

## Energy from an Atom

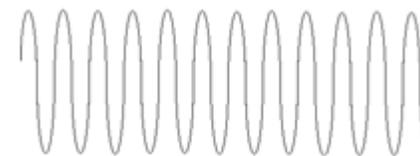
(pg 97) Light behaves like : \_\_\_\_\_ speed of electromagnetic radiation (speed of light)  $c =$  \_\_\_\_\_ m/s

(pg 98) Label wavelength & frequency on each of the waves.

**Now** label each wave as having:

- high frequency or low frequency
- long wavelength, or short wavelength

What relationship is observed between wavelength & frequency?



(pg 99) The formula that relates wavelength & frequency is:

(label all variables include possible units)

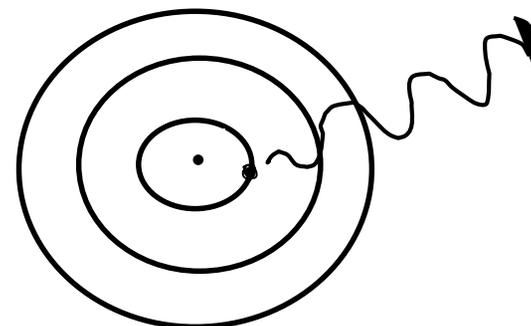
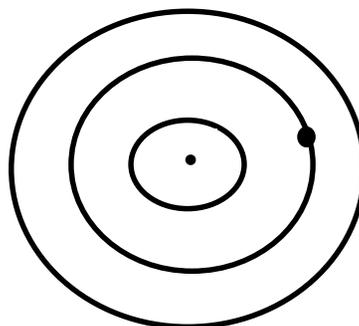
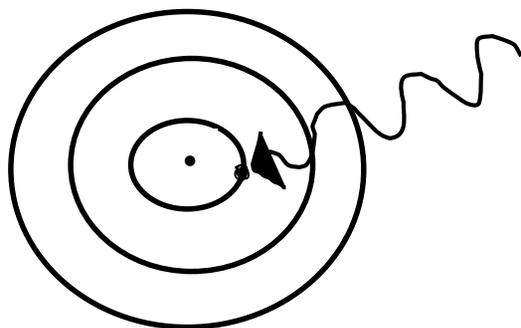
(pg99) **Planck** observed that hot objects do not continuously emit electromagnetic radiation (energy) but instead emits a quantum of energy. Explain what quantum of energy means.

(pg 99) **Planck's** formula that relates quantum of energy, & frequency is:

(label all variables include possible units)

(pg 99-100) Einstein took Planck's observation a step further by stating that yes light does have wave like properties but it also has properties of matter. This theory is called: \_\_\_\_\_ and states that particle of the electromagnetic spectrum called a \_\_\_\_\_ has zero mass and carries a \_\_\_\_\_ of energy. Planck's formula determines the energy of the photon. Matter is made up of atoms and inside atoms are the electrons that "create" the photon observed.

(pg 101 – 102) Use figure 7 & 8 use the images below to explain how electrons emit photons. Use the following terms ground state, excited state, nucleus, electron, & quantum of energy.

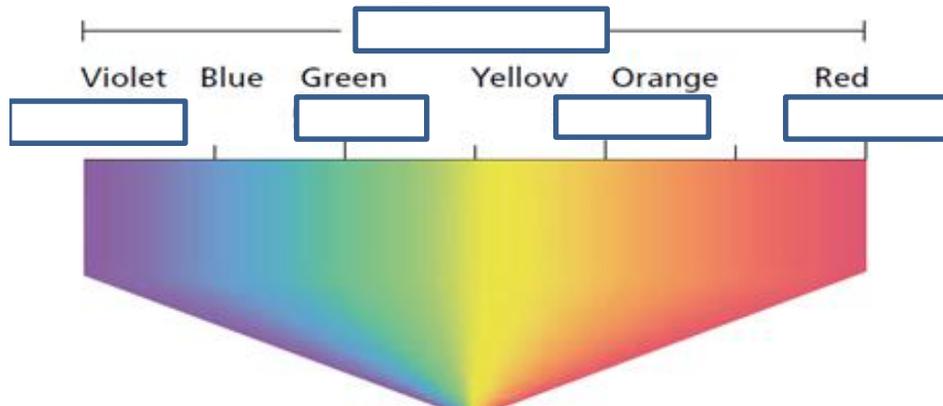


**Recap:** Describe each scientist major contribution to the Quantum Mechanical Model of the Atom

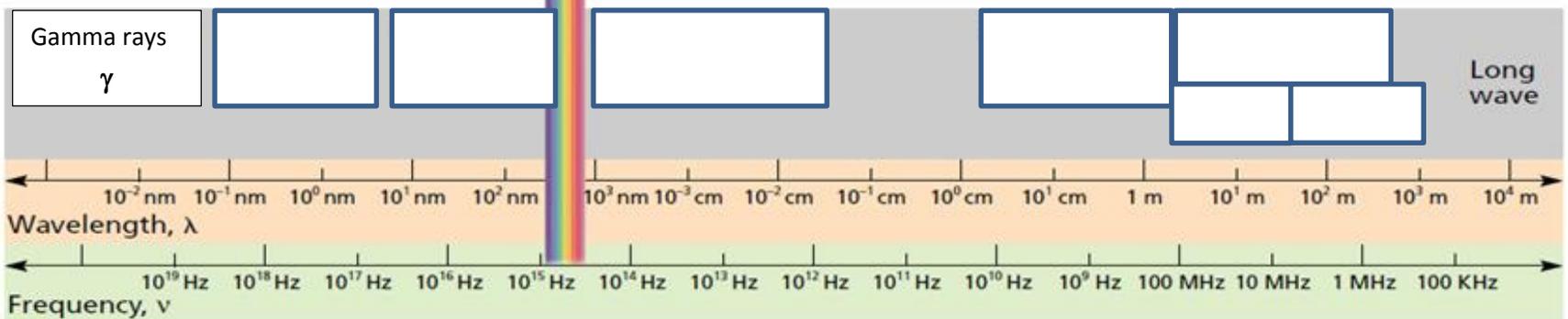
1. Planck(pg99 )
2. Einstein (pg99)
3. Bohr(pg102 )
4. de Broglie(pg104)
5. Schrodinger(pg105)
6. Heisenberg (pg105)

(pg 98) When electrons emit a photon the frequency, wavelength, or energy of the photon can determine the type of energy is given off. The different types of energy are organized by the electromagnetic spectrum. Label the spectrum. Color the visible spectrum.

**Violet** has the \_\_\_\_\_ wavelength & \_\_\_\_\_ frequency.  
Draw what a **violet** wave would look like:



**Red** has the \_\_\_\_\_ wavelength & \_\_\_\_\_ frequency.  
Draw what a **red** wave would look like:



Draw the correct wave: