

Lab: Light Refraction, Part One

When light moves from one medium into another, it appears to change direction. We call this change of direction “refraction.” We would like to explore the refraction of light through water.



Questions:

What determines how much light refracts when it enters water?
 What is the quantitative relationship between this factor and the refraction?

EQUIPMENT: Each group needs access to a laser, a rectangular glass tank that holds about a gallon of water, various other water containers with thin transparent sides (can be square, round, or whatever), rulers, and protractors.

Pre-lab Discussion

Whole Class

5 minutes

- Give them the lasers and show them where they can get water.
- Explain that, in the interest of making the batteries last, their use of the lasers should be confined to short bursts. No leaving them on for minutes.
- Always point the lasers away from people’s eyes. No horsing around with them.

Planning the Experiment

Groups of 4

30 minutes

- They should get the idea that the angle of approach affects the bending. If not, try to guide them in this direction.
- The planning of this experiment is non-trivial. You may have to get them to realize that the light bends *twice* if it enters and then leaves water.
- As usual, make sure they are dealing with variations in the data in some responsible way.
- As usual, make sure they are aware of any limitations in their measurement devices. (For example, how well can they measure an angle?)

Class Discussion

Whole Class

20 minutes

- When each group has an idea of what they can do, stop them for a brief discussion.
- Have each group present their methods. Use this as an opportunity for the students to make changes to their experiment.

Data Collecting

Groups of 4

40 minutes

- Students should use the feedback from the presentations to get better data.

Writing the Report

Groups of 4

15 minutes