

Light Optics

Running Time: 26 Minutes

Nifty questions in this episode:

- When does light change direction?
- Does light travel in straight lines?
- How does light become bent?

Awesome answers:

- Light changes direction when it is reflected (mirror) or refracted (lens).
- Light travels in a straight line unless it is pulled by gravity or hits an object.
- When you slow light down with a curving lens (concave or convex), light is bends.

Experiments shown on the video:

UP PERISCOPE!

Objective: To demonstrate how reflected light and mirrors can be used for viewing objects not in the direct line of sight.

- Cut the top off a one-quart milk carton.
- Make two slits (one by eight centimeters) two centimeters from the top of one side (along its width), and another slit on the opposite side, two centimeters up from the bottom of the carton.
- Place a ten centimeters mirror on the bottom of the milk carton at a slight angle, so it can be viewed through the bottom slit.
- Place a ten centimeters mirror on top of the carton, at a slight angle, and tape it to the edge of the carton. Place the mirror so that you can look through the slit and see the bottom mirror.
- Look through the bottom mirror to see objects reflected in the top mirror.
- Place your periscope over a wall or around corners to let you see objects you wouldn't otherwise be able to see.

WATER PICTURES

Objective: To reveal refracted (bent) light through water.

- Place a penny in the bottom of a pie tin next to the edge of the tin.
- Bend down so that, at your eye level, you can't see the penny.
- Pour water in the pie tin, maintaining the same eye level.
- Light bends when entering water, so the resulting refraction will make the penny visible.


More interesting stuff to do:

FRACTURED LIGHT

Objective: To see how prisms separate (refract) light.

- Prisms can be purchased at science and educational supply stores.
- With a mirror, reflect sunlight through a prism onto a piece of white paper; have a partner color in the colors that appear on the white paper (colored chalk works well).
- Reverse the process and shine sunlight through a prism onto a mirror.
- Guide the sunlight reflected from the mirror onto a piece of white paper and color in the colors that appear again; compare the colored sheets to determine the similarities of the two tests.
- Cut a slit (five millimeters by two centimeters) in a piece of cardboard; place a prism flat against the slit.
- Then place the prism so that sunlight is refracted through the prism and the slit onto white paper.
- Again, color in the refracted colors on the white paper.
- Reverse the prism/cardboard set-up so that light enters through the slit first, then through the prism onto the white paper. Color, and compare with previous experiments.
- Use two prisms to refract sunlight to determine if different light and color patterns appear.
- Are these colors similar to the light spectrum (red, orange, yellow, green, blue, violet)?
- Try blending the prism colors together! Color in the new pattern and colors you have observed on the paper.
- Develop your own experiment using mirrors and additional prisms.

Way Cool Scientist: Carol Teitz, Surgeon

 closed-captioned



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Funding provided
by The National
Science Foundation.