Waves

	Working towards Mastery (W)	**Meeting Mastery (M)**	**Beyond Mastery (B)**
Sound	- Sound consists of vibrations which travel as a longitudinal wave through substances. The denser the medium, the faster sound travels. - The greater the amplitude of the waveform, the louder the sound. The greater the frequency (and therefore the shorter the wavelength), the higher the pitch.	- Explain observations where sound is reflected, transmitted or absorbed by different media. - Explain observations of how sound travels using the idea of a longitudinal wave. - Describe the amplitude and frequency of a wave from a diagram or oscilloscope picture. - Use drawings of waves to describe how sound waves change with volume or pitch.	- Suggest the effects of particular ear problems on a person's hearing. - Evaluate the data behind a claim for a sound creation or blocking device, using the properties of sound waves. - Use diagrams to compare the waveforms a musical instrument makes when playing different pitches or volumes.
Light	- When a light ray meets a different medium, some of it is absorbed and some reflected. For a mirror, the angle of incidence equals the angle of reflection. The ray model can describe the formation of an image in a mirror and how objects appear different colours. - When light enters a denser medium it bends towards the normal; when it enters a less dense medium it bends away from the normal. Refraction through lenses and prisms can be described using a ray diagram as a	- Use ray diagrams of eclipses to describe what is seen by observers in different places. - Explain observations where coloured lights are mixed or objects are viewed in different lights. - Use ray diagrams to describe how light passes through lenses and transparent materials. - Describe how lenses may be used to correct vision	- Use a ray diagram to predict how an image will change in different situations. - Predict whether light will reflect, refract or scatter when it hits the surface of a given material. - Use ray diagrams to explain how a device with multiple mirrors works.

	model.		
Wave Effects	- When a wave travels through a substance, particles move to and fro. Energy is transferred in the direction of movement of the wave. Waves of higher amplitude or higher frequency transfer more energy.	- Explain differences in the damage done to living cells by light and other waves, in terms of their frequency. - Explain how audio equipment converts sound into a changing pattern of electric current.	- Suggest reasons why sound waves can agitate a liquid for cleaning objects, or massage muscles for physiotherapy. - Evaluate electricity production by wave energy using data for different locations and weather conditions.
Wave Properties	- A physical model of a transverse wave demonstrates it moves from place to place, while the material it travels through does not, and describes the properties of speed, wavelength and reflection.	- Describe the properties of different longitudinal and transverse waves. - Use the wave model to explain observations of the reflection, absorption and transmission of a wave.	- Compare and contrast the properties of sound and light waves. - Suggest what happens when two waves combine.