

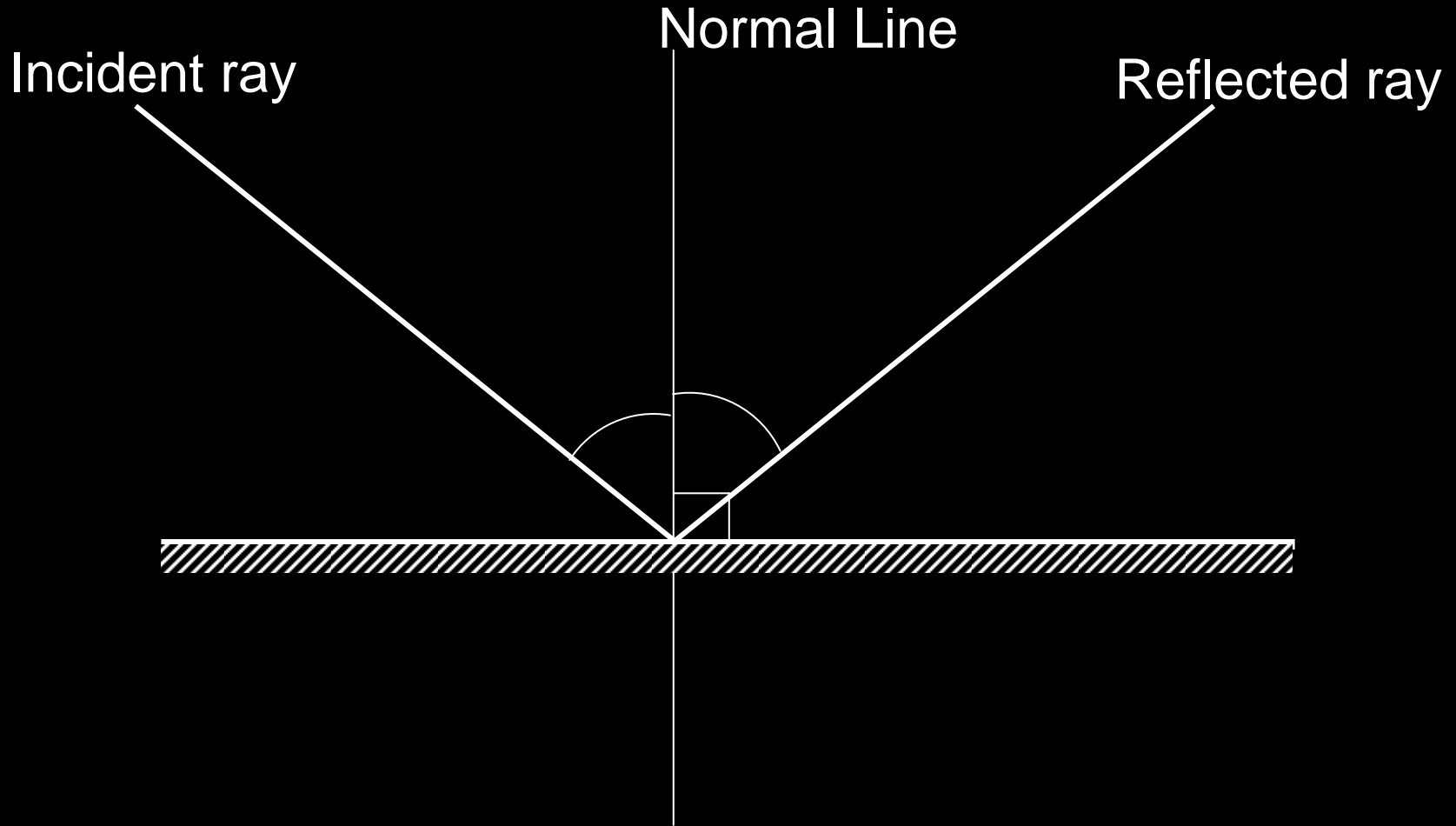
Unit - K3  
Refraction + Colour

Form Group 8\_0



5th June 2007

# THE LAW OF REFLECTION



The Angle of Incidence = The Angle of Reflection

# Bending Light...

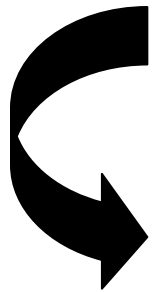
The speed of light waves depends on the material they are travelling through.

