

AP Biology Summer Assignment and Requirements 2018-2019

WELCOME TO AP BIOLOGY! I hope you are looking forward to an exciting semester. Since this is a college level course, it will be fast paced and challenging, as well as demanding a great deal of time both in and out of the classroom. As this course must be completed in one semester, our class will primarily operate as a 'flipped classroom'. This essentially means that class time is devoted to activities and labs that require application and analytical skills. This means you must view 'lecture' videos, as well as reading and studying Power Points, Prezi presentations and chapters from your book, while at home. In addition, these assignments & viewings must be done 'ahead' and PRIOR to the class activities to be successful in the class. For more information, please be sure to review the class syllabus on my blog at www.phillipsscience.com. If you're up to the challenge (and I hope you are!), get started by completing the following assignment before the beginning of the school year. This assignment is due the first day of school and will count as your first grade. All answers for the assignments must be handwritten, and your work must **ALWAYS** be your own! There will also be a QUIZ over the 'Intro to Statistics' summer assignment as well as Chapters 1-4 from the 8th edition Campbell Biology textbook during the first week of school (likely the 3rd day of class). Chapters 1-4 are concepts that were covered in first year biology and chemistry classes: Themes of Biology; Scientific Inquiry; Chemical Context of Life; Water and Life. It is advised that you review these concepts over the summer. Questions for these chapters will be given the first day of school and will also be accessible on my blog before school starts. They will be due on the 3rd day of school (the day of the quiz).

Before you get started on the Summer Assignment, you need to do several things:

1- Most students register for an online account for our book during the summer: 'Campbell Biology' (publisher is Pearson). An electronic text is one of the many resources the site offers. Last year, we used the 8th edition, but the county has recently adopted the 11th edition, which will be issued to each student in the fall. I'm not sure when the 11th edition will be available for access, but using the 8th edition over the summer is perfectly fine, as it is very similar to the 11th edition. Regardless of which version is available for access this summer, **YOU MUST EMAIL ME** at susan.phillips@cobbk12.org **between 5/21/18 and 6/15/18 (or after 7/23/18) to request your student code for accessing the Pearson website. I will not be checking my email on a regular basis between 6/16-7/22.** However, if you find yourself 'caught' between the dates I am available, there is another excellent (free!) online AP text you can use for the time being: <https://openstax.org/details/books/biology-ap-courses>. I really like this site and plan to use it more often next year.

a. I **HIGHLY** recommend that you purchase the latest version of the 'AP Biology Test Prep Series' paperback book by Pearson Education, as I only have ONE class set for all classes and you will not be permitted to take them home. **Make sure the edition is 2013 or later.** You can find them on Amazon, as well as several other places.

2- Go to my blog (www.phillipsscience.com) and click on AP Biology (it may still say '2017-18', but I will change that sometime over the summer). Go to the right hand column, under the heading 'Useful Links/Apps', and **sign up for Remind (beginning 5/21/18)**.

3- Go to www.collegeboard.org & **register for an account**. Go over the 'Course Descriptors', 'Formulas Sheet', etc. for AP Biology and get very familiar with the standards and requirements for this course.

4- You must purchase (at least) **3 'composition notebooks'** (google it and refer to 'Images' to see a picture of the type of notebook required) for this course, along with a **large 3 ring binder** (2+ inches). One composition notebook will be for lab data and problem solving (as well as a few virtual assignments). Another comp notebook is for the "*Henrietta Lacks*" book assignment (explained in #4, below) and I'll explain the need for the 3rd one when school starts. Graph paper is also required, along with pencils, black pens, a red pen. A highlighter is recommended.

The assignment is as follows:

1. **Introduction to Statistics-** [click here](#) (you may have to download it from my blog for the links to work): The College Board AP Biology Exam requires that you are proficient in data & statistical analysis. The Exam and Standards were revised in 2013 and there are many questions integrated with statistics, as well as other mathematical equations. You should look over the [AP Biology Formula Sheet](#) on the College Board website (there is also a link on my blog). It is most challenging to master the depth of biology content required for this course in one semester (it is the equivalent of a 2 semester college course), hence it is essential to get started on understanding and applying some of the mathematical concepts and equations prior to the start of the course. This assignment is due on the **FIRST DAY** of the semester. **This material will also be on the first quiz, given the first week of the semester.** (*NOTE- If you cannot access the statistics assignment from the above link, it is on my blog).

