**Snell's Law Practical**

NAME: ............................................................................................. SET:...................... DATE:........................

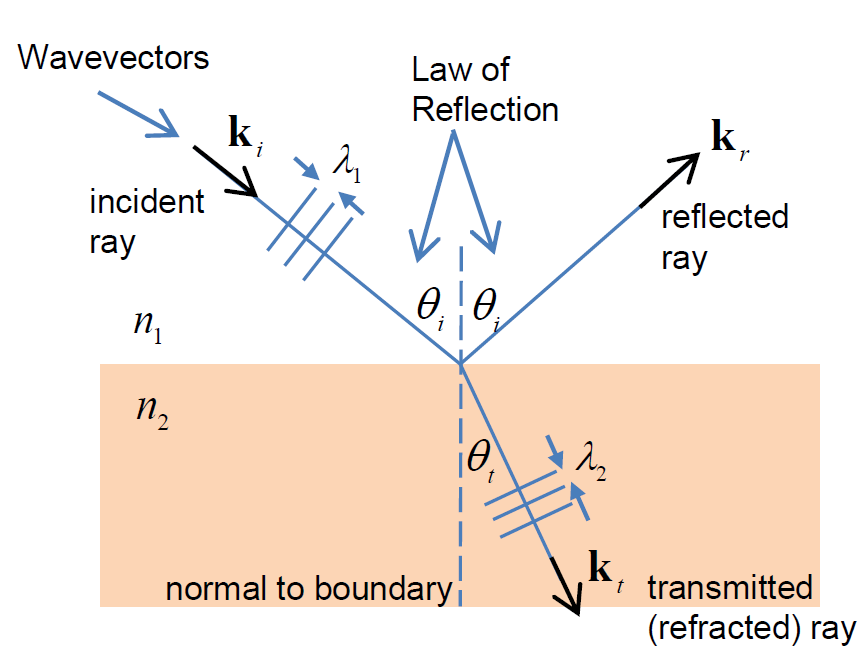
**Background Physics ideas**

* Wave period = *time* *T* between wave crests
* Frequency (the number of waves per second, measured in Hertz, Hz). 
* Wave speed equation: 
* For **reflection**, angle *of incidence = angle of reflection* (both from surface normal)
* *Refractive index*  (*n* = 1 for vacuum, about 1.0 for air, about 1.5 for glass)
* For **refraction** of waves at a boundary between to mediums of different wave speeds we have Snell's Law:

 , which for light (i.e. using refractive index) is .

As for reflection, the angles are measured from the surface normal.

* The number of waves per second entering a boundary must equal the number of waves exiting i.e. frequency is conserved. Hence if wave speed changes, so does wavelength in the same proportion.





**All electromagnetic waves travel**

**at the speed of light.**

**Scope of experiment**

In this experiment you will shine light into a rectangular glass block and measure angle of incidence  and angle of refraction .

Snell's Law states , so if we plot a graph of  against  :



Since the region 1 is air, . The refractive index for glass is about . Hence we might *predict* a straight line graph of  against , with gradient about 1/1.5 = 2/3.

