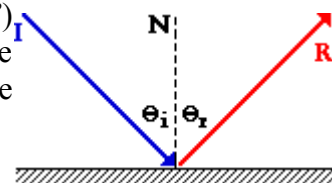


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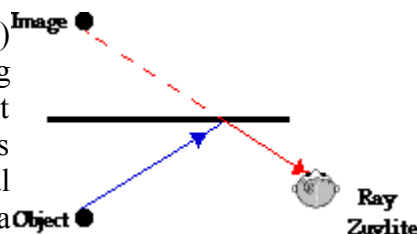
Plane Mirrors and Virtual Images An Inquiry Activity

Recall from yesterday that light propagates in straight lines (“rays”) and when a light ray strikes a plane mirror, the angle between the reflected ray and the normal perpendicular to the mirror is equal to the angle between the incident ray and the normal: $\theta_i = \theta_r$



This is the **Law of Reflection**.

Thus when an observer (e.g. Ray Zuwlite in the diagram at right) looks in a mirror, what he will see is an **image** of an object along the line of the reflected ray, i.e. where his eye thinks an object must have been to send the ray he sees his direction. Since this image is dependent on the observer and is not formed by actual rays of light that may be projected onto a screen, it is called a **virtual image**.



In this activity, you will be determining the location and the characteristics of a virtual image formed in a plane mirror.

1. Position a pin (or other small object) in an upright position in front of a plane mirror standing upright on a sheet of paper..
2. Look in the mirror. Answer each of the multiple choice questions below to describe the image of the pin you see in the mirror relative to the object itself.

The image is _____ the object.

- A. larger than B. smaller than C. the same size as

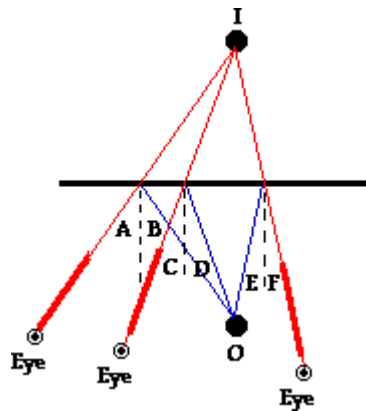
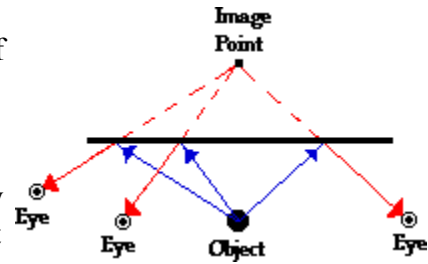
The image is _____ compared to the object.

- A. upright B. inverted (upside down)

The image is _____ compared to the object.

- A. reversed left-right B. not reversed left-right

- Look in the mirror again but out of one eye only this time. Draw a line along your line of sight to the image of the pin you see in the mirror.
- Change your position and draw a line along your line of sight to the image of the pin you see in the mirror. Repeat for at least three more lines of sight.
- Trace your lines of sight back behind the mirror. They should intersect at a single point, as in the diagram at right. This point is the location of your image.
- Validate the accuracy of your sighting and ray tracing by measuring your angles of incidence and reflection. These should be equal for each individual sight line. For example, in the diagram below, angle A should be equal to angle B and angle C should be equal to angle D.



- Measure the distance from the object to the mirror: $d_o =$ _____
 Measure the distance from the image point to the mirror: $d_i =$ _____
 How do these distances compare? _____

Please attach the paper on which you sketched your lines of sight to this sheet and hand both in together.