2. Review Chapters 1-4 (8th edition) or Chapters 1-3 (11th edition). Questions will be given to you on the 1st day of class and will be due the 3rd day of class (quiz day). They will also be accessible on my blog before school begins, if you would like to get a head start. There will be no class time for reviewing the information from these chapters, but you must apply these concepts throughout the course (ex- hydrogen bonding, polarity, specific heat of water, natural selection, etc.).

3. While not required, some of you may want to begin the semester book project. Last year, it was recommended by many science teachers that students read the book: *The Immortal Life of Henrietta Lacks* by Rebecca Skloot. This book is extremely relevant to our course, so we will explore it further. **The first installment of questions is due on Friday, August 16, which is the 2nd full week of school.** Some of you may want to get a 'head start' on this. You must follow the appropriate guidelines **EXACTLY, as outlined in the link on my blog.** All installments will be averaged as a **test grade** and each installment (there are 4) is due monthly (schedule TBA). A hard copy of the guidelines will also be available in the plastic bin outside my door during the last few days of this school year. FYI: I have around 12 copies of the book (first come, first serve) if you would like to stop by my room (515) before the current school year is over and check one out. The paperback is available for purchase on Amazon, as well as other sites. Even if you decide to wait and start the book once school starts in the fall, you **NEED TO ATTAIN A COPY PRIOR TO THE 1st DAY OF SCHOOL** in order to complete the 1st installment on time.

4. I will periodically check my school email between 6/16 - 7/22, but likely not very often. Therefore, if you have any questions, it would be in your best interest to complete the assignments earlier in the summer, rather than later, as it may be a week or more before I get back with you.

I hope you enjoy the summer and I really do look forward to having you in class next year!

AP Bio: Intro to Statistics
Summer Assignment

Name _____

The following assignments are due the FIRST DAY of the semester. There will be a quiz over these concepts during the first few days of class. **If you have a hard copy of this assignment and can't access the below links, you can find everything on my blog: www.phillipsscience.com.*

INTRO TO STATISTICS:

A. Watch the following videos. Take notes in your composition notebook and answer the following questions directly on this sheet. You must be able to APPLY and/or ANALYZE data on most EVERY assignment throughout this course based on these principles, concepts and practices:

1. Bozeman- [Types of Graphs](#) (**MUST know when to use each type appropriately!*)
 - a. What type of graph uses a 'best fit' line?
 - b. Explain the difference in a bar graph and a histogram.
 - c. What type of graph shows a change over time?
 - d. What type of graph displays a correlation of variables?
 1. Distinguish between the independent variable and dependent variable and where they are placed on a graph.
 - e. Which type of graph is best for comparing 2 or more different groups?
 - f. Which type of graph is better for showing distribution of data?
 - g. Explain when a pie graph should be used and give (draw) any example.
 - h. State at least 5 elements that any graph should **always** display.

i. Watch 'Graphing Data by Spreadsheet'. Bookmark it and take notes in your notebook for reference. Also, watch 'Graphing Data by Hand', if needed.

2. Bozeman- [Statistics for Science](#)

- a. What is n ?
- b. What is \bar{x} ?
- c. What is M ?
- d. What was the range of the sample he gave?
- e. Explain 'Degrees of Freedom' (with any example) and why the formula is $n-1$.

