

Refractive Index Using Hollow Cell and Percent Light Transmission Measurement: Lab Worksheet

Part 1. Refractive Index Using Hollow Cell

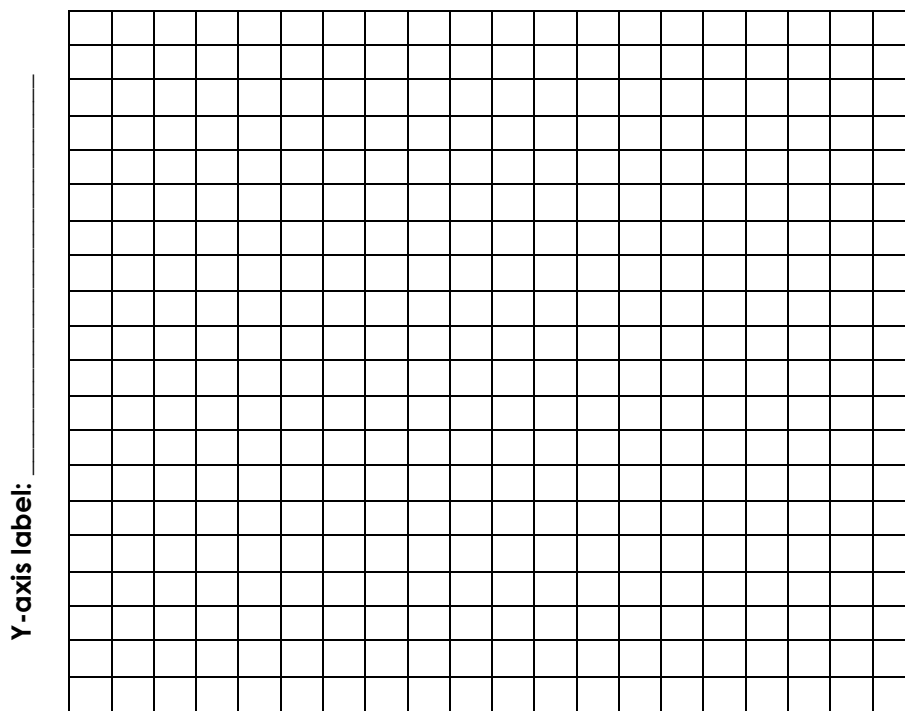
Table 1. Angle of refraction (θ_2) vs. changing angle of incidence (θ_1).

θ_1	θ_2	$\sin \theta_1$	$\sin \theta_2$
0°			
5°			
10°			
15°			
20°			
25°			
30°			
35°			
40°			
45°			
50°			

Plot Your Data

Plot your data in terms of $\sin \theta_2$ vs. $\sin \theta_1$. Label your graph. Determine the slope, which is your average refractive index. (Note: $n_{\text{air}} = 1.00$)

Graph title: _____

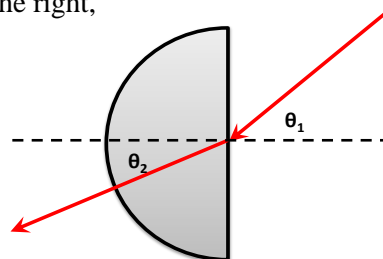


X-axis label: _____

Analysis Questions

1. What is the first and second medium?
2. What line shape does $\sin \theta_2$ vs. $\sin \theta_1$ create? Describe the line or the curve that you produce.
3. What is the average refractive index of your liquid?
4. At what angle did you start to observe total internal reflection?
5. What is the identity of your unknown liquid? Explain your answer.

6. If you change the configuration of your setup to that shown to the right, would there be any difference? Explain.



Part 2. Refractive Index Matching Using Percent Light Transmission Measurement

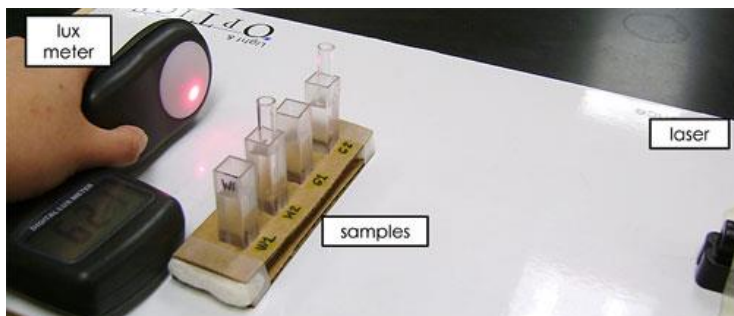
Table 2. Refractive index matching using % light transmission of particles on two different liquids.

Liquid	Light intensity (V)	$\%T = \frac{I}{I_o} \times 100$
W1		With WATER (n=1.33):
W2		
G1		With GLYCERIN (n=1.47)
G2		

Analysis Questions

1. What is most likely the refractive index of the glass tube? Explain your answer.

2. Verify your results using a lux meter as the detector. (See the setup to the right →)
 A lux meter is a commercially available device used to determine light intensity.
 Did you get the same results as with the LED-multimeter detector?
 Describe what you observed.



Lab Reflection Questions

Write a paragraph answering the following questions. Your answer should have at least five sentences.

1. What is the purpose of this lab?
2. What are three things that you learned in this lab? (Write at least one sentence explaining each one.)
3. How does this lab connect to the real world?