

## Experiment 2: The Law of Reflection

### EQUIPMENT NEEDED:

- Optics Bench
- Ray Table and Base
- Slit Plate
- Ray Optics Mirror.
- Light Source
- Component Holder
- Slit Mask

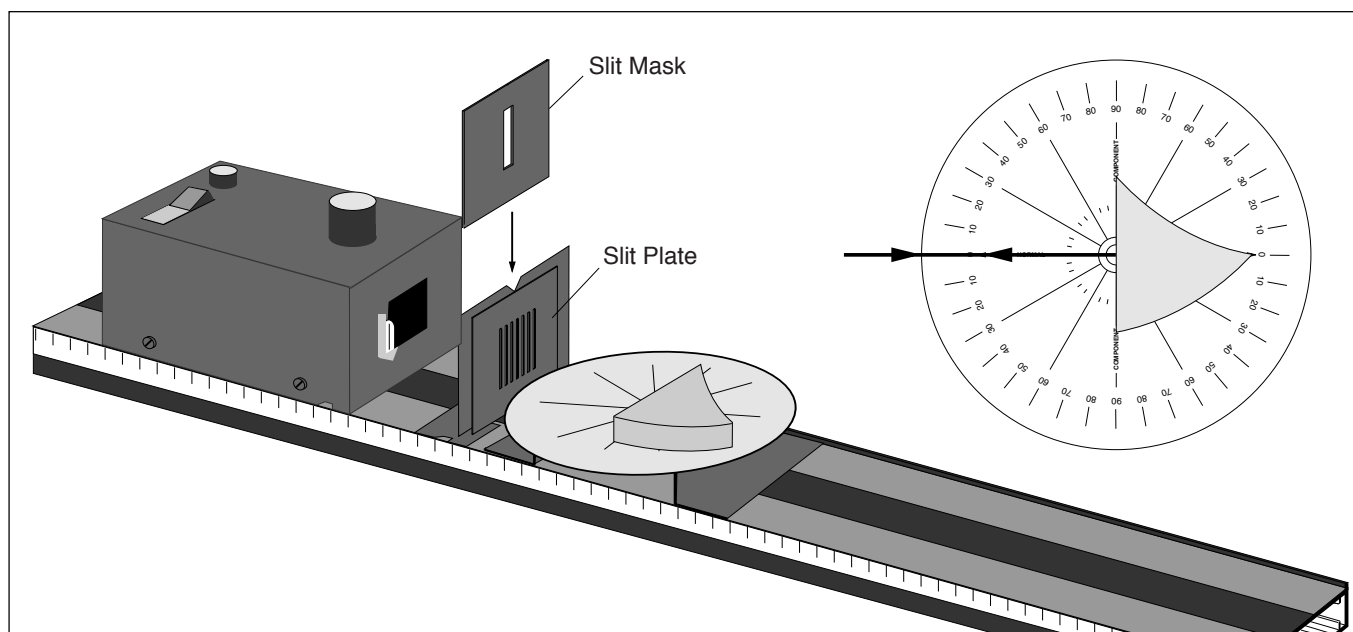


Figure 2.1 Equipment Setup

### Introduction

The shape and location of the image created by reflection from a mirror of any shape is determined by just a few simple principles. One of these principles you already know: light propagates in a straight line. You will have an opportunity to learn the remaining principles in this experiment.

To determine the basic principles underlying any phenomenon, it is best to observe that phenomenon in its simplest possible form. In this experiment, you will observe the reflection of a single ray of light from a plane mirror. The principles you discover will be applied, in later experiments, to more complicated examples of reflection.

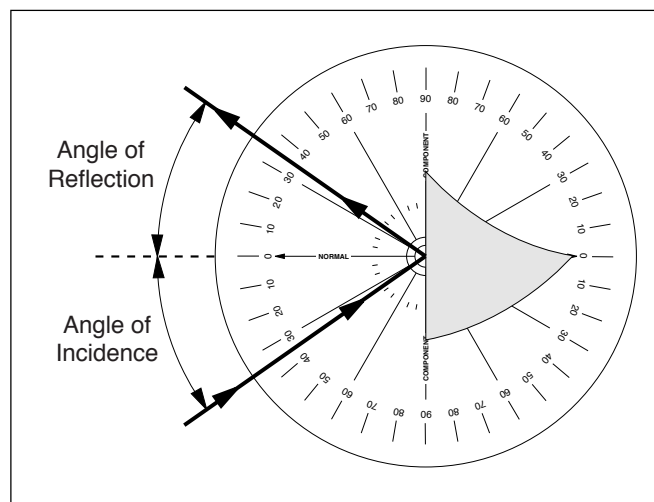


Figure 2.2 Incident and Reflected Rays

### Procedure

Set up the equipment as shown in Figure 2.1. Adjust the components so a single ray of light is aligned with the bold arrow labeled “Normal” on the Ray Table Degree Scale. Carefully align the flat reflecting surface of the mirror with the bold line labeled “Component” on the Ray Table. With the mirror properly aligned, the bold arrow on the Ray Table is normal (at right angles) to the plane of the reflecting surface.

Rotate the Ray Table and observe the light ray. The angles of incidence and reflection are measured with respect to the normal to the reflecting surface, as shown in Figure 2.2.

By rotating the Ray Table, set the angle of incidence to each of the settings shown in Table 2.1. For each angle of incidence, record the angle of reflection (Reflection<sub>1</sub>). Repeat your measurements with the incident ray coming from the opposite side of the normal (Reflection<sub>2</sub>).

- ① Are the results for the two trials the same? If not, to what do you attribute the differences?  
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- ② Part of the law of reflection states that the incident ray, the normal and the reflected ray all lie in the same plane. Discuss how this is shown in your experiment \_\_\_\_\_  
\_\_\_\_\_.
- ③ What relationship holds between the angle of incidence and the angle of reflection? \_\_\_\_\_  
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### Additional Questions

- ① The Law of Reflection has two parts. State both parts.
- ② You were asked to measure the angle of reflection when the ray was incident on either side of the normal to the surface of the mirror. What advantages does this provide?
- ③ Physicists expend a great deal of energy in attempts to increase the accuracy with which an exact law can be proven valid. How might you test the Law of Reflection to a higher level of accuracy than in the experiment you just performed?

**Table 2.1 Data**

<i>Angle of:</i>	<b>Incidence</b>	<b>Reflection<sub>1</sub></b>	<b>Reflection<sub>2</sub></b>
	0°		
	10°		
	20°		
	30°		
	40°		
	50°		
	60°		
	70°		
	80°		
	90°		