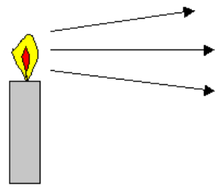
Name:_____ Div:____ Date:_____

Waves-

Some You See

Some You Don't



Light

- a form of **energy**
-travels in **straight** lines
-can be **reflected**, **absorbed** and **transmitted**

The Visible Spectrum:

Visible spectrum: the band of colours you **see** in a rainbow
-Red, Orange, Yellow, Green, Blue, Violet

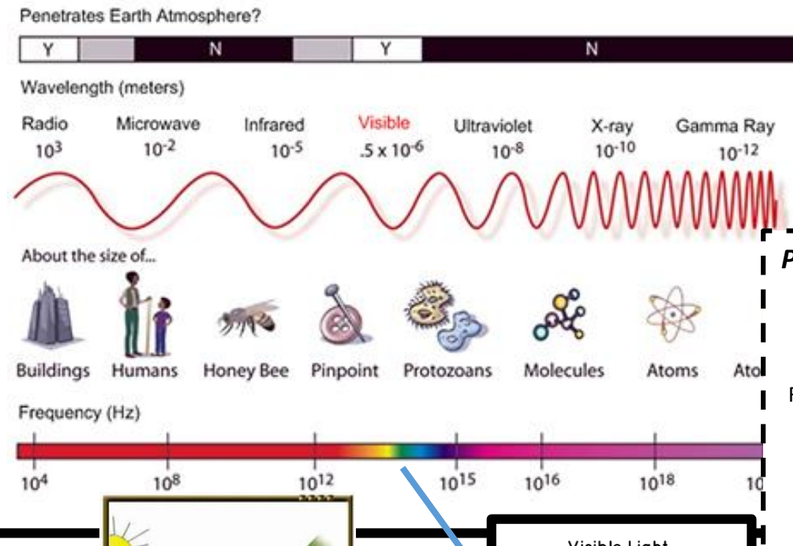
White light: made up of the spectral colours red through violet

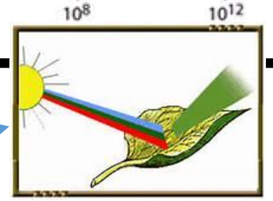
→ discovered by **Isacc Newton** as he studied sunlight passing through a triangular prism.

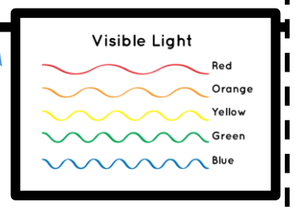
Later discoveries:
- Colours of light travel at different **speeds** inside a prism
- Each colour **changes** direction a slightly different amount when the light reaches the surface of the glass.
-The colour that changes direction the most (violet) **slows down** the most

Wave uses and Comparisons

The electromagnetic spectrum represents a wide range of frequencies. **Higher** frequency wavelengths are more **dangerous** than lower frequency parts.







Why We See the Colour of Objects:

- As light hits an object, it either:
  - → **reflects**
  - →**absorbs**
  - → **both** reflection and absorption of light
- different spectral colours are absorbed **and** reflected based on an objects material

Eg. -If we **see** an object as red, the object is reflecting the **red** part of the visible spectrum, and absorbing the other colours
-If we see **white**: **all colours** of the visible spectrum are reflected

-If we see **black**: **no parts** of the visible spectrum were reflected

The Electromagnetic Spectrum:

Electromagnetic Spectrum- the entire range of **radiant energies**

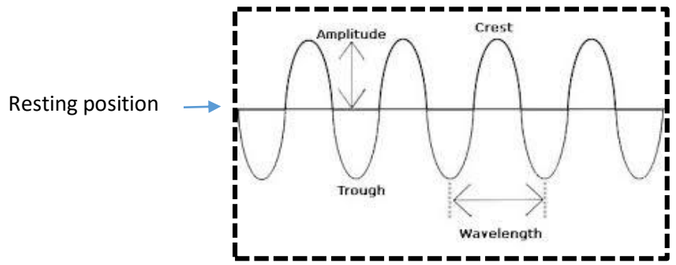
- → light
- → ultraviolet (UV) radiation
- → X-rays
- →microwaves
- → etc.

- Radiant energies all act in the same way as light, but are **invisible** to our eyes.

- All electromagnetic radiation can travel through a **vacuum** (no substance is needed to transmit it).

- These radiant energies travel extremely **quickly**
  - → 1.3 s to travel from earth to the moon
  - → 8 min from Sun to Earth
  - → over 4 years for a stars light beyond our solar system to reach us even at its high speed

Picture of a Wave:



Crest: Farthest point **above** the resting position

Trough: **Lowest** point below the resting position.

Wavelength: the distance between two adjacent **crests** or **troughs.**

Amplitude: The maximum distance **above** or **below** the resting position.
→ Determines the amount of energy that is transferred

Frequency (Hertz Hz): the number of **cycles** per **second**.

Name:_____ Div:____ Date:_____

Check Your Understanding 10.4

1. Which statement do you think is correct? Explain.
   A. White light is made up of the spectral colours. The rainbow colours appear when light passes through water droplets.
   B. Water droplets add colour to white light to produce the rainbow.
2. Which colour of light changes direction the most when it leaves the triangular prism? Which colour of light changes the least?
3. Briefly describe three places where you have seen the visible spectrum.
4. Why can we see the colour of objects?

Check Your Understanding 10.5

1. Use simple sketches of waves to illustrate the meaning of the terms wavelength, amplitude, and frequency
2. Assuming that the speed of a wave is constant, explain the relationship between wavelength and frequency.
3. Place these electromagnetic waves in order from lowest energy to highest energy: blue light, microwaves, X-rays, orange light, infrared radiation.
4. List the electromagnetic waves you have experienced in the past year and where they are found in the electromagnetic spectrum.

Teacher notes:

Project EM comic
Photocopy Review with Question Review of Key Ideas and Vocabulary

Handouts:

Terms of Light

Diagram of a Wave

Light Waves

Uses of Electromagnetic Energy