Notes: Waves and the Physics of Light

# Waves

A is a which travels through a vacuum or medium (air, water, etc) that contains matter

A wave transports

Some waves do \_\_\_\_\_\_\_to travel in; they can travel even in the

* Example:

Other waves to travel; they depend on the \_\_\_\_\_\_\_\_\_\_\_\_

* Example:

# What is light?

**Light:** An that is visible to the naked eye

Waves have 3 components:

1)

2)

3)

## Amplitude

**Amplitude:** is the from its resting position

* In other words, amplitude is a wave’s
* For light, this means its

## Wavelength

**Wavelength:** The wavelength of a wave is the between a point on one wave and the same point on the next wave, eg.

* For visible light, the wavelength will indicate its
* \_ has the longest wavelength
* \_ has the shortest wavelength

The colours we see are only a small part of the electromagnetic spectrum

* We call this the

We also have other types of waves that we cannot see

* + Example:

|  |  |  |
| --- | --- | --- |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

## Frequency

**Frequency**:

* Measured in Hertz (Hz) = wavelengths/sec

**Note**: wavelength and frequency are related

* The the wavelength, the the frequency
* The the wavelength, the the frequency

**Classification on the Electromagnetic Spectrum**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Types** | **Radio Waves** | **Infrared** | **Visible Light** | **UV Rays** | **X-Rays** | **Gamma Rays** |
| Frequency |  |  |  |  |  |  |
| Energy |  |  |  |  |  |  |
| Tech  Applications |  |  |  |  |  |  |
| Interesting Facts |  |  |  |  |  |  |

# Types of Waves

**Transverse waves:** are that consists of oscillations occurring (or right angled) to the direction of energy transfer

* Because they are not made of vibrating particles they can travel through a vacuum. They do not need a . So they travel through space.
* They are very fast 300 000 000 m/s in the air
* Speed of light

**Compression waves:** waves that  \_\_\_\_\_\_\_\_ through which it is transmitted

* Also called waves
* Example:

Compression waves must travel through a (solid, liquid or gas)

* One molecule hits another molecule, which hits another one and so on
* Passing on
* Since they depend on they cannot move very fast
* Less than 350 m/s in air

# Light and Lenses

## Properties of Light

1. The sun is the of
2. Light can be  and
3. Light travels in a from its source
4. The is dependent on the it is travelling through; light can be !
5. White light is made up of of light
6. Light energy can be  **\_\_\_\_\_\_\_\_\_\_**  into other types of energy

## Light behaviour

* Light usually travels in a
* Light can be bent
  + This is called
* We can use lenses to bend the light and at one point
  + This point is called the
* We can also uses lenses to the light waves outward
  + We call this the light
* We have looked at 2 types of lenses:
  + **\_** lenses
  + **\_**  lenses

Type of lens:

Type of lens: