

## Selecting Mirrors

*In this lab, you will compare several mirrors and select the type that is best for a specific use.*

**Problem** What mirror shape is best for magnifying images?  
For providing a wide view?

### Materials

- plane, convex, and concave mirrors
- 2 metric rulers
- roll of string
- protractor

**Skills** Observing, Measuring

### Procedure

#### Part A: Comparing Magnification

1. Place the plane mirror on a tabletop with its mirror side facing up. Position a metric ruler horizontally across the center of the mirror.
2. Hold the other metric ruler horizontally against your nose, just below your eyes, as shown below. Make sure the ruler's markings face away from you. Look down at the mirror.
3. Use the ruler resting on the mirror to measure the actual length of the image of a 3-cm-long portion of the ruler you are holding. In the data table, record the size of the image.

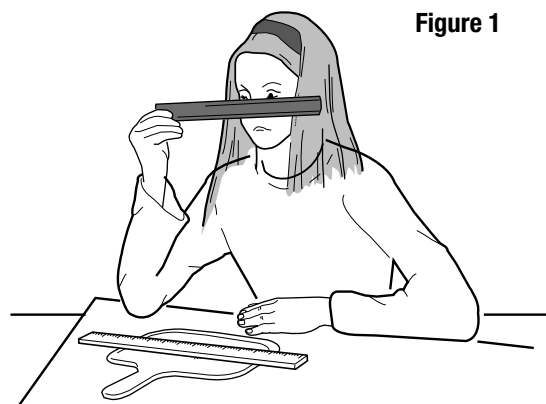


Figure 1

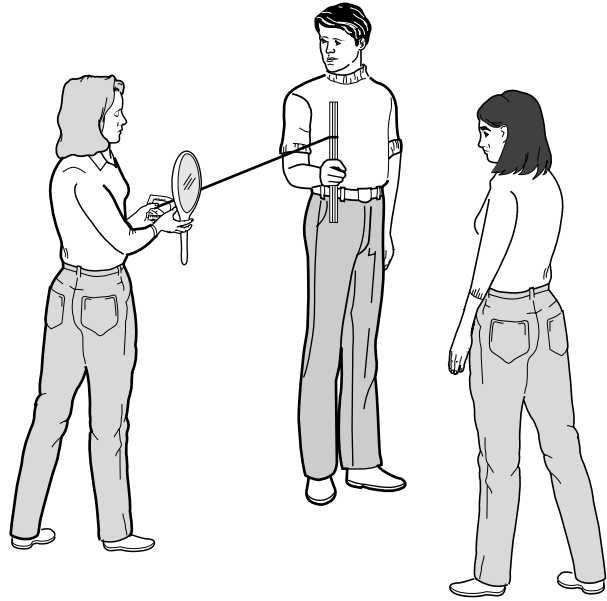
#### DATA TABLE

Mirror	Size of Image	Magnification	Field of View
Plane			
Concave			
Convex			

4. Repeat Steps 1 through 3, using concave and convex mirrors. Observe each image from the same distance.
5. Divide each image size you measured by 3 cm to determine its magnification. Record the magnification in the data table.

**Part B: Comparing Fields of View**

6. Tie a string to a ruler. Hold the protractor, mirror, and free end of the string. Have a classmate hold the ruler vertically off to one side of the mirror. Position a third classmate (the observer) directly in front of and about 2 meters away from the mirror, as shown in Figure 2.



**Figure 2**

7. Have the classmate holding the ruler slowly move toward the observer while keeping the string tight. The observer should look directly into the mirror and say “Stop!” as soon as the reflection of the ruler can be seen.

8. Measure the angle the string makes with the protractor. Multiply this angle by 2 and record it as the field of view in the data table.

9. Repeat Steps 6 through 8, using concave and convex mirrors. Observe each mirror from the same distance.

**Analyze and Conclude**

1. **Observing** Which mirror provided the greatest magnification? The widest view?

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2. **Applying Concepts** Which mirror shape would work best for a dentist who needs to see a slightly magnified image of a tooth? Explain your answer.

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3. **Drawing Conclusions** Could one of the mirrors be used both to view a wide area and to magnify? Explain your answer.

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