

LESSON  
**113**

ACTIVITY

# All Aglow Light Energy

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

## Purpose

To trace the path of light on various objects.

## Materials

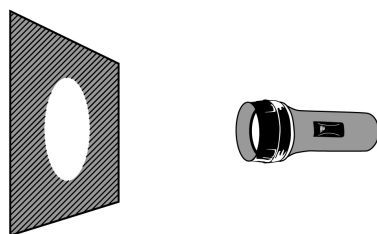
- flashlight
- white paper
- clear and colored pieces of transparent plastic

## Part I: Iron Lung

1. The sun, light bulbs, and fire are examples of sources of light. Imagine that the bulb below is emitting light. Draw arrows to show the path of the emitted light.



2. Hold a flashlight perpendicular to a piece of white paper as shown in the drawing so that you can see a circle of light on the paper when you turn on the flashlight.



- a. Can you see the light when it is traveling from the flashlight to the paper?
  - b. Draw an arrow on the figure to show the path of the light.
3. Your teacher will toss some white powder along the light path from a flashlight. What do you observe?

4. Your teacher will create a rainbow by sending the white light from a flashlight through a prism.
  - a. Describe what you observe. List the colors in the order in which they appear, starting with red.
  - b. What does this demonstration suggest about the nature of white light?

## Part 2: Light and Matter

1. Most matter we see does not emit visible light. But emitted light interacts with matter. The drawings below show three ways that light can interact with matter. Describe what's happening to the light rays in each drawing.



Reflection



Transmission



Absorption

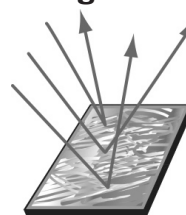
- a. Reflection:
  - b. Transmission:
  - c. Absorption:
2. Much of the light we see is reflected light. Light can reflect in different ways. Observe the figure showing how light reflects off smooth surfaces and rough surfaces.

### Smooth Surface



Examples: mirror, still water highly polished metal

### Rough Surface



Exmamples: paper, snow, rocks, water that is disturbed, dull unpolished metal

- a. Based on the model, describe how the light rays behave when they reflect off a smooth How does this compare to the model of light hitting a rough surface? What is similar and what is different?

- b. If you were to hold up an object that has a smooth surface to your face, what do you think you would observe on the surface of the object?
- c. If you were to hold up an object that has a rough surface to your face, what do you think you would observe on the surface of the object?

3. The table shows some objects that are considered opaque or transparent.

<b>Opaque</b>	<b>Transparent</b>
stone	glass
block of metal	water
wood	plastic sunglasses lens
apple	stained glass window
metal water bottle	plastic water bottle

- a. What do you think happens to light when it hits an opaque object? Is it absorbed, reflected, or transmitted?
- b. What do you think happens when light hits a transparent object? Is it absorbed, reflected, or transmitted?

4. Explore what happens when you shine the flashlight through the pieces of transparent colored plastic. Use your flashlight, a piece of colored plastic, and a white piece of paper. In the table, record the color of the plastic and the color of the light that shines through to the white paper.

<b>Color of Plastic</b>	<b>Color of Light That Shines Through</b>

5. Consider a green apple.
- What could you do to provide evidence that a green apple is not emitting green light?
  - If light is not emitted from the apple itself, how do you see it as green in color? Explain by describing what happens to white light when it hits the apple. Is the white light absorbed, reflected, or transmitted when it hits the apple?
6. Draw sketches to show how light emitted from the sun is detected by your eye after shining on each of the objects listed. Use the concepts of emission, reflection, transmission, and/or absorption to describe what happens in each case.
- White sand:
  - Window (from the inside of a house):
  - Black road:
7. **Making Sense** Use the words *emits* and *reflects* to explain the difference between white light from a lamp and white light from a sheet of paper.