air = fastest

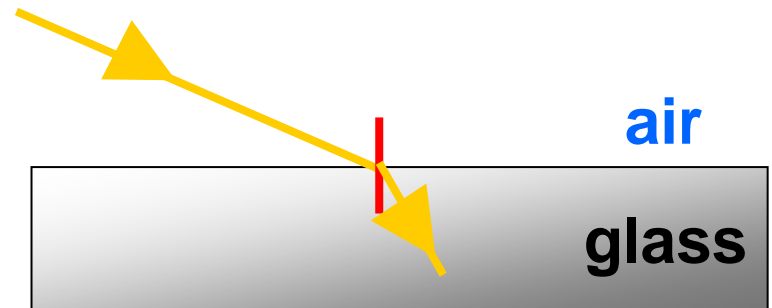
glass = slower

diamond = slowest

If light waves enter a different material (e.g. travel from glass into air) the speed changes.

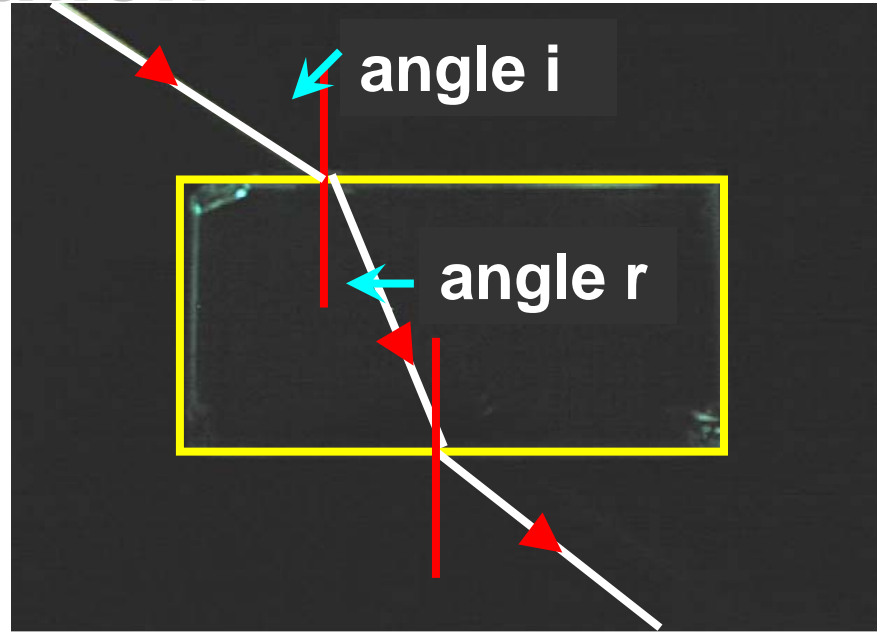


This causes the light to bend or **refract**.



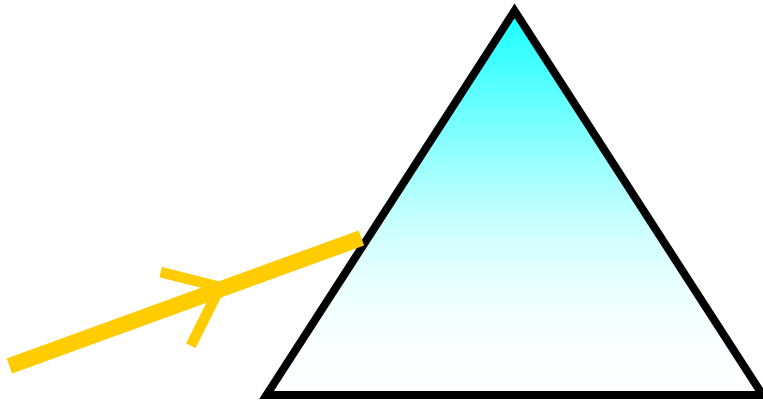
# Refraction investigation

1. Place a rectangular glass block on a sheet of paper and draw around it.
2. Draw a normal line (at  $90^\circ$ ) along the top surface of the block.
3. Shine rays of light with incident [ $i$ ] angles of  $30^\circ$ ,  $60^\circ$  and  $0^\circ$  into the block, making sure they all hit where the normal line crosses the glass surface. Measure angle ' $r$ ' each time and record the results.



