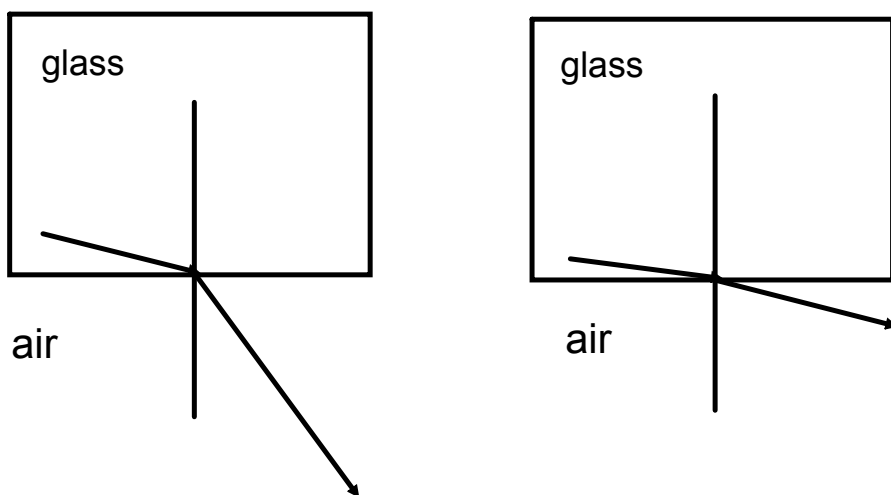
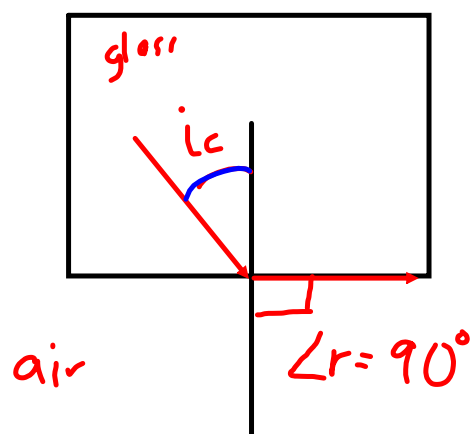


Critical Angle and Total Internal Reflection

* only occurs when light starts in the more dense medium

As the angle of incidence increases, the angle of refraction also increases.





There is one angle of incidence that will cause the angle of refraction to be 90° .

This angle is called the **critical angle**.

***The first medium must be more dense than the second for this to happen.*

$$n_1 \sin \angle i = n_2 \sin \angle r$$

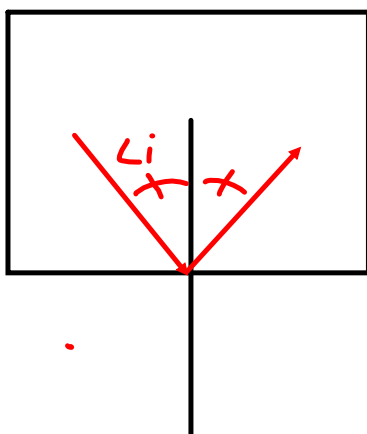
What is the critical angle of a block of glass ($n = 1.54$) sitting in air?

-

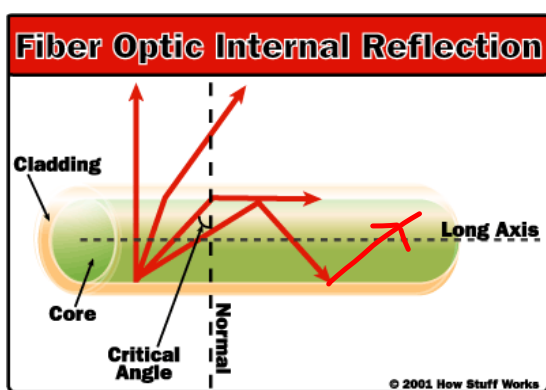
At any angle greater than the critical angle, there is no refracted light.

All the light is reflected back into the first medium.

