

Science 8
Unit 3: OPTICS
Topic 3: Refraction of White light



Student Name: _____

Refraction is the bending or changing direction of a wave as it passes from one material to another. Light bends because it changes speed when it moves through materials that have different densities. Light travels slower in materials that are more dense, because there are more particles.

The longer wavelengths are refracted less than the shorter wavelengths, different colours are separated when they emerge from the prism



The analogy of marching soldiers can be used to demonstrate why waves bend as they change from one medium to another.



Each colour has a different wavelength, and the prism bends, or refracts, each colour by a different amount. This phenomenon causes the colours to emerge from the prism in slightly different directions, producing an array of different colours.

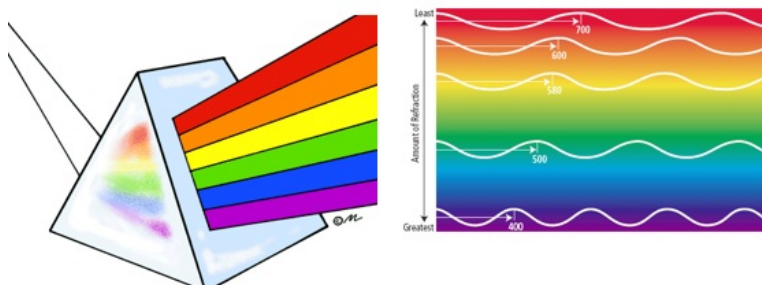
When a laser is shone through a prism, the light will refract but not disperse. Why?



Refraction is when waves _____ or slow down due to travelling in a different _____. A medium is something that waves will travel through. When a pen is placed in water it looks like this:

In this case the light rays are slowed down by the water and are _____, causing the pen to look odd. The two mediums in this example are _____ and _____.

Spectrum the array of colours of light that have been separated by the dispersion of white light



Red has the longest wavelength but the lowest frequency

Blue has the lowest wavelength but the highest frequency

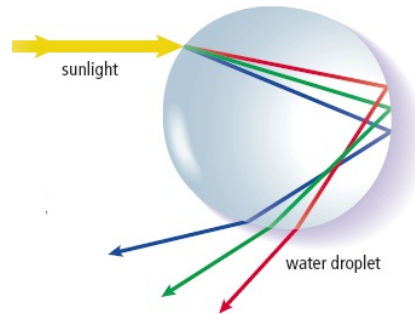
The constituent colours of white light are:

Red
Orange
Yellow
Green
Blue
Indigo
Violet

Remember ROY G BIV

Why You See a Rainbow?

Like prisms, water droplets also refract light. In a rainbow, the human eye can distinguish a range of colours in order of decreasing wavelength, and increasing frequency.



In a rainbow, raindrops in the air act as tiny prisms. Light enters the drop, reflects off the side of the drop and exits, and in the process is broken into a spectrum just like it is in a triangular glass prism. Like this:

PART A: MULTIPLE CHOICE.

Instruction: Circle the correct answer below each question. Also, transfer your answers to the bubble sheet provided.

- The bending of a beam of light when it passes from one medium to another is known
 - Dispersion
 - Reclinear Propagation
 - Refraction
 - Reflection
- How many mediums do you need for refraction to occur?
 - 1
 - 2
 - 3
 - 4
- Light refracts when traveling from air into glass because light
 - travels at the same speed in air and in glass.
 - frequency is greater in air than in glass.
 - frequency is greater in glass than in air.
 - travels slower in glass than in air.
- Which of the following refers to the array of colours of light that have been separated by the dispersion of white light
 - Array
 - Arrangement
 - Prism
 - Spectrum

5. How many colours makeup white light?
 - (A) 5
 - (B) 6
 - (C) 7
 - (D) 8

6. Which of the following is used to remember the arrangement of colours in white light?
 - (A) BIV G ROY
 - (B) BIV ROY G
 - (C) ROY G BIV
 - (D) BIV G ROY

7. Which colour has the longest wavelength?
 - (A) Blue
 - (B) Green
 - (C) Orange
 - (D) Red

PART B: WRITTEN RESPONSE

1. How does a prism separate light into different colours?

2. What do the letters in the acronym ROY G BIV stand for?

3. Which colour has the longest wavelength?

4. Which colour has the shortest wavelength?

5. Which colour has the highest frequency?

6. Which colour has the lowest frequency?

7. Fill in the colours of the spectrum in the diagram below. For help, refer to the chart on page 150 of your textbook.

