Name:_____Date:_____Class:_____

Student Worksheet

Refraction Tank: Guided Inquiry

Safety
Never shine a laser into anyone's eyes. It can cause permanent blindness.

Introduction

To further investigate the bending of light through different mediums, we will be using a new scientific measurement tool called the refraction tank. Using this tool, you will be able to measure the *angle of incidence* and the *angle of refraction* of a beam of light as it travels through two mediums. Your goal will be to establish a general rule describing the bending of light as it travels from water to air and as the light travels from air into water.

Materials
- refraction tank
- water
- laser pointer

Question

What happens to a beam of light as it crosses from one medium to another?

Make a Prediction

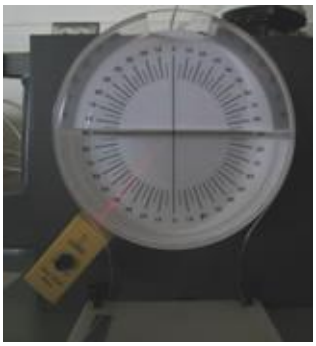
_____

_____

_____

Procedure: Part I

1. Make sure the water level reaches horizontal line (90°) on the refraction tank and turn on the laser.
2. Adjust the laser so that the beam enters the tank at 20° below the surface of the water. This is your *angle of incidence*.
3. Record the corresponding *angle of refraction* on the table below.
4. Increase your angle of incidence by 10° and continue to measure angles of refraction until you have reached and angle of



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incidence of 90°.

5. Does your light beam ever obtain *total internal reflection*? If so, at which angle does it start? _____

Observations

Data Table: Angles of incidence and refraction as light travels from water into air

Angle of Incidence	Angle of Refraction

Analyze the Results

1. Does the beam behave consistently at all angles of incidence? If not, explain.

_____

_____

_____

_____

_____

2. Develop a general rule describing the relationship between the angle of incidence and the angle of refraction as the beam travels from water into air.

_____

_____

_____

_____

refraction tank

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Procedure: Part II

Light traveling from air into water: Now investigate the bending properties of light as it travels from air into water. Set up a data table similar to the one you just completed and write a simple procedure to accompany your measurements.

Procedure:	**Data Table:**

Analyze the Results

1. Does the beam behave consistently at all angles of incidence? Develop a general rule describing the relationship between the angle of incidence and the angle of refraction as the beam travels from air into water.

2. Does total internal reflection occur in this situation? Why or why not?

3. How would the critical angle of total internal reflection change if a liquid other than water were used?

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