AP Biology 2020-2021 Summer Assignment

Welcome to AP Biology! I'm your instructor, Dr. Amanda Helip-Wooley.

The summer assignment has three parts:

I. ***Brain Rules*** **-** Read the book *Brain Rules* by John Medina (available in print and electronic formats) and complete the assignment below. The goal is to learn about how the human brain works and use this to develop effective study strategies for this class.

II. **Chemistry Review** - Maybe it's been a while. Maybe you never really loved chemistry. It's OK. Watch the videos, take notes, define the terms, and answer the questions in the assignment below to get ready for our first unit.

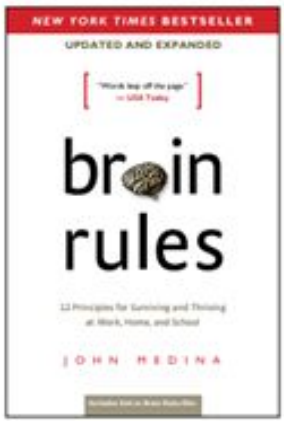
III. **Root words** - Biology can be challenging because it's like learning a foreign language. Instead of learning hundreds of new words, get to know some of their Greek/Latin roots. Complete the worksheet below to find the meaning of the root words and practice using them.

Submit your work in a single PDF to the shared Google folder AP Bio Summer Assignment 2020-2021 no later than **Sunday, August 16, 2020**. This assignment will count as the first test grade of the year, with a total value of 100 points.

I hope you have a wonderful summer and I look forward to a fantastic year!

Questions? Contact me at ahelipwooley@tampaprep.org.

I. *Brain Rules*



Read each chapter, then **answer the relevant Brain Rules Question(s)** below. If you start now, you can complete the assignment doing just one per week. You may want to watch the videos provided on the author's website: http://brainrules.net/about-brain-rules to reinforce the main points.

Rule 1 – Survival

1. According to the author, what are some of the unique abilities of the human brain?

Rule 2 – Exercise

2. How does physical activity influence our mental capabilities and/or mental states? How does the body "feed" the brain?

Rule 3 – Sleep

3. a) Are you a "lark," "owl," or "hummingbird?" Based on that, and what you learned about the circadian rhythm, how would you structure your study schedule?
   b) How does sleep loss impact our ability to learn and perform?

Rule 4 – Stress

4. a) What are some negative effects of long term stress?
   b) What are some ways that we can manage stress?

Rule 5 – Wiring

5. a) How does learning physically change the brain?
   b) Knowing that every brain is literally different, how can we use that knowledge to improve learning?

Rule 6 – Attention

6. a) What does the author have to say about multi-tasking?
   b) How can you use the "10-minute" attention rule?

Rule 7 – Memory

7. a) The author talks about "elaborative rehearsal," and how thinking or talking about an event right after it happens is important for memory. How can this relate to how you study?
   b) The author states that memory works better in the same environment in which it was created. Since it is unlikely that you will be able to take the AP exam in your bedroom, what advantages might there be to studying the same material in many different locations?

Rule 8 – Sensory Integration

8. a) If we learn best when we stimulate several senses at once, what does that mean for how you learn, take notes, and study?
   b) The author describes smell as unusually powerful in bringing back memories. Why is this? Do you have any personal examples?

Rule 9 – Vision

9. a) The author asserts that "vision is king." What does he mean by this?
   b) Watch the video https://www.youtube.com/watch?v=U6PoUg7jXsA. Memory champions take advantage of the power of visual imagery when they create a memory palace. How can you apply the information from this video and the chapter you read as you study?

Rule 10 – Music

10. According to the book, what are the benefits of listening to music (and playing it) and how can it be useful to you?

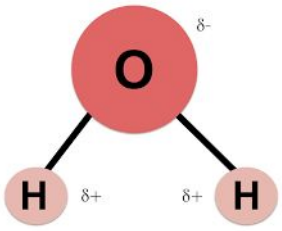
Rule 11 – Gender

11. a) What is the difference between sex and gender?
    b) The author describes a number of ways in which male and female brains are different. Is there anything you disagree with or find particularly surprising?

Rule 12 – Exploration

12. We're all curious about something…what drives your curiosity?

II. Chemistry Review for AP Biology



Watch the following videos. Take notes, define the terms, and answer the questions below.

