Bending Light PhET Lab   Name: **ANSWERS**

Go to https://phet.colorado.edu/en/simulation/bending-light and open the Bending Light Sim. Click on **Intro**. loreescience

Move the **protractor** and line it up with the surface of the interface between the two materials.

Press the **red button** to turn on the laser.

For each scenario, select the top and bottom material as specified in each data table. Record the index of refraction, n, for each material in the data table. Choose **two** different incident angles between 5° – 85° for each scenario, and record the incident, reflected, and refracted angles in the table.
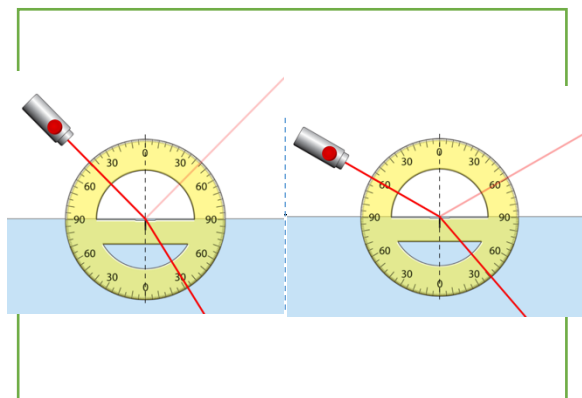
After filing in the table, draw the rays as they are in the sim.
Both your drawings will be made in one box.

Top Material: Air   **Top Index of Refraction (n): 1.00**
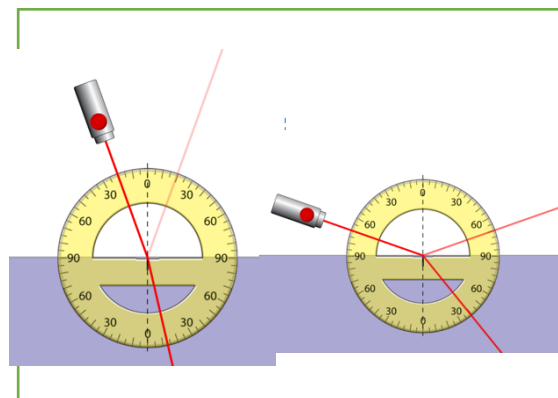**Bottom Material:** Water   **Bottom Index of Refraction (n): 1.33**

Incident Angle	Reflected Angle	Refracted Angle
45	45	32
60	60	41

Angles of incidence used for each trial will vary. These are examples to show trends.
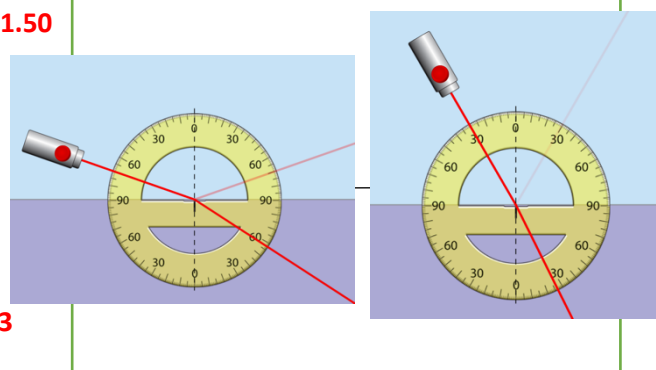

