AP Chemistry

Dr. Wilhelm

**Chapter Six Reading Guide: The Structure of Atoms**

*On a separate piece of paper, write a response to the following reading prompts while reviewing chapter seven of your textbook.*

1. Define electromagnetic radiation and the characteristic properties that define it.
2. What is and wavelength (λ) and frequency (υ) the relationship between them? Explain
3. Complete “Review & Check section 6.1” to make sure you can relate wavelength and frequency to the electromagnetic spectrum.
4. What is being observed when viewing a heated object and the what is called blackbody radiation? How is this relate heat energy to visible light and electromagnetic radiation?
5. What is Planck’s constant and how is it applied to measure change in energy?
6. What is meant by the term quantization and how is it applied in Planck’s equation?
7. What are photons and how does this concept support the photoelectric effect?
8. Review the energy and chemistry relationship to appreciate how photons/moles can be related when discussing electromagnetic energy..
9. What is a line spectrum and why is it unique for each element? How is Planck’s equation used to relate energy to the line spectrum?
10. Briefly overview the concept behinds Bohr’s model for hydrogen and relate its significance to understanding atomic model.
11. How does the equation (6.4) support the Bohr model? What is the principle quantum number (n) and how does it relate to electron positioning outside the nucleus?
12. Review example 6.3 to understand the relationship between energy (E) and the principle quantum number (n).
13. Review equation 6.5. What is the energy of an emission line and how does this calculation relate to ground state and excited state electrons?
14. Case Study: What makes the colors in fireworks? Is really interesting! Please take a moment to read this and complete the 3 concluding questions.
15. Identify the de Broglie equation (6.6). Explain how this equation explains the wave-particle properties of electrons.
16. Review the background to the quantum numbers (section 6.4). Recognize the contributions of Schrodinger and Heisenberg for this development.
17. Outline the three quantum numbers (n, l, m l) used in quantum mechanics and prepare a table describing their relationship as appears in table 6.1 to help you better understand quantum number assignments.
18. Using this prepared table read the discussion on electron shells (n=1- n=4), see if you can make sense of these relationships.
19. Explain the role of orbital shape and energy level in describing the location of electrons in an atom. Draw a picture to represent the shape of the s, p, d orbital. What is meant by the term degenerate and ground state/excited state.
20. What is electron spin quantum number and what values are used to describe this assignment?
21. What is the difference between paramagnetic and diamagnetic?