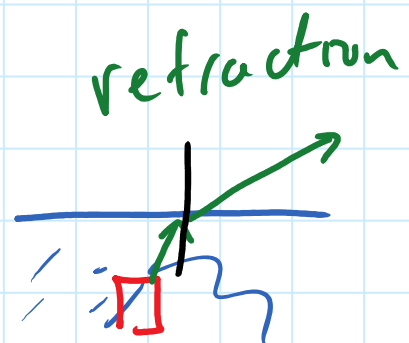
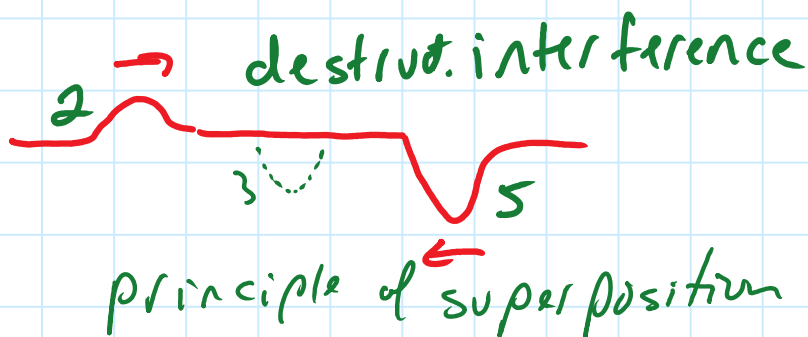
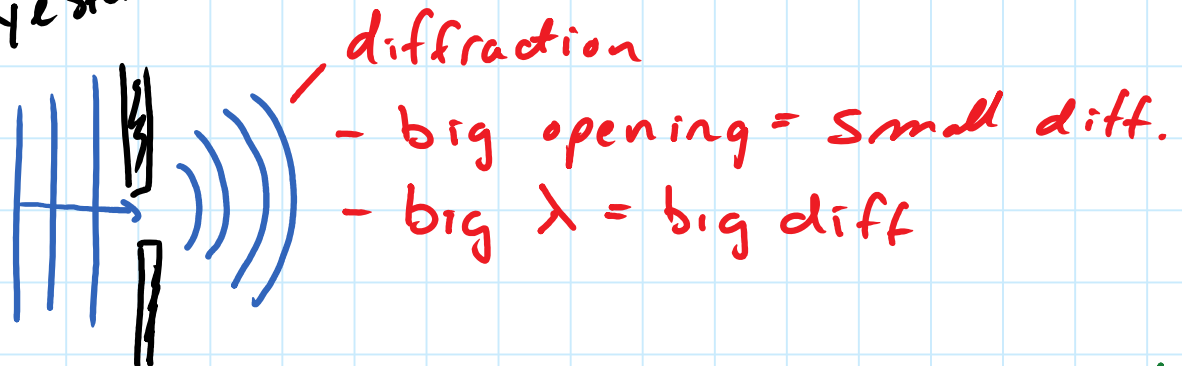


Refraction and Snell's Law

Friday, September 16, 2016 8:51 AM

Review from
Yesterday



Refraction

- occurs when the velocity of a wave changes, change in the medium (material)

Optical Density: a measure of how fast light travels through a medium

Index of Refraction: a comparison of optical densities

$$n = \frac{\text{Velocity of light in vacuum}}{\text{Velocity of light in medium}}$$

$$n = \frac{v_{\text{vac}}}{v_{\text{med}}}$$

P. 353
table

ex: $v_{\text{vac}} = 3.0 \times 10^8 \text{ m/s}$, $v_{\text{H}_2\text{O}}$

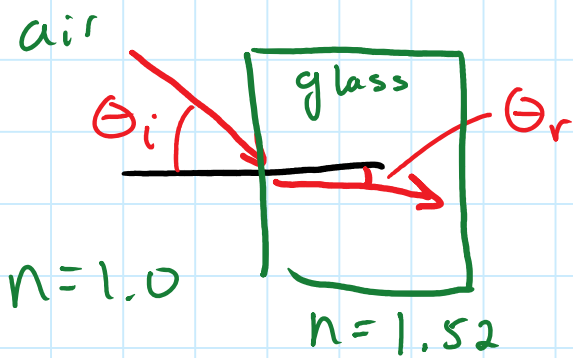
$$n = \frac{v_{\text{vac}}}{v_{\text{med}}}, \quad 1.33 = \frac{3 \times 10^8 \text{ m/s}}{v_{\text{H}_2\text{O}}}$$

$$v_{\text{H}_2\text{O}} = \frac{3 \times 10^8 \text{ m/s}}{1.33} = 2.26 \times 10^8 \text{ m/s}$$

ex: $v_{\text{med}} = 1.24 \times 10^8 \text{ m/s}$, what is the material

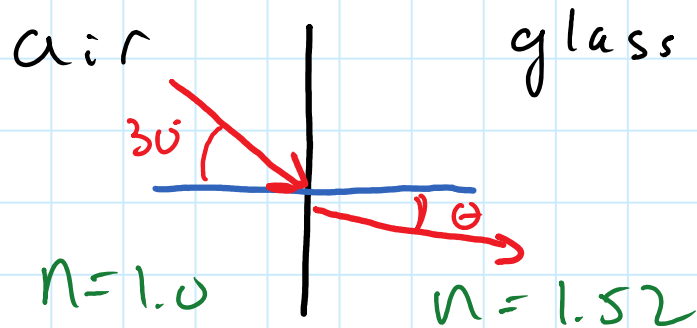
$$n = \frac{v_{\text{vac}}}{v_{\text{med}}} = \frac{3 \times 10^8}{1.24 \times 10^8} = 2.42 \quad \text{Diamond}$$

