

Briarcrest AP Biology (2025-26) Summer Assignment

Welcome to AP Biology! In order to prepare for success in this class, you must complete the following three (3) assignments. There is also a vocabulary note for you to review after assignment 3. ***Note the due date for each assignment.*** Assignments can be turned in early, but NOT after due dates. Late work is NOT accepted.

Assignment 1: Introduction Email

I would like to know a little about you, so your first assignment is to send me an email. Yep... that's it... if only all of the grades were this easy!

Due July 25, 2025 by email to lschief@briarcrest.com; Include the following in your email:

1. Email Subject Line: AP Biology Intro Letter 25-26
2. Email Body: Your full name (& nickname that you go by) **AND** the following information.
 - a. Who was your last science teacher? What class?
 - b. What other science classes have you taken? Are you planning to take any next year?
 - c. What do you like to do (hobbies, sports, music, interests, etc.)?
 - d. What are your personal strengths when it comes to learning new material?
 - e. What causes you to struggle in a course?
 - f. What is the most effective way for you to prepare for a test?
 - g. How many AP classes have you taken so far? How many AP Exams have you scored a 3 or higher?
 - h. How many AP classes are you taking this year? Please list.
 - i. Have you or will you be taking Anatomy and Physiology?
 - j. Have you or will you be taking AP Chemistry? If you took it, what grade did you get and what did you find interesting and/or difficult?
 - k. Was there anything that you liked or disliked about your earlier Biology class?
 - l. Why are you taking AP Biology? What do you hope to accomplish/gain from this course?
 - m. What are you looking forward to the most in AP Biology?
 - n. What are you most anxious about in AP Biology?
 - o. Please feel free to add any information you'd like to share—it's all CONFIDENTIAL!

Don't fret. There are no right or wrong answers. ***You can only lose points by not following instructions.*** Please be honest, so that I can determine the best way for me to be prepared to help you! Again, ***it is due July 25, 2025 by email to lschief@briarcrest.com***

Assignment 2: Chemistry Review

This is a review of basic chemistry. We will not spend a lot of class time on these concepts or the unit as they should have been learned in chemistry. You may use your textbook or online resources to answer these questions. **ALL RESPONSES MUST BE HANDWRITTEN. Due by the beginning of class on August 12, 2025.**

1. Compare and contrast the term element with compound: _____

2. Write the symbols and ion charge of the following elements:

a. Carbon _____

d. Nitrogen _____

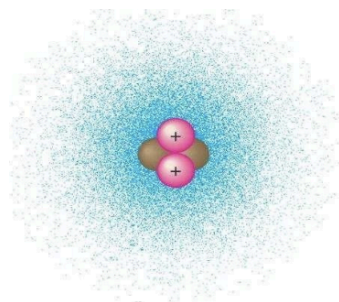
b. Hydrogen _____

e. Phosphorus _____

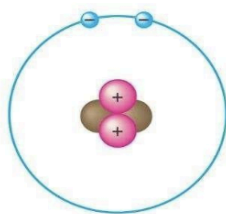
c. Oxygen _____

f. Sulfur _____

3. Label the diagram below **AND** define the terms that you label.



(a)



(b)

4. Distinguish the terms atomic mass and atomic number. _____

5. What is an isotope and what is “special” about radioactive isotopes? _____

6. What determines interactions between atoms? Why are valence electrons important? _____

7. Define the following terms:

- a. Chemical bond- _____
- b. Covalent bond- _____
- c. Single bond- _____
- d. Double bond- _____
- e. Electronegativity- _____
- f. Nonpolar covalent bond- _____
- g. Polar covalent bond- _____

8. Write the molecular formulas for the following compounds.

- | | | | |
|-------------------|-------|--------------|-------|
| a. Oxygen gas | _____ | d. Phosphate | _____ |
| b. Carbon dioxide | _____ | e. Ammonia | _____ |
| c. Glucose | _____ | f. Water | _____ |

9. How are ionic bonds and covalent bonds different? _____

10. Compare and contrast hydrogen bonds and van der Waals interactions. _____

11. Why is water considered a polar molecule? _____

12. For each of the below listed properties of water — briefly define the property and then explain how water's polar nature and polar covalent bonds contribute to the water special property.