3. Bozeman- [Standard Deviation](#)

- a. What is meant by normal distribution?
- b. What does standard deviation (SD) measure?
- c. Can 2 sets of data have the same mean but a different SD? Explain.
- d. 1 SD means _____% of the population falls within this range; while 2 SD means _____% falls in this range.
- e. Pause the video and calculate the SD from the 2nd set of data given BY HAND. Show your work.

f. Take notes as to how to solve for SD using Excel. You may want to bookmark the video for quick reference for labs we will be doing throughout the course. *Note- The AP Bio

*Exam only allows you to use a **BASIC** 4 function (with square root) calculator, so make sure you learn to solve it by hand!*

3. Bozeman- [Standard Error](#) and Kevin Piers [Standard Deviation & Standard Error of Mean](#)

a. From Bozeman: Explain the significance of standard error among 2 different sets of data with different sample sizes that have the same Mean (in terms of precision).

b. From Piers:

1- What do SEM bars that have overlapping Means on a graph indicate?

2- Explain the significance if SEM bars overlap, but the Means do not overlap.

3- Explain the significance if there is no overlap between SEM bars.

c. From Bozeman-As stated earlier, make notes (notebook) for calculating & using Excel.
Use the example he gave and try it yourself!

4. Go to www.Bozemanscience.com/ap-biology/. Watch the videos on [AP Biology Practices](#).
TAKE NOTES IN YOUR COMPOSITION NOTEBOOK!

B. [Go over this Power Point](#). Make sure you can work all examples on your own (use your notebook)

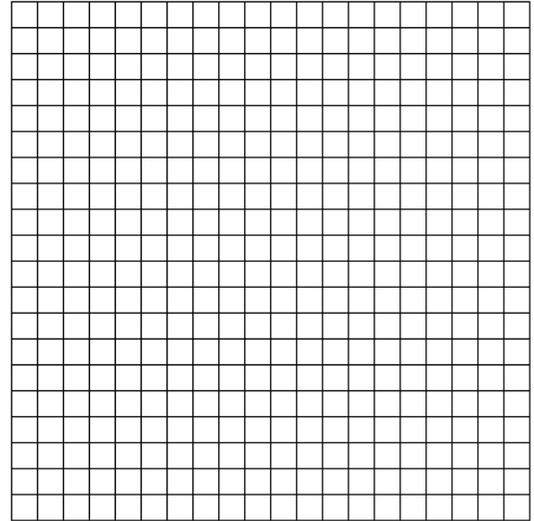
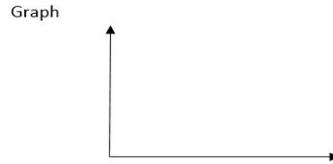
C. **If additional review is needed, there are some other recommended sites on my blog.* One good site is www.mathisfun.com.

*SEE NEXT PAGE FOR PROBLEMS TO SOLVE

D. Solve the following problems IN PENCIL. You must show ALL WORK. Make sure graphs have Titles and are properly labeled WITH UNITS: (Click [here](#) for AP Bio Formulas Sheet)

1. Graph the following sample data set showing the number of leaf disks that rise in a solution over time as photosynthesis occurs.

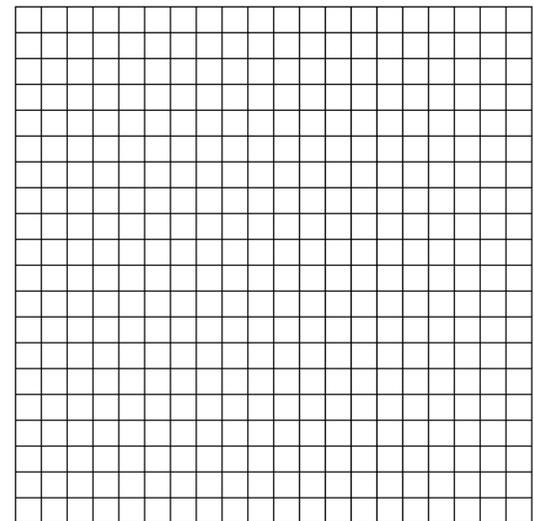
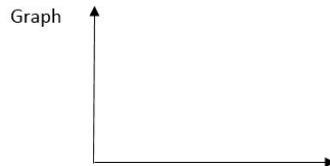
Time (min)	Number of Disks Floating
1	0
2	0
3	0
4	0
5	0
6	0
7	1
8	1
9	1
10	2
11	5
12	8
13	10
14	14
15	14
16	15
17	20
18	20
19	20
20	18



2. A- Calculate the mean and standard deviation for the data set of annual monthly rainfall. B- Use the data to sketch the appropriate type of graph.