# Splitting white light with a prism

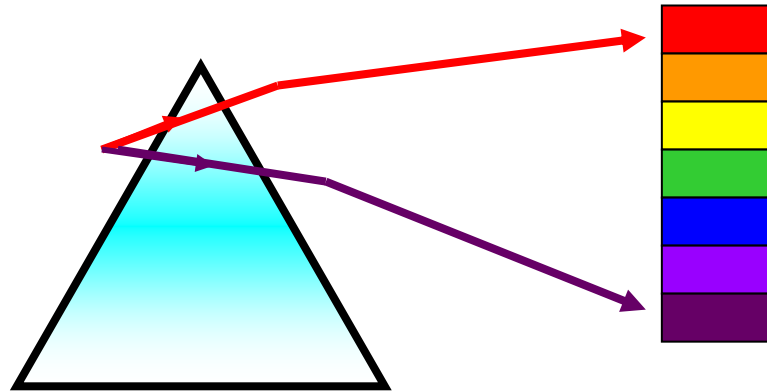
Shine a ray of bright white light at a prism and move the prism until colours appear.



# Splitting white light into colours

A prism splits a ray of white light into a spectrum of colours.

This is known as **dispersion**.



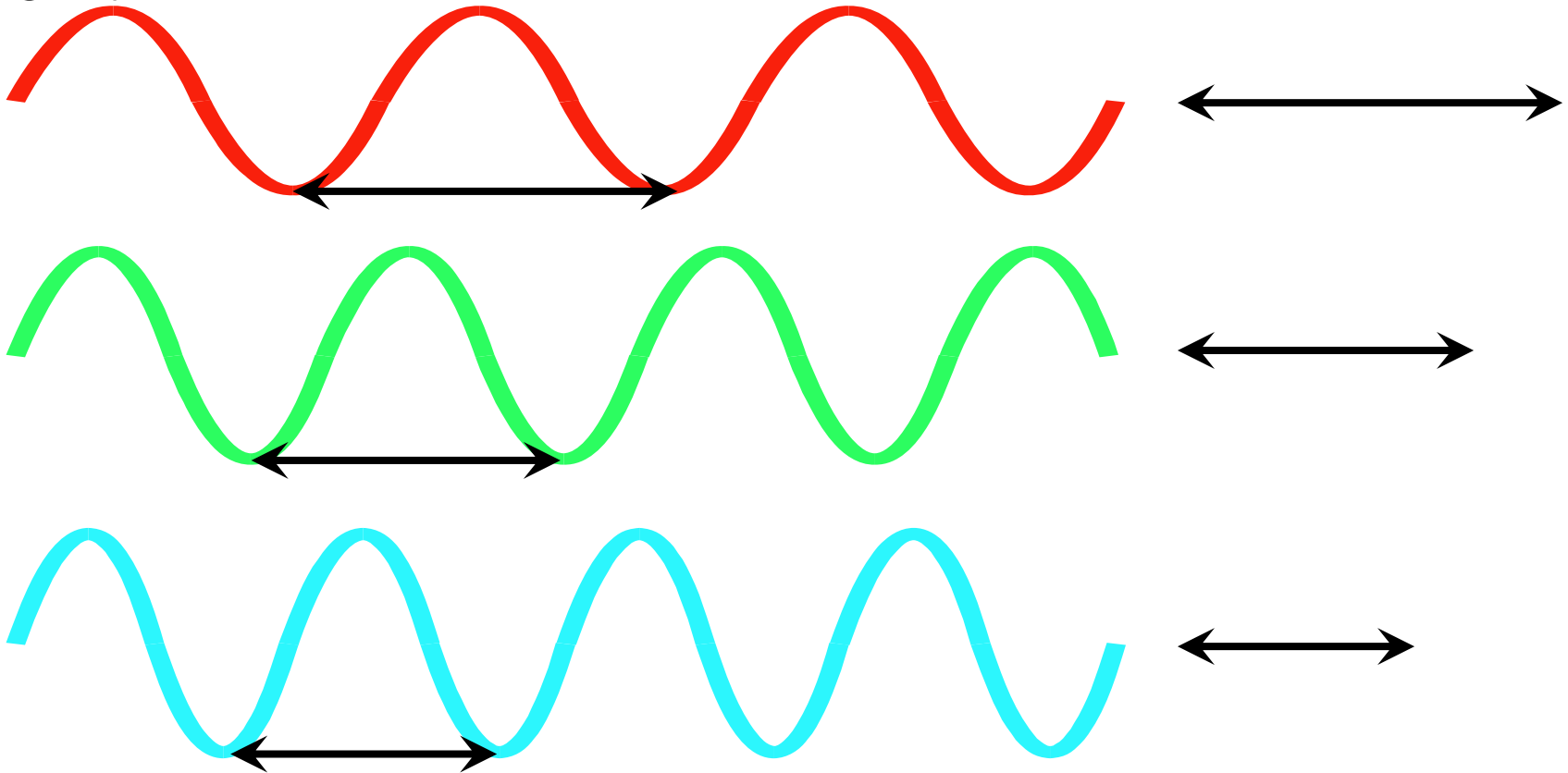
When white light is split, the colours always follow the same order.

