# 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. "

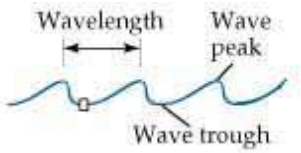
OBJECTIVE: To understand the significance of periodic trends and bonding in chemical reactions, it is first necessary to study the arrangement of electrons in an atom known as its **electronic structure**. Before we do so, we must learn more about light.

**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.**



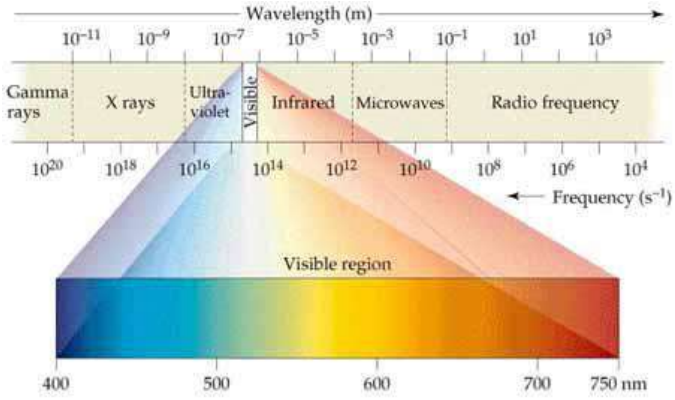

- The number of complete wavelengths, or *cycles,* that pass a given point during 1 second is the **frequency** of the wave.
- All types of EM radiation move through a vacuum at a speed of $\boldsymbol{c}$ =3.00 $\times$ $10^8$ m/s (commonly referred to as the "speed of light").

$$C = \lambda \nu$$

– Wavelength and frequency are related in an **inverse relationship** as shown in the above equation (***C*** = speed of light, $\lambda$ = wavelength, $\nu$ = 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** $\nu$.
– The constant $h$, **Planck's constant**, has a value of $6.63 \times 10^{-34}$ 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

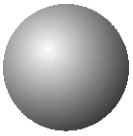

*Emission spectrum of hydrogen (bright line spectrum)*

- Dark lines

*Absorption spectrum of hydrogen (dark-line spectrum)*

## Models of the atom

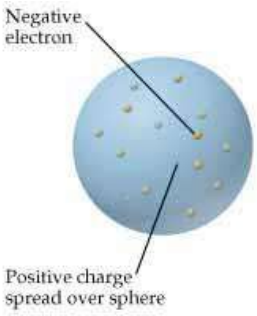
1. **Dalton (billiard-ball model):**



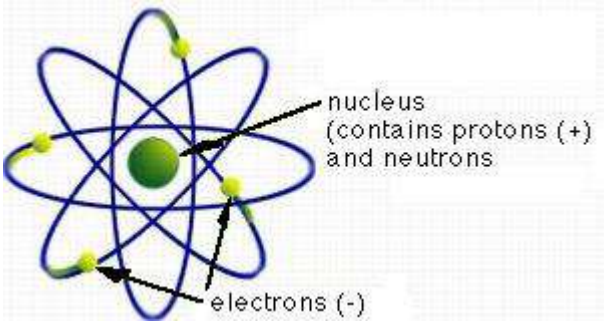
Dalton
1803-1805

*Atoms are identical, indivisible objects, with no internal structure*

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

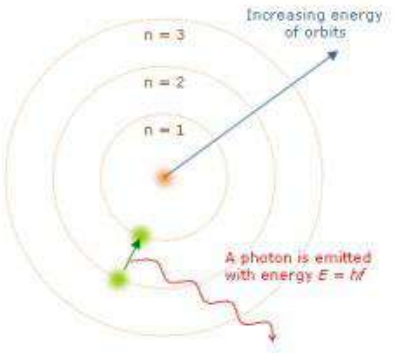



3. **Rutherford (planetary model):**




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.