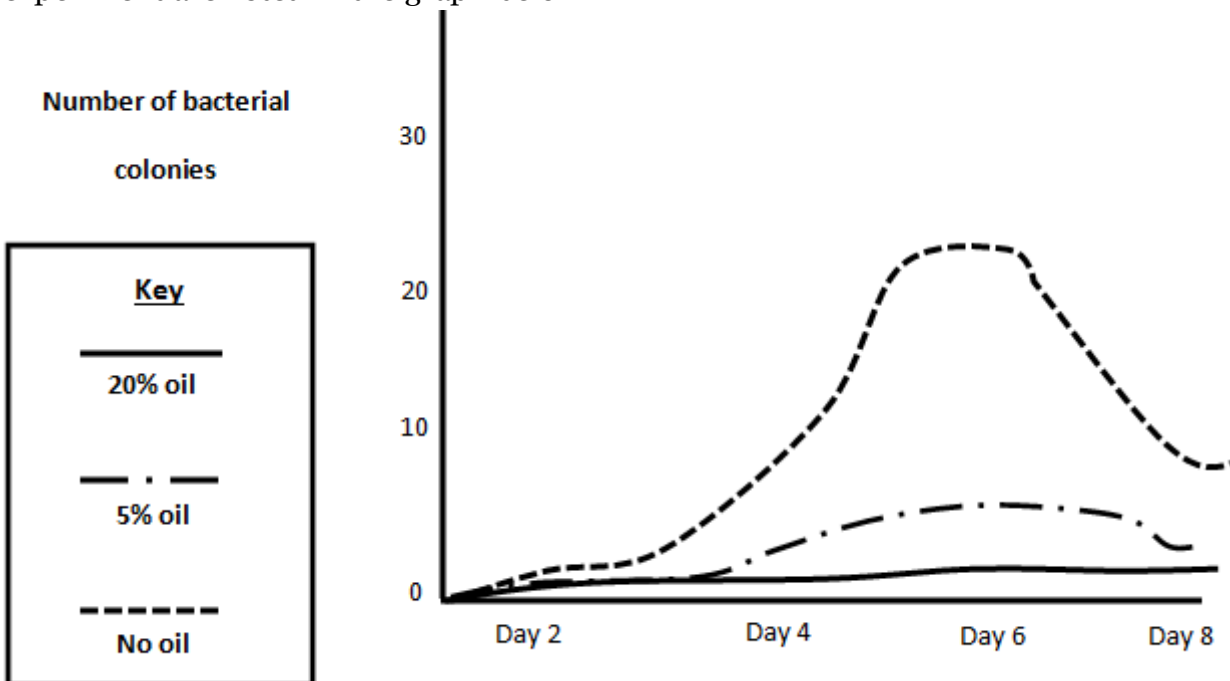
2. Which macromolecule do you believe to be the most important to us? Explain why you believe this.
3. Which macromolecule have you heard about the most in your daily life?
4. Which macromolecule have you heard about the most in your daily life?
5. Why are nucleic acids an important macromolecule if we can't even include them in our daily diet?

Week 10.

1. This week we are going to focus on doing some practice for the ACT exam. It is important to start practicing early on this test as well as the SAT in order to get your best grade. Below is a reading passage that is set up as an ACT style question that relates to biology. Do your best on these questions and we will review them in class when you return to Knox.

Passage

A group of scientists were studying the growth of bacteria. It is their hope that they will be able to induce the bacteria to grow and metabolize oil as a food source. They have taken three samples of *Escherichia coli* and are growing them on nutrient agar plates. The scientists used three conditions to test the *E. coli* bacteria. The first group was grown at 37°C on plain nutrient agar plates. The second group was grown at 37°C on plain nutrient agar plates with a 5% oil solution. The third group was grown at 37°C on plain nutrient agar plates with a 20% oil solution. The results of the experiment are listed in the graph below.



1. What is the independent variable in the experiment above?
2. What is the dependent variable in the experiment above?
3. Which bacterial culture had the greatest rate of growth throughout the 8 day period?
4. Why do you believe that the nutrient agar plate with 20% oil reached a population plateau and then dropped as they approached day 8?