8L Waves

Waves	•A wave is a vibration or disturbance of particles •A wave transfers energy or information from one place to another •Waves transfer energy but the medium (substance) they travel through *isn't* moved from one place to another.
Transverse Wave	•A transverse wave is a wave where the vibrations are at right angles to the direction the wave is travelling in. •Examples: Water waves, light waves, infrared waves, slinky waves
Longitudinal Waves	•A longitudinal wave is a wave where the vibrations are parallel (in the same direction as) to the direction the wave is travelling in •Examples: Sound waves, slinky waves.
Wavelength	•Waves are made up of a series of peaks and troughs. •The distance between two peaks (or troughs) next to each other is called the wavelength.
Interacting Waves	•Two waves travelling in opposite directions can pass through each other •This can cause them to add together and make the wave bigger, or it can cause the waves to cancel each other out. This depends on which part of each wave interacts. •This is called superpositioning.
Sound Waves	•Sound waves are caused by vibrations in the air. A vibrating object like a guitar string causes the air around it to vibrate. •How quickly the vibrations are happening and how big the vibrations are affects the sound we hear. •The pitch of a sound is affected by how many vibrations there are per second. We call this the frequency of a sound wave. •Frequency is measured in Hertz, Hz. •The higher the frequency, the higher the pitch. We see lots of waves on an oscilloscope trace. •The intensity (how loud or quiet the sound is) is affected by how big the vibrations in a sound waves are. This is called the amplitude. •The higher the amplitude, the louder the sound. We see peaks and troughs that go far away from the starting point on an oscilloscope trace

Sound Vs Light	•Sound and light are both types of wave •Light waves are transverse waves. •Light waves always travel at 300 000 000 m/s, or the speed of light •Light waves are a type of electromagnetic radiation and do not need a medium to travel through. •Sound waves are longitudinal waves •Sound waves are caused by vibrations in the medium they travel through. •Sound waves have different speeds in different mediums •The speed of sound in air is 330 m/s. •We can measure the speed of sound using a clapper board, a tape measure, a stop watch and a big flat wall. We time how long it takes the echo to reach us. •The more dense the medium, the faster sound will travel through it.
The Ear	•The ear is the organ that detects sounds waves. •It is made up of the outer ear, the middle ear and the inner ear. •Sound waves are funnelled into the ear canal by the pinna. The sound waves travel along the ear canal to reach the ear drum. The vibrating air particles cause the ear drum to vibrate. The ear drum is connected to the hammer, anvil and stirrup, the tiniest bones in your body. The stirrup moves back and forth, causing the fluid inside the cochlea to move. This makes tiny receptor hairs inside to move, making them send an impulse along the auditory nerve to the brain. •Humans have a limited range of hearing- we can detect sounds between 20 and 20 000 Hz. •We can say that 20Hz is the threshold of human hearing.
Noise and Sound	•Noise is unwanted sound •Loud sounds can damage our ears by either damaging the eardrum so it can't vibrate or by causing the tiny hair cells in the cochlea to become damaged and less sensitive. •Decibels are the unit that we measure the loudness of a sound in. •A decibel meter measures the loudness of a sound. •Soundproofing can reduce or stop unwanted sound. Materials that are good for soundproofing usually have lots of air trapped inside them.