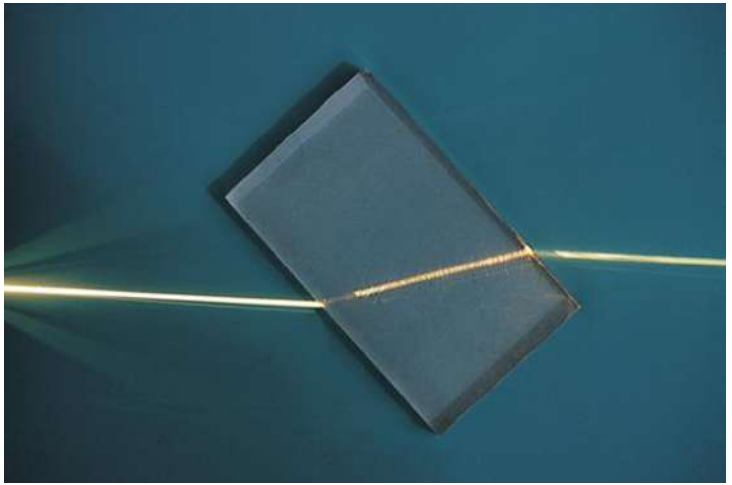
Physics Honors: Refraction and Snell’s Law

Refraction

Refraction is the bending of light as it travels from one medium to another.

Refraction occurs because light’s velocity changes when it enters a different medium

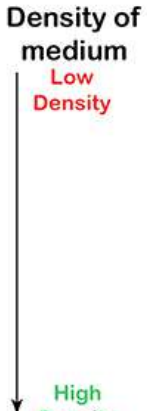


Index of Refraction

A scientist named Snell discovered that how much the light bent when it moved from one medium to another was related to the properties of that medium

The index of refraction (n) is defined by the ratio of how fast light travels in a vacuum to how fast light travels in that medium.

Medium	Refractive Index
Vacuum	1
Helium	1.000036
Water (typical)	1.30
Sugar Solution (30%)	1.38
Glass (typical)	1.5
Diamond	2.4



Index of Refraction

You can solve for the index of refraction for an object using the following formula

$$n = \frac{c}{v}$$

n = index of refraction (No units)

c = speed of light in a vacuum (3 x 10^8 m/s)

v = speed of light in medium (m/s)

Snell's Law of Refraction

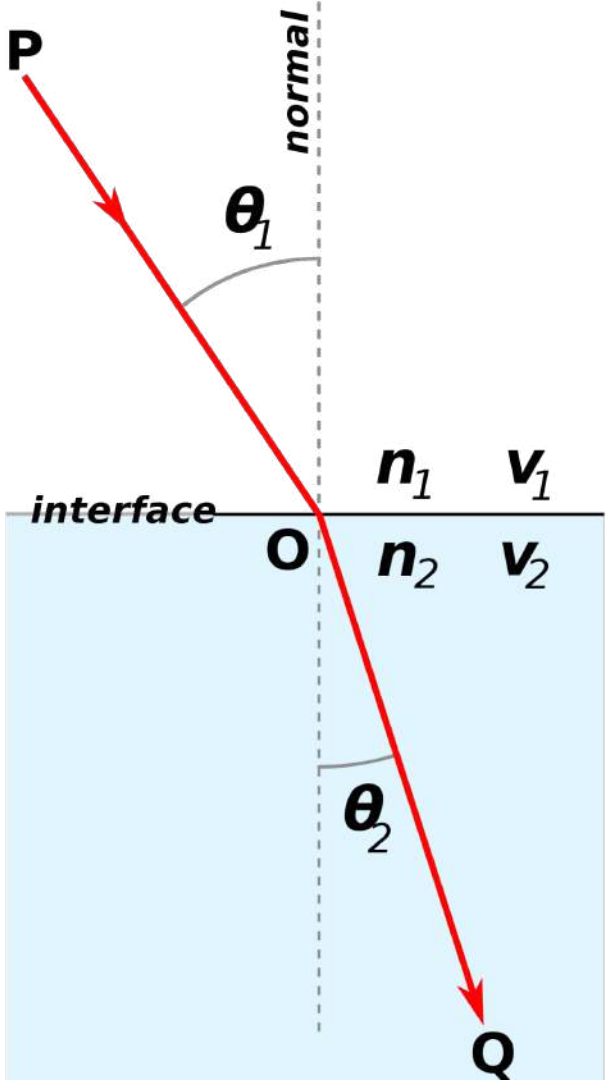
$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$

n_1 = index of refraction for medium 1

n_2 = index of refraction for medium 2

Θ_1 = angle from normal in medium 1

Θ_2 = angle from normal in medium 2



Snell's Law Practice Problems

A light ray is traveling through glass. It enters water at an incident angle of 45 degrees. What is the new angle of the light ray?

In which medium is the light moving faster?

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