

University of Delaware  
Interdisciplinary Science Learning  
Laboratories (ISLL)

SCEN 101: Lab Overview  
Lab 07. Reflection & Refraction of Light

GTA: Siddharth Chaini → [chaini@udel.edu](mailto:chaini@udel.edu)

Section: 012

Office Hours: Wed, 3:00 pm - 5:00 pm (ISE 314)

## **Some notes :**

- Start thinking about your GREs!
- Not everyone is present today, so we may have to adjust groups.

# Objective(s):

## **Component 1: *Reflection of Light***

*Test the Law of Reflection by:*

- Constructing and tracing rays (incident and reflected); and measuring angles (angles of incidence and reflection).

## **Component 2: *Refraction of Light***

*Find the refractive index of a refraction block by:*

- Constructing and tracing rays (incident, transmitted/refracted, and emergent) going through two boundaries; and measuring angles (angles of incidence and refraction).
- Computing Snell's Law using your group's data.
- *Explore the physics of light in everyday life.*
- *Possibilities for R&E.*

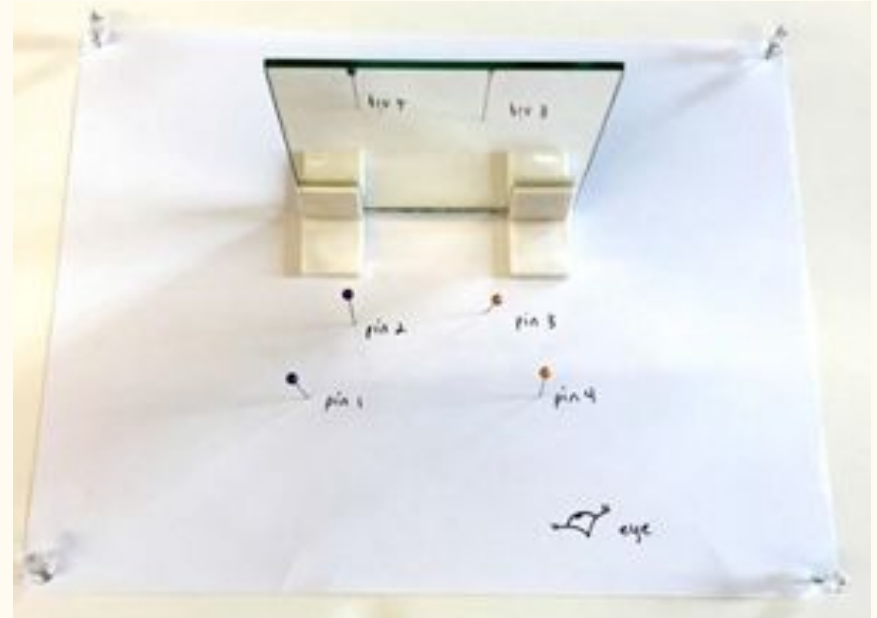
# Experimentation setup



Figure 1. Experimental Equipment - Pins, Mirror, Refraction block, Geometry Math kit, and Foam board

# Component 1- Reflection of Light

Save 1 photo of experiment setup showing all materials.



