

PCB BIO 4 ASSIGNMENT SHEET 3: SEPTEMBER 8-11, 2008  
Reading, Preparation, Study Questions, Practice Essays, Labs.

ASSIGNMENT	DESCRIPTION
Tuesday	<p>We are about to switch things up this week and into the future. Over the past three weeks have become experts in the ways in which scientists answer questions through the scientific method. We also worked to understand and apply natural selection, the mechanism for evolutionary change. We will use both concepts throughout the year to frame the other biological concepts and gain large volumes of meaningful knowledge. You should be extremely excited. Get excited.</p> <p>So starting today, we are going to learn about the chemistry of life. You are going to become experts on biological molecules, biochemical reactions, and know how to write out and draw biochemical compounds. You will learn things like the structure of glucose, and that glucose is the same carbohydrate as dextrose. Glucose is not fructose, but you will have to learn what fructose looks like.</p> <p>Learning the basics of biochemistry is challenging to some students, and it will require studying, memorizing, practice, and deep thought. Prepare to learn. Ask intelligent questions, focus, and think in class and you will be in good shape.</p> <p>Everything in the assigned reading, class lectures and discussions, and labs is important and your knowledge will be tested on exams. This is the case for the entire course.</p> <p>Tonight for homework: Make sure that you really understand all of the material in the questions below.</p> <ol style="list-style-type: none"><li>1. Distinguish between an element and a compound.</li><li>2. List the 8 elements that are the key constituents of life (use the mnemonic CHNOPSCaK. For each one, you should know the symbol, atomic number, and key characteristics (metal, non-metal, valence electrons, solid, liquid, gas, etc.)</li><li>3. Define isotope. Explain why some isotopes are radioactive, some uses of radioactive isotopes, and some of their hazards.</li><li>4. Compare/contrast covalent, ionic, polar covalent, hydrogen, and Van der Waals bonds.</li><li>5. Define "reactant," "product," and "equilibrium."</li><li>6. Describe why water is a polar molecule, and how this affects how water molecules interact with one another and their surroundings (cohesion, adhesion, and surface tension) .</li><li>7. Describe chemistry and consequences of water's high specific heat, high heat of evaporation, expansion when freezing, and effectiveness as a solvent.</li><li>8. Explain how polar and non-polar substances interact with water. Use the terms hydrophobic and hydrophilic in your explanation.</li><li>9. Explain the pH scale, and the difference between an acid and base (both in terms of H<sup>+</sup> ions and the pH scale).</li><li>10. What are buffers, and how do they work?</li><li>11. What's acid precipitation? What are its causes and effects?</li></ol>

Wednesday	<p>This does not have to be turned in. It is to help you learn only. But, most people who will choose to do it, will do well. If you do not do it, you may struggle.</p> <p>A. Read pp. 34-35. Make a t-chart or flashcards that include the general formula, and an example of the following really important biological functional groups:</p> <ul style="list-style-type: none"> <li>• Hydroxyl</li> <li>• Carbonyl</li> <li>• Carboxyl</li> <li>• amino</li> </ul> <p>You have to know this like your telephone number.</p> <p>B. Make sure that you understand what dehydration synthesis (AKA condensation), and hydrolysis reactions are. P. 36.</p> <p>C. Also, start a t-chart in which you list important properties, descriptions and sketches of biological macromolecules. <b>Tonight</b>, start with carbohydrates and lipids.</p> <p>The info is on pp. 36-47.</p>
Thursday	<p>Finish your excellent t-chart on the biological macromolecules. Tonight do proteins and nucleic acids. Yeah it is a lot, but you will be experts when you are done.</p>
Friday	<p>Spend actual time reviewing your notes and hw questions. Make sure that if you are struggling, you get appropriate help. Your future success in the course is based on the knowledge you obtained this week. That was not a joke.</p>