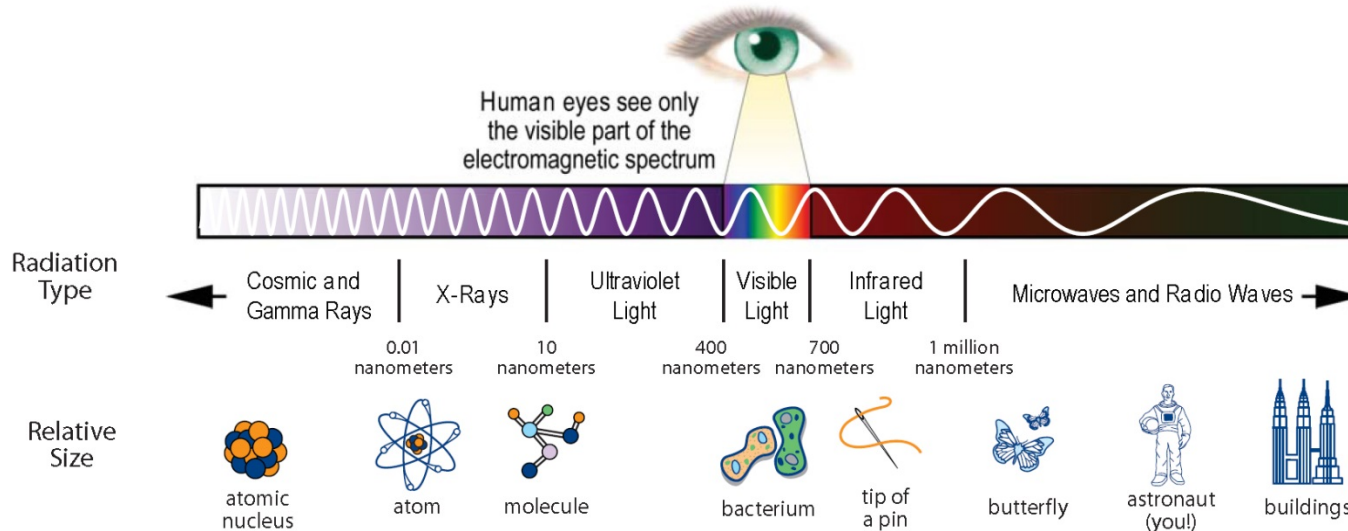


# What Is Electromagnetic Radiation?

How are radio waves, visible light, and X-rays similar? They are all types of electromagnetic radiation. All three travel — radiate — and are made or detected by electronic (or magnetic) sensors, like a T.V., a digital camera, or a dentist's X-ray machine. Types of electromagnetic radiation with which we are most familiar include ultraviolet light (causing sunburn), infrared light (in remote controls), and microwaves (in ovens). Electromagnetic radiation is made of electromagnetic waves. It is classified by the distance from the crest of one wave to the crest of the next — the wavelength. These waves can be thousands of miles long, like radiowaves, or smaller than an atom, like gamma rays! Collectively, these wavelengths make a spectrum — the electromagnetic spectrum.

The shorter the wavelength, the more energetic the electromagnetic radiation. Radio waves, including microwaves, have long wavelengths and relatively low energy levels. Visible light, ultraviolet rays, X-rays, and gamma rays have shorter wavelengths and correspondingly higher levels of energy. The wavelengths of ultraviolet light, X-rays, and gamma rays are short enough to interact with human tissue and even alter DNA.



## What Is Reflectance Spectroscopy?

**Spectroscopy** is the study of the electromagnetic radiation emitted, absorbed, or reflected by an object.

**Reflectance spectroscopy** is the study of electromagnetic radiation that is reflected from an object, such as a leaf, a rock, or ice on a distant planet's surface. We have a source of electromagnetic radiation right in our solar system — our Sun! The light we see with our eyes coming from moons and planets is actually reflected sunlight. Scientists can study this visible light, and other portions of the electromagnetic spectrum reflecting from planets and moons, to learn about their physical and chemical properties.