Science Literacy Standards for The Subject of Light

Source: National Science Education Standards, National Academy Press, 1996.

Grades K – 4

Students should know:
Light travels in a straight line until it strikes an object. Light can be reflected by a mirror, refracted by a lens, or absorbed by an object.

"as a result of the activities in grades K-4, all students should develop an understanding of light… "(p. 123) "By experimenting with light…, students begin to understand that phenomena can be observed, measured, and controlled in various ways" (p.126)

Grades 5 - 8

Students should know:
Light interacts with matter by transmission (including refraction), absorption, or scattering (including reflection). To see an object, light from that object – emitted by or scattered from it – must enter the eye. (p.155)

The Sun's energy arrives as light with a range of wavelengths, consisting of visible light, infrared, and ultraviolet radiation.

Grades 9 - 12

"…as a result of their activities in grades 9-12, all students should develop an understanding of [how]…each kind of atom or molecule can gain or lose energy only in particular discrete amounts and thus be absorbed and emit light only at wavelengths corresponding to those amounts. These wavelengths can be used to identify the substance" (pp. 176, 180-181)

Source: "Benchmarks for Science Literacy", Project 2061, American Association for the Advancement of Science, Oxford University Press, 1993.

Grades 6 – 8

Students should know:
Light from the sun is made up of a mixture of many different colors of light, even though to the eye the light looks almost white. Other things that give off or reflect light have a different mix of colors.

Something can be "seen" when light waves emitted or reflected by it enter the eye – just as something can be "heard" when sound waves from it enter the ear.

Human eyes respond to only a narrow range of wavelengths of electromagnetic radiation – visible light. Differences in wavelength within that range are perceived as differences in color.

Grades K – 4

Students should know:
The Doppler shift effect.