Top Material: Air   **Top Index of Refraction (n): 1.00**

Bottom Material: Glass   **Bottom Index of Refraction (n): 1.50**

| Incident Angle	Reflected Angle	Refracted Angle
20	20	14
70	70	39

Top Material: Water   **Top Index of Refraction (n): 1.33**

Bottom Material: Glass   **Bottom Index of Refraction (n): 1.50**

Incident Angle	Reflected Angle	Refracted Angle
70	70	57
30	30	26

Top Material: Water   **Top Index of Refraction (n): 1.33**

Bottom Material: Air   **Bottom Index of Refraction (n): 1.00**

Incident Angle	Reflected Angle	Refracted Angle
30	30	42
60	60	none
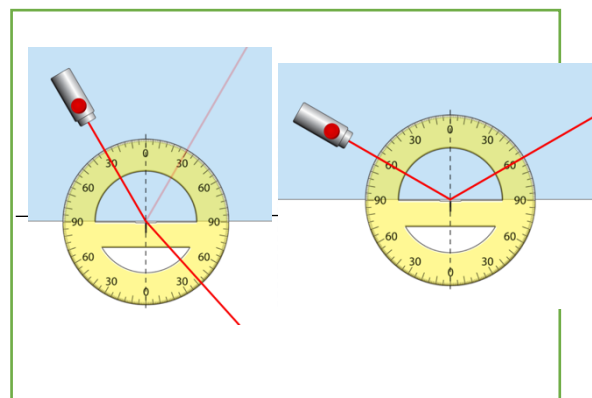
Based on your data in the data tables, what patterns do you observe? Write at least three summary points.

- When light travels into a denser medium the angle refraction is smaller than angle of incidence
- When light travels into a denser medium the light refracts towards the normal
- When light travels into a less dense medium, above a certain point, only reflection occurs

Set up a situation where **total internal reflection** occurs. Record the details below.

Answers will vary – sample data to show trend/pattern.

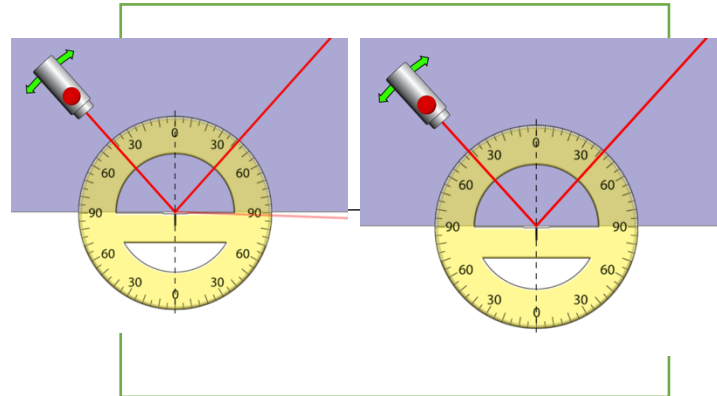**Top Material:**   glass   **Top Index of Refraction (n):** 1.50

Bottom Material: air   **Bottom Index of Refraction (n):** 1.00

Critical Angle: 41-42 based on interactive

Critical Angle: _____ based on calculation – show work below

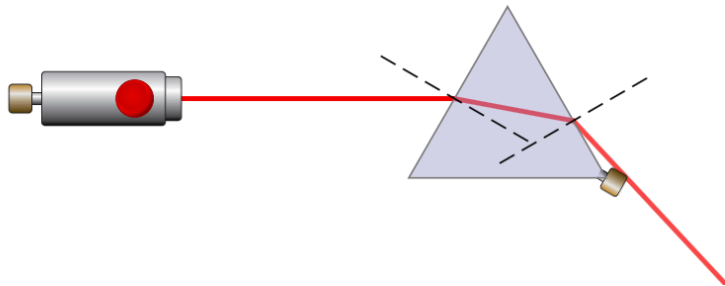**n1 = 1.50**   **n2 = 1.00**   **θ1 = ?**   **θ2 = 90**

θ1 = 41.8

Click **home.** Click on **Prisms**.

Turn on the **laser**. Drag the **triangle prism** into the path of the laser. Click on the **Normal** button on the bottom right.

Draw the light rays, prism, and normal for your configuration below. Click on the protractor button & complete the table.

Angle of incidence	Angle of refraction
30	18
40	78

Change the light to **white light**. Rotate the prism until the light that comes out the other side of the prism is separated into the color spectrum. Draw your configuration indicating where the **red and blue** light is.

- **Red is on top**
- **Blue is on the bottom**

What color of light refracts more when moving through the prism? **WHY?**

- **Violet, it has the shortest wavelength. More wave is interacting In the mediums so it slows down/speeds up more than other colours**