**Bending Light PhET Lab Name:**

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

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 incident angles between 5o – 85o 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.

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

**Bottom Material:** Water **Bottom Index of Refraction (n):**

|  |  |  |
| --- | --- | --- |
| **Incident Angle** | **Reflected Angle** | **Refracted Angle** |
|  |  |  |
|  |  |  |

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

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

|  |  |  |
| --- | --- | --- |
| **Incident Angle** | **Reflected Angle** | **Refracted Angle** |
|  |  |  |
|  |  |  |

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

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

|  |  |  |
| --- | --- | --- |
| **Incident Angle** | **Reflected Angle** | **Refracted Angle** |
|  |  |  |
|  |  |  |

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

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

|  |  |  |
| --- | --- | --- |
| **Incident Angle** | **Reflected Angle** | **Refracted Angle** |
|  |  |  |
|  |  |  |

**Top Material:** Glass **Top Index of Refraction (n):**

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

|  |  |  |
| --- | --- | --- |
| **Incident Angle** | **Reflected Angle** | **Refracted Angle** |
|  |  |  |
|  |  |  |

**Top Material:** Glass **Top Index of Refraction (n):**

**Bottom Material:** Water **Bottom Index of Refraction (n):**

|  |  |  |
| --- | --- | --- |
| **Incident Angle** | **Reflected Angle** | **Refracted Angle** |
|  |  |  |
|  |  |  |

Based on your data in the data tables, what patterns do you observe? Write at least three summary statements.

Now click on Prisms at the bottom. 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.

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.

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

Now remove the prism and drag the convex lens (rounded on the left side, flat on the right side) into the path of the laser. Select the multiple beam laser. Center the laser on the surface of the rounded side of the lens. Draw the lens and light rays.

Now remove the convex lens and replace it with the concave lens (curved inward on the left side, flat on the right side). Draw the lens and light rays.

(THIS NEXT QUESTION DOES NOT USE THE SIM)

Use the convex and concave lenses in the classroom and try to recreate an image of the objects outside the classroom window with both lenses. Hold each lens a short distance away from a solid white wall or object, and try to create an image of what is outside the window on the white wall/object. Compare what you see on the white wall/object with your drawing above. How are the images you created on the white wall/object related to what you drew above?

(BACK TO THE SIM)

Choose any lens/prism and light source configuration. Predict what will happen to the light rays when they move through the lens/prism.

Draw your prediction:

Now set it up. Draw what you see: