

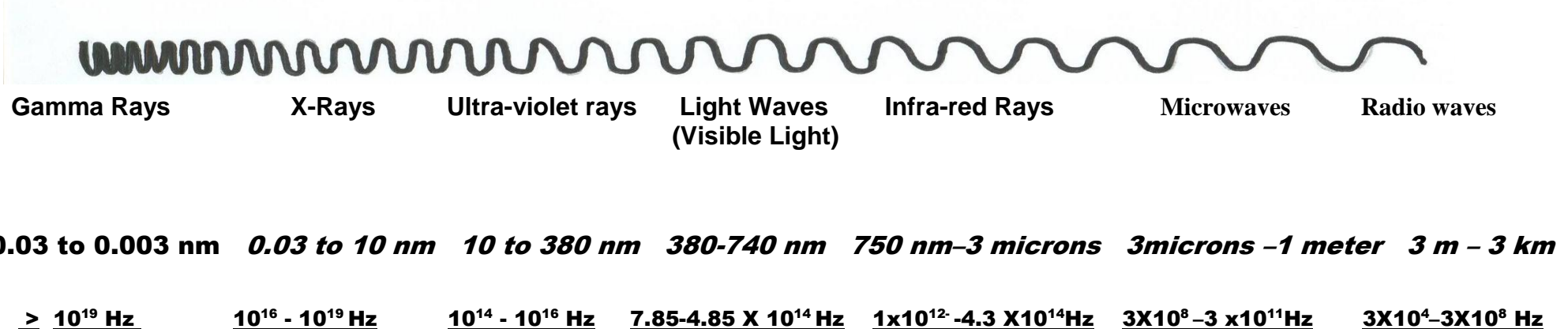
Arrange the types of electromagnetic radiation according to frequency.



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The most important point is to recognize that light waves are only one type of electromagnetic wave, and are a very small part of the electromagnetic spectrum. 5th-6th graders only need to list the order of the waves. As an additional project, students can make a chart showing uses of the different types of waves.

Start by analyzing the LENGTH of radio waves. (3m to 3km.) Then compare the length of microwaves and the other shorter waves. Remember there are a 1000 mm in a meter, 1000 microns in a mm, and 1000 nm in a micron.



Review that frequency is inverse to length; the greater the length of a wave, the smaller the frequency (or cycles per second.) The greater the frequency, the more powerful the wave, and potentially dangerous. Use this opportunity to review scientific notation, by having the student write the numbers out long hand. Develop a scale where 1000 Hz is equal to one millimeter. Notice what a small portion of the scale is occupied by visible light.

Gamma Rays LE-14	0.03 to 0.003 nm LE-14	10^{19} Hz & Higher LE-14
X-Rays LE-14	0,03 to 10 nm LE-14	10^{16} - 10^{19} Hz LE-14
Ultra-violet rays LE-14	10 to 380 nm LE-14	10^{14} - 10^{16} Hz LE-14
Light Waves (Visible Light) LE-14	380-740 nm LE-14	7.85-4.85×10^{14} Hz LE-14
Infra-red Rays LE-14	750 nm – 3 microns LE-14	1×10^{12}- 4.3×10^{14} Hz LE-14
Microwaves LE-14	3 microns – 1 meter LE-14	3×10^8 – 3×10^{11} Hz LE-14
Radio waves LE-14	3 meter – 3 km LE-14	3×10^4 – 3×10^8 Hz LE-14

To Make Your MatchCard more durable:

- 1. Put the student MatchCard and instructor MatchCard back to back in a clear plastic page protector.*
- 2. Laminate the information pieces. Or you can make them sturdier by covering the paper with transparent tape prior to cutting the pieces out.*
- 3. For more ideas on how to use the MatchCards, and for keeping a notebook for review, see the Instructor's Guide.*