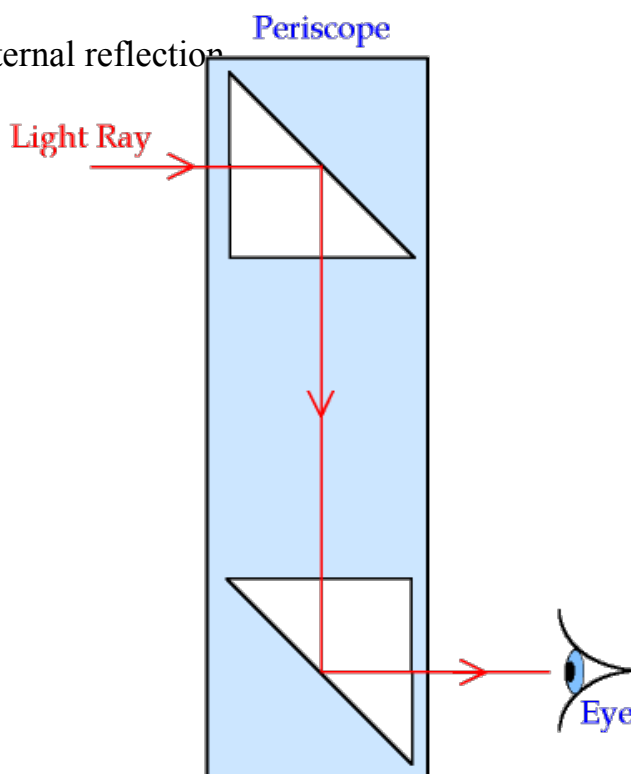
This is called **Total Internal Reflection**



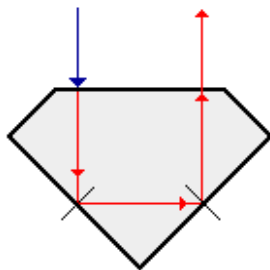
There are many applications of total internal reflection



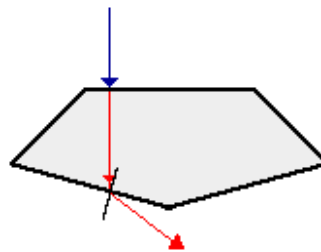
Diamonds...



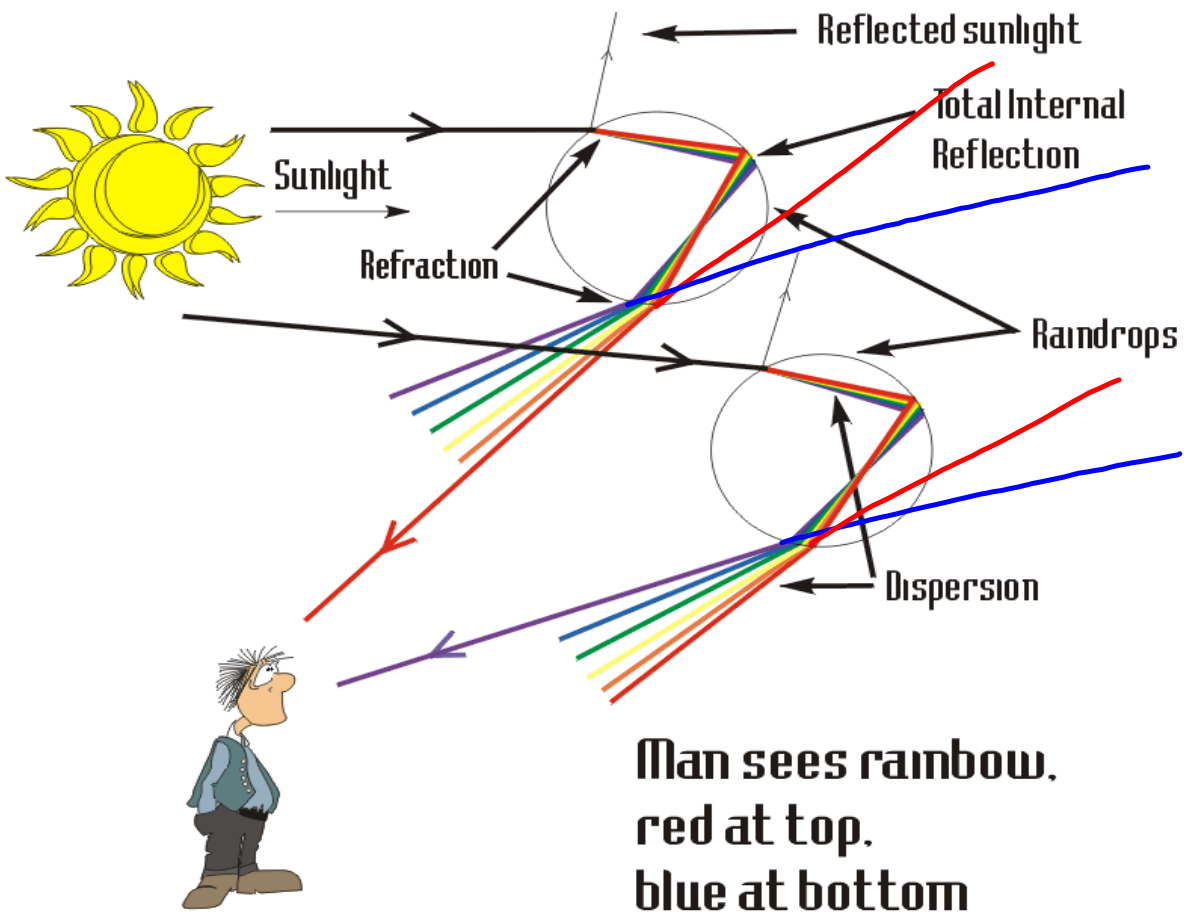
TIR and the Importance of a Diamond's Cut

