Light: Color and the Electromagnetic Spectrum

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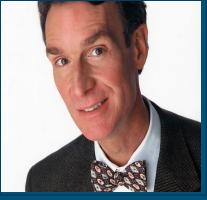
CHP. 1

The human eye and brain work together to let us see each frequency of visible light as different colors. The frequency of light increases from the red end of a rainbow to the violet end. Wavelength, which is inversely related to frequency, decreases from red to violet. The wavelength and frequency of light are closely related. The higher the frequency, the shorter the wavelength. Because all light waves move through a vacuum at the same speed, the number of wave crests passing by a given point in one second depends on the wavelength. That number, also known as the frequency, will be larger for a short-wavelength wave than for a long-wavelength wave.

The equation that relates wavelength and frequency for electromagnetic waves is: $\lambda\nu=c$ where λ is the wavelength, ν is the frequency and c is the speed of light.



CHP.2

Most materials absorb some wavelengths of light and reflect other wavelengths. The reflected light determines its color. A banana peel, for example, mostly reflects wavelengths that correspond to a yellow color. Color is the effect of absorption: the darker the color of a surface, the more visible light it absorbs. Absorbed light is not transmitted and not reflected, and if a dark surface is illuminated, the absorbed energy is transformed into heat.

CHP.3

Light is a type of energy called electromagnetic radiation. Visible light consists of only a small band of the possible frequencies and wavelengths for this radiation. All of the possible types of radiation make up the electromagnetic spectrum. From low frequency to high frequency, the spectrum includes radio waves, microwaves, infrared light, visible light, UV light, X-rays, and gamma rays. The electromagnetic spectrum describes all the wavelengths of light. From dark nebulae to exploding stars, it reveals an otherwise invisible universe.

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