- a. Cohesion: _____
- b. Adhesion: _____
- c. Surface tension: _____
- d. High specific heat: _____
- e. Heat of vaporization: _____
- f. Evaporative cooling: _____

13. What is special about water and density? _____
14. Explain how the properties of water are related to the phenomena described in the statements below. More than one property may be used to explain a given phenomenon.
- a. During the winter, air temperatures in the northern United States can remain below 0°C for months; however, the fish and other animals living in the lakes survive. _____

 - b. Many substances (for example, salt (NaCl) and sucrose) dissolve quickly in water. _____

 - c. When you pour water into a 25-ml graduated cylinder, a meniscus forms at the top of the water column. _____

 - d. Sweating and the evaporation of sweat from the body surface help reduce a human's body temperature. _____

 - e. If you touch the edge of a paper towel to a drop of colored water, the water will move up into (or be absorbed by) the towel. _____

15. Define the following terms:
- a. Solute: _____
 - b. Solvent: _____
 - c. Aqueous solution: _____
 - d. Hydrophilic: _____
 - e. Hydrophobic: _____
16. MOLARITY- Know the following:
- a. *Concentration*: comparison of solute to solvent (solute : solvent)
 - b. *Concentrated solution*: large ratio of solute to solvent
 - c. *Diluted solution*: small ratio of solute to solvent
 - d. *How to Calculate Molarity*: <http://www.wikihow.com/Calculate-Molarity>
 - i. Molarity Symbol: _____
 - ii. Molarity Equation: _____

17. What defines an acid and a base? _____

18. Why are small changes in pH so important in biology? _____

19. Why is organic chemistry so important in the study of biology? _____

20. What is special about carbon that makes it the central atom in the chemistry of life? _____

21. Describe the following chemical functional groups and their properties:

a. Hydroxyl: _____

b. Carbonyl: _____

c. Carboxyl: _____

d. Amino: _____

e. Sulfhydryl: _____

f. Phosphate: _____

Remember: Assignment 2 is due by the beginning of class on August 12, 2025.

Assignment 3: Introduction to Statistics

You may be thinking, “Stats??? I thought this was AP Biology!” You're totally right, it is! There will be many opportunities to analyze authentic data; so, having a strong understanding of what graph to use to show information and the skills to interpret those results will help you as we learn content.

Watch the following videos and take notes in your notebook; then answer the questions in the space provided. *You will have to APPLY & ANALYZE data on assignments throughout the course using these principles, concepts, and practices.* **ALL RESPONSES MUST BE HANDWRITTEN. Due by the beginning of class on August 12, 2025.**

1. Beginner's Guide to Graphing Data: (<http://www.bozemanscience.com/statistics-graphing>)
 - a. What type of a graph uses a “best fit” line?
 - b. Explain the difference between a bar graph and a histogram.
 - c. Which type of graph shows a change over time?
 - d. Which type of graph displays a correlation of variables?
 - e. Distinguish between the independent/dependent variable in an experiment, and where their axes are on a graph.
 - f. Which type of graph is best for comparing 2 or more different groups?
 - g. Which type of graph is better for showing distribution of data?
 - h. Explain when a pie chart/graph should be used and give (draw, label) any example.
 - i. State at least 5 elements that any graph should always display.
2. Bozeman- Statistics for Science (<https://www.bozemanscience.com/statistics-for-science>)
 - a. What is n ?
 - b. What is \bar{x} (bar)?

- 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 (<http://www.bozemanscience.com/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 (or Google Sheets). You can bookmark the video for quick reference for labs we will be doing throughout the course.
4. Bozeman Standard Error (<http://www.bozemanscience.com/standard-error>)
 Kevin Piers Standard Deviation & Standard Error of Mean <https://www.youtube.com/watch?v=3UPYpOLeRJg>
- 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:* What do SEM bars that have overlapping Means on a graph indicate?
 - c. Explain the significance if SEM bars overlap, but the Means do not overlap.
 - d. Explain the significance if there is no overlap between SEM bars.

Final Note on Vocabulary: The following are basic biology vocabulary words. You need to know these, but **you do NOT have to turn in definitions!**

1. abiotic factors
2. biotic factors
3. adaptation of an animal or plant
4. analogous structure
5. autotroph
6. batesian mimicry
7. biodiversity
8. carrying capacity
9. coevolution
10. commensalism
11. convergent evolution
12. detritivore
13. dispersion: clumped, random, or uniform
14. divergent evolution
15. ectotherm vs endotherm
16. heterotroph
17. homologous structures
18. intersexual vs intrasexual selection
19. interspecific vs intraspecific competition
20. invasive species
21. keystone species
22. life histories: K-selected, r-selected
23. limiting factors: density-dependent, density-independent
24. logistic growth
25. mullerian mimicry
26. mutualism
27. mycelium
28. mycorrhizae
29. natural selection
30. niche
31. parasitism
32. predation
33. saprophyte
34. spore
35. symbiosis