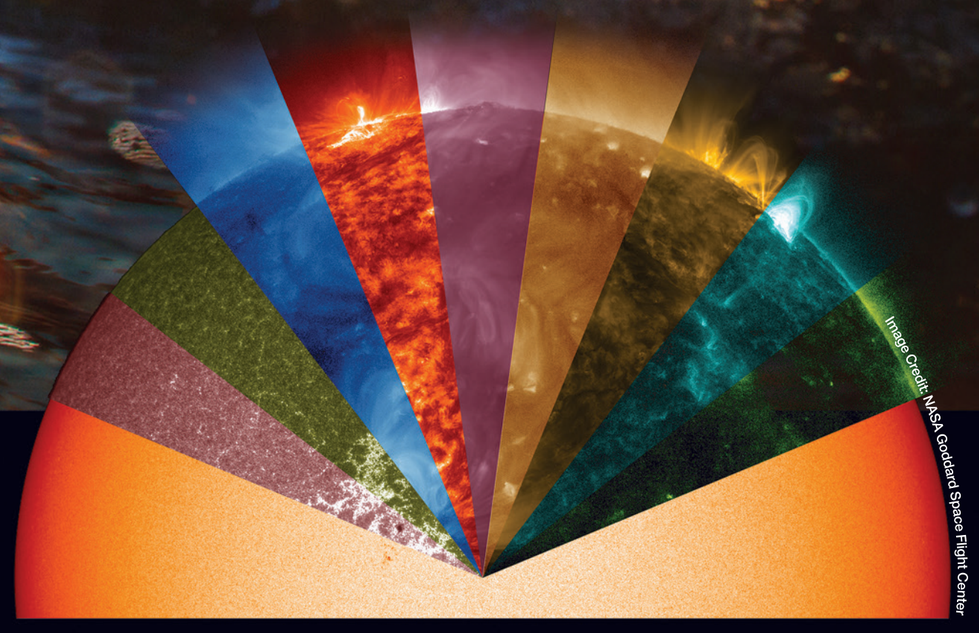
# LIGHT




This still image was taken from a new NASA movie of the sun based on data from NASA's Solar Dynamics Observatory, or SDO, showing the wide range of wavelengths – invisible to the naked eye – that the telescope can view. By examining pictures of the sun in a variety of wavelengths, scientists can track how particles and heat move through the sun's atmosphere. In this image, the various invisible wavelengths are each colorized differently to show the range of components on the sun's surface, helping scientists to paint a complete picture of our star.

## What is Light?

Light plays a vital role in our daily lives and has become an important tool in meeting the needs of our 21st century world. Light-based technologies protect health and safety, provide sustainable energy, enable space explorations, advance lighting options in rural areas, enable communication via the Internet, and hold the promise of limitless possibilities to improve the human condition and protect the earth.

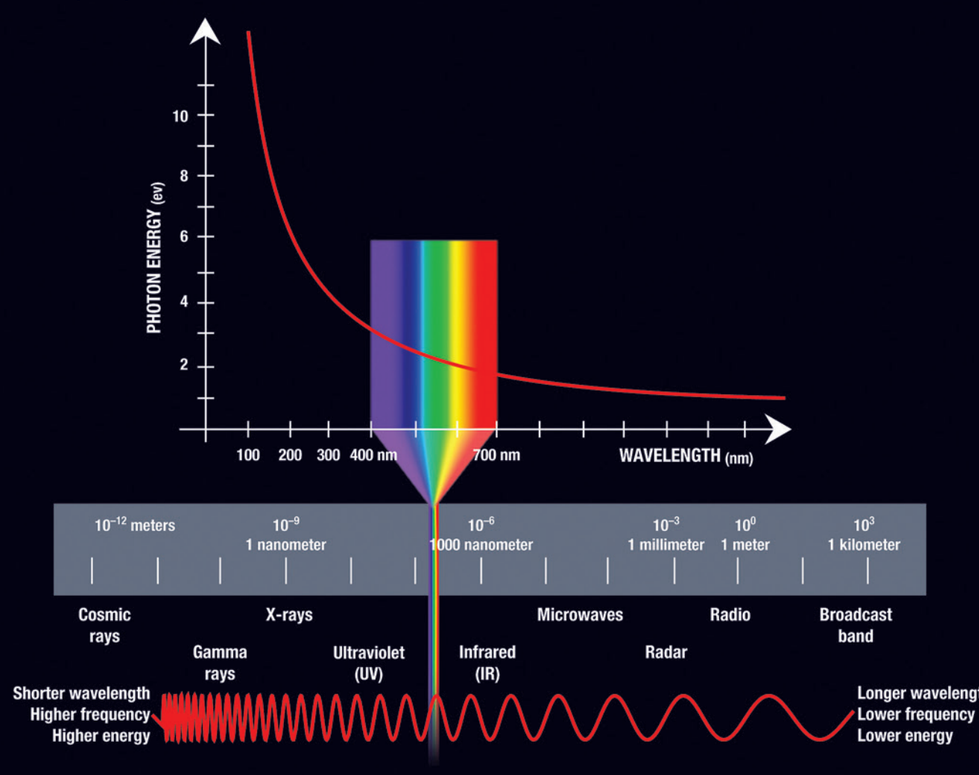
Light is part of the electromagnetic radiation spectrum and is a form of energy. Light is usually considered to be the visible part of the spectrum. However, in physics, light can be defined as all portions of the electromagnetic scale, including invisible forms such as infrared, ultraviolet, X-rays, radio waves, and more.

Electromagnetic waves can be described by their wavelengths, energy, and frequency.

**Wavelength ($\lambda$)**–Light waves are vibrations in the electromagnetic field. The wavelength of a light wave is measured as the distance between two wave crests. Light wavelengths can vary greatly; for example, radio waves can be about the size of small buildings, while gamma rays are subatomic size.

**Frequency ($\nu$)**–The number of wave crests passing by a fixed point in a given time period—usually one second—is called frequency. Frequency is measured in hertz (Hz). Higher-frequency waves have shorter wavelengths.

**Energy (E)**–The greater the energy, the higher the frequency and the shorter (smaller) the wavelength. Given the relationship between wavelength and frequency—the higher the frequency, the shorter the wavelength—it follows that short wavelengths are more energetic than long wavelengths.

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