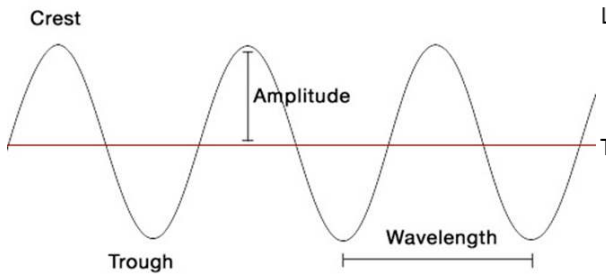
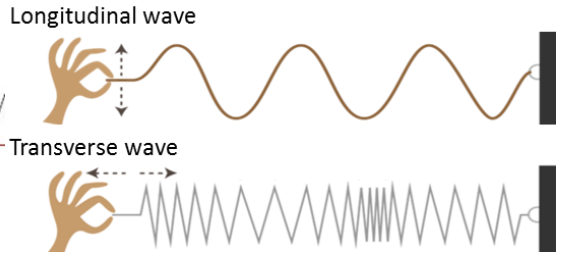
Year 11 Physics 6: Waves Knowledge Organiser

1. Keywords

Transverse wave	A wave where the vibration is perpendicular to the direction of travel
Longitudinal wave	A wave where the vibrations are parallel to the direction of travel
Mechanical wave	A vibration that travels through a substance (e.g. sound)
Frequency	The number of wave fronts passing a fixed point every second (measured