**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* = *λ* / *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