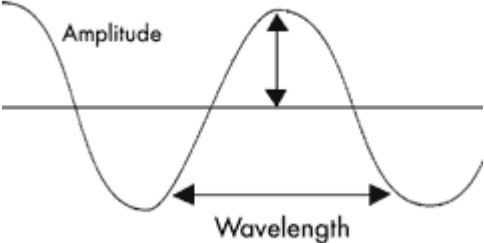
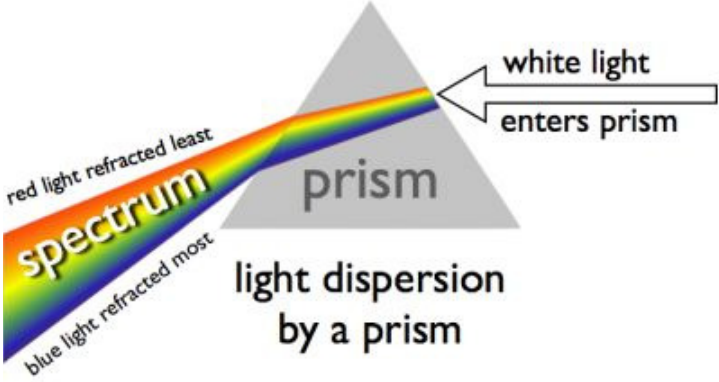
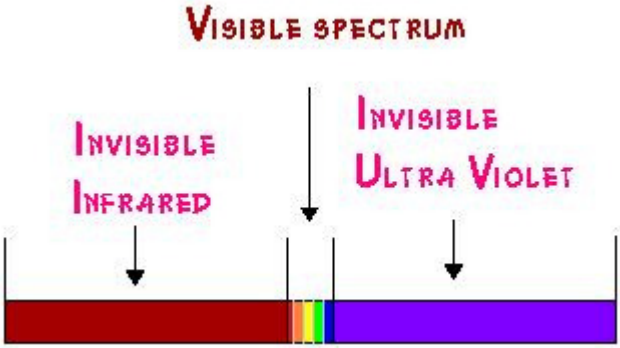

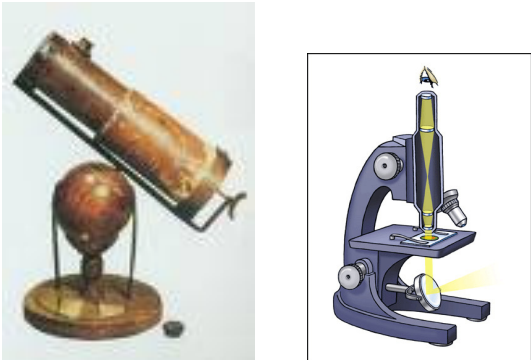


# Light (SOL 5.3) Study Guide



<p><b>White light</b> is a combination of several different wavelengths of light traveling together.</p>	<p>What is light?</p>
<p>Light travels in waves composed of a <b>wavelength, peak or crest, and trough</b>. Light waves travels much faster than sound; light from the sun takes less than 8 ½ minutes to travel 93 million miles (150million kilometers) to reach Earth.</p>  <p>The diagram shows a sine wave oscillating above and below a horizontal baseline. A vertical double-headed arrow indicates the height from the baseline to the peak, labeled 'Amplitude'. A horizontal double-headed arrow indicates the distance between two consecutive peaks, labeled 'Wavelength'.</p>	<p>What is a light wave?</p>
<p>Passing white light through a <i>prism</i>-a triangular shaped piece of cut and polished glass - in a dark room produces a band of rainbow colors called the <b>visible spectrum</b>.</p>  <p>The diagram shows a triangular prism with a beam of white light entering from the right. The light is dispersed into a rainbow spectrum on the left. Labels include 'white light enters prism' with an arrow pointing to the right, 'prism' in the center, 'light dispersion by a prism' below the prism, 'red light refracted least' at the top of the spectrum, 'blue light refracted most' at the bottom, and 'spectrum' written across the rainbow.</p>	<p>What is the visible spectrum?</p>
<p>The <b>prism</b> spreads the colors out by refracting (bending) them at different angles. Red is refracted the least – it has the longest wavelength. Violet is refracted the most – it has the shortest wave length. Violet is a form of blue.</p>	<p>How are the colors arranged in the visible spectrum?</p>

