

# How Does Light Reflect from a Mirror? Teacher's Notes

<b>Main Topic</b>	Light & Color
<b>Subtopic</b>	Reflection
<b>Learning Level</b>	Middle
<b>Technology Level</b>	Low
<b>Activity Type</b>	Student

Description: Experiment with rays reflecting from a mirror. Measure angles and discover the Law of Reflection.
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Required Equipment	Light Box and Optical Set, Protractor
Optional Equipment	

This lab is excerpted from *Light and Color Teacher's Guide* (Arbor Scientific P2-9560). The diagrams allow students to use the Light Box and Optical Set (Arbor Scientific P2-9561) directly on their lab pages.

## Reflection—AB2— How Does Light Reflect from a Mirror Surface?

### Teacher's Notes

#### Educational Objectives

- To use a ray drawing to represent a light path
- To correctly measure angles for ray optics using the normal as a reference line
- To develop from the activity the First Law of Reflection: The angle of incidence ( $\theta_i$ ) is equal to the angle of reflection ( $\theta_r$ ) or  $\theta_i = \theta_r$ .
- To use the light box and optical set to study reflection

#### Key Questions

- How does light reflect from a mirror surface?

#### Concept Overview

This activity is designed to help students “discover” that light reflected from a mirror's surface is reflected in a systematic, predictable way such that the angle of incidence is equal to the angle of reflection ( $\theta_i = \theta_r$ ). Students should be instructed that all angles are measured from the normal (a perpendicular to the surface at that point) and the light ray. The terms incident and reflected are introduced in the activity and may require instructional emphasis.

# How Does Light Reflect From a Mirror?

Name: \_\_\_\_\_  
Class: \_\_\_\_\_

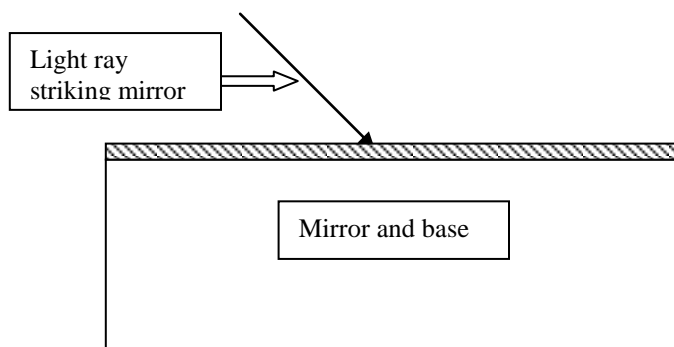
## How Does the Light Reflect from a Mirror Surface?

### Goal

- To learn how light is reflected when it strikes a mirror surface.

### Prediction

Look at the diagram below. It represents a line of light striking a mirror. Sketch your prediction of the light that will be reflected from the mirror. Place an arrowhead on the line to indicate the direction of the reflected light.



Why did you draw the reflected line in this position?

