

DISCUSSION:

Using techniques learned in class, develop an experiment to determine the index of refraction of an unknown material and the wavelength of a laser beam.

THE EXPERIMENT:

You are given the following equipment for use in the optics experiments.

- A solid rectangular block made of transparent plastic
 - A laser that produces a narrow, bright, monochromatic ray of light
 - A protractor
 - A meterstick
 - A diffraction grating of known slit spacing
 - A white opaque screen
1. Briefly describe the procedure you would use to determine the index of refraction of the plastic. Include a labeled diagram to show the experimental setup. Write down the corresponding equation you would use in your calculation and make sure all the variables in this equation are labeled on your diagram.
 2. Since the index of refraction depends on wavelength, you decide you also want to determine the wavelength of your light source. Draw and label a diagram showing the experimental setup. Show the equation(s) you would use in your calculation and identify all the variables in the equation(s). State and justify any assumptions you make
 3. Collect any necessary equipment and perform your experiments as you have diagrammed them.

ANALYSIS:

In addition to any necessary data, measurements and calculations from the experiment itself, include the following in your lab report.

1. Determine the index of refraction, n , for the transparent plastic.
2. Determine the wavelength, λ , of the laser.
3. Ask the instructor for the actual values for the index of refraction and wavelength of the laser. Determine your percentage error? Explain any errors.