Reading Journal Examples
Chapter 1: Atomic and Molecular Structure

Instructions:

1. Skim through the first few sections of Chapter 1 in the textbook. Pay attention to headings, figures, bold and underlined text, etc.
2. Read through the prepared sample reading journal submissions. Discuss with your neighbor the strengths and weaknesses of each.

Submission #1.

1. What is "vitalism"?
    a. "Vitalism" was a theory developed in the late 1700s. At the time, scientists believed that only living organisms could summon what was thought of as the "vital force" needed to create organic compounds. Such compounds included glucose and testosterone. But in 1828, Friedrich Wohler, a German physicist and chemist, proved vitalism to be incorrect. He created urea in the lab from ammonium cyanate.
2. What is the difference between an organic vs. an inorganic compound?
    a. They contain carbon.
3. What does chicken wire have to do with organic chemistry?
    a. Real chicken wire doesn't have much to do with organic chemistry. But in Figure 1-5, I saw that there were chicken-wire type macromolecular frameworks made up of only carbon. One such example is graphene, which is like a sheet of carbon atoms made up of a series of hexagons. Sometimes the graphene sheet is wrapped up like a tube and this is called a nanotube. The coolest one was the Buckminsterfullerene which looks more like a soccer ball.

<u>Muddiest point:</u> Why does borane (BH_3) have less than an octet but no charge while the carbocation (H_3C^+) have less than an octet but a positive charge? This is from Figure 1-17.

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Submission #2.

1. What is "vitalism"?
    a. "Vitalism" was the belief in the 1700 and early 1800s that only living creatures could synthesize organic compounds, which are chemicals which contain carbon, and that they could not be formed by a scientist in the lab. This was proved incorrect in 1828 when urea (CON_2H_4) was synthesized from ammonium cyanate $(NH_4)^+(NCO)^-$.
2. What is the relationship between bond strength and bond length? Why does this relationship exist?
    a. As bonds get shorter, they get stronger. For instance, the C-C single bond is 339 kJ/mol and 154 pm in length, while the C-C triple bond is 812 kJ/mol (stronger – it takes more energy to break it) and only 120 pm in length. I think this is because of the number of electrons? But I don't really get it.
3. What do the different colors mean in Figure 1-21?

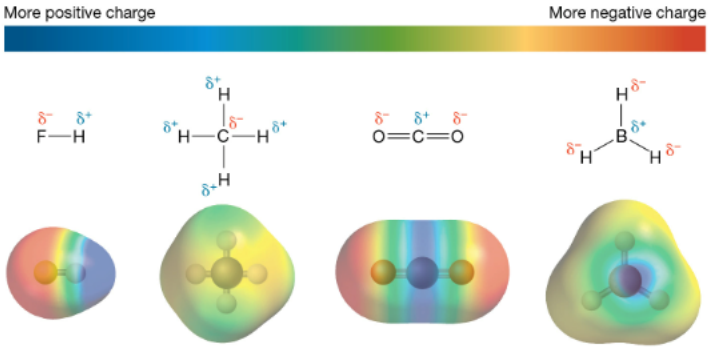

FIGURE 1-21 Electrostatic potential maps of four molecules Red indicates a buildup of negative charge; blue indicates a buildup of positive charge.

    a. As can be seen in the figure, red indicates atoms that have a buildup of negative charge. When I read, I learned that this was because those atoms are more electronegative, which means that they take more of the electrons when bonding. The blue atoms are electron deficient and are not as electronegative. I'm still not sure why some are just green and yellow though.

Muddiest point: I'd like to better understand *why* bonds get stronger as they get shorter. What does the number of electrons shared between the atoms have to do with it, if anything?

Also, why are some electrostatic potential maps of molecules only yellow and green?

And I have a question about Smartwork5. Can you help me with it when I get to class?

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Submission #3.

1. How was organic chemistry performed by ancient civilizations?
    a. Babylonians might have converted oil into soaps.
2. Why is carbon important to organic chemistry?
    a. Organic chemistry is the chemistry of carbon-containing molecules.
3. What is an electrostatic potential map? How is it useful?
    a. I never really understood these things last year. I think they show hot and cold electrons. I'm not sure how it's useful.

Muddiest point: I still don't understand electrostatic potential maps.