Use this phrase to remember the order of colours:

**R**ichard **O**f **Y**ork **G**ave **B**attle **I**n **V**ain

# Dispersion

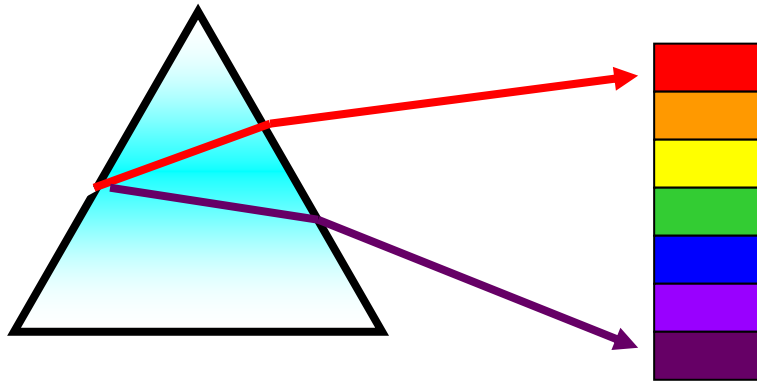
Each of the colours of the spectrum [ROYGBIV] has a slightly different **wave**. What is the difference?



**Each colour has a different wavelength ( $\lambda$ ).**

The different colours of light have different wavelengths, this means they are bent (refracted) by different amounts.

Which colour is refracted the most?



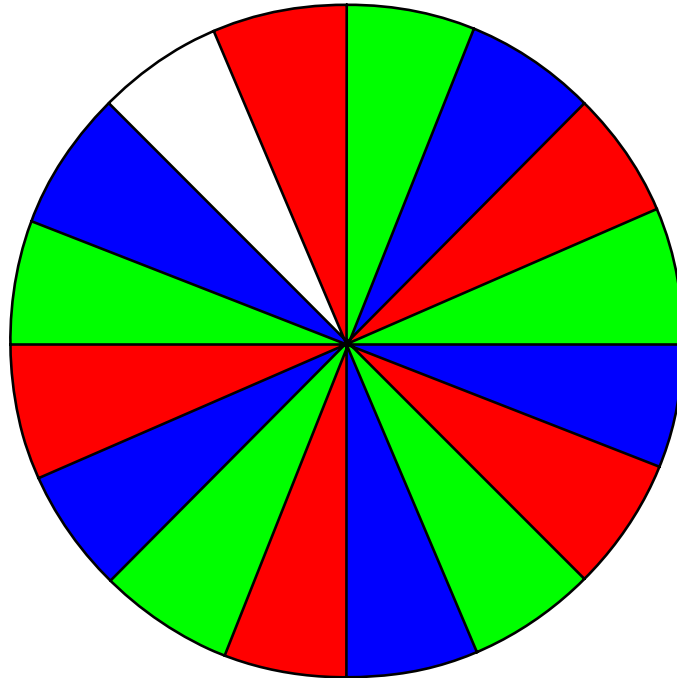
**Red light is refracted least because it has the longest wavelength.**

**Violet light is refracted the most because it has the shortest wavelength.**



# Newton's disc

Colour in a paper or card circle with the colours of the spectrum.



