

## Lab #2: Snell's Law (Use Sig. Figs)

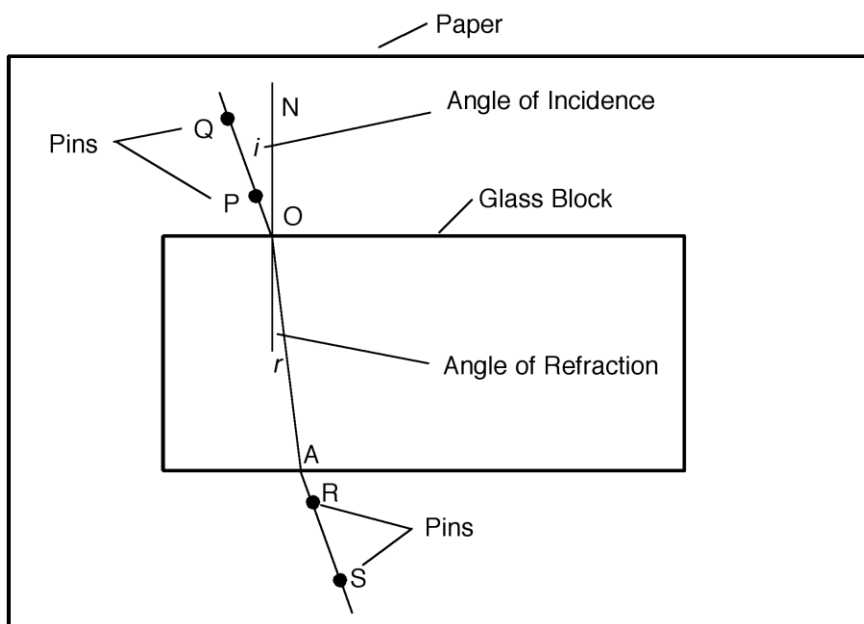
**Purpose:** To verify that Snell's Law,  $\frac{\sin i^\circ}{\sin r^\circ} = \frac{n_2}{n_1}$ , is a constant for two specific mediums.

**Material:**

1. Piece of paper
2. Glass Prism
3. Pins

**Procedure:**

1. Set up the apparatus as shown in the sketch.
2. Lay the glass block on a sheet of paper. With a sharp pencil trace an outline of the block.
3. Remove the block and draw a line at right angles to the outline of the block from any point, O. This line, ON, is a normal.



4. Draw a line making an angle of  $10.0^\circ$  with the normal.
5. Replace the block and place two pins, P and Q, along this line. The angle of incidence is  $10.0^\circ$ .
6. Place two more pins, R and S, at the far side of the block in such a position that SRPQ is a straight line when viewed through the block.
7. Remove the block and draw the line SR produced to the point A on the outline of the block.
8. Join OA.
9. Measure the angle of refraction,  $r$ .
10. Repeat the whole process for the values of  $i = 0.00^\circ, 20.0^\circ, 30.0^\circ, 40.0^\circ, 60.0^\circ, 70.0^\circ$  and  $80.0^\circ$ .
11. Fill in the table of values with your results.
12. Plot a graph of  $\sin r^\circ$  (x-axis) vs.  $\sin i^\circ$  (y-axis) and draw a best-fit line.

**Results and Analysis:**

$i^\circ$	$r^\circ$	$\sin r^\circ$	$\sin i^\circ$
0.00			
10.0			
20.0			
30.0			
40.0			
50.0			
60.0			
70.0			
80.0			

1. Calculate the slope of the graph.

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2. What does the slope represent?

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3. What is the index of refraction of air?

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4. What is the index of refraction of the glass?

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5. The book value of for the **refractive index of air into glass is 1.42**. Calculate the percentage error in your value.

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6. How do your results and data show that Snell's Law holds true?

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