Snell's Law: Describes the relationship between angles of incidence; refraction



$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

Ex Light travels from air into crown glass at an incident angle of 30° , what is the refracted angle?



$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

$$1.0 \sin 30 = 1.52 \sin \theta_2$$

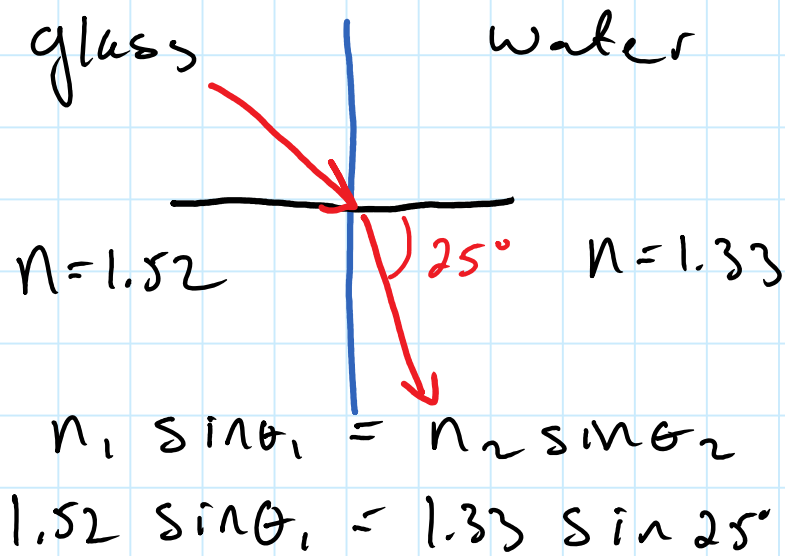
$$\frac{0.5}{1.52} = \frac{1.52 \sin \theta_2}{1.52}$$

$$0.329 = \sin \theta_2$$

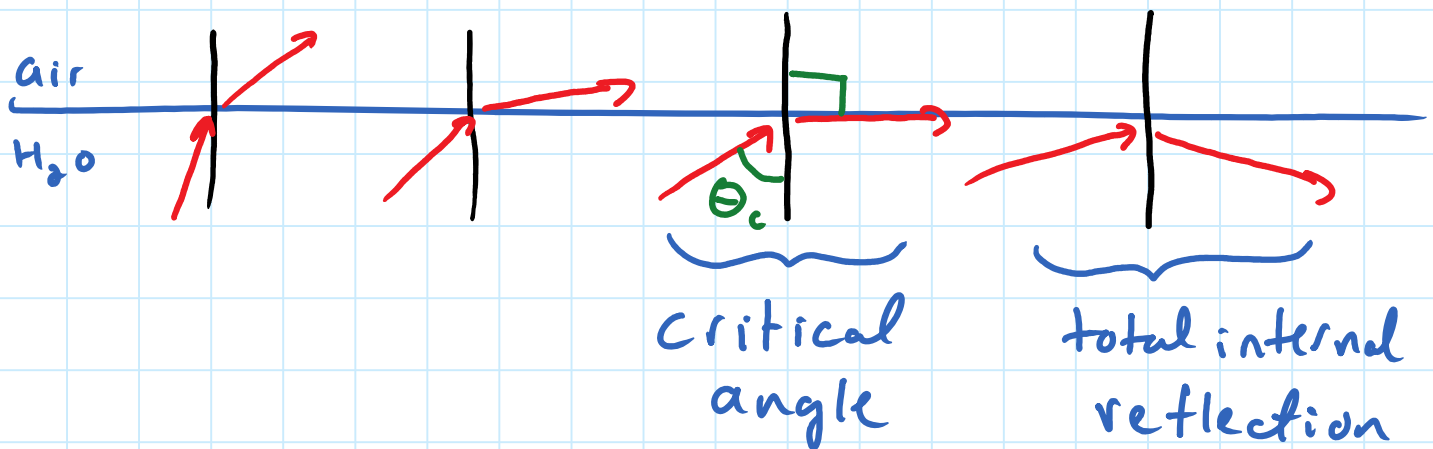
$$\sin^{-1}(0.329) = 19^\circ$$

Light travels from crown glass into water.

Find θ_i , if $\theta_r = 25^\circ$



Critical Angle:



HW. P354, 355
#1-7