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The National Content Standards (Grades K–4)

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 the object.

The National Content Standards (Grades 5–8)

Light interacts with matter (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.

The 15 Big Ideas About Light & Corresponding Labs

1. Visible light is a form of energy that makes up a very small portion of the electromagnetic spectrum. This light energy can be measured and then described using the terms *wave*, *crest*, *trough*, *amplitude*, and *frequency*.

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2. We can detect light using our eyes. The human eye can be described using several different models to demonstrate how the different parts function.

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3. Organelles called cones and rods collect the light images that enter the eye and transmit them to the brain. Their presence in the eye also creates other phenomena we can detect.

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4. White light is composed of all the colors of the rainbow: red, orange, yellow, green, blue, indigo, and violet. White light can be separated into all of these colors when it passes through a prism or diffraction grating.

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5. Red, blue, and yellow are the primary colors of the rainbow. These three colors can be mixed in a variety of combinations and produce all of the other colors that we see.

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6. When light strikes an object, it can be completely reflected or absorbed, diffused, or transmitted. The terms used to describe these phenomena are *opaque*, *translucent*, and *transparent*.

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7. Light emitted from different materials can be filtered and observed through a diffraction grating to produce characteristic patterns that are unique to that material. These patterns, or fingerprints, of light can be used to identify different kinds of materials.

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Even More Contents

8. White light can be polarized using a special filter that allows certain wavelengths of light to pass through while blocking others.

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9. A lens is a tool that is used to bend, diffuse, magnify, or concentrate light. It can be made of glass, plastic, water, and other transparent materials.

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10. Light can be bent as it passes through certain materials. The amount it is bent is called the index of refraction and varies from material to material.

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11. Light can be reflected off the surface of a material. The incident angle of light always equals the reflected angle of light.

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12. Light can enter and be completely reflected inside some objects. When this phenomenon happens, it is called total internal reflection.

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13. Waves can bounce off surfaces and interfere with other light waves. This is called wave interference, which can be either constructive or destructive.

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14. Optical illusions are light images that are reflected to the eye and trick the brain into thinking it is seeing something it is not.

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15. Light can be absorbed. When this happens, the object that absorbs the light may experience a temperature increase, color change, or possibly a change of state.

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