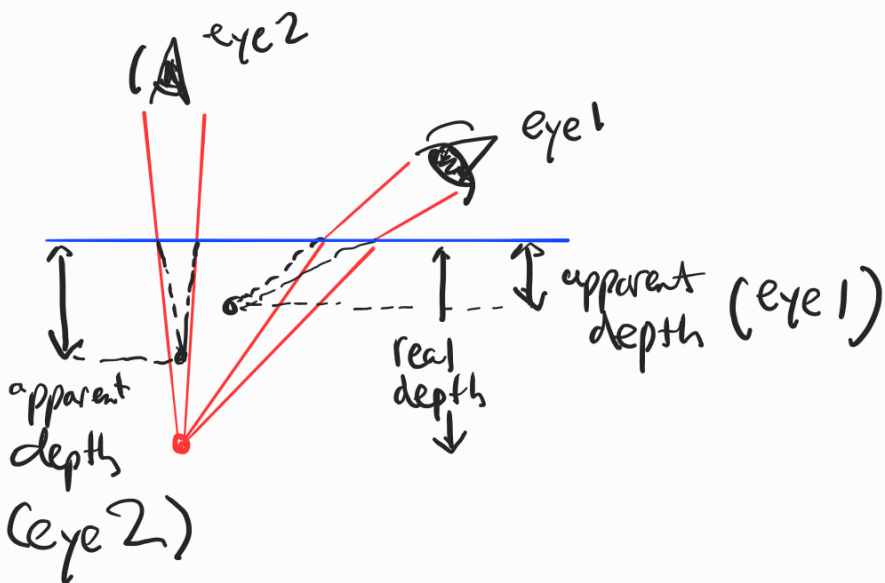
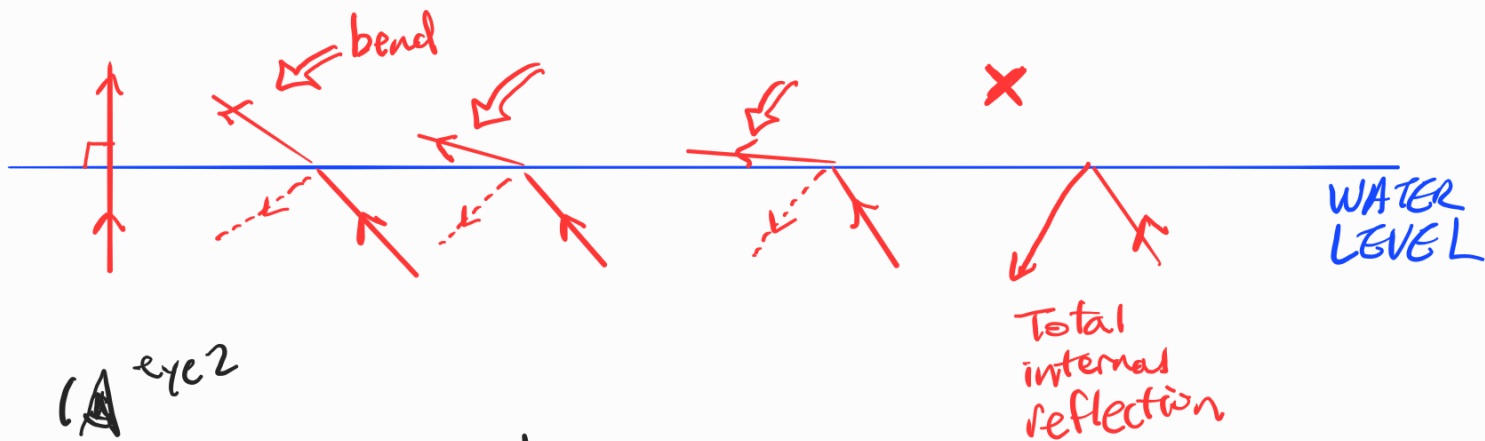
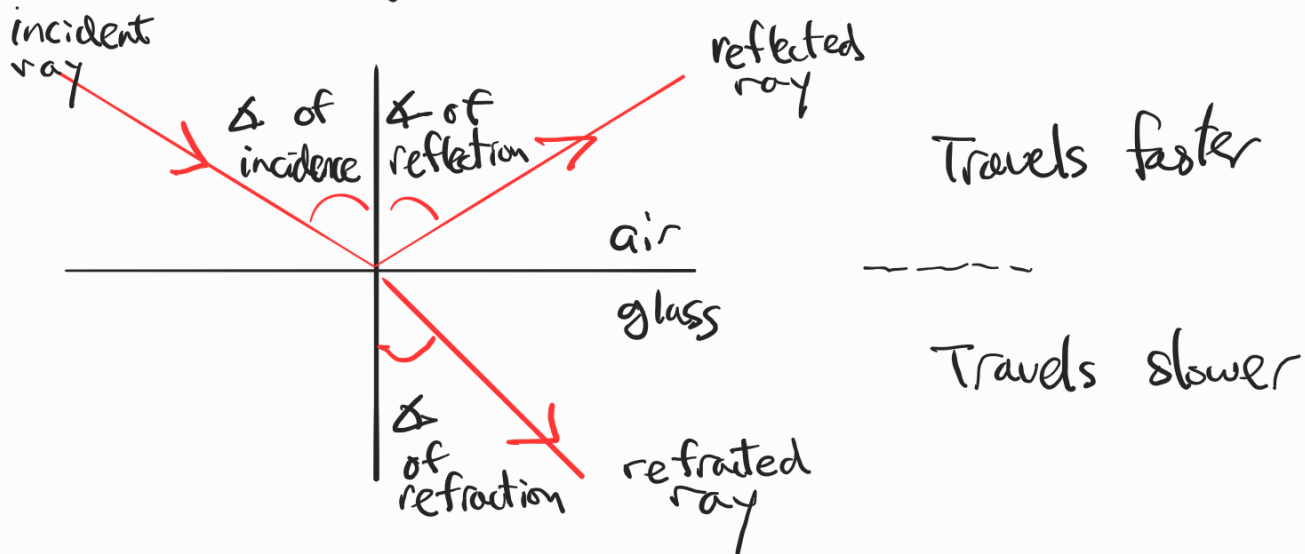


