

Refraction

- ▶ To know what is refractive index first of all we will discuss what is refraction
- ▶ Refraction is the bending of a wave when it enters a medium where its speed is different.
- ▶ The refraction of light when it passes from a fast medium to a slow medium bends the light ray toward the normal to the boundary between the two media.
- ▶ The amount of bending depends on the indices of refraction of the two media and is described quantitatively by Snell's Law.

- ▶ If i is the angle of incidence of a ray in vacuum (angle between the incoming ray and the perpendicular to the surface of a medium, called the normal)
- ▶ and r is the angle of refraction (angle between the ray in the medium and the normal),
- ▶ the refractive index n is defined as the ratio of the sine of the angle of incidence to the sine of the angle of refraction; i.e.,

$$n = \sin i / \sin r.$$

- ▶ Refractive index is also equal to the velocity of light c of a given wavelength in empty space divided by its velocity v in a substance, or $n = c/v$.

Speed Of Light Faster In Air Or Water

- ▶ The speed of light is faster in water.
- ▶ The refractive index of water is 1.3 and the refractive index of glass is 1.5.
- ▶ From the equation $n = c/v$, we know that the refractive index of a medium is inversely proportional to the velocity of light in that medium.
- ▶ Hence, light travels faster in water.