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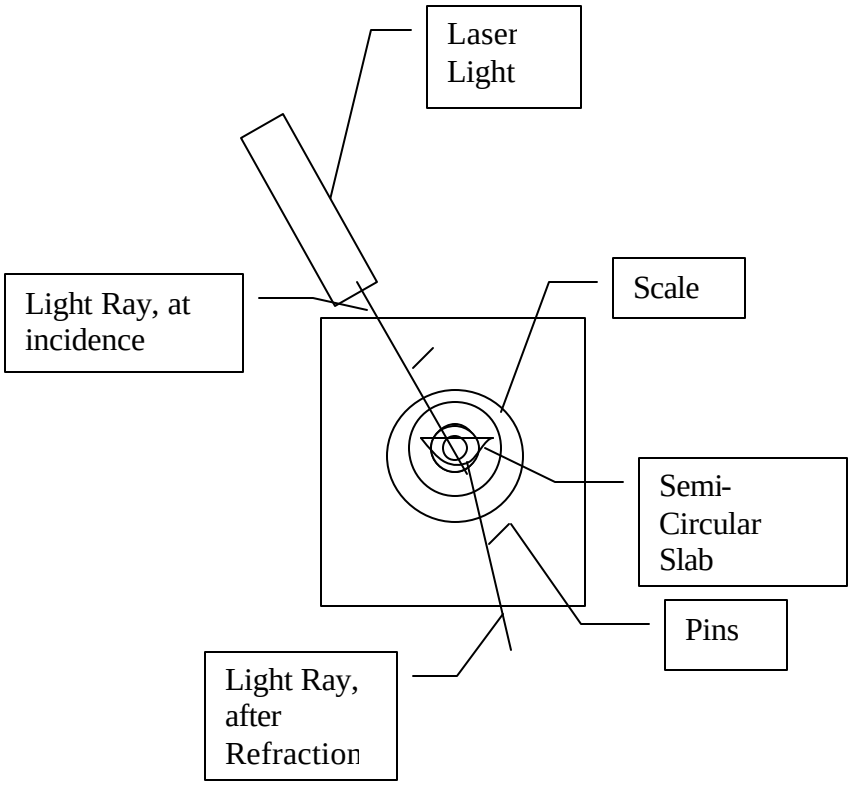
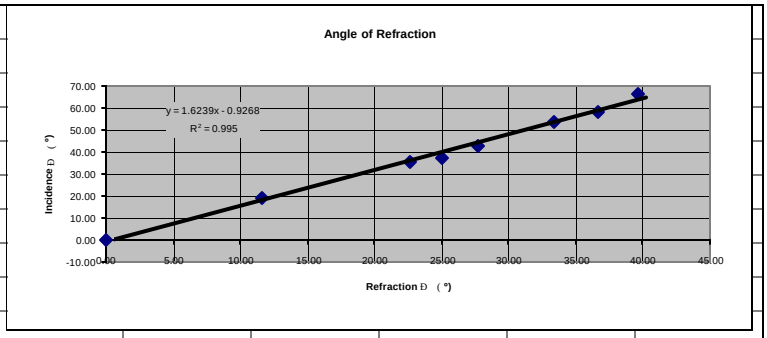
REFRACTION OF LIGHT
Thursday, September 21, 2000

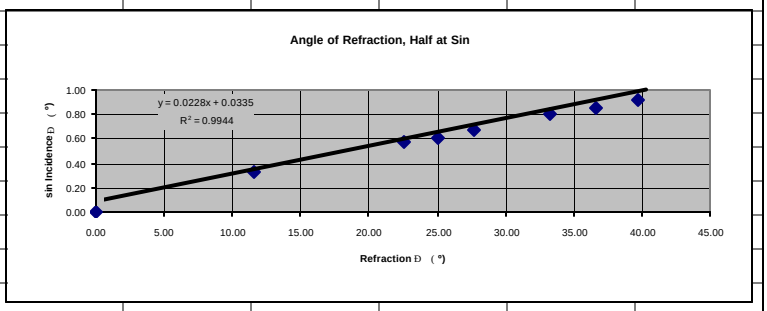


[redacted]

