

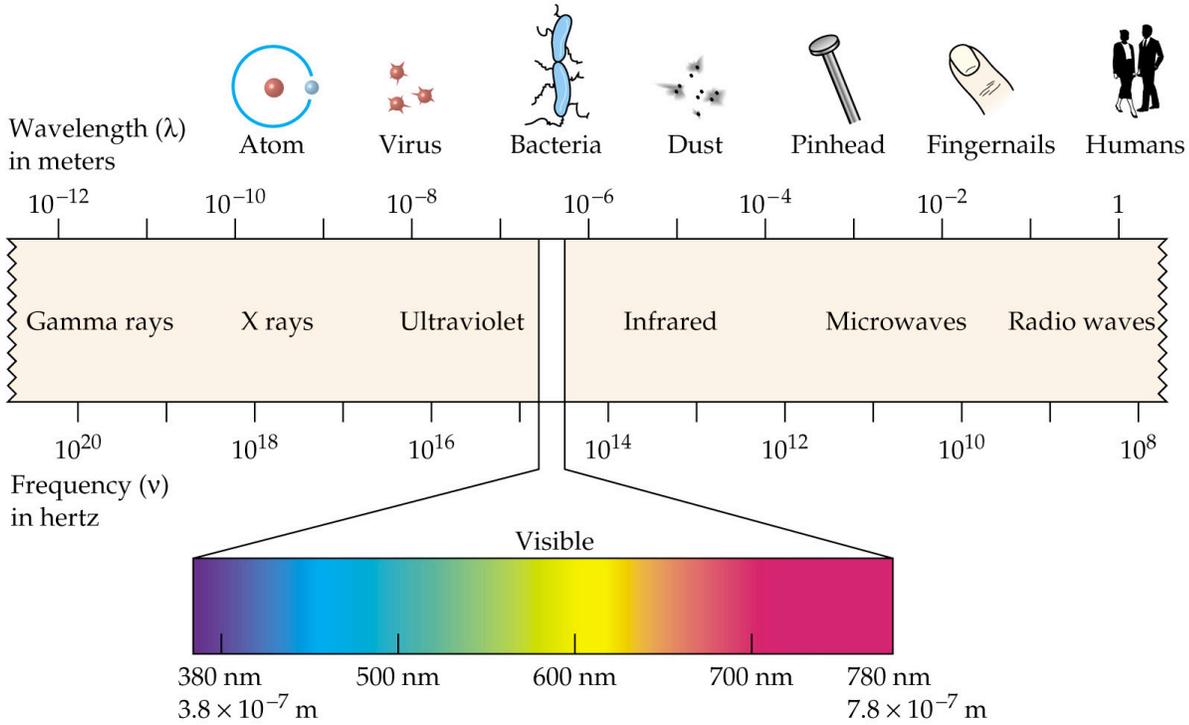
Name _____

This is a reference HO and a worksheet!

In book: Ch 13.3

Equations: $\Delta E = h\nu$

$c = \lambda\nu$



1. What type of electromagnetic radiation has a wavelength of:

a) 5.0×10^{-4} m?

b) 3.0×10^{-3} m

c) 1.0×10^3 m

d) 2.4×10^{-8} m?

e) 7.5×10^{-11} m

Which of the above is the most harmful to humans?

2. An ultraviolet light wave is used to kill bacterial. It has a frequency of 1.2×10^{16} Hz. Find the wavelength in meters.

3. An x-ray has a wavelength of 1.54×10^{-11} m. Find the frequency of this light in Hertz.

4. A visible light wave has a frequency of 7.5×10^{14} Hz. Find the wavelength in nanometers (nm) and determine the color of the light using the above chart.
5. a) The frequency of light used to heat food in a microwave oven is 2.45 GHz (2.45×10^9 1/s). What is the wavelength of this light in meters?
- b) Metal will absorb microwaves, protecting you from their harmful energy. You may have holes in the metal, as long as the holes are smaller than the wavelength of the microwave. If the metal screen in the above microwave has holes that are 0.50 mm thick, will the metal absorb the microwaves?
6. Your favorite radio station 97.9, broadcasts at a wavelength of 3.06 meters. Find the frequency of this station in megahertz (MHz) and find out the energy in Joules of one photon from this radio station.
- 7) As you sit there, your body gives off radiation. Right now a photon with the energy of 2.4×10^{-21} Joules has left your face. Calculate the frequency and wavelength of this photon, then determine the type of radiation based on the chart.
- 8) Even very high energy radiation such as gamma rays have seemingly low energy photons, since a photon is so incredibly small (massless!). Calculate the energy in joules of one photon from gamma radiation with a wavelength of 1.5×10^{-15} meters.