NATIONAL SCIENCE EDUCATION STANDARDS

A. Science as Inquiry

Abilities necessary to do scientific inquiry
Understanding about scientific inquiry

B. Physical Science

K–4

Light, heat, electricity, and magnetism

- 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 an object.
- Electricity in circuits can produce light, heat, sound, and magnetic effects. Electrical circuits require a complete loop through which an electrical current can pass.

5–8

Transfer of energy

- Light interacts with matter by transmission (including refraction), absorption, or scattering (including reflection).
- Electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced.

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Light on the Move

Here is a way to see light moving in a straight line and then to make it change direction.

You will need:

- scissors
- a piece of black card stock
- tape
- a comb
- a sheet of white paper
- a table
- a very dark room
- a flashlight
- a mirror
- someone to help you
- talcum powder

What to do:

1. Cut a hole (the height of the comb's teeth) in the middle of the black card stock.
2. Tape the comb over the hole.
3. Lay the white paper down on a table in a dark room.

4. Hold the black card over the paper as shown in this photograph.

5. Shine the light through the hole in the card. Rays of light will go straight through the gaps between the comb's teeth.

6. Now hold a mirror in the light rays' path. The light rays will change direction! (The mirror is reflecting them.)

7. Try holding the mirror at different angles. See how the rays bounce off the mirror and travel off in straight lines in different directions.

Tip:

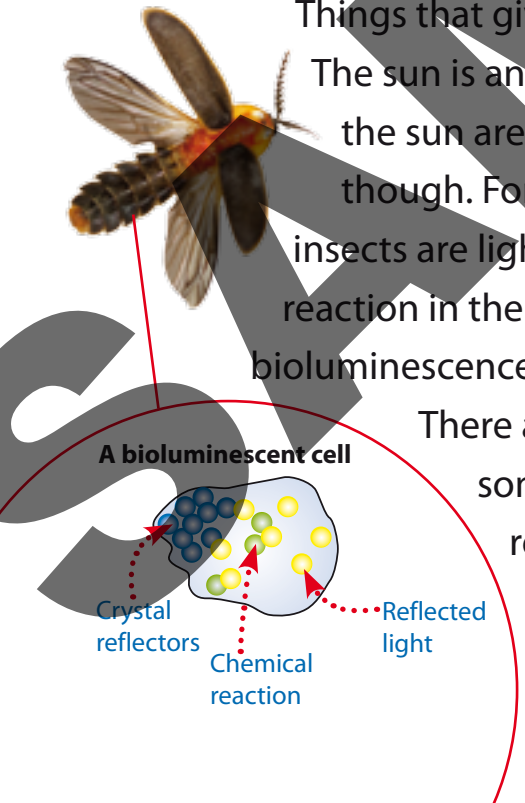
Get your helper to blow talcum powder into the light rays while you do this experiment. It will make the light rays easier to see!

Show a friend:

Show your helper how light travels in a straight line. Then show them how to make light rays change direction. Let them try it, too!

Things that give off light are called light sources. The sun is an example of a light source. Stars like the sun are not the only light sources there are, though. For example, did you know that some insects are light sources? Fireflies use a chemical reaction in their cells to produce a form of light called bioluminescence (pronounced *bio-loom-in-ess-ence*).

There are **crystal** reflectors at the back of some of the cells in their bodies that reflect the light the chemical reaction makes out into the dark.



Batteries make electrical energy with a chemical reaction. Battery terminals are a bit like the arrival and departure gates at an airport—electrons from the chemical reaction leave from one terminal and return through the other.

If you look closely, you'll find a + and a – written on most batteries. These symbols show which terminal is positive (+) and which is negative (–). When you use a battery, electrons go out though the negative terminal and come back through the positive one.