

## Atomic and Nuclear Structure

Study Guide: Chapters 12 and 13, *Conceptual Physical Science*, 4<sup>th</sup> edition

*Objectives:* When you finish this unit you should be able to:

- Give a brief history of the development of atomic structure ideas.
- Describe the quantum theory of light and the contributions of Planck and Einstein.
- Describe the Bohr model of the atom and use it to answer questions as to why atoms absorb and give off light.
- Explain the Quantum Mechanical model of the atom and how it is different from the Bohr model. (Be sure and include the ideas of deBroglie and Heisenberg)
- Describe an electron cloud.
- Explain how the nucleus is held together. Define quarks.
- Define isotopes, atomic number, mass number.
- Define radioactivity and alpha and beta particles and gamma rays.
- Write nuclear reactions for radioactive processes including nuclear transmutations.
- Explain and use the concept of half-life in problems.
- List useful applications of radioactivity.
- Explain fission and fusion and write nuclear reactions. List pros and cons of each process for application to power production.
- Explain why fission gives off energy and fusion gives off energy.

*Activities:*

- Read chapter 12, pages 286-291 and 300-303. Answer mentally review questions 8, 9, 19, 20, 22. Answer Exercises 8, 10, 22, 30, 32, 33, 34.
- Read all of chapter 13. Answer mentally review questions 1, 6, 8, 9, 10, 12, 13, 14, 15, 17, 19, 20, 22, 25, 26, 28, 29, 30. Answer Exercises 4, 5, 6, 7, 9, 10, 12, 13, 14, 16, 22, 23, 24, 34, 37, 38, 42, 43, 45, 46, 47, 48. Work Problems 1, 2, 3.
- Work Practice Book pages 83, 92, 95, and 96. (4th edition)