**Experimental setup**

Normal to block





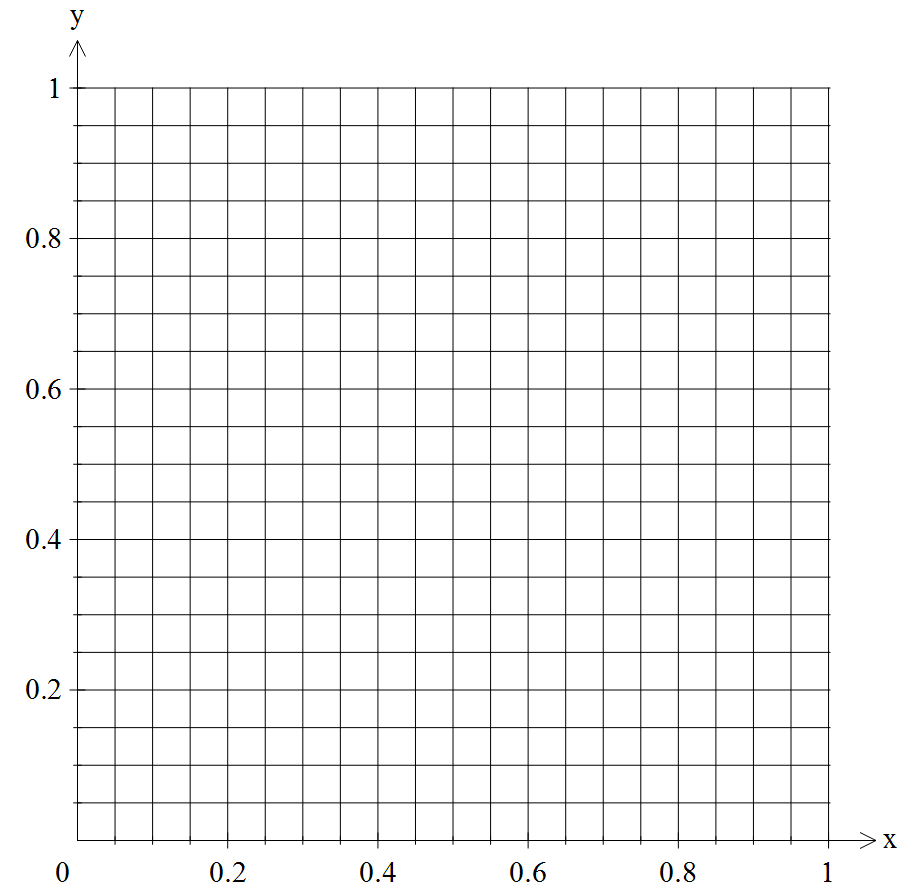


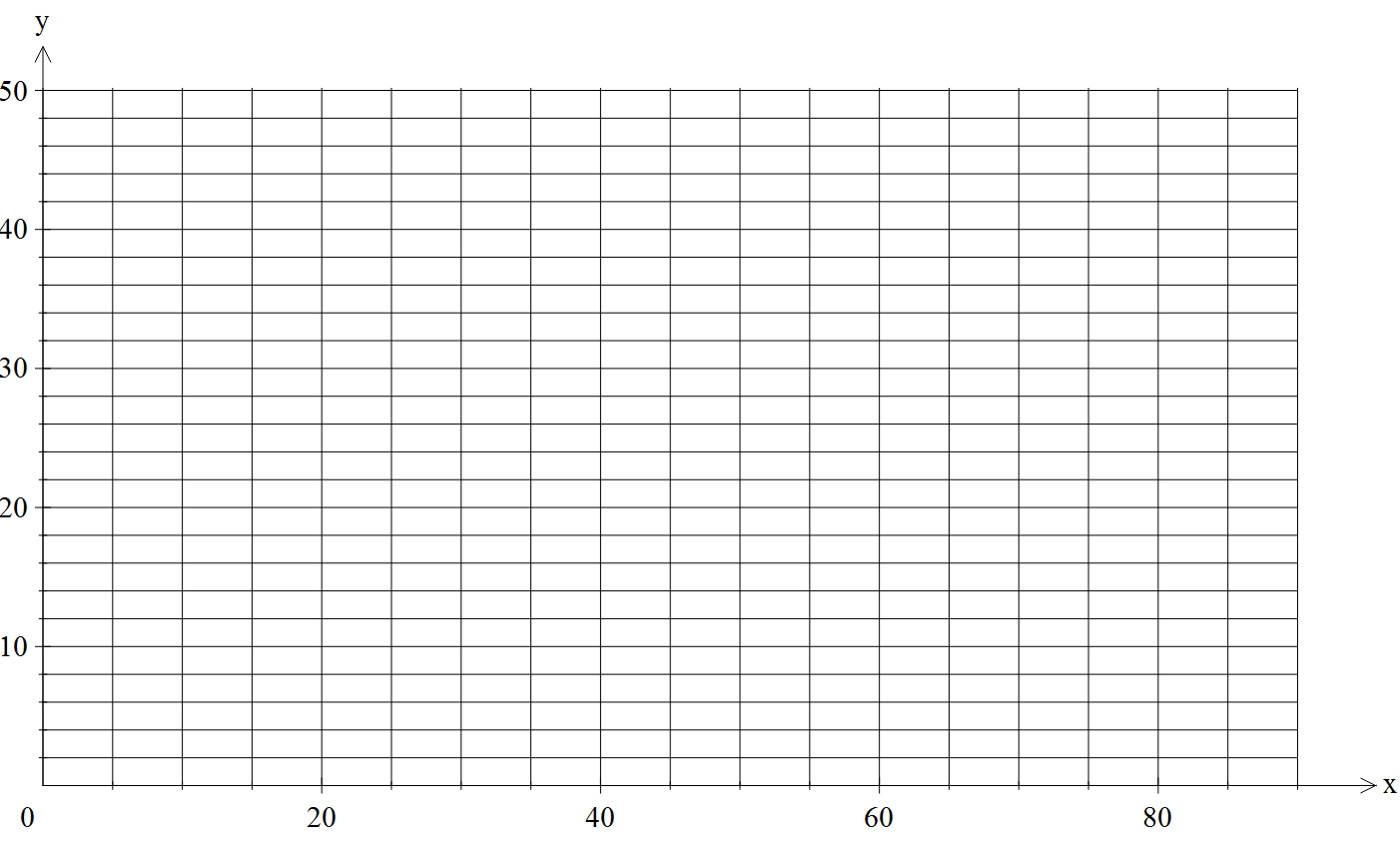
Glass block

Light ray

Make the following measurements carefully using a protractor and hence fill in the table below. You should be able to achieve precision to within a degree. *Don't fill in the last two MODEL columns yet!*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Angle of incidence  /deg |  | Measured angle of refraction  /deg |  | MODEL | MODEL |
| 5 |  |  |  |  |  |
| 10 |  |  |  |  |  |
| 15 |  |  |  |  |  |
| 20 |  |  |  |  |  |
| 25 |  |  |  |  |  |
| 30 |  |  |  |  |  |
| 35 |  |  |  |  |  |
| 40 |  |  |  |  |  |
| 50 |  |  |  |  |  |
| 60 |  |  |  |  |  |
| 70 |  |  |  |  |  |
| 80 |  |  |  |  |  |
| 85 |  |  |  |  |  |

Plot the data *as you go* using the graph axis below











Draw a line of best fit through the graph of  against  and hence calculate the refractive index of glass, assuming that the refractive index of air is 1.00

*Refractive index of glass is:*

Hence fill in the columns labeled MODEL in the table, and plot lines on your graph. Hopefully there should be a strong agreement!

**Comments /evaluation following experiment:**