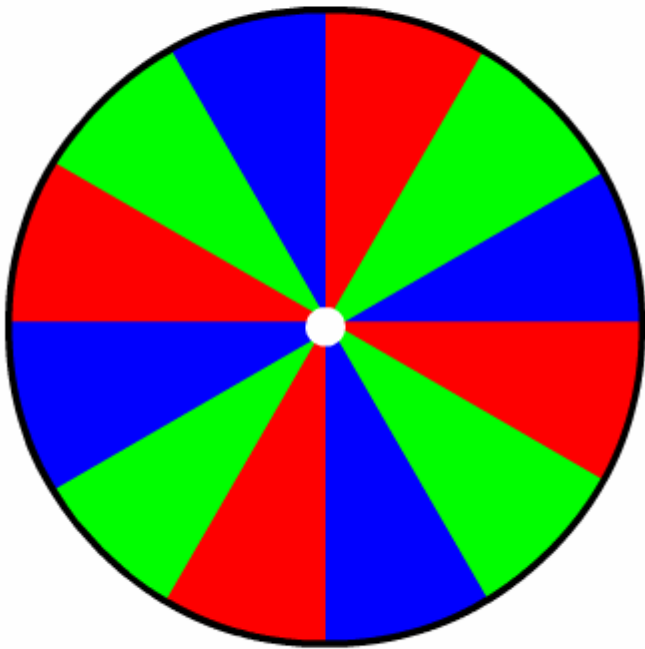
Using string or a pencil spin your disc around.

What do you predict you will see?

What did you observe?

What does this tell you?

# Newton's disc animation



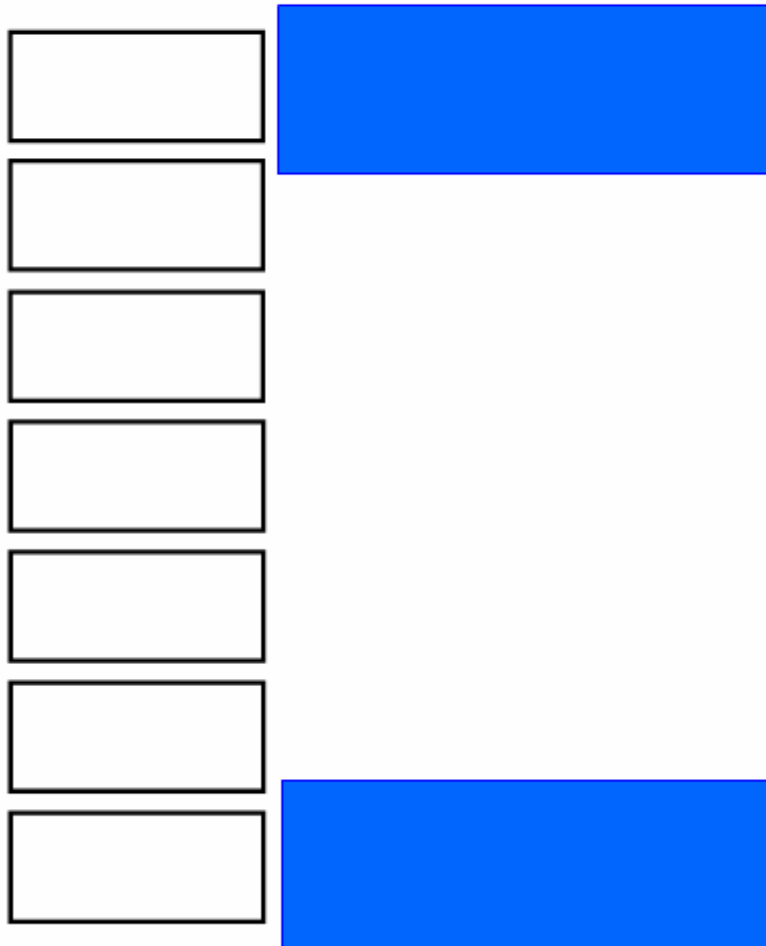
- slow
- fast



# Colours of the spectrum



Complete the diagram of the spectrum by dragging the colours and the labels to the correct box.



Violet

Red

Green

Yellow

Indigo

Orange

Blue

Long wavelength,  
refracted the least

Short wavelength,  
refracted the most