Types of light

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This is a list of sources of light, the visible part of the electromagnetic spectrum. Light sources produce photons from another energy source, such as heat, chemical reactions, or conversion of mass or a different frequency of electromagnetic energy, and include light bulbs and stars like the Sun. Reflectors (such as the moon, cat"s eyes, and mirrors) do not actually produce the light that comes from them.

Light carries information in ways you may not realize. Cell phones use light to send and receive calls and messages. Wireless routers use light to send pictures of cats from the internet to your computer. Car radios use light to receive music from nearby radio stations. Even in nature, light carries many kinds of information.

Telescopes are light collectors, and everything we know from Hubble is because of light. Since we are not able to travel to a star or take samples from a faraway galaxy, we must depend on electromagnetic radiation — light — to carry information to us from distant objects in space.

The Hubble Space Telescope can view objects in more than just visible light, including ultraviolet, visible and infrared light. These observations enable astronomers to determine certain physical characteristics of objects, such as their temperature, composition and velocity.

The electromagnetic spectrum describes all of the kinds of light, including those the human eye cannot see. In fact, most of the light in the universe is invisible to our eyes.

The light we can see, made up of the individual colors of the rainbow, represents only a very small portion of the electromagnetic spectrum. Other types of light include radio waves, microwaves, infrared radiation, ultraviolet rays, X-rays and gamma rays — all of which are imperceptible to human eyes.

All light, or electromagnetic radiation, travels through space at 186,000 miles (300,000 kilometers) per second — the speed of light. That’s about as far as a car will go over its lifetime, traveled by light in a single second!

Light travels in waves, much like the waves you find in the ocean. As a wave, light has several basic properties that describe it. One is frequency, which counts the number of waves that pass by a given point in one second. Another is wavelength, the distance from the peak of one wave to the peak of the next. These properties are closely and inversely related: The larger the frequency, the smaller the wavelength — and vice versa. A third is energy, which is similar to frequency in that the higher the frequency of the light wave, the more energy it carries.

Your eyes detect electromagnetic waves that are roughly the size of a virus. Your brain interprets the various energies of visible light as different colors, ranging from red to violet. Red has the lowest energy and violet

the highest.

Beyond red and violet are many other kinds of light our human eyes can’t see, much like there are sounds our ears can’t hear. On one end of the electromagnetic spectrum are radio waves, which have wavelengths billions of times longer than those of visible light. On the other end of the spectrum are gamma rays, with wavelengths billions of times smaller than those of visible light.

Scientists use different techniques with telescopes to isolate different types of light. For example, although our eyes cannot see ultraviolet light from a star, one way to perceive it is to let the star’s light pass through a filter on a telescope that removes all other kinds of light and fall on a special telescope camera sensitive to ultraviolet light.

Infrared light is used to see through cold dust; study warm gas and dust, and relatively cool stars; and detect molecules in the atmospheres of planets and stars.