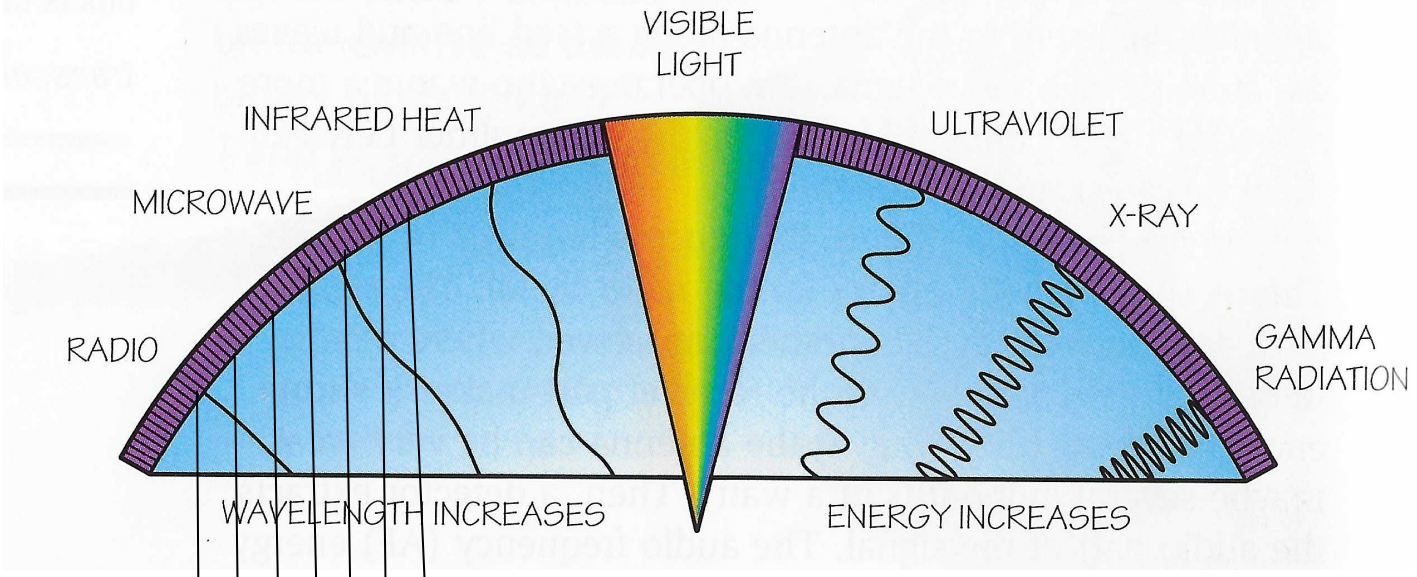
The Electromagnetic Spectrum



Extremely high frequency (EHF)	30 to 300 GHz
Super high frequency (SHF)	3 to 30 GHz
Ultra high frequency (UHF)	300 to 3,000 MHz
Very high frequency (VHF)	30 to 300 MHz
High high frequency (HF) Also known as shortwave	3 to 30 MHz
Medium frequency (MF)	300 to 3,000 kHz
Low frequency (LF)	30 to 300 kHz

Radio frequencies are measured in Hertz and abbreviated Hz. One hertz is the equivalent of one cycle per second. You will see the prefix kilo (k) used with frequencies, Kilo means one thousand, so 1.0 kHz is 1,000 Hertz. You will see the prefix mega (M) used with frequencies. Mega means one million, so 1.0 MHz is 1,000 kHz which is 1,000,000 Hertz. You will see the prefix giga (G) used with frequencies. Giga means one billion, so 1.0 GHz is 1,000 MHz which is 1,000,000 kHz which is 1,000,000,000 Hertz.

The electromagnetic spectrum is the range of frequencies from direct current (DC) through audio, radio, light waves (infrared to visible light to ultraviolet), X-rays, and gamma rays. For the Radio merit badge, you will be interested in the radio part of the spectrum – around 0.3 MHz to 3.0 GHz.

Radio waves travel through space at the speed of light (186,000 miles per second or 300,000,000 meters per second). The distance a radio signal travels in one cycle (positive to negative and back again) is called its wavelength. The higher the frequency the shorter the wavelength. Ham operators and shortwave listeners (SWLs) usually use the wavelength of signals to group radio frequencies into bands. Signals on the 20-meter ham radio band, for instance, have wavelengths of about 20 meters (66 feet).

The radio spectrum is divided into ranges as shown above.

Microwaves have frequencies higher than about 1,000 MHz (1 GHz), which include much of the UHF range and all of the SHF and EHF ranges.