**Investigating Refraction**

**Background:** The *refractive index* (*n*) of a material is a dimensionless number that compares the speed of light in that material to its speed in a vacuum (empty space). The higher the refractive index, the slower light travels through a material and the more it is bent.

**Aim:** To identify a material by determining its refractive index.

**Equipment:**

|  |  |
| --- | --- |
| * Hodson light box
* Power supply
* Rectangular block
 | * Single slit slide
* Protractor
* Pencil and ruler
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**Method:**

*Note: if you are working on a device, recreate the diagram below on a piece of blank paper.*

1. Place the block in the space below with the long edge on the line, such that the incident ray hits the block in the middle of the surface.
2. Trace along the bottom edge of the block.
3. Aim a single light ray at the face of the block along the incident ray.
4. Mark where the light ray exits on the other side of the block.
5. Remove the block, then draw in the refracted ray.
6. Using the protractor, draw a normal and measure the angles of incidence and refraction.
7. Repeat steps 3 to 6 for five different incident rays.

**Results:**

*i*

**Results:**

**Processing Results and Discussion:**

1. Describe what happened to the ray as it entered the block. Explain why this happened.
2. Describe what happened to the ray as it exited the block. Explain why this happened.
3. Snell’s Law extends to the refractive indices of the two media:

$$\frac{\sin(θ\_{1})}{\sin(θ\_{2})}=\frac{v\_{1}}{v\_{2}}=\frac{n\_{2}}{n\_{1}}$$

Where θ1 is the angle of incidence, θ2 is the angle of refraction, *n*1 is the refractive index of the initial medium, and *n*2 is the refractive index of the final medium. Assuming that the refractive index of air is 1, calculate the refractive index of the block using each pair of angles in your results. Add the calculated values to your results table.

1. Using the average refractive index and a list of refractive indices from the internet, identify the material of the prism.