

Chemistry I - Mrs. Bauck, PHUHS  
Unit 3 Title: Structure of Matter – Chapters 4,5  
State Standards:

SC.912.P.8.4 AA (High) Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom.

SC.912.P.8.3 AA (High) Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence.

SC.912.P.10.18 (High) Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications

SC.912.P.10.9 Describe the quantization of energy at the atomic level.

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| 4.0 | Extensions/Applications | Students will be able to: <ul style="list-style-type: none"><li><input type="checkbox"/> List and describe other subatomic particles not covered in class (quarks, neutrinos, bosons, baryons, etc.)</li><li><input type="checkbox"/> Describe other subatomic particles not covered in class (quarks, neutrinos, bosons, baryons, etc.)</li><li><input type="checkbox"/> Explain “Schrodinger’s cat” and general concepts of quantum mechanics.</li></ul> |
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| 3.0 | Learning Goal (Derived from State Standard) | <p>Students will be able to:</p> <p>(CHAPTER 4)</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Compare and contrast the proton, neutron, and electron based on their relative mass, electrical charge, and location in the atom.</li><li><input type="checkbox"/> Explain the existence of neutrons and how they affect an element's mass.</li><li><input type="checkbox"/> Calculate the relative atomic mass of an element</li><li><input type="checkbox"/> Explain the order in which the proton, neutron, and electron were discovered and the basic research that led to each subatomic particle's discovery.</li><li><input type="checkbox"/> Identify the scientists responsible for the discovery of the proton, neutron, and electron.</li><li><input type="checkbox"/> Identify the changes in the atomic model from ancient to modern times.</li><li><input type="checkbox"/> Describe the following experiments and their importance to the development of modern atomic theory: Rutherford's Gold -foil, Thompson's cathode ray tube, and Millikan's oil drop experiment.</li></ul> <p>(CHAPTER 5)</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Explain the inverse relationship between wavelength and frequency.</li><li><input type="checkbox"/> Explain the direct relationship between energy and frequency.</li><li><input type="checkbox"/> Perform calculations to determine wavelength or frequency, given the speed of light.</li><li><input type="checkbox"/> Perform calculations to determine energy or frequency, given Planck's constant.</li><li><input type="checkbox"/> Compare and contrast the different parts of the EM spectrum in terms of energy.</li><li><input type="checkbox"/> Explain what happens to an electron when it absorbs or releases energy.</li><li><input type="checkbox"/> Explain the relationship between an electron's distance from the nucleus and its energy.</li><li><input type="checkbox"/> Draw a Bohr model and utilize it to explain the concepts of electron energy and placement in atom</li><li><input type="checkbox"/> Apply the concepts of Aufbau, Pauli and Hund to determine the location of an electron in an atom.</li><li><input type="checkbox"/> Compare and contrast energy levels, sublevels, and orbitals.</li><li><input type="checkbox"/> Write the complete, condensed, and valence electron configurations for elements 1-118.</li></ul> |
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| 2.0 | Required Skills or Background Knowledge to accomplish Learning Goal   | <p>Students will be able to:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Define subatomic particle.</li> <li><input type="checkbox"/> Differentiate between directly and indirectly proportional.</li> <li><input type="checkbox"/> Explain the wave particle duality of nature.</li> <li><input type="checkbox"/> Explain the units associated with energy, frequency, wavelength, speed of light, and Plancks constant.</li> <li><input type="checkbox"/> Explain what happens between like and opposite charges.</li> <li><input type="checkbox"/> Round calculated answers to the correct number of significant figures.</li> </ul> |
| 1.0 | With help from the teacher, student has partial success with the goal | <p>Students will be able to:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Achieve partial success with 2.0 and/or 3.0.</li> </ul>  |
| 0.0 | Even with help, the student has no success with the goal              | <ul style="list-style-type: none"> <li><input type="checkbox"/> Even with help, student is unable to understand or complete any of the skills in scales 1.0 through 4.0.</li> </ul>   |