<p>We cannot see waves longer than red or shorter than violet, but we can use them. <b>X-rays</b>, <b>microwaves</b>, and <b>infrared rays</b> are all outside the visible spectrum.</p> 	<p>Are there other types of light that we cannot see?</p>
<p>Colors of the visible spectrum: <b>Roy G. Biv</b> Red, orange, yellow, green, blue, indigo, violet</p>	<p>How can I remember the order of the colors in the visible spectrum?</p>
<p>Light travels in straight paths called <i>rays</i>. Unlike sound waves they do NOT need matter to move. Light can be:</p> <ul style="list-style-type: none"> <li><b><i>reflected</i></b>- bounced off</li> <li><b><i>refracted</i></b>- bent</li> <li><b><i>transmitted</i></b>- passed through the object or</li> <li><b><i>absorbed</i></b>- taken in as heat</li> </ul>	<p>How does light move?</p>
<p>Light can be <b>bent</b>, or <b>refracted</b>, by water, lenses, or other substances. Refracting light makes objects look different.</p>	<p>What is refraction?</p>
<p>Light can be <b>reflected</b>, or <b>bounced</b>, off of objects and shine in another location.</p>	<p>What is reflection?</p>
<p>Light passes through some objects but is blocked by others. <b>Opaque</b> materials completely block light from passing through. Wooden doors, desks, and pencils are opaque.</p>	<p>Can light go through objects?</p>

<p><b>Transparent</b> materials allow light to pass through with little or no disturbance. Transparent objects may or may not color the light, but you can see objects clearly through them. Clear glass is an example of a transparent object.</p> <p><b>Translucent</b> materials allow only part of the light to pass through, while bouncing the rays off in many directions giving only a blurry view. Frosted glass and wax paper are examples of translucent materials.</p>	<p>Can light go through objects?</p> <p>Continued</p>
<p>A <b>rainbow</b> occurs from water droplets that act as both mirrors and prisms. The rays of light have to slow down as they go from traveling through air to traveling through a liquid. This causes the light to bend, thus breaking the white light up into the colors of the rainbow.</p> 	<p>What is a rainbow?</p>
<p>Inventors and scientists have used the properties of lenses and mirrors to create important optical tools such as the refracting telescope, microscope, and reflecting telescope, have led to many important discoveries in many fields of science.</p> 	<p>What have scientists discovered using light?</p>

<p><b>Sir Isaac Newton</b> (1642-1727) was an English scientist, mathematician, and astronomer who invented calculus, discovered and named the visible spectrum and showed how the universe is held together through his theory of gravitation. He also designed a reflecting telescope which used a reflecting mirror instead of the traditional combination of lenses.</p>	<p>What is Sir Isaac Newton known for regarding light?</p>
<p><b>Galileo Galilei</b> (1564-1642), an Italian scientist, built larger and more effective telescopes, developed the refracting telescope and used it to discover that many of Aristotle's and Ptolemy's claims about the heavens were not true such as the moon being smooth. He also discovered four of Jupiter's moons and made observations of sunspots and Venus, which helped support the truth of Copernicus's theory that the planets revolve around the sun.</p>	<p>What is Galileo known for regarding light?</p>
<p><b>Robert Hooke</b> (1635-1703), an Englishman, built the first Gregorian telescope, an early reflecting telescope. He also was the first to use a microscope to observe plant cells and coined the word "cell" to describe what he saw.</p>	<p>What is Robert Hooke known for regarding light?</p>
<p><b>Anton van Leeuwenhoek</b> (1632-1723) was one of the first people to record observations of microscopic life and to provide one of the first clear descriptions of bacteria. He was a Dutch cloth merchant and made his first microscopes to inspect the quality of cloth. His simple single lens microscopes were the most powerful of his day and his best surviving microscopes magnified objects clearly up to 270 times their normal size.</p>	<p>What was Anton van Leeuwenhoek known for regarding light?</p>