Ionic Bonds (4:09 min)

1. ion -
2. ionic bond -
3. electron -
4. valence electron -
5. cation -
6. anion -

Covalent Bonds (5:42 min)

7. covalent bond -
8. How do you indicate a partial positive charge?
9. How do you indicate a partial negative charge?
10. What does polarity mean?

Chemical Bonds: Covalent vs Ionic (8:56 min)

11. octet rule -
12. electronegativity -
13. polar covalent bond -
14. nonpolar covalent bond -
15. What is NH3 - non-polar covalent, polar covalent, or ionic?

Hydrogen Bonding (6:38 min) -

16. hydrogen bonds -
17. Why are hydrogen bonds important in biology? Give two examples.

Making Sense of Chemical Structures (8:58 min) -

18. What are the Bonding Rules for:
    a. Hydrogen:
    b. Carbon:
    c. Nitrogen:
    d. Oxygen:

Chemistry Review Questions

1. Which type of bond exemplifies a weak chemical bond?

A. Covalent bond
B. Hydrogen bond
C. Ionic bond
D. Nonpolar covalent bond

2. Which of the following statements is false?

A. Electrons are unequally shared in polar covalent bonds.
B. Electrons are equally shared in nonpolar covalent bonds.
C. Hydrogen bonds are weak bonds based on electrostatic forces.
D. Ionic bonds are generally stronger than covalent bonds.

3. What forms ionic bonds?

A. atoms that share electrons equally
B. atoms that share electrons unequally
C. ions with similar charges
D. ions with opposite charges

4.

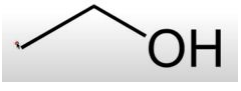
Element	Electronegativity
N	3.04
H	2.20
Cl	3.16
O	3.44
Li	0.98
F	3.98

Based on the information provided, which of the following statements is correct?

A. In NH_2, the nitrogen atom acquires a partial positive charge and the hydrogen atoms acquire a partial negative charge.
B. In H_2O, the hydrogen atoms acquire a partial negative charge, and the oxygen atom acquires a partial positive charge.
C. In aqueous HCl, the hydrogen atom acquires a partial positive charge, and the chlorine atom acquires a partial negative charge.
D. In LiF, the lithium atom acquires a positive charge, and the fluorine atom acquires a negative charge.

5. Why do hydrogen and oxygen form polar covalent bonds within water molecules?

A. Hydrogen is more electronegative than oxygen, generating a partial negative charge near the hydrogen atom.
B. Hydrogen is more electronegative than oxygen, generating a partial positive charge near the hydrogen atom.
C. Oxygen is more electronegative than hydrogen, generating a partial negative charge near the oxygen atoms.
D. Oxygen is more electronegative than hydrogen, generating a partial positive charge near the oxygen atoms.

6. What is the chemical formula of this molecule? 

Part III – Root Words

Find the meaning of the following Greek/Latin root words (Google is fine). I've done a few for you.

Root	Meaning	Root	Meaning
-ase	*suffix indicates an enzyme*	-ology	
a- / an-		-lysis	
aero-		macro-	
amphi-		meta -	
aqua- / hydro-		micro-	
auto-		mono-	
bi- / di-		multi- / poly-	
bio-		-ose	*suffix indicates a simple sugar*
cyto-		-ped /-pod	
de-		-philia	
derm-		-phobia	
ecto- / exo-		photo-	
endo-		primi- / archea-	
epi-		pro- /proto-	
glyco-		pseudo-	
haplo-		sacchar-	
hetero-		-sis	*process*
homo-		sym- / -syn	
hyper-		-therm	
hypo-		-troph	
intra-		uni-	
-itis		zoo-, -zoa	
kary-		zyg- / -zygous	

Using Root words to define unknown words

Break apart each word below into its smaller root word components. Then use ONLY the completed root word table (above) to develop a SIMPLE definition for each of the following terms **in your own words.** If some parts are missing, just give it your best shot using what you know (NO Google). I've done the first one for you.

1. Hydrolysis - *water breaking or breaking with water*

2. Glycolysis -

3. Protozoa -

4. Epidermis -

5. Anaerobic -

6. Symbiosis -

7. Hypertrophic -

8. Dehydrogenase -

9. Endocytosis -

10. Prokaryote -

11. Monosaccharide -

12. Homozygous -

13. Photoautotroph -

14. Thermophilic archaebacteria -

15. Dehydration synthesis -