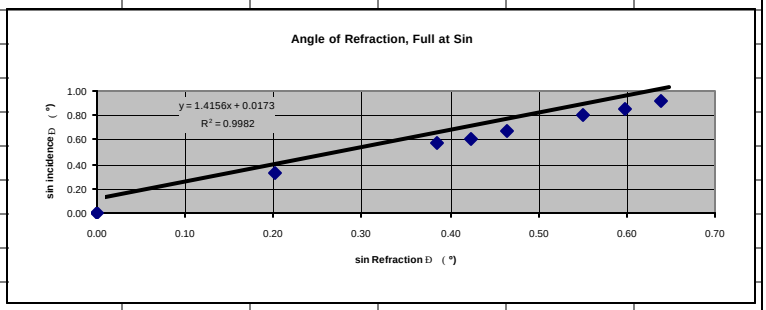
	r ∠ (º)	i ∠ (º)
+/-	2.33	2.33
	11.58	18.67
	22.60	35.10
	36.67	58.00
	39.70	66.33
	33.33	53.50
	27.67	42.50
	25.00	37.67
	0.00	0.00



	r ∠ (º)	sin i ∠ (º)
	11.58	0.32
	22.60	0.58
	36.67	0.85
	39.70	0.92
	33.33	0.80
	27.67	0.68
	25.00	0.61
	0.00	0.00



	sin r ∠ (º)	sin i ∠ (º)
	0.20	0.32
	0.38	0.58
	0.60	0.85
	0.64	0.92
	0.55	0.80
	0.46	0.68
	0.42	0.61
	0.00	0.00



	slope
	1.415629847
+/-	0.024684582
+	1.44
-	1.39

When a light ray enters a different medium, the ray changes direction. When a wave hits a boundary between media, some of it energy is reflected and some is transmitted. This phenomenon is analyzed like all other phenomena with a mathematical model. We know that the first media and the pass through media have an effect on the angle created by the change in direction. We will can the entry angle, the angle of incidence; and the opposing angle will be the refraction angle.

We used a laser light to shine light through air, hit a semi-circular slab of plastic, pass through the slab, and return into air on the other side of the slab. We will then measure the angle of incidence, angle of refraction, and tabulate. From the results, we plotted “Laser, Slab at Refraction”; “Laser, Slab at Refraction, Half at Sin”; and “Laser, Slab at Refraction, Full at Sin.” The empirical equation for the linear graph is $y = m x + b$, this compare to the theoretical equation is $\text{Sin}_i = \mathbf{h}_{glass} * \text{Sin}_r$. The LINEST was done on the “Laser, Slab at Refraction, Full at Sin” graph and not the other two graphs because it was found to have the R^2 value closest to one. The value of the slope is between 1.39 and 1.44, without any units. This is our calculated experimental value for the index of refraction for our semi-circular slab of plastic. We do not know the exact value of $\mathbf{h}_{glass}$, however we do know that the values for the index of Refraction fall

between 1.00029 and 2.42 for air and Diamond, respectively (Table 22.1 Indices of Refraction, 692). With some research, we have found additional information on the Internet that allows us to determine the material used to make the slab of plastic from our experimental value for the index of refraction. This material is polyvinylidinefluoride (PVDF), a type of plastic (matweb.com, 1). We thus have proven that $Sin_i = \mathbf{h}_{glass} * Sin_r$ is a valid equation for finding the index of Refraction.

Works Cited

1. "Material Name." 25 Sep. 2000.
<http://www.matweb.com/GetMatls.asp>
2. Wilson, Jerry D., and Anthony J. Buffa. College physics.4th ed. Upper Saddle River, New Jersey: Prentice_Hall, Inc., 2000.