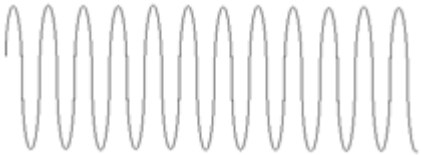
Energy from an Atom **Test is: _____**

(pg 97) Light behaves like : _____ speed of light (c) = _____ m/s

(pg 98) Label wavelength & frequency on the waves to the right, then label the two waves as high frequency, low frequency, long wavelength, or short wavelength.



What relationship is observed between wavelength & frequency?

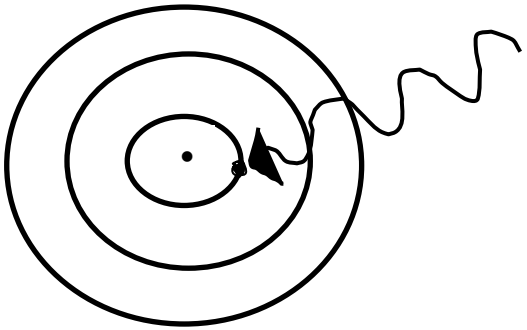
(pg 99) The formula that relates wavelength & frequency is:
(label all variables include possible units)

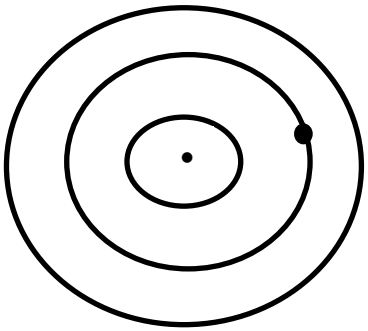
(pg99) **Planck** observed that hot objects do not continuously emit electromagnetic radiation (energy) but instead emits a quantum of energy. Explain what quantum of energy means.

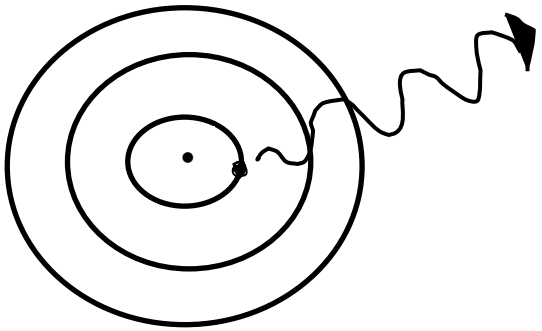
(pg 99) **Planck's** formula that relates quantum of energy, & frequency is:
(label all variables include possible units)

(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 the electrons "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.







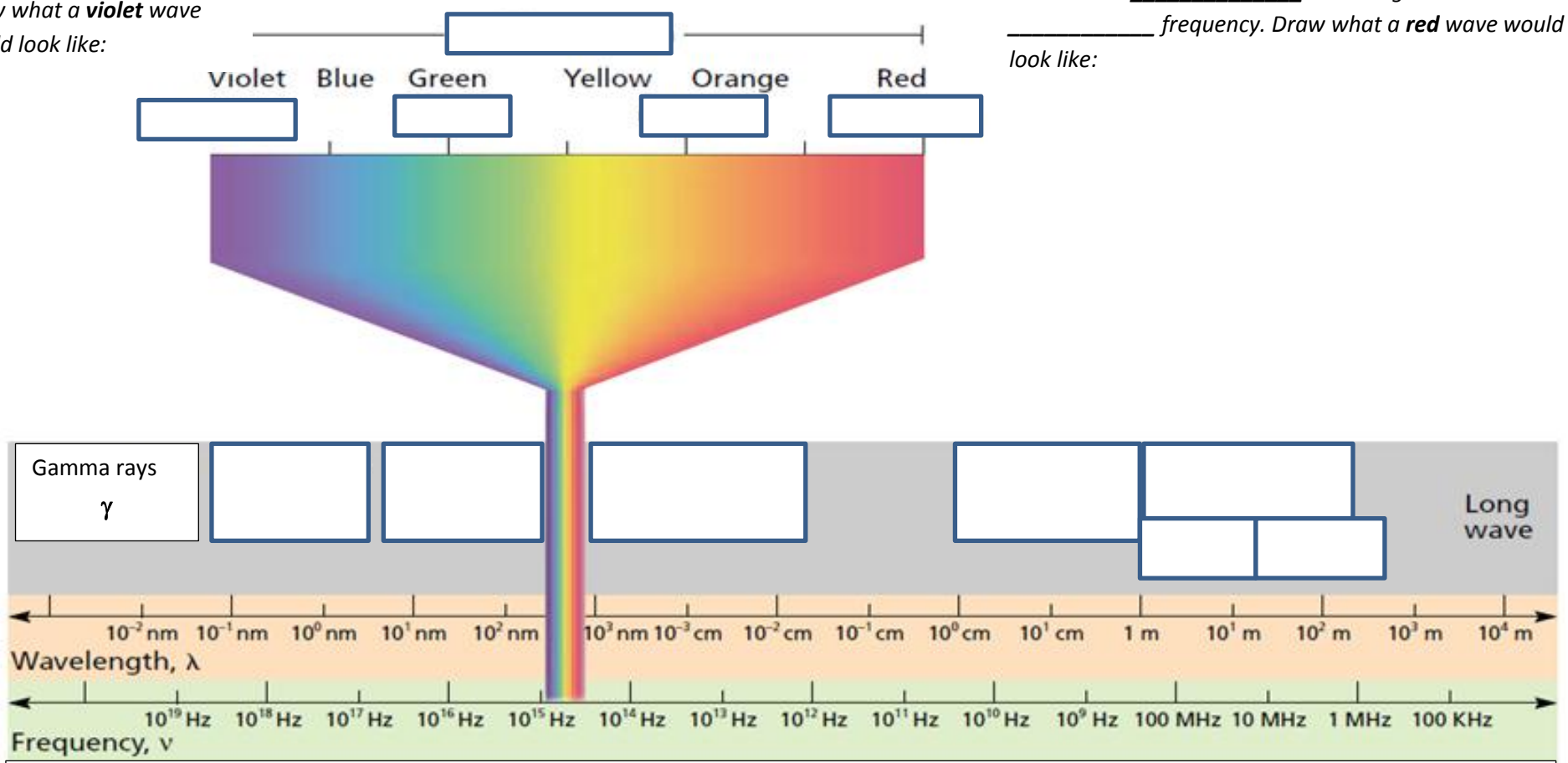
Recap: Describe each scientist major contribution to the Quantum Mechanical Model of the Atom

Planck(pg99) ➔ Einstein (pg99) ➔ Bohr(pg102) ➔ de Broglie(pg104) ➔ Schrodinger(pg105) ➔ 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.

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

Red *has the _____ wavelength and _____ frequency. Draw what a* ***red*** *wave would look like:*



Draw the correct wave