The Berwickshire High School
S1 Physics
Waves Knowledge Organiser

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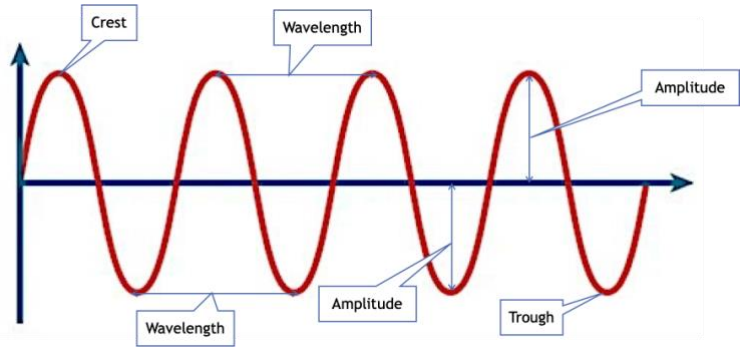
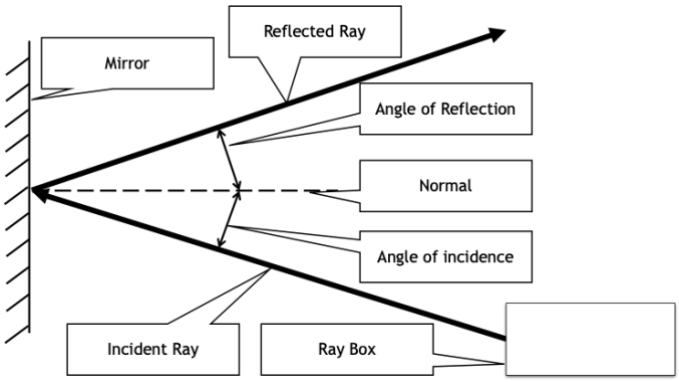
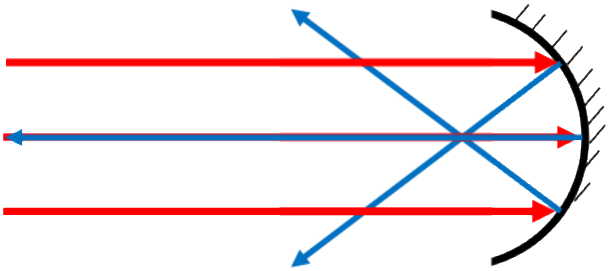
WAVES

Wave	A way of moving energy from one place to another without moving the material.
Transverse Wave	The particles move **up and down** while the energy moves **side to side**. Examples: **light, water**. 
Longitudinal Wave	The particles move **back and forward** in the **same direction** as the energy. Example: **sound**. 
Amplitude	The height of a wave from its middle to the top (crest) or bottom (trough).
Wavelength (λ)	The distance between two matching points on a wave (e.g. crest to crest).
Crest / Trough	Highest and lowest points of a transverse wave.

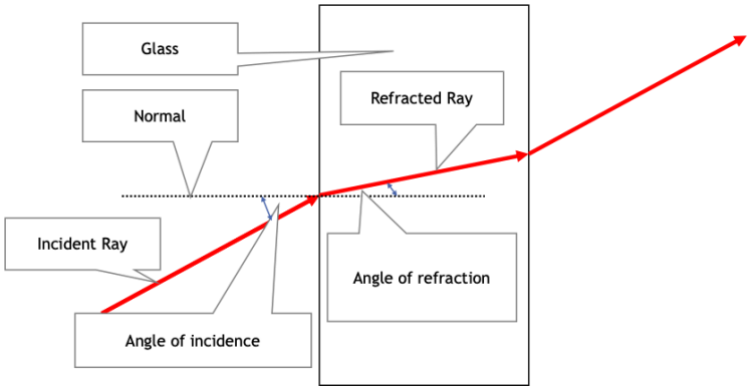
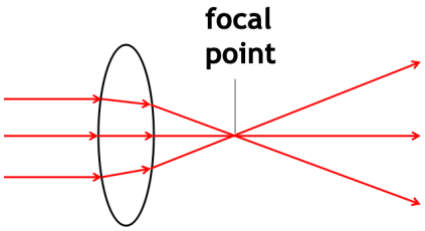
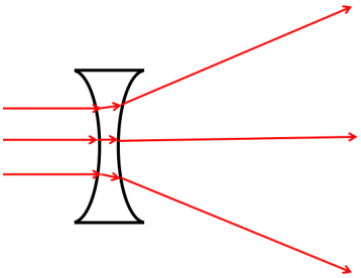
LIGHT

Light	A type of energy that travels in **straight lines**. Speed = **300,000,000 m/s**.
Luminous Object	Gives out its own light (e.g. the Sun, a bulb).
Non-Luminous Object	Seen by **reflected light** (e.g. the Moon, a book).
Seeing Things	We see objects when **light reflects** from them into our eyes.

