

- Homework #hw
  - Look through the 8th grade bio site Weeks 2 through 5 for roughly 40 mins.
  - Free association writing for 10 roughly minutes, maybe a paragraph or two? Response: ““ I figured I would write for a few minutes before reviewing the site to give you an idea of what content I remembered, so here is that: The second law of thermodynamics states something along the lines of “entropy increases in a closed system”, which means that things will generally reach equilibrium, find a locally minimal energy state, or remove order. I like to think of it as a emergent property of randomness, where atoms/molecules go around randomly and in the process undo gradients, etc. Atoms have electrons revolving around them, and those electrons stick with the nucleus because the core is positively charged. Depending on the size and contents of the atom, it might hold onto its outer (valence) electrons more strongly than others. This element is said to have higher electronegativity. When an atoms bond to form molecules, electrons may be transfered (ionic) or they may not. When electrons are transfered, each atom/molecule gains an electron which changes it's charge. This happens when the electronegativity is very high (> 3.4? I don't remember the number). Covalent bonds happen when two atoms try to take the same electron, but the difference in strength (electroneg) isn't strong enough for one to rip it away. If there is a significant difference in strength, you end up with a polar covalent bond (delta electroneg  $\geq 0.4$ ?). That means that one side of the bond has a partial charge, because the electron spends more time on that side of the bond. This is called a dipole, and means that the molecule is polar. Polar molecules are hydrophilic, which means they tend to interact with water (because water is polar and can pull apart polar molecules).

I'm less sure about this stuff: Lipids (like phospholipids which make up the animal cell walls) are fats, and they are made of carbohydrates? Carbohydrates are molecules made of carbons and hydrogens. They are not polar (no polar covalent or ionic bonds) and don't really interact with water (hydrophobic). Protien are strings of amino acids, which are folded by other protiens that float around in the cytoplasm of a cell based on mRNA?. Protiens do everything in a cell, and their shape is determined by the polarity of the amino acids that make them up. That's why protien folding as a computational problem is so important—because if we can determine the shape of a given amino acid string then we can design medicine faster (I love this kind of stuff). Enzymes are catalysts that speed up reactions. I don't remeber how they relate to other things.

Okay, that was 12 minutes. I'll now review the site and note updates that I would make to the previous brain dump. 1. Nice, she my scale models in! (Week 3) 2. Enzymes are protiens that help reduce the activation energy for a reaction, such as by locking the orientation of the reactants. Enzymes often need to be activated/deactivated and that happens when other molecules (protiens?) change or block the activation site. ““

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