

Unit 4: Structure of the Atom, Electron Configurations and the Periodic Table

Chapter 8.1-8.8, Chapter 10, Chapter 11.1-7 and Chapter 3.10

Practice Problems are *within the chapter*. **Solutions** to these are found *at the end of the text*.

Review Questions are also found *within the chapter*.

Chapter Review (Problems) are found *at the end of the chapter*.

Assignments designated as “graded” assignments will be collected and scored.

Other assignments may be collected at random and graded for effort.

Topics and Assignments

NOTE: The text does an excellent job of recounting the historical events in detail.

- Historical development of atomic theory: Dalton, Thomson and Rutherford
 - Assignment #1:* Read Study Guide, p. 1
 - Read Text 8.1-8.8
 - Text p.270 Review Problems 1-4
 - Text p.274 Review Problems 7, 8
 - Text p.336 Review Problem 1

- Properties of waves (speed, frequency, wavelength, amplitude), electromagnetic radiation, wave & particle models of light and other electromagnetic radiation
 - Assignment #2:* Read Study Guide p. 3-4 (top) (through “Particle Model of Light”)
 - Read Text 10.1-10.4
 - Text p.336 Review Problems 4-5, 9
 - Text p.357 Chapter Review 8, 10-11

- Potential energy, Bohr’s explanation of the bright line spectrum of hydrogen and the Bohr model of the atom
 - Assignment #3:* Read Study Guide p. 5-6
 - Read Text 10.5-10.6
 - Study Guide p.7 problems 1-3
 - Text p.347 Review Problem 12

- Evolution of modern atomic theory: wave-particle duality, The Uncertainty Principle, quantum mechanical or wave mechanical model, energy levels, sublevels and orbitals
 - Assignment #4:* Read Study Guide p.8-9
 - Read Text 10.7-10.8
 - Text p.347 Review Problems 13, 15, 16
 - Text p.357 Chapter Review 25

- Writing electron configurations and drawing orbital diagrams for ground state atoms, ions and excited atoms
 - Assignment #5:* Read Study Guide p.10-13
 - Read Text 10.9-10.10
 - Study Guide p.14-15 problems 4-26
 - Review Problems (p.353) 21-22

- graded Assignment #6:** Text p.357-359 Chapter Review 22, 31, 33, 35, 38, 39

- Mendeleev and the first periodic table, the periodic law; the modern periodic table: groups, periods, major regions
- Define valence electrons; identify number of valence electrons from configuration or group number
- Stable ions are isoelectronic with a noble gas.
 - Assignment #7:* Read Study Guide p. 16-17(top)
 - Read Text 11.1-11.5
 - Text p.368 Review Problem 1
 - Text p.377 Review Problems 13-14
 - Text p.389 Chapter Review 21, 22
- Electrostatic forces within the atom, shielding effect, trend of atomic radius within a group, trend of atomic radius within a period, relative sizes of atoms and corresponding ions.
 - Assignment #8:* Read Study Guide p.17-19
 - Read Text 11.6
 - Text p.390 Chapter Review 31
 - Text p.385 Review Problems 18
- Ionization energy and periodic trends in ionization energy,
 - Assignment #9:* Read Study Guide p.20
 - Read Text 11.7 (ignore "successive ionization energies)
- Electronegativity and periodic trends in electronegativity, metallic character, nonmetal reactivity
 - Assignment #10:* Read Study Guide p.21-22
 - Study Guide p.23 Complete diagrams by drawing vertical, horizontal and diagonal arrows to indicate the direction of increase in the trend. (if you didn't do this in class)
 - Study Guide p.24-25 problems 27-32
- Single replacement reactions revisited, predicting the products of a single replacement reaction using an "activity series", writing molecular and net ionic equations for single replacement reactions
 - Assignment #11:* Read Text 3.10
 - Text p.107 Practice Problems 11, 12
 - Text p.118 Chapter Review 36

Homework Answers (Study Guide p.43)

Lab

4-1: Emission Spectra (Study Guide p.27)

4-2: The Establishment of an Activity Series (Study Guide p. 33)

Practice Test (Study Guide p. 37)