

- amazing-space.stsci.edu/light/
This "Star Light, Star Bright" site has a number of Web-based light activities designed for classroom use.
- www.fi.edu/color
The Franklin Institute Online presents an enormous amount of information on light. This page illustrates how we see.

Suggested Print Resources

- Hunter, Rebecca. *Light and Dark (Discovery Science)*. Raintree Steck Vaughn, Austin, TX; 2000.
- Leary, Catherine. *Awesome Experiments in Light & Sound*. Sterling Publications, New York, NY; 2000.
- Macaulay, David. *The New Way Things Work*. Houghton Mifflin, New York, NY; 1998.
- Richards, Jon. *Light and Sight*. Copper Beech Books, Brookfield, CT; 1999.
- Tocci, Salvatore. *Experiments With Light (True Books: Science Experiments)*. Children's Press, Chicago, IL; 2002.



Light

Grades 3-6

Journey to Mammoth Island, a whimsical place where investigating scientific principles is always an adventure. Olive, a young girl, assisted by the Island's mammoth population and a visiting inventor helps the locals discover why and how machines work. Science facts are clearly demonstrated, giving kids an opportunity to see how important everyday machines are linked together by the science that drives them. Students come to see that science is a way of organizing information about the world, explaining why things work the way they do and allowing us to predict what might happen in new situations.

This guide provides a brief synopsis of the program, background on the science concepts presented, discussion topics, additional activities, vocabulary and suggested print and Internet resources.

TEACHER'S GUIDE

Paula J. Bense, M.Ed.

Curriculum Specialist, Schlessinger Media

The Way Things Work Video Series includes these 26 programs:

- | | | |
|-----------------|-----------------------|----------------------|
| • BALLOONING | • INCLINED PLANES | • SCREWS |
| • BELTS & GEARS | • LEVERS | • SENSORS |
| • COOLING | • LIGHT | • SINKING |
| • ELECTRICITY | • MAGNETS | • SOUND |
| • ENGINES | • MUSICAL INSTRUMENTS | • SPRINGS |
| • FLIGHT | • PHOTOGRAPHY | • STEAM POWER |
| • FLOATING | • PRESSURE | • TELECOMMUNICATIONS |
| • FRICTION | • PULLEYS | • WHEELS & AXLES |
| • HEAT | • PUMPS | |

Teacher's Guides Included
and Available Online at:



800-843-3620



Program Copyright 2002 by Millimages S.A./Pearson Broadband
Teacher's Guide Copyright 2003 by Schlessinger Media,
a division of Library Video Company
P.O. Box 580, Wynnewood, PA 19096 • 800-843-3620
All rights reserved.



Program Summary

With the help of a visiting inventor and a room full of crystal trophies, young Olive and her cousin Troy learn all about the properties of light. They discover that many devices use light in different ways to change the way we see things. When light waves hit something, three things can happen: the light can bounce, it can pass through or it can be absorbed. When you look into a mirror, you can see yourself because the light waves are bouncing off the smooth surface of the mirror to your eyes. This is called reflection. When you look through a window, you can see through to the other side because light passes right through clear glass. Things that let light pass through are called transparent.

Sometimes, when light waves enter and leave a transparent object, the light waves bend, or refract. Magnifying lenses and eyeglasses bend the light and change the way things look. Lenses can make objects look larger or smaller and they can flip images, making them appear to be upside down. Lenses are very useful things — we even have them in our eyes, enabling us to see images correctly! They are also used for reading glasses, magnifying glasses, cameras, telescopes and binoculars. Convex lenses are thicker in the middle than at the edges. When light rays from an object pass through a convex lens, they converge and form an image that can be seen on a screen or other material that is not transparent.

Pure sunlight contains all the colors of the rainbow! When light passes through a prism, it is broken into different colors. When all the colors that make up sunlight are combined, they look white, but once they are refracted, the colors break up into the ones we see in a rainbow. A rainbow is a band of colored light that shows all the colors of the spectrum. It is caused by rays of sunlight traveling from one medium, like the air, through another medium, like the raindrops in the air. The light waves bent and split into bands of colored light.

Glossary

The following words are included for teacher reference and for use with students to extend the subject matter in the show.

absorb — The action of light changing into heat energy when entering a medium.

convex lens — A lens with a surface that curves outward that causes light to focus and form an image.

lens — Special pieces of glass or other transparent materials that are shaped to bend or focus light, changing the way things look.

light — Energy that is visible to the human eye.

magnifying glass — A simple optical device that bends light rays to make things look bigger than they are.

optical illusion — When things look different to us than they really are (like a “broken” pencil in a glass of water).

periscope — An optical instrument that allows one to see around corners. The light goes in one end, bounces off a mirror, hits a second mirror then comes out the other end.

(Continued)

prism — A special piece of glass that separates white light into all the colors of the rainbow.

rainbow — A band of colored light (from red on the inside to violet on the outside) that appears as an arc in the sky. A rainbow is formed by the bending of the sun’s rays inside raindrops.

ray — The form in which visible light waves travel in a given direction; also referred to as a beam.

reflect — The action of light bouncing off a medium.

refraction — The bending of light rays as they enter a new medium.

ROY G BIV — An acronym for the colors of the rainbow, in the order of their appearance in the color spectrum (red, orange, yellow, green, blue, indigo and violet).

transparent — A word describing an object that allows light to pass through it. Clear glass is transparent.

wave — A vibration that moves energy from one place to another.

Pre-viewing Discussion

- What is light? Where does it come from?
- How does light move from place to place?
- What does light have to do with the colors we can see?
- Why does light bounce off a mirror, but not off a pile of towels?
- What colors are in pure sunlight?
- What is an optical illusion?

Follow-up Questions & Activities

- Let students examine a pencil in a glass of water. Why does a pencil appear to be broken when it’s placed in the glass?
- Have your students perform an investigation with a prism and flashlights to produce a rainbow. Help them discover other things that break white light into colors, like raindrops, pans of water and crystals.
- As a group, brainstorm a list of ways that humans use light. Create a bulletin board to illustrate the many ways in which light is controlled and used for energy and communication. (Photos, movies, television, holograms, lasers, solar energy systems, eyeglasses, microscopes, telescopes, optical fiber telephone systems, CDs, etc.) Ask students to choose a topic to research more fully and write a report to present to the class.
- Have students research rainbows, discovering how rainbows occur and why you can never get to the end of one.

Suggested Internet Resources

Periodically, Internet Resources are updated on our Web site at www.LibraryVideo.com

- www.exploratorium.edu/snacks/colored_shadows.html
This enormous site lists many ideas and lessons about light. *(Continued)*