3-6 REFRACTION 折射

When light ray enters a different medium (介质)

* It changes speed

* It changes direction



Laws of Refraction

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

n : refractive index

c : speed in vacuum ($3 \times 10^8 \text{ ms}^{-1}$)
最快

v : speed in a medium → 光疏

examples of v :

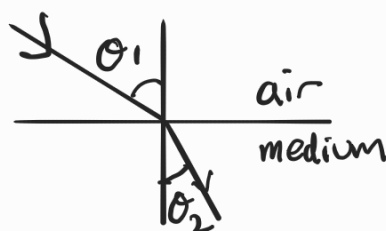
vacuum	$n = 1$	(least dense)
air (20°C)	$n = 1.0003$	$\approx$ vacuum
water	$n = 1.33$	
glass	$n = 1.62$	
diamond	$n = 2.42$	(most dense)

密度

光密

Snell's Law

$$\frac{\sin \theta_1}{\sin \theta_2} = \frac{c}{v} = n$$



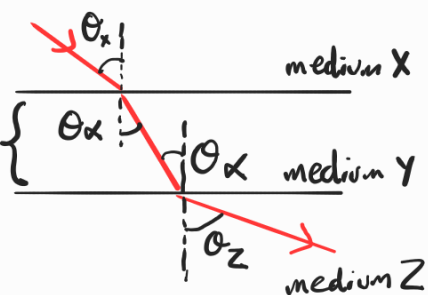
Note: If light ray goes from medium to air
then $\frac{\sin \theta_2}{\sin \theta_1} = \frac{v}{c} = \frac{1}{n}$

Note: If light ray goes from medium 1 to medium 2

General form
of Snell's Law

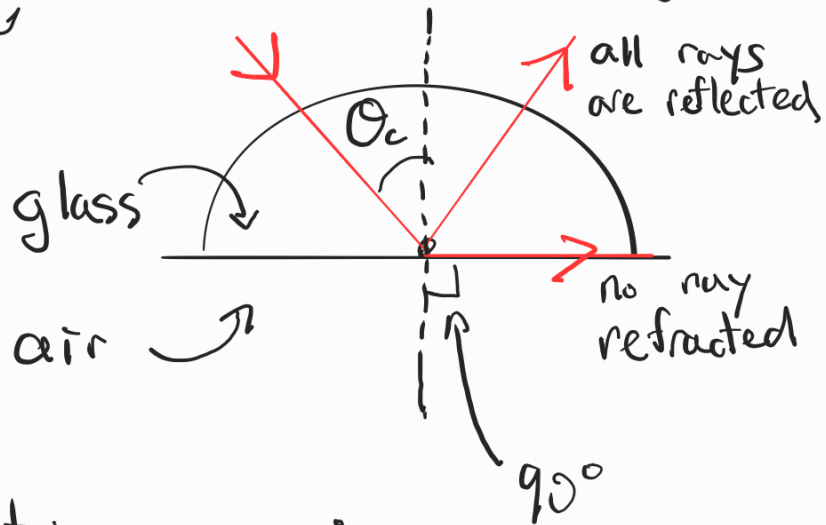
$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

Note: If light ray travels between
more than one medium, the sandwich
medium does not have any refraction effect



Total Internal Reflection (θ_c)

$$\underbrace{n}_{\text{medium}} \sin \theta_c = \underbrace{1}_{\text{air}} \times \sin 90^\circ \Rightarrow \sin \theta_c = \frac{1}{n}$$



Total internal reflection occurs:
 * ray is going towards a less dense medium
 * angle of incidence is $> \theta_c$

APPLICATIONS