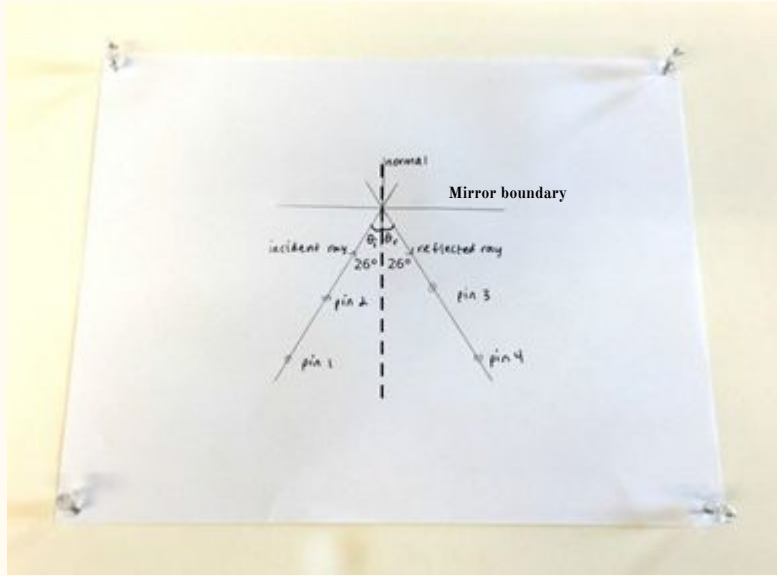


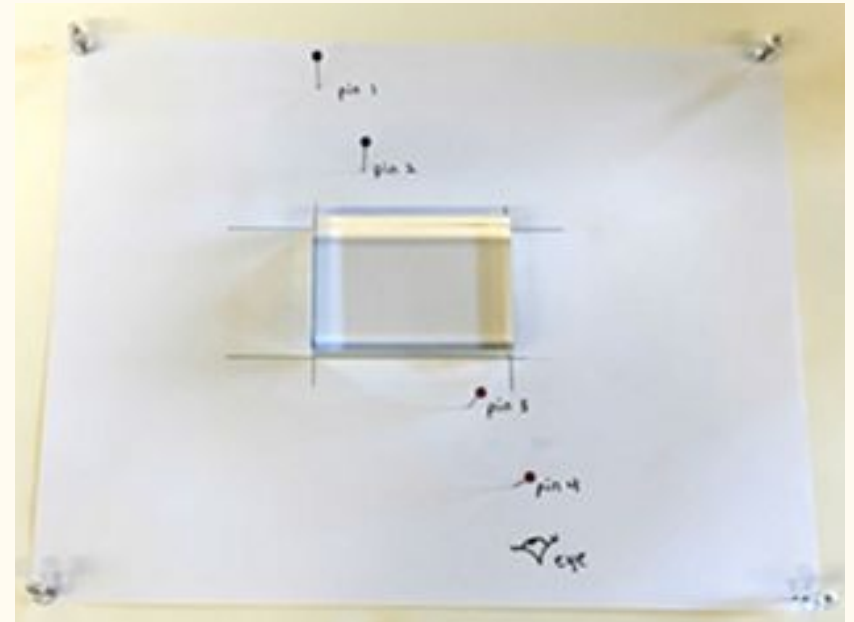
Figure 2. Reflection of light sketch

### Include labels for:

- Pin labels (4)
- Mirror boundary
- *Dotted* normal line
- Name of two rays
  - with correct direction of arrows (*the direction light is traveling*)
- Name of two angles
  - with values
- Descriptive title of figure/sketch
- **PLUS, two signatures!**

# Component 2 - Refraction of Light

Save 1 photo of experiment setup showing all materials.



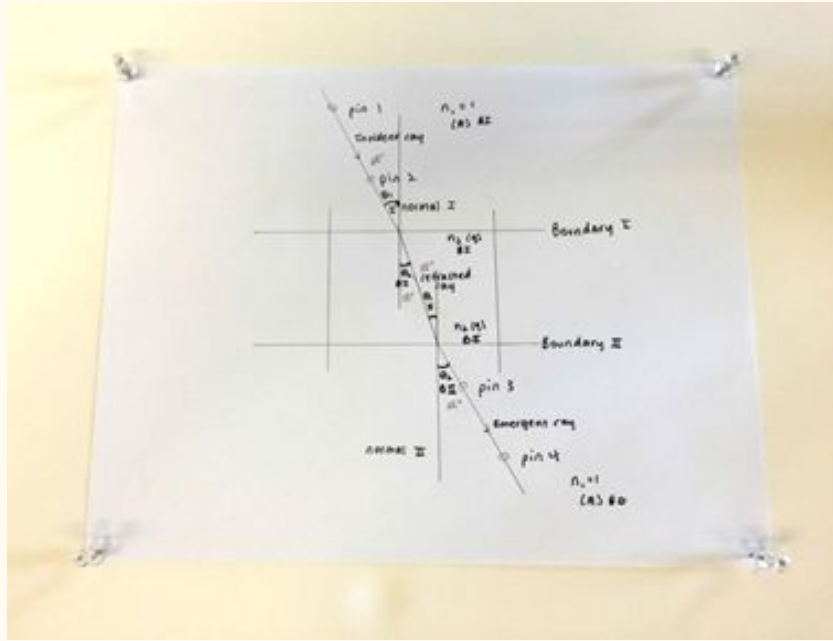


Figure 3. Refraction of light sketch

## Include labels for:

- Pin labels (4)
- Two boundaries of the refraction block (Boundary 1 & 2)
- Two *dotted* normal lines
- Name of three rays (Incident, Refracted, & Emergent)
  - with correct direction of arrows (*the direction light is traveling*)
- Name of four angles
  - with values
- Descriptive title of figure/sketch
- **PLUS, two signatures!**



Table 7.1. Data for Component 1: Reflection measurements and calculation

Angle of Incidence ( $\theta_i$ ) (degree)	Angle of Reflection ( $\theta_r$ ) (degree)	% difference between angles

% Difference =

Value<sub>1</sub> - Value<sub>2</sub>

Value<sub>1</sub> + Value<sub>2</sub>

2

x 100%

Table 7.2. Data for Component 2: Refraction measurements and calculation

BOUNDARY 1			
Angle of Incidence ( $\theta_{ia}$ ) (degree)	Angle of Refraction ( $\theta_{rm}$ ) (degree)	Refractive index, B1 ( $n_m$ )	% error for refractive index, B1 ( $n_m$ )
BOUNDARY 2			
Angle of Incidence ( $\theta_{im}$ ) (degree)	Angle of Refraction ( $\theta_{ra}$ ) (degree)	Refractive index, B2 ( $n_m$ )	% error for refractive index, B2 ( $n_m$ )
Speed of light (use best boundary/refractive index) ( $n_m$ ):			

B1:  $n_1 \cdot \sin \theta_1 = n_2 \cdot \sin \theta_2 \rightarrow n_a \cdot \sin \theta_{ia} = n_m \cdot \sin \theta_{rm}$

B2:  $n_2 \cdot \sin \theta_2 = n_1 \cdot \sin \theta_1 \rightarrow n_m \cdot \sin \theta_{lm} = n_a \cdot \sin \theta_{ra}$

% Error =

Theoretical - Experimental

Theoretical

x 100%

Refractive index

=

Constant speed of light

Speed of light in the medium

$\rightarrow n = \frac{c}{v}$

# Lab 07. Reflection & Refraction of Light

## Deliverables

1. Photo 1. Reflection experiment setup
2. Photo 2. Refraction experiment setup  
\* Hint: these two photos should show the materials and tools used
3. Figure 1. Reflection of light on a mirror
4. Figure 2. Refraction of light through a refraction block  
\* Hint: these two figures should have all the appropriate labels and a descriptive title
5. Completed Tables 7.1 & 7.2, with final numbers
6. Calculations, showing formulas used and all work

USE PROVIDED  
DATA  
SPREADSHEET!

**\*The labels for visuals are examples, be sure to be more descriptive AND include appropriate selections within each graph.**

ANY QUESTIONS?