Light Mini Labs

Name: _____

In this lab, you will investigate the mathematical models for refraction due to a medium change and diffraction in double slit experiment.

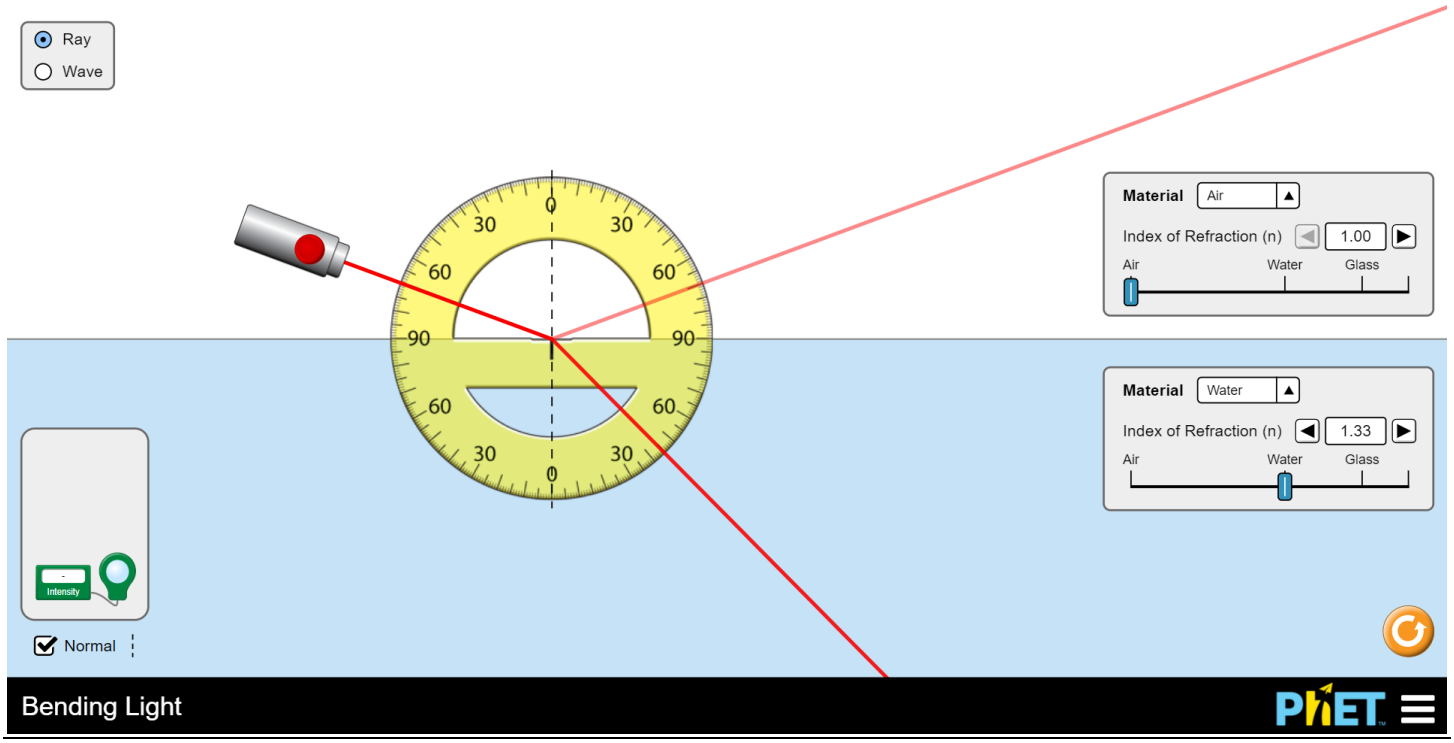
Part 1: Refraction of an Unknown Material

Light bends when traveling from medium into another. The amount of this bend is related mathematically to the material's index of refraction through Snell's Law.

$$\frac{n_1}{n_2} = \frac{sin\theta_2}{sin\theta_1} = \frac{v_2}{v_1}$$

Use a simulation to collect data and calculate the index of refraction for an unknown material

[Click Here for the Simulation]



Start by exploring the simulation and see what effect different set ups have on the path of the light. For example, what sorts of configurations result in the largest or smallest change in angle?

Once you have a feel for the simulation, go to the next page to do some calculations ↓

Set up the simulation according to the settings listed here to investigate the optical properties of **Mystery A** →

Top Material	Air (n = 1.00)
Bottom Material	Mystery A

Drag around the laser and use the protractor to collect 2 different angles of incidence and refraction. (make sure you are measuring relative to the normal line)

	Angle #1	**Angle #2**
Angle of Incidence		
Angle of Refraction		

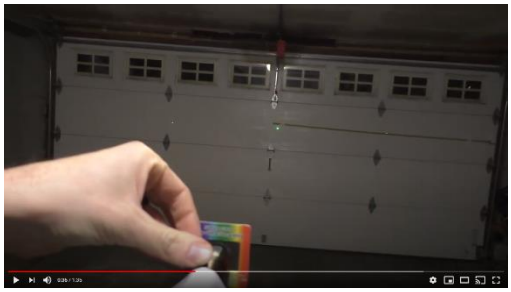
Calculate the unknown index of refraction of Material A for each of these set ups in the space below. Average these calculated values together and record below

Angle #1:
Angle #2:

Mystery A - Index of Refraction	

Part 2: Calculating the Wavelength of a Laser

When light travels through narrow slits, it produces a pattern of light and dark fringes. If you know the relationship between the different distances, you can calculate for an unknown. In this lab, your task is to calculate the wavelength of the laser used in this video.



[Click Here for the Lab Video]

Using data from the video, identify the variables and calculate for the wavelength of the laser in nm. List variables and show all work in the space below. (Note: be extra cautious with your units)

$$s = \frac{\lambda D}{d}$$

s	
D	
d	

Wavelength (in nm)	

Check your answer:

Using this website, type in your calculated wavelength in nanometers. If you are close, you should see a color similar to the green laser used in the investigation 😊

academo.org/demos/wavelength-to-colour-relationship/