AP CHEMISTRY H1N1 EMERGENCY PLANS

Week #1

While I intend to communicate with my students through e-mail and through modifications to my MTHS website, the following work is proposed in case of an emergency:

DAY 1 & DAY 2:

Create an outline for:

Chapter 7 – Atomic Structure and Periodicity: Electronic structure and the Periodic Table, Quantum numbers, electron orbital notation, electron configuration notation, electron dot notation, wave and energy level transition calculations, periodic functions and properties of the elements
Chapter 8 & Chapter 9 – Covalent bonding: Lewis structures and the Octet Rule, Molecular geometry, Bond and molecular geometry, hybridization, MO theory

OUTLINE SAMPLE:

ELECTRONIC STRUCTURE OF ATOMS

AP CHEMISTRY - Chapter 7 Outline

" When atoms react, it is *the electrons* that interact. "

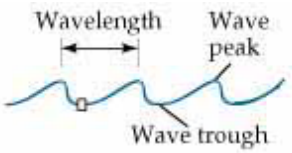
OBJECTIVE: To understand the significance of periodic trends and bonding in chemical reactions, it is first necessary to study the arrangement of electrons in an atom known as its **electronic structure**. Before we do so, we must learn more about light.

NEED TO KNOW HOW TO:

Use the relationship between wavelength, frequency, and speed of electromagnetic radiation.

Electromagnetic radiation – A form of energy that has wave characteristics due to the periodic oscillations of its electric and magnetic components; also called **radiant energy**

The distance between successive peaks (or troughs) is called the **wavelength.**



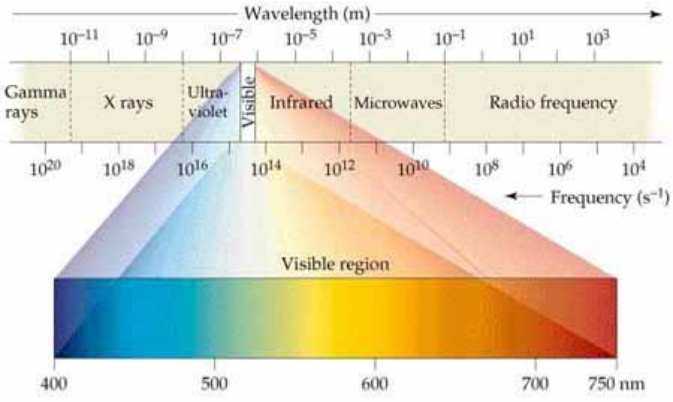
- The number of complete wavelengths, or *cycles,* that pass a given point during 1 second is the **frequency** of the wave.
- All types of EM radiation move through a vacuum at a speed of $\boldsymbol{c}$ =3.00 $\times$ 10^8 m/s (commonly referred to as the "speed of light").

$$C = \lambda \nu$$

- Wavelength and frequency are related in an **inverse relationship** as shown in the above equation (***C*** = speed of light, λ = wavelength, ν = frequency).

- **Visible light** is a type of electromagnetic radiation
- The wavelength range of visible light is: ~400 nm to ~750 nm

- Other types of EM radiation are also shown in the diagram to the right:



Use Planck's Law to calculate the energy of a photon: $E = h\nu$ *(Planck's Law)*

Energy can be absorbed or emitted by objects only in small, specific quantities known as ***quanta***

- **Energy**, E, of a single quantum equals a constant, h, times its **frequency** ν.
- The constant h, **Planck's constant**, has a value of 6.63×10^{-34} joule·seconds (J·s).
- Note: **higher frequency (lower wavelength) means higher energy**, and vice versa.
- Radiant energy itself is quantized; a **photon** is the smallest quantum of radiant energy
- Light possesses **both wavelike and particle-like** properties.

The following represents a **Continuous spectrum** of visible light ("white" light dispersed by a prism):

High frequency	⟺	Low frequency
Low wavelength	⟺	High wavelength
High energy	⟺	Low energy

The following represents the **Line spectra** of hydrogen (light coming from hydrogen gas in reduced pressure tube under high voltage dispersed by prism):

- Bright lines

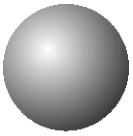

Emission spectrum of hydrogen (bright line spectrum)

- Dark lines

Absorption spectrum of hydrogen (dark-line spectrum)

Models of the atom

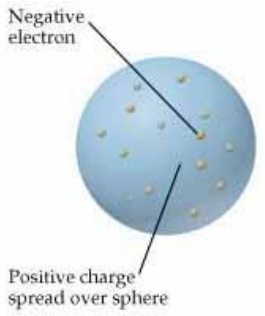
1. **Dalton (billiard-ball model):**



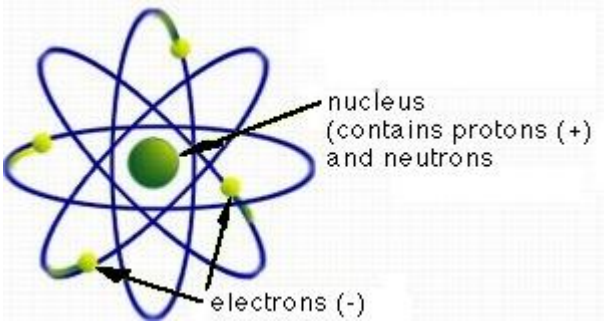
Dalton
1803-1805

Atoms are identical, indivisible objects, with no internal structure

2. **Thomson (plum-pudding model):**

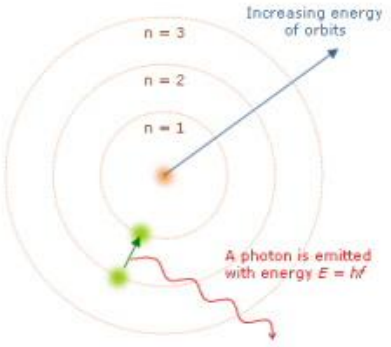


3. **Rutherford (planetary model):**



Electrons orbit the nucleus in specific, defined orbits

4. **Bohr:**



To explain the hydrogen line spectrum, Bohr assumed that electrons move only in circular orbits of certain radii, corresponding to certain definite energies.

DAY 3 & DAY 4:

Complete the following tests (answers are provided at the end of each test).

REVIEW TEST #1

REVIEW TEST #2

REVIEW TEST #3

REVIEW TEST #4

Students will identify questions that they have difficulty understanding and will e-mail Dr. Pangalos for clarification.

DAY 5 :

Complete the following tests (answers are provided at the end of each test).

2006 CHEM I: January

2003 CHEM I: February

2003 CHEM I: March

Students will identify questions that they have difficulty understanding and will e-mail Dr. Pangalos for clarification.