

Refraction of Light

Optical Media: any substance that light can travel through without interference (clear)

Index of Refraction: the optical density of a substance, used to determine speed of light and angle of refraction

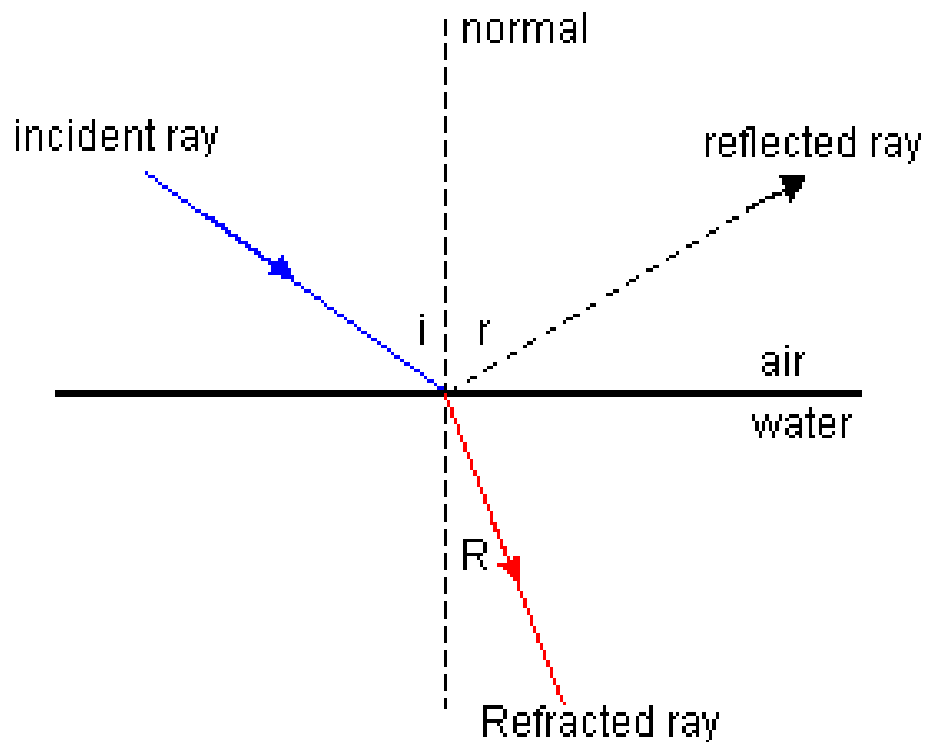
Speed of Light in a Perfect Vacuum:

$$c = 3 \times 10^8 \text{ m/s (actually } 299\,792\,458 \text{ m/s)}$$

Substance (Optical Media)	Index of Refraction (Optical Density)	Speed of Light given in c
vacuum	1.0000	1.000
air	1.0003	0.997
ice	1.31	0.763
water	1.333	0.750
plexiglas	1.51	0.662
crown glass	1.52	0.658
diamond	2.417	0.414
gallium phosphide	3.50	0.286

The slowing of light that occurs when light moves from one media to another media with a greater index of refraction causes the light to refract. The reverse is also true.

Refraction: the bending of light as it moves from one media to another.



where:

i = angle of incidence

R = angle of refraction

r = angle of reflection

Refraction of Light Behaviour:

1. Whenever light travels from a less optically dense media to a more optically dense media the ray will bend towards the normal. *A reflected ray will also occur*
2. Whenever light travels from a more optically dense media to a less optically dense media, the light ray will bend away from the normal.*
3. If the incident angle is zero, the refracted angle is also zero, no refraction occurs.

* There is a maximum possible angle of incidence within a more dense optical media know as the critical angle, beyond which refraction is not possible. At this angle and beyond a condition of total internal reflection occurs.