

Name: _____

Exploring the Electromagnetic Spectrum Math Worksheet

1) Write the names of the electromagnetic waves by their wavelengths (smallest to largest). They are shown below, but they are not in any order.

X-ray *Infrared (heat)* *Visible Light* *Microwave*
Gamma Ray *Ultraviolet* *Radio wave*

Smallest -----> Largest

2) True or false: A longer wave has a higher frequency? See the wave equation below.

$$v = \lambda / f$$

Where: v = speed of electromagnetic wave through a material (distance/time)
 λ = wavelength of electromagnetic wave (distance)
 f = frequency of electromagnetic wave (how many per second; 1/time)

3) Write the names of the materials below in order of the speed of an electromagnetic wave through it. Remember:

$$v = c/n$$

Where: v = speed of electromagnetic wave through a material (distance/time)
 c = speed of electromagnetic wave in a vacuum (distance/time)
 n = refractive index (unit less). These values are shown below.

material	n	material	n
Vacuum	1	Asphalt	1.635
Diamond	2.42	Air	1.0003
Salt	1.54	Water	1.33

Slowest -----> Fastest