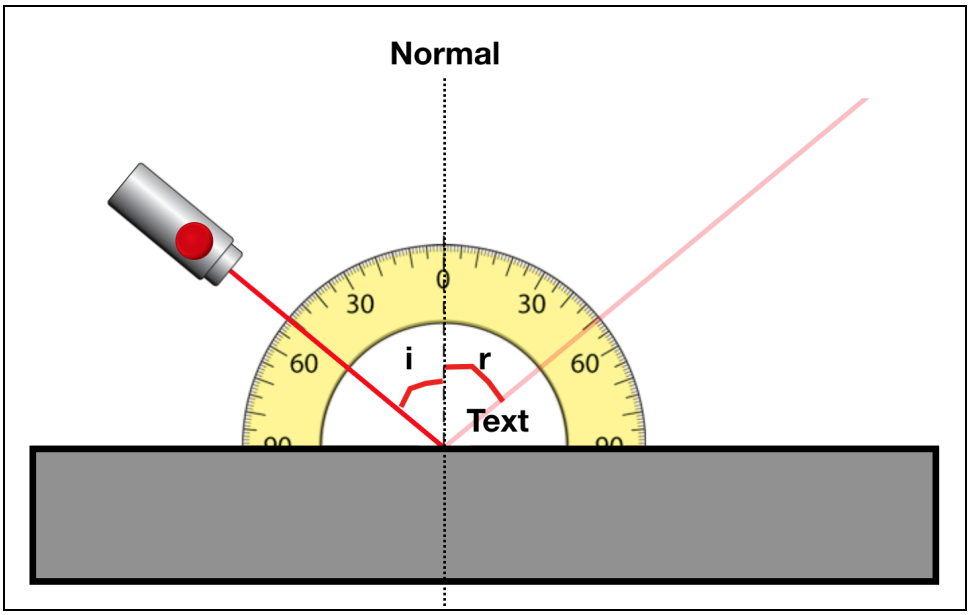
Reflection - Refraction - Snell-Descartes Law

Link to the simulation

Reflection

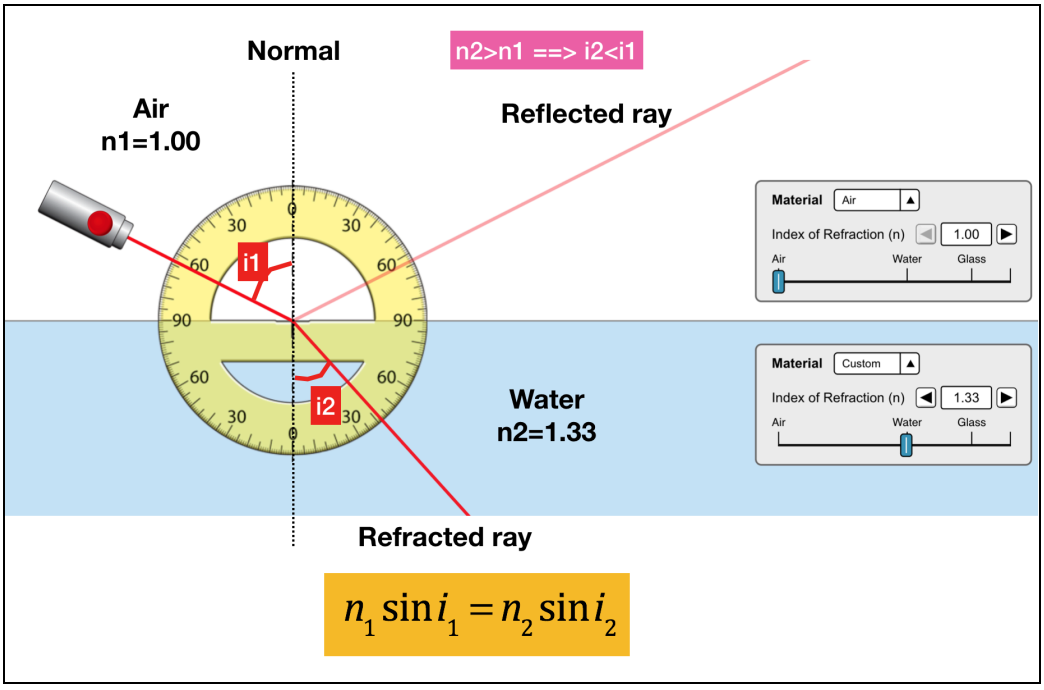
The angle of incidence i (angle between the ray and the normal to the reflecting surface at the point of incidence) is equal to the angle of reflection r (angle between the normal to the reflecting surface and the reflected ray). The reflected and incident rays and the normal to the surface lie on the same plane, called the plane of incidence.



