

Names: \_\_\_\_\_

Per: \_\_\_\_\_

# The Law of Reflection

The law of reflection states that the angle of incidence must equal the angle of reflection

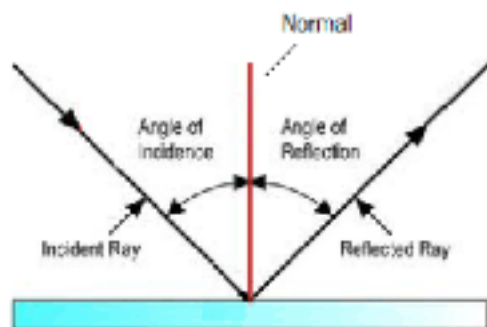


Fig. 1

**Concepts to Investigate:** Law of reflection, mirror images, angle of incidence, angle of reflection

**Materials:** 5 mirrors, 1 block per mirror, straight edge (e.g. meter stick), butcher paper, protractor, markers

## Procedures:

### Part 1: “Hide and Seek” with Mirrors

Roll out butcher paper on a large table and identify two arbitrary positions on opposite ends of the paper as  $x$  and  $y$ . Attach small mirrors to blocks to keep them propped up. One student should crouch down so his or her nose is directly above  $x$ , while the other student does the same at  $y$ . Position the mirrors so that you can see the other student through the reflections of all five mirrors. Trace the light path on the butcher paper from  $x$  to  $y$  with the light bouncing off the center of each mirror along the way. Use a protractor to measure the angles. Does the angle of incidence equal the angle of reflection in each case? Repeat the activity using different locations for  $x$  and  $y$ .

### Part 2: Mirror Images

Have you ever tried to trim your hair while looking in the mirror? It's not easy because the image you see is a “mirror image.” Hold a page of written text up to a mirror and note that it is difficult to read because images are reversed. What would happen if you held up a page of reversed text? Would the mirror unscramble the image?

Write a message using large, all caps, block lettering. Note how the image looks when held up to a mirror. Now rewrite the same message so that it reads normally when held up to a mirror.

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1. When looking in the rearview mirror of a car, a driver might only see the forehead of a passenger in the back seat. If that's the case, could that passenger see the eyes of the driver?
2. How many ways are there of arranging the mirrors so both students can see each other (Part 1)? Explain.
3. What is the relationship between the angles of incidence and their respective angles of reflection when there are multiple mirrors (Part 1)?
4. Explain how the fact mirror images look the way they do is a result of the law of reflection (Part 2)
5. Draw the design for a submarine periscope and illustrate how it uses the law of reflection to see what's happening above water.