

Name _____

Date _____

1. Define the term refraction. (use your text or use the internet) (15 points)

Refraction _____ **Answers will vary** _____

deflection from a straight path undergone by a light ray in passing obliquely from one medium (as air) into another (as glass) in which its velocity is different _____

2. Go to the website

<http://www.physicsclassroom.com/Physics-Interactives/Refraction-and-Lenses/Refraction/Refraction-Interactive>

You will see a Refraction Interactive shown in an iFrame. Follow these basic steps so you can view light refraction as it changes mediums:

- Look at the lower half of the iFrame, under the title *Bottom Substance*, and click on air. Now both the top and bottom substances are air.
- Click the blue *hide partial reflection* button in the upper right hand corner of the iFrame.
- Click the green *go* in the upper left hand corner of the iFrame. A laser line will draw diagonally across the screen.
- Click the black *show protractor* button at the top center of the iFrame. A 360degree protractor will appear. Drag the protractor so that the angle of the light passing from the laser through the protractor measures 65 on the bottom right of the protractor.

Now you are set to begin recording data:

- Click the *Bottom Substance* back to water. Click the green *go* button. A new laser line will be drawn and you will see that the light bends as it enters the water. Record the angle.
- After you record the angle of refraction for water, change the *Bottom Substance* first to oil, then diamond, unknown # 1, and unknown # 2. Each time you change the *Bottom Substance* to a different substance, you must then click the green *go* button to draw a new laser line. Record the angle of refraction. Be sure to not move the protractor.

3. Complete the table (each answer might vary by a degree higher or lower dependent on protractor location)

Substance	Angle the rays of light changed from normal
Water	21 degrees (5 points)
Oil	25 degrees (5 points)
Diamond	44 degrees (5 points)
Unknown #1	38 degrees (5 points)
Unknown # 2	34 degrees (5 points)

4. What happened to the angle of refraction as it went from water, to oil, to diamond? (10 points)

The angle of refraction increased from water, to oil, to diamond. _____

5. Which substance Unknown # 1 or Unknown # 2 is the most dense? _____ **Unknown # 1** (5 points)

Justify your answer. (15 points) **Unknown # 1 is close to the angle that diamond refracts the light. A higher degree of change indicates a denser substance. Unknown # 1 is more dense because the angle of change is 38 degrees which is steeper than the 34 degrees of change made by Unknown #2.**

6. Based on the amount of refraction, order the 5 items tested from least dense to most dense. **(10 points)**

A. water, B. oil C. unknown # 2 D. unknown # 1 E. diamond

7. Draw a diagram to show what happens as the laser light shines from air to water. Label air, water, and the laser. (15 points) Diagrams will vary.