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### Materials

Light box  
plane mirror

mask with single small opening  
protractor

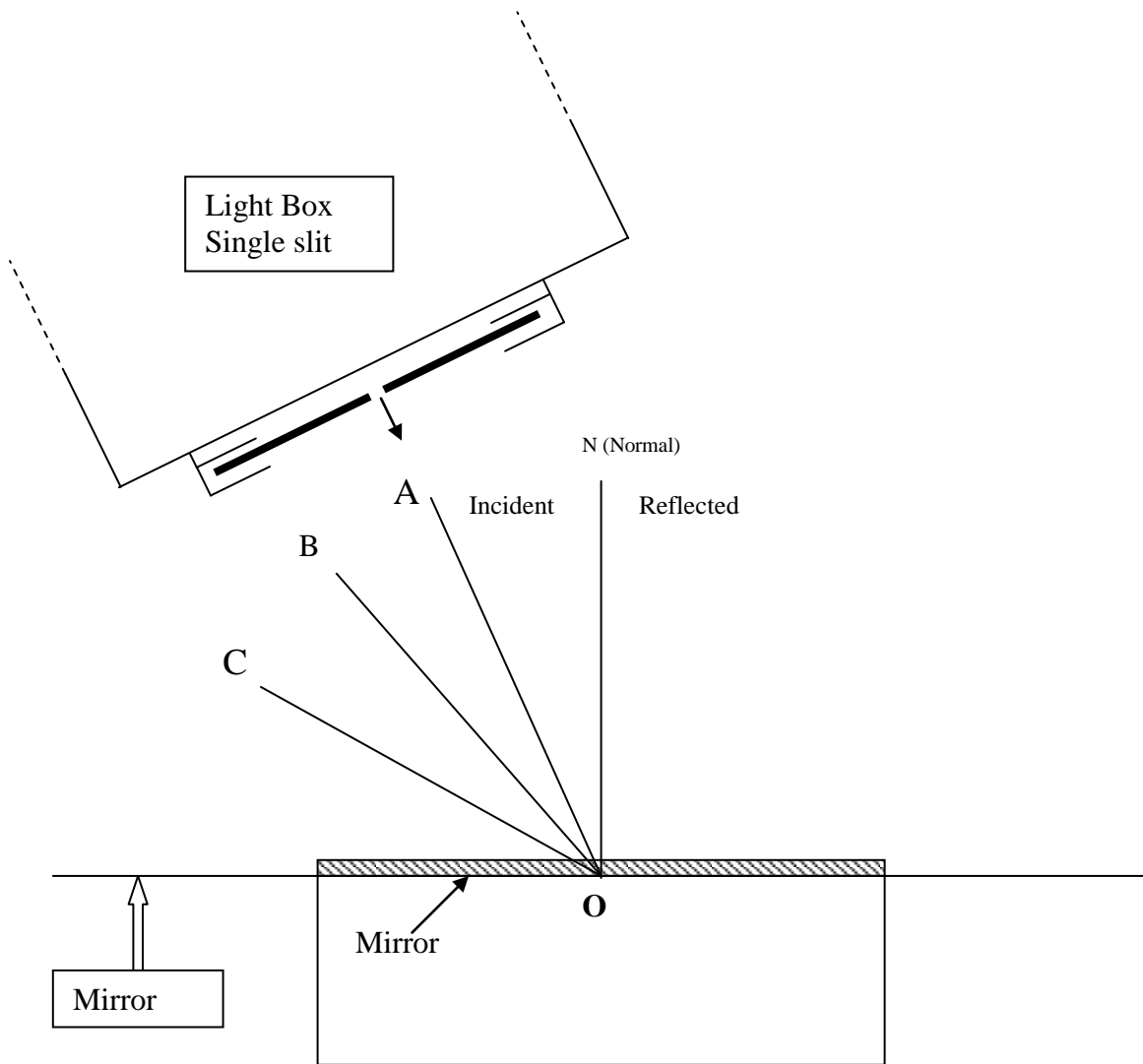
### Procedure

1. Use the light box and a single slit mask to send a single ray of light along line AO toward the mirror. Use the collimated end of the light box. Move the knob so that the edges of the lighted area are parallel. This should produce a thin ray of light that is seen on the paper.
2. Use a **sharp, pointed** pencil to make at least three dots along the center of the reflected ray of light. Space the dots as far apart as possible. Mark this ray A'.
3. Repeat this procedure from the two steps above with lines BO and CO. (Be sure to mark reflected rays B' and C').
4. Remove the mirror.
5. Using a straight edge, *carefully* draw lines OA', OB', and OC'.
6. In optics, angles are measured relative to the normal line NO in the diagram.

# How Does Light Reflect From a Mirror?

Name: \_\_\_\_\_

Class: \_\_\_\_\_



7. Measure the angles carefully to the nearest *half degree*. Record the angle measurements on the blanks below.

Angle of Incidence	Angle of Reflection
$\angle AON$ _____	$\angle A'ON$ _____
$\angle BON$ _____	$\angle B'ON$ _____
$\angle CON$ _____	$\angle C'ON$ _____

Compare the angle of incidence and the angle of reflection for each angle pair. Make a general statement about these angle pairs.

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