Atomic Structure

http://www.unit5.org/chemistry/Atom.htm

Learning Objectives/Targets

Worksheet / Lab

ATOMIC STRUCTURE

5.1 DALTON MODEL OF THE ATOM _____

- *To describe the early practice of chemistry.*
- *To describe the Dalton model of the atom.*

5.2 THOMSON MODEL OF THE ATOM _____

- *To describe the early practice of chemistry.*
- *To describe the Thomson plum-pudding model of the atom.*
- *To state the relative charge and mass of the electron and proton.*

5.3 RUTHERFORD MODEL OF THE ATOM _____

- *To describe the early practice of chemistry.*
- *To describe the Rutherford nuclear model of the atom.*
- *To state the relative charge and approximate mass of an electron, proton, and neutron.*

5.4 ATOMIC NOTATION _____

- *To describe the early practice of chemistry.*
- *To draw a diagram of an atom, given its atomic notation.*
- *To explain and illustrate the concept of isotopes.*

5.5 ATOMIC MASS _____

- *To describe the early practice of chemistry.*
- *To explain the concept of relative atomic mass.*
- *To calculate the atomic mass of an element, given the mass and abundance of the naturally occurring isotopes.*

5.6 THE WAVE NATURE OF LIGHT _____

- *To describe the early practice of chemistry.*
- *To explain the wave nature of light.*
- *To state the relationship of wavelength, frequency, and energy of light.*

5.7 THE QUANTUM CONCEPT _____

- *To describe the early practice of chemistry.*
- *To explain the quantum concept.*

5.8 BOHR MODEL OF THE ATOM _____

- *To describe the early practice of chemistry.*
- *To describe the Bohr planetary model of the atom.*
- *To explain the relationship between energy levels in the atom and the lines in an emission spectrum.*

5.9 ENERGY LEVELS AND SUBLEVELS _____

- *To describe the early practice of chemistry.*
- *To state the energy sublevels within a given energy level.*
- *To state the maximum number of electrons that can occupy a given energy level and sublevel.*

5.10 ELECTRON CONFIGURATION _____

- *To describe the early practice of chemistry.*
- *To list the order of sublevels according to increasing energy.*
- *To write the predicted electron configuration for selected elements.*

5.11 QUANTUM MECHANICAL MODEL OF THE ATOM _____

- *To describe the early practice of chemistry.*
- *To describe the quantum mechanical model of the atom.*
- *To describe the relative sizes and shapes of s and p-orbitals.*

Vocabulary

atomic mass (average atomic mass)
atomic number
electromagnetic radiation
electromagnetic spectrum
electron configuration
energy level (principal energy level)
excited state
frequency
ground state
group
Hund's rule
isotope
kernel electrons
Law of Definite Composition
mass number
nucleus
orbital
orbital diagram
period
quantum theory
valence electrons
wavelength

Labs/Activities

(1) Isotopes Lab pdf
(2) Half-life Activity pdf
(3) Battleship Electron Configuration Game pdf (directions)
(4) Line Spectra
(5) Do You Know these Men from ATOM?
(6) The Atomic Lab

Worksheets

(7) Vocabulary: Atomic Structure pdf
(8) Atomic Number and Mass Number pdf
(9) Ions and Subatomic Particles pdf
(10) Development of the Atomic Theory pdf
(11) Light Problems pdf
(12) Half-life of Radioactive Isotopes pdf
(13) Quantum Mechanics and Electron Configuration
(14) Atom, Mass, and the Mole pdf
(15) Electron Configuration WS pdf *Pattern* pdf
(16) Orbital Diagrams pdf
(17) Isotopes and Average Atomic Mass
(18) Test Review list pdf
(19) Textbook Questions pdf
(20) Review Sheet pdf

LECTURE OUTLINE: Unit 3 Notes - Atomic Structure (23 pages) pdf (students) pdf

Calendar

Day 1 – Models Can Be Useful
Day 2 – Homecoming (7)
Day 3 – Atomic Structure Developed, (9) WEBSITE for Chemistry Textbook
Day 4 – Models of the Atom (5), (10)
Day 5 – Models of the Atom (8)
Day 6 – Models of the Atom (13)
Day 7 – Protons, Neutrons, and Electrons (14), (17)
Day 8 – Develop Electron Configuration (5), (15)
Day 9 – Review Electron Configuration (15)
Day 10 – Light (11)
Day 11 – Halloween Demonstrations
Day 12 – Light Demonstrations
Day 13 – Emission Spectra (4)
Day 14 – Review Day (18), (20)
Day 15 – TEST: Atomic Structure