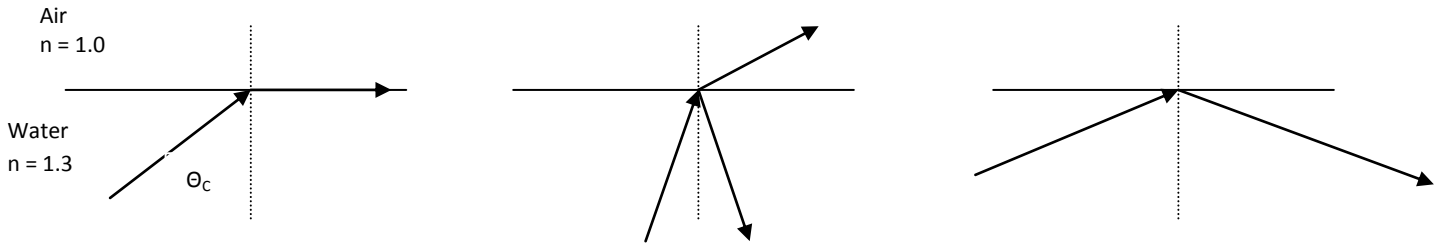


Total Internal Reflection (T.I.R.) - 12.5

Most of the time light both reflects AND refracts when it hits a new medium. Under certain special conditions, light will totally internally reflect and this is very useful to us.

Both Conditions must be met for T.I.R. (total internal reflection)

- 1) light must be moving from a high refractive medium to a low refractive medium.
- 2) the angle of incidence must be greater than the critical angle. (explained in diagram)



Critical angle (θ_c)

$\theta_c \rightarrow$ when light hits the interface exactly at the critical angle, then the light neither reflects nor refracts. It goes along the interface.

angle incidence less than θ_c

When angle of incidence is less than the critical angle, the light both reflects and refracts. (partial reflection and partial refraction)

angle incidence greater than θ_c

When angle of incidence is greater than the critical angle, the light ONLY reflects and stays inside the 1st medium. This is TOTAL (100%) INTERNAL (inside 1st medium) REFLECTION T.I.R.

Remember: angles are measured to the normal line.

Remember: angle of reflection = angle of incidence

Remember: Light bends AWAY from normal as it goes into a less optically dense medium ('n' value is lower)

A property of light is that it travels in a straight line, but by taking advantage of T.I.R., light can travel in curvy lines! This is the basis of fibre optics!

Homework: Read the section 12.5 in your text

Be able to give & briefly explain 3 applications of T.I.R. (ie: where we use in real life)

Do # 1,2,3,4,5,7,9 on page 531