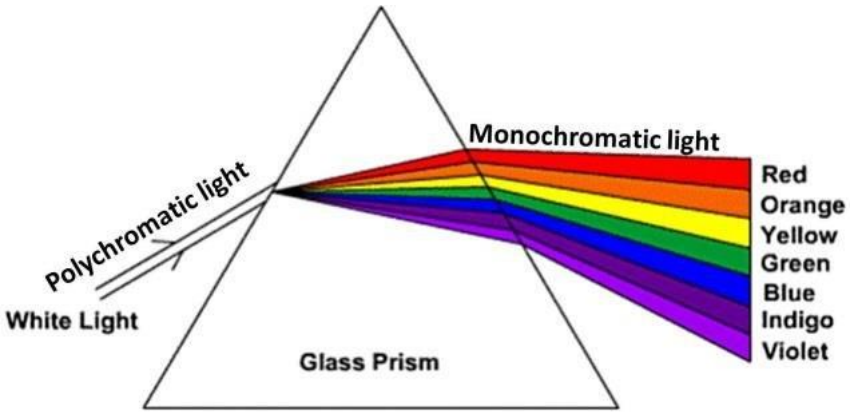
🔍 REFLECTION

Law of Reflection	The **angle of incidence = angle of reflection**. 
Normal	A **dashed line at 90°** to the mirror surface.
Incident Ray	The ray of light that **hits** the mirror.
Reflected Ray	The ray of light that **bounces off** the mirror.
Curved Reflector	Reflects all rays to the **focal point**, where the energy is strongest. 
Focal Point	The point where reflected rays meet. Used in **satellite dishes** and **headlights**.

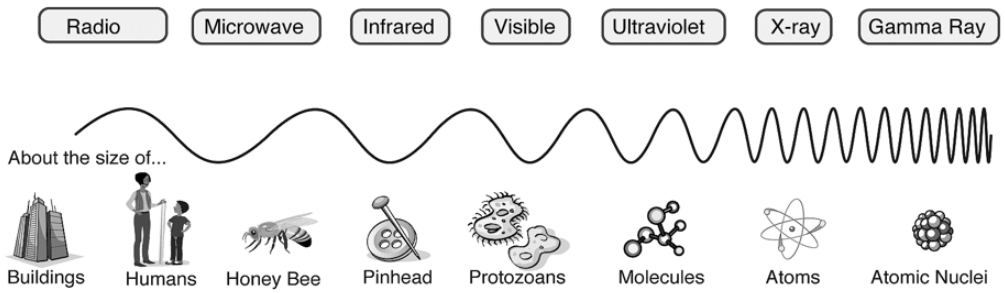
REFRACTION AND LENSES

Refraction	When light changes **speed and direction** as it passes through different materials like air, water, or glass.
Angle of Refraction	The angle between the **bent ray** and the **normal**. 
Lenses	Pieces of glass or plastic that **bend light** to help us see or focus images.
Convex Lens	Curves **outwards** and **focuses** light rays to a point. Used in **magnifying glasses**, **cameras**, and **eyes**. 
Concave Lens	Curves **inwards** and **spreads out** light rays. Used in **projectors** and **telescopes**. 

🌈 COLOUR AND THE SPECTRUM

Dispersion	When white light splits into different colours using a **prism**. 
Visible Spectrum	The seven colours of light: **Red, Orange, Yellow, Green, Blue, Indigo, Violet (ROYGBIV)**.
Primary Colours of Light	**Red, Green, Blue.**
Mixing Colours	Red + Green = **Yellow**, Red + Blue = **Magenta**, Blue + Green = **Cyan**, All three = **White**.

📡 ELECTROMAGNETIC SPECTRUM (EM SPECTRUM)

Electromagnetic Spectrum	
Radio Waves	Longest wavelength. Used for **radio and TV signals**. No known health risks.
Microwaves	Used for **mobile phones** and **cooking**. Can cause **burns** with high exposure.
Infrared (IR)	Felt as **heat**; used in **remote controls** and **thermal cameras**. Can cause **skin burns**.
Visible Light	What our eyes can see. Used for **sight** and **photography**. Very safe in normal amounts.
Ultraviolet (UV)	Used in **forensics** and **sterilising equipment**. Can cause **sunburn or skin cancer**.
X-rays	Used in **medical imaging**. High doses can **damage cells**.
Gamma Rays	Highest energy. Used for **cancer treatment** and **sterilisation**. Can **kill living cells**.

🔊 SOUND

Sound	A **longitudinal wave** made by vibrations. Cannot travel in space.
Speed of Sound	**340 m/s** in air. **Speed = distance ÷ time**.
Volume	How **loud** a sound is; measured in **decibels (dB)**.
Pitch	How **high or low** a sound is; depends on how fast it vibrates (**frequency**).
High Pitch	Many waves per second (short wavelength).
Low Pitch	Fewer waves per second (long wavelength).
Loud Sound	Large amplitude.
Quiet Sound	Small amplitude.