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Semi-Circular Refraction Tank
#SCRD-01

Warning:

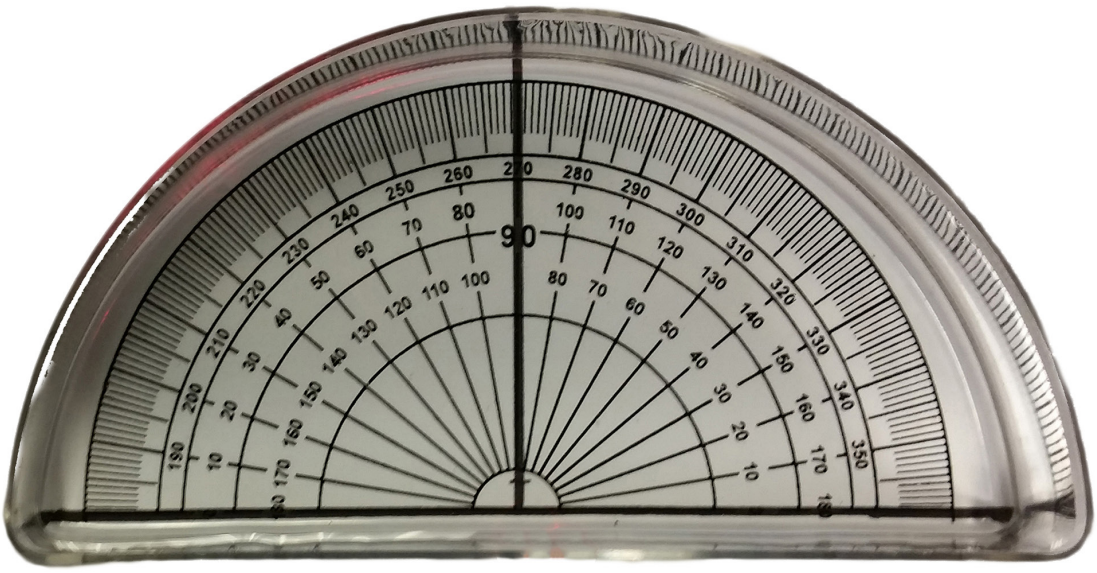
- **Not a toy; use only in a laboratory or educational setting.**
- **California Proposition 65 Warning: This product can expose you to chemicals including styrene and lead, which are known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information go to www.P65Warnings.ca.gov.**

Additional Supplies Not Included:

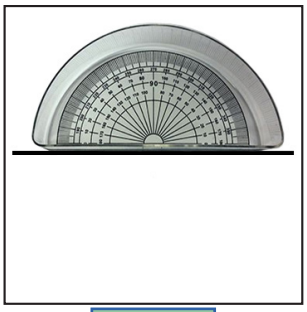
- **Laser pointer (not included)**
- **Blank Sheet of Paper**
- **Water to fill tank (Experiment with other media, too!)**

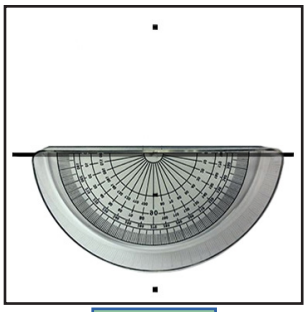
Introduction

Refraction is the change in the direction of a wave due to it changing phase velocity when passing through a new material. This phenomena takes place with any waves passing through two different media. It is accurately measured and predicted by **Snell's Law**, which mathematically links the **indices of refraction** of the two substances a wave passes through with the **angles of incidence and of refraction.** This tank is a great tool for observing refraction and the angles of incidence and refraction. By finding these values, you will be able to find the indicies of refraction for the air around the tank and whatever liquid you are experimenting with inside of the tank.



How to Use


Step 1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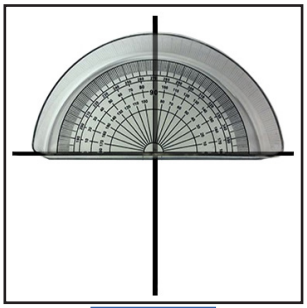
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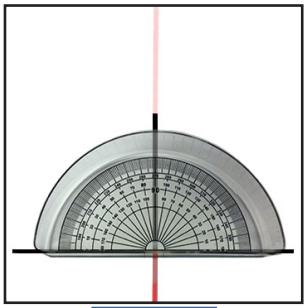
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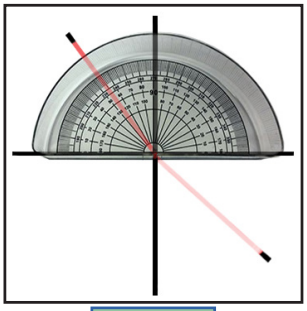
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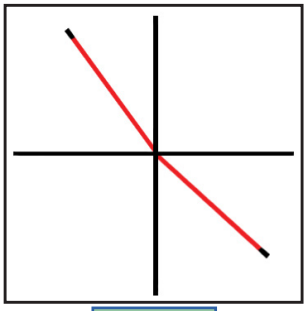
Step 6

1. Draw a straight line on your paper. Use the flat edge of your tank, a protractor, or a ruler to keep it straight.

2. Draw a second line perpendicular to the first one by marking the paper at the 90° mark on the tank above and below the first line. Connect the two marks with a straight line.

3. Fill your tank with water, and place its straight edge up to one of the perpendicular lines as you would a protractor. **(Note:** Feel free to experiment with different liquids to find different **indices of refraction)**.

4. Turn your laser light on, and point it at the flat side of the tank. Shine it along the perpendicular line and observe that the light travels straight, but is somewhat diminished or not as bright.

5. This time, shine your laser through the tank at an angle, making sure that it leaves the tank at the cross between the perpendicular lines. Mark the point where your laser starts **(**the **angle of incidence)** and where it leaves **(**the **angle of refraction)**.

6. Using your straight edge, connect the points you marked to the center of your perpendicular lines. You can now use the protractor on the tank and Snell's Law to calculate the angle of incidence, the angle of refraction, and the indicies of refraction.

Snell's Law

$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$

- n_1 = Refractive Index (1)
- n_2 = Refractive Index (2)
- θ_1 = Angle of Incidence
- θ_2 = Angle of Refraction