

# AP BIOLOGY

## SUMMER ASSIGNMENT

Part I - Answer all of the following questions completely. Answers should be typed.

### Chapter 1 – Exploring Life

1. Diagram the hierarchy of structural levels in biology.
2. Explain how the properties of life emerge from complex organization.
3. Describe seven emergent properties associated with life.
4. Distinguish between prokaryotic and eukaryotic cells.
5. Explain, in your own words, what is meant by “form fits function”.
6. List and distinguish between the three domains of life.
7. Distinguish between the four kingdoms that make up Eukaryotes.
8. Briefly describe how Charles Darwin’s ideas contributed to the conceptual framework of biology.
9. Outline the scientific method.
10. Distinguish between inductive and deductive reasoning.
11. Explain how science and technology are interdependent.



### Chapter 2 – The Chemistry of Life

1. Define element and compound.
2. State four elements essential to life that make up 96% of living matter.
3. Describe the structure of an atom.
4. Define and distinguish among atomic number, mass number, atomic weight and valence electron.
5. Explain why radioisotopes are important to biologists.
6. Explain the octet rule.
7. Explain why the noble gases are so unreactive.
8. Distinguish among nonpolar covalent, polar covalent and ionic bonds.
9. Describe the formation of a hydrogen bond and explain how it differs from a covalent or ionic bond.
10. Explain why weak bonds are important to living organisms.

### Chapter 3 – Water and the Fitness of the Environment

1. Describe the structure and geometry of a water molecule and how hydrogen bonds form between water molecules.
2. List five characteristics of water that are emergent properties resulting from hydrogen bonding.
3. Describe the biological significance of the cohesiveness of water.
4. Explain how water’s high specific heat, high heat of vaporization and expansion upon freezing affect both aquatic and terrestrial ecosystems.
5. Explain how the polarity of water molecules makes it a versatile solvent.
6. Explain the pH scale.
7. Explain how acids and bases directly or indirectly affect the hydrogen ion concentration of a solution.
8. Explain how buffers work using the bicarbonate buffer system as an example.

## Summer Assignment

### Part II

**“Collect” 40 items from the list of terms below.**

When I say “collect”, I mean you should collect that item by finding it and taking a photograph (digital) of that item. You will upload your photographs with corresponding explanations to me via email ([poesen@hopatcongschools.org](mailto:poesen@hopatcongschools.org)). A Power Point would be preferred for ease of presentation. You do not need to find the exact item on the list!



### EXAMPLES:

- If it is an internal part to an organism such as “tendon”, you don’t have to dissect out your little brother’s Achilles tendon and take a picture of it. A photo of his heel, and what the tendon does would suffice, but you must apply the term to the specimen you find and briefly explain in your document how this specimen represents the term.
- If you choose the term “phloem,” you could submit a photograph you have taken of a plant leaf or a plant stem and then explain in your document what phloem is and specifically where phloem is in your specimen.

### ORIGINAL PHOTOS ONLY:

You cannot use an image from any publication or the Web. You must have taken the photograph yourself. The best way to prove that is to place an item in all of your photographs that only you could have added each time, something that you might usually have on you like a pen or a coin or a key or your phone, etc.

### NATURAL ITEMS ONLY:

Some specimens may be used for more than one item, but all must be from something that you have found in nature. Take a walk around your yard, neighborhood, and town. **DON'T SPEND ANY MONEY!** Research what the term means and in what organisms it can be found... and then go out and find one.

### TEAM WORK:

You may work with other students in the class to complete this project, but each student must turn in his or her own project with a unique set of terms chosen. There are 100 choices... probability says there is a very small chance that any two students will have most of the same **40 terms** chosen.

1. acid
2. adaptation of an animal
3. adaptation of a plant
4. altruistic behavior
5. alkaline (base)
6. amino acids
7. amniotic egg
8. analagous structures
9. angiosperm
10. animal that has a segmented body
11. asexual reproduction
12. autotroph
13. Basidiomycete
14. Batesian mimicry
15. bilateral symmetry
16. biological magnification
17. buffer
18. carnivorous plant
19. cartilage
20. Calvin cycle
21. cambium
22. cellular respiration
23. cellulose
24. chitin
25. coenzyme
26. coevolution
27. commensalism
28. connective tissue
29. cuticle layer of a plant
30. detritovore
31. disaccharide
32. dominant vs. recessive phenotype
33. ectotherm
34. endosperm
35. endotherm
36. enzyme
37. epithelial tissue
38. ethylene
39. eukaryote
40. exoskeleton
41. fermentation
42. flower ovary
43. fungi
44. genetic variation within a population
45. genetically modified organism
46. glycogen

47. gymnosperm cone – male or female
48. gymnosperm leaf
49. habitat
50. hermaphrodite
51. heterotroph
52. homeostasis
53. homologous structures
54. hybrid
55. hydrophilic
56. hydrophobic
57. introduced species
58. keystone species
59. Krebs cycle
60. K-strategist
61. lichen
62. lipid used for energy storage
63. littoral zone organism
64. mating behavior (becareful!)
65. methane
66. modified leaf of a plant
67. modified root of a plant
68. modified stem of a plant
69. monosaccharide
70. Müllerian mimicry
71. mutation
72. mutualism
73. mycelium
74. mycorrhizae
75. niche
76. parasitism
77. phloem
78. pollen
79. pollinator
80. polysaccharide
81. population
82. predation
83. prokaryote
84. purebred
85. r-strategist
86. radial symmetry (animal)
87. redox reaction
88. rhizome
89. seed dispersal (animal, wind, water)
90. selective permeability
91. spore
92. succession

93. taxis
94. territorial behavior
95. tropism
96. unicellular organism
97. water adhesion
98. water cohesion
99. vestigial structures
100. xylem