

LESSON #2 - PROPERTIES OF LIGHT (2 Classes)

Student Objectives, Activities and Assignments

- The teacher uses a filmstrip projector to demonstrate the following properties of light:
 - 1) light is invisible when it travels and cannot be seen until it hits something
 - 2) light travels in straight lines and will not detour around objects
 - 3) when light is blocked, a shadow forms behind the object.
- Students take notes and classify materials as transparent, translucent or opaque.
- Students investigate a practical application of light's tendency to travel in straight lines and to leave shadows by, building a sundial.

Suggested Teaching Strategies

- Begin by turning out the lights and shining a filmstrip projector on a wall. Ask students if they can actually see the light as it travels from the light source to the wall. (Since light is invisible until it hits something, none of the students should be able to see the light as it travels - unless of course, they are really aliens just posing as school children in a fruitless attempt to gain an understanding of human society)
- Next, ask student volunteers (kids love this part) to bang dusty chalkbrushes together and notice how the light becomes visible because it is hitting tiny particles of chalk dust. Students should also notice how the beam of light is straight - not wavy.
- Ask students to predict what will happen when you place your hand in front of the beam of light. Will the light go through, be stopped or will it detour around your hand to get to the screen? (It will be stopped, creating a shadow)
- Students take notes and classify materials as transparent, translucent or opaque. (It is a good idea to have actual samples of the various materials on hand)
- Finally, students follow the instructions to **"Build a Working Sundial"**.
- The actual times for the sundial on the worksheet may not be accurate depending on your latitude. You might have to calibrate the times yourself by setting the sundial up at 12:00 noon and going out every hour to mark times. As well, the angle on your gnomon should equal your latitude. (The 50 degree gnomon provided should work for most places in Canada)

***** Note *****

Teachers who are unable to complete the first part of the lesson because they do not have dusty enough chalkbrushes should return this unit to the publisher as their classrooms are much too organized!

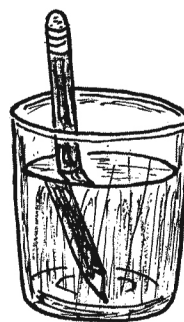
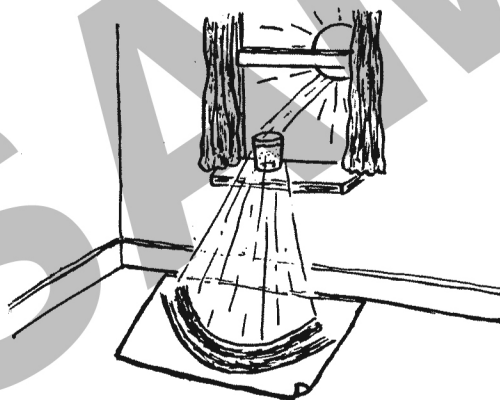
LESSON #6 - REFRACTION - The Bending of Light (1 Class)

Student Objectives, Activities and Assignments

- Students experiment, discovering that light can be bent (refracted) when it passes from one substance to another.
- Students complete the activity “**Bending Light - Refraction**” and learn about refraction. One practical application of lenses is studied as students make crude magnifying glasses out of babyfood jars. Students then complete related notes.

Suggested Teaching Strategies

- Materials needed: magnifying glass, fork, baby jars, water, pencils, paper, laminated cards with printed type on them.
- Begin with the following teacher demonstration which requires a magnifying glass and fork. (A comb will also work)
- Tape a sheet of white paper around a book and tape a magnifying glass to the book so that half of the lens sticks up over the book.
- Hold the fork about 5 cm in front of the lens and adjust it until the sunlight goes through the fork and onto the paper demonstrating how light is bent or refracted when it passes through a lens.



- Hand out the worksheet “**Bending Light - Refraction**”
- Students first draw a pencil in a baby jar (beaker) to illustrate refraction and then use the water-filled jar (beaker) as a magnifying glass.

*** Note ***

Baby jars are not really jars that contain babies but rather *babyfood* jars.

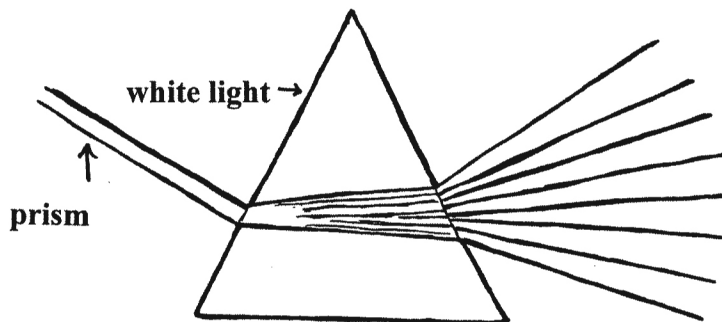
Matching

- | | |
|--|----------------|
| _____ A transparent cover that protects the eye. | a) optic nerve |
| _____ A black “hole” in the eye that lets light into the eye. | b) rods |
| _____ Acts like a screen and contains cells which react to light. | c) retina |
| _____ Sends messages from the cells in the eye to the brain. | d) cornea |
| _____ Cells in the retina that see colour and are used in the day. | e) pupil |
| | f) cones |

Short Answer

Remember to write all answers in full sentences if you see (A.I.F.S.)

1. List three things that are transparent.
 - 1) _____
 - 2) _____
 - 3) _____
2. Draw a picture that shows what the “Law of Reflection” is.
3. A prism was used to break light into the colours of the spectrum. Use pencil crayons to colour the spectrum. Write the name of colour beside each.



Properties of Light

Light is invisible when it travels. A person will not see light until it hits something. Light also travels in straight lines. It can go through objects or it can be stopped but it will not go around. If light is blocked, a shadow will form behind the object where there is no light.



Transparent

Objects that let all the light through are transparent. (see-through)

Examples include:

- 1) _____
- 2) _____
- 3) _____

Translucent

Objects that let only some of the light through are translucent.

Examples include:

- 1) _____
- 2) _____
- 3) _____

Opaque

Objects that do not let any light through are opaque.

Examples include:

- 1) _____
- 2) _____
- 3) _____

Put each under the correct heading above: glass, cardboard, wax paper, plexiglass, aluminum foil, dirty water, air, frosted glass.