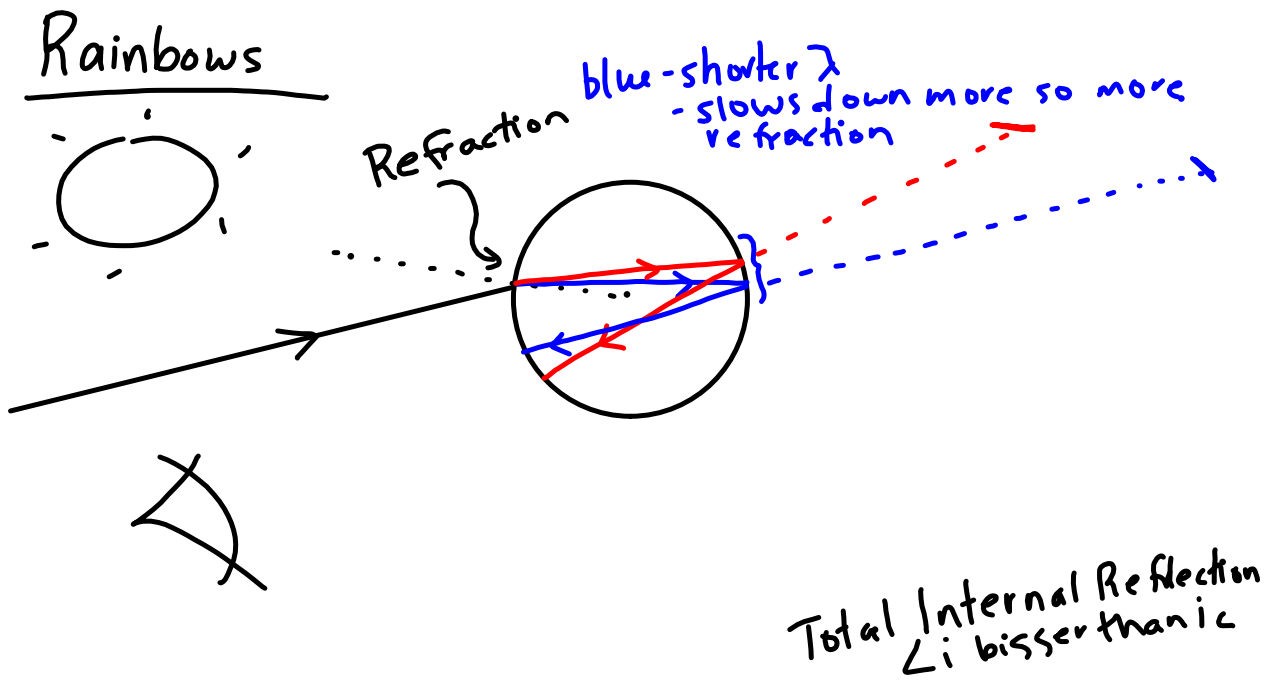


Light entering through the top facet undergoes TIR a couple of times before finally exiting.



Light entering through the top facet of the diamond quickly exits at the second boundary since its angle of incidence is less than the critical angle.





Formation of a Rainbow