Month	Rainfall (cm)
Jan	2.0
Feb	1.8
Mar	1.2
Apr	5.7
May	6.2
Jun	5.9
Jul	1.0
Aug	1.1
Sep	1.1
Oct	2.3
Nov	2.7
Dec	2.5

Mean =
Standard Deviation =



3. Below are 2 samples of data that were collected (*we will ignore Units & Graph Title for this one):

Sample A: 12, 13, 14, 15, 16, 17, 18

Sample B: 10, 15, 20

Phillips- AP Biology

Calculate the mean for Sample A _____

Calculate the mean for Sample B _____

Are the calculated means sufficient in explaining the data? Why or why not? (**Be specific!*)

Calculate:

SD for Sample A _____

SD for Sample B _____

Explain the significance of the results.

Calculate the Standard Error of Mean for Sample A _____

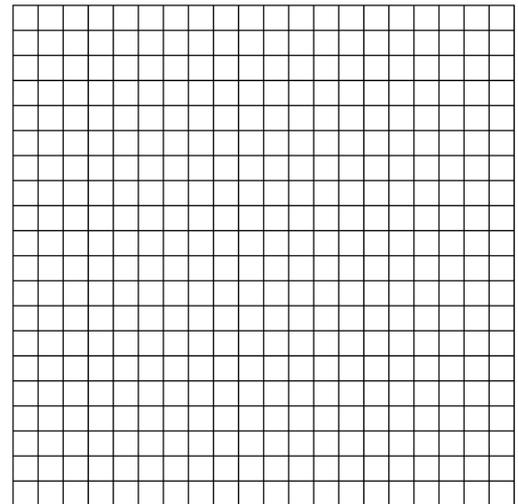
Calculate the SEM for Sample B _____

Graph your results, showing error bars for each.

Do the bars overlap?

Do the means overlap?

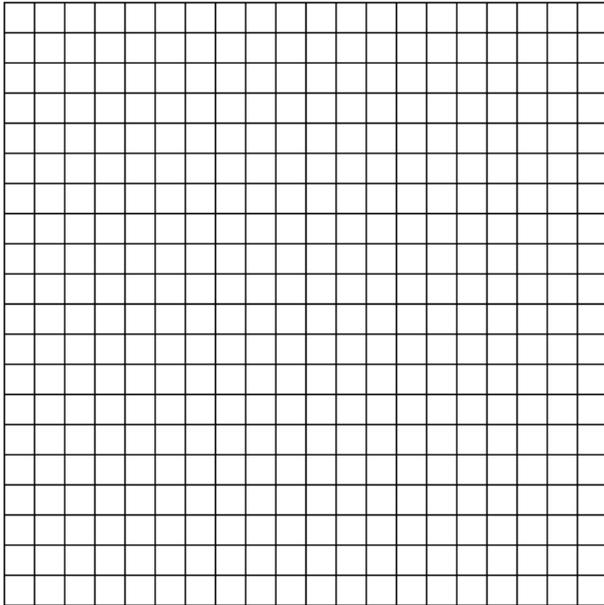
Explain whether or not there are 'significant' differences between the 2 populations.



4. A student noticed that the ivy leaves growing on the shady side of a building were larger than ivy leaves growing on the sunny side of the same building. The student collected and measured the maximum width, in centimeters, of 30 leaves from each habitat. Use statistical analysis to determine if it's likely that there is a significant difference in leaf size between the shady and sunny ivy plants with 95% confidence (± 2 SE). Graph the data and indicate error bars. (**see next page*)

Calculated Results (from collected data):

	Shady Leaves	Sunny Leaves
Mean	7.43	5.88
Standard Deviation	1.63	1.32
<i>N</i>	30	30
Standard Error	0.30	0.24



Using the data given and constructed graph, justify the significance between the two samples.