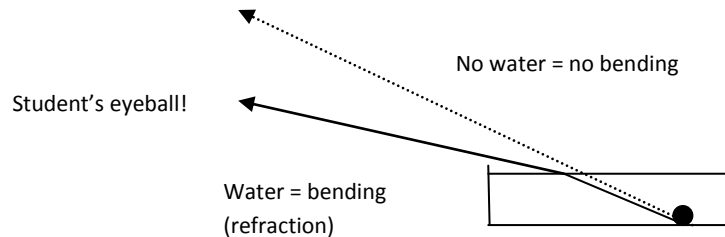


## What is Refraction? - 12.1

Do you remember the reappearing penny in class? A student stood where he/she couldn't see a penny but when I poured water into the container, suddenly the penny reappeared! Why? It reappears because a key ray of light that went over his/her head was now bending at the water/air boundary and hitting the eye! Viola – it is seen!



Notice that the refracting (bending) of light happens just at where the water and air meet. We call this the **interface**.

Why does it refract? Basically light refracts when it changes speed. yes, the speed of light is  $3.0 \times 10^8$  m/s but this is just in a vacuum ( think deep space). It is very very close to this speed in air too. But in other mediums, like water, it slows down and it refracts.

### Rules of Refraction

1) The incident ray, refracted ray and the normal all lie in the same plane (ie: will be on a piece of paper in the lab – 2 dimensional).

See Fig. 4 on page 517 – Sketch and label below:

2) Light **bends towards** the normal when it slows down.

Light **bends away** from the normal when it speeds up.

\*There is a good analogy with a wagon in the text.

Refraction AND Reflection - Often refraction and reflection occurs together. The closer the incident ray is to  $0^\circ$ , the more refracted light goes into the new medium. The greater the incident angle is, the more reflected light there is. Think about a window – you can see through, but often there is reflected 'glare' off it. Mirrored sunglasses have a special coating that reflects a lot of light – we see the reflection and usually we don't see the eyes behind!

**Homework:** p. 519 # 1,2 3, 4, 5, 7