**AP Biology Summer Assignment**

Hello, and welcome to AP Biology! I am Dr. Lazar and my email address is (nlazar@springfieldschools.com). Please do not hesitate to contact me over the summer if you have any questions about this assignment.

My goal with this assignment is to cover or review some fundamental science skills. These skills are often referred to as "Unit 0" by AP Biology teachers because they are important throughout the entire year but are never explicitly covered in the curriculum. I hope that covering these topics now will make the course more manageable over the rest of the year.

## ***You need to be logged into your Springfield Schools Google account to access any of the links below.***

1. **Read pages 1-5 (Section 0.1) of the Morris textbook.**

   **Using what you know from your previous biology coursework, group each of the 8 units of biology under one of the four "Big ideas." You may use each unit more than once.**

   Big Idea 1: Evolution
   Big Idea 2: Energetics
   Big Idea 3: Information Storage and Transmission
   Big Idea 4: Systems Interactions

   *Unit 1: Chemistry of life (biochemistry)*
   *Unit 2: Cell structure and function*
   *Unit 3: Cellular energetics (Cell respiration, photosynthesis, enzymes)*
   *Unit 4: Cell communication and cell cycle (mitosis)*
   *Unit 5: Heredity (meiosis, Mendelian genetics)*
   *Unit 6: Gene expression and regulation (DNA, RNA, protein)*
   *Unit 7: Evolution*
   *Unit 8: Ecology*

2. **Read pages 5-13 (Section 0.2) of the Morris textbook. Complete the question on page 9 (summarized below).**

   *Organize the description of his experiment by identifying the following:*
   1. *The scientific (testable) question*
   2. *The hypothesis*
   3. *The independent variable*
   4. *The dependent variable*
   5. *The experimental group*
   6. *The control group*

3. **What is a null hypothesis? What is an alternative hypothesis? How are these related to the idea of a p-value? How are these related to error bars?**

4. **Read the Statistics tutorial here. Be sure you understand how to calculate a mean, standard deviation, and standard error of the mean. Error bars are also explained well at the end. A sample calculation with work shown is available here if you are uncertain.**

   **Complete questions 1-4 for the scientific skills exercise on this page. Summarize your results in the chart below.**

| Treatment | Dose | Log number of colonies | Mean | Standard deviation | Standard error (SE) | Mean +/- 2SE | Overlaps with control? |
|---|---|---|---|---|---|---|---|
| Control | - | 9.0, 9.5. 9.0, 8.9 | | | | | - |
| Vancomycin | 1.0 | 8.5, 8.4, 8.2 | | | | | |
| | 5.0 | 5.3, 5.9, 4.7 | | | | | |
| Teixobactin | 1.0 | 8.5, 6.0. 8.4, 6.0 | | | | | |
| | 5.0 | 3.8, 4.9, 5.2, 4.9 | | | | | |

5. **Read a few pages from the Campbell textbook. Do you prefer the Campbell or Morris textbook? Give me your thoughts. You do not need to have a strong opinion either way.**