# Physics Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Reflection from a Plane Mirror Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Procedures & Data

1. Draw a straight line across the middle of a sheet of graph paper (or white paper). Place the mirror on the line so that the edge of its reflecting surface coincides with the line you drew. The mirror must stand vertically and may be held in place using clay at the bottom corners.
2. Pick a location in front of the mirror (not closer than 4 cm) to draw a scalene triangle – a triangle with unequal angles and unequal side lengths. Be sure that the triangle has sides that are between 4 cm and   
   7 cm. Label each point of the triangle as A, B, and C.
3. Place a pin at the point of the triangle labeled A. Lower you head so you are eyelevel with the pin. You will need to find two sightlines. Move your head to the left of the real pin. Using a straightedge, draw a line that includes the image of the pin at this location and label it A. Move your head to the right of the real pin and do the same thing again.
4. Remove the pin and place it at the point of the triangle labeled B. Find two sightlines using the directions in step 3. **If necessary, that mirror may be moved from side to side along your original line to permit a better view, but its reflecting surface must always coincide with your original line!!**
5. Once you are finished, do the same thing for point C on the triangle.
6. Remove the mirror (and pin) and extend the two sightlines for A until they intersect behind the mirror –*use dashed lines behind the mirror*. Label this point of intersection **A’**; it is the image of **A**. Measure the distance of each from the mirror line. Record the distances on the lines as labels. The difference represents the construction error.  
     
    **A** to centerline (cm) =   
     
    **A’** to centerline (cm) =
7. In the same manner, extend the sightlines for **B** until they meet at **B’** to form the image of **B**. Join **B** and **B’**, and measure their distance from the mirror line.  
     
    **B** to centerline (cm) =   
     
    **B’** to centerline (cm) =
8. Extend the sightlines for **C** until they meet at **C’**. Measure the distances of **C** and **C’** from the mirror line.  
     
    **C** to centerline (cm) =   
     
    **C’** to centerline (cm) =
9. Draw a line from the point of **A** to the place where a one of your sightlines meets the centerline. Draw a normal (perpendicular line to the centerline) at the location where both rays meet. Using a protractor, measure the angle of incidence (angle between the line coming from **A** and the normal) and the angle of reflection (the other angle).  
     
    **A:** θ of incidence=   
     
    **A:** θ of reflection=
10. Repeat step 9 for point **B.**  
     **B:** θ of incidence=   
      
     **B:** θ of reflection=
11. Repeat step 9 for point **C.**  
     **C:** θ of incidence=   
      
     **C:** θ of reflection=
12. Connect **A’**, **B’**, and **C’** with dashed lines to form the triangle **A’B’C’**.
13. Measure the sides of the triangle **ABC** and write the measurements along the respective sides as labels.  
      
     **side AB** (cm) =   
      
     **side AC** (cm) =   
      
     **side BC** (cm) =
14. Measure the sides of the image of triangle **A’B’C’** and write their lengths along the respective sides.  
      
     **side A’B’** (cm) =   
      
     **side A’C’** (cm) =   
      
     **side B’C’** (cm) =

# Questions

1. Could the image produced in the mirror be projected onto a sheet of paper? If you’re not sure, hold a sheet of paper up to a mirror (behind the object) and look to see if you see the image projected.
2. How does the orientation of the image (A’B’C’) compare to the object (ABC)?
3. How does the relative size of the object (ABC) and the image (A’B’C’) compare?
4. How does the object distance compare to the image distance? Compare the distances to the centerline for A, B and C to A’, B’ and C’ respectively.