Inquiry Investigation 11.4

Viewing Images in a Plane Mirror

Everyone uses mirrors. When you look in a plane mirror, you see an image of the object, not the object itself. As you learned in Section 11.3, an image can be described using four characteristics: size, attitude, location, and type.

INQUIRY SKILLS	
○ Questioning	● Hypothesizing
● Predicting	○ Planning
● Conducting	● Recording
● Analyzing	● Evaluating
● Communicating	

Question

What are the characteristics of an image seen in a plane mirror?

Prediction

(a) Predict what you will discover in this Investigation.

Hypothesis

(b) From your experience with mirrors, write a hypothesis that explains the image seen in a plane mirror.

LEARNING TIP

For help with writing a prediction and a hypothesis, see "Predicting" and "Hypothesizing" in the Skills Handbook section **Conducting an Investigation**.

Experimental Design

You will view images in mirrors and draw diagrams to help you describe these images.

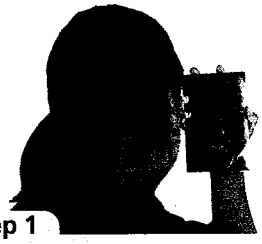
Materials

- safety goggles
- large plane mirror
- plain paper
- flat cardboard
- ruler
- small plane mirror (or MIRA)
- four pins

Handle mirrors carefully to avoid breakage.
To avoid injury, handle pins with care.

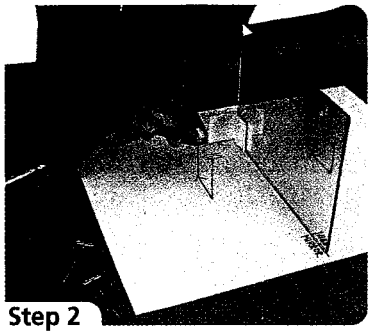
Procedure

1. Look into a large plane mirror. What is the size of the image compared with the size of the object (you)? What is the attitude of your image?



Step 1

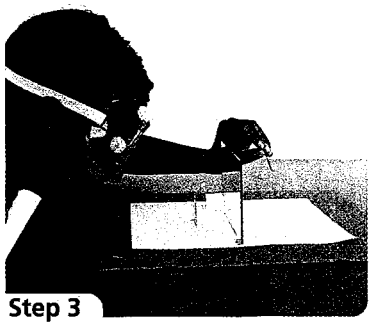
2. Put on your safety goggles. Place a piece of paper on the cardboard. Draw a straight line that is a little longer than the small mirror. Label this line *mirror*. Place the reflecting surface of the mirror along this line. Draw an arrow that is about 2 cm or 3 cm long in front of the mirror. Label the arrow *object*. Stick a pin vertically through each end of the arrow.



Step 2

3. Move around a pin behind the mirror until the pin is exactly where the image of the first pin appears to be. Check by looking at the image from several viewpoints. When you are sure of the location, stick the second pin into the paper and cardboard behind the mirror. Repeat this step using a fourth pin for the other end of the arrow. Draw a broken arrow between the two pins, and label it *image*.

4. Check to see if the image of the arrow is real or virtual. Put a piece of paper (a screen) where the image seems to be. If you can see the image on the paper, it is real. If you cannot see the image on the paper, it is virtual. Record your observations.



Step 3

5. Remove the mirror and the pins. On your diagram, measure and label the shortest distance from the mirror line to each end of the object. (This is the object distance.) Measure and label the shortest distance from the mirror line to each end of the image. (This is the image distance.)

Analysis

(b) State the four characteristics of the image in this Investigation.

(c) In step 5, how did the distance from the image to the mirror compare with the distance from the object to the mirror?

Evaluation

(d) Did your observations support your prediction? Explain.

(e) Describe any possible sources of error in this Investigation.