i=r

Refraction and Snell/Descartes law

Refraction is the travel of light from one medium into another where it has a different speed. Refraction changes the direction of the incident ray (unless the incident ray is normal to the boundary of the two media).



n1 x sin(i1) = n2 x sin(i2)

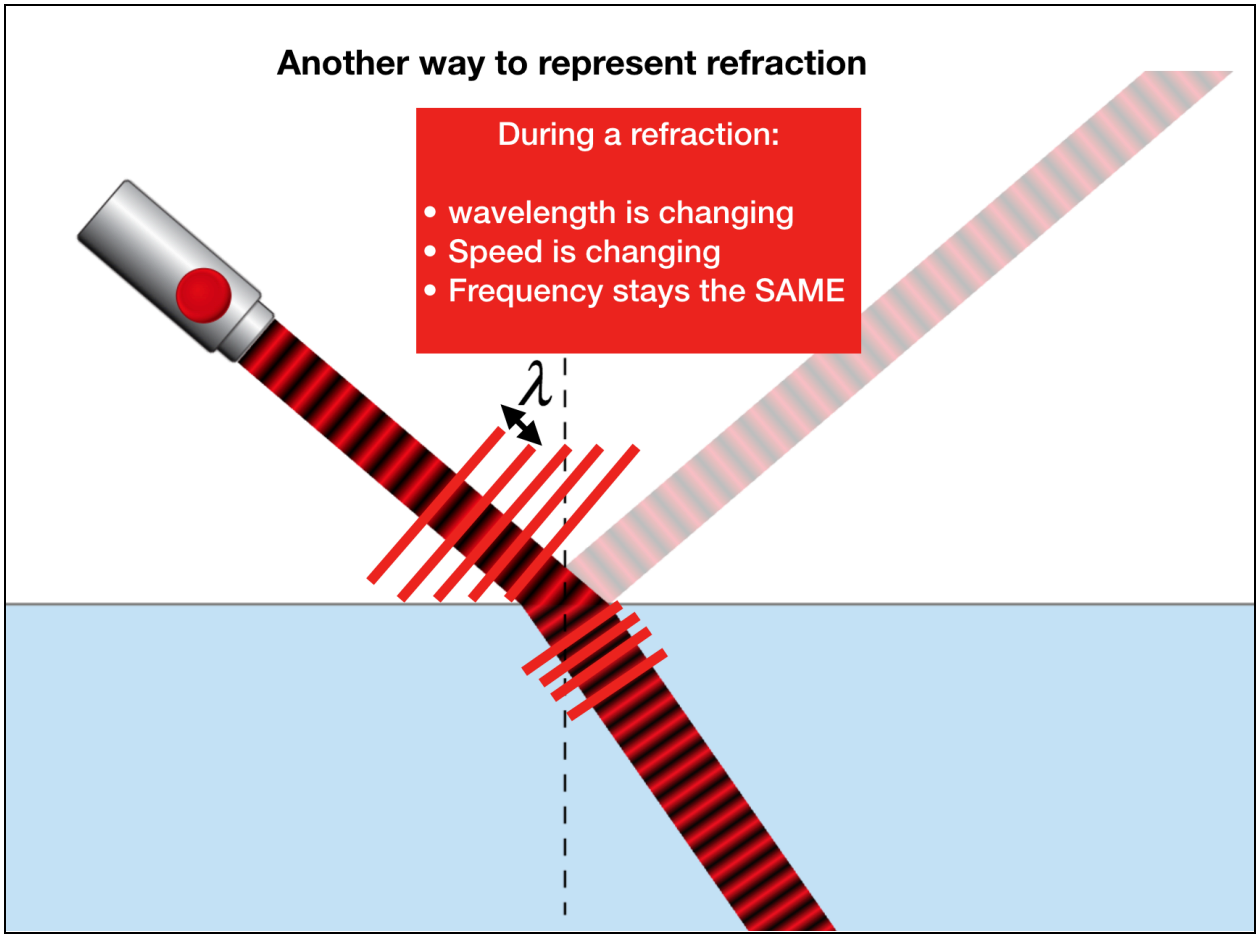
- n is called the refractive index of a given medium

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

- c is the speed of light in vacuum and v is the speed of light in the medium. $c=3.00 \times 10^8\ ms^{-1}$

- n is always greater or equal to 1. (ex: $n_{air} = 1$ / $n_{wate}=1.33$)

$$\frac{n_1}{n_2} = \frac{v_2}{v_1} = \frac{\sin i_2}{\sin i_1}$$


Another way to represent refraction
During a refraction:
• wavelength is changing
• Speed is changing
• Frequency stays the SAME
λ

Total internal reflection

Total internal reflection occurs when the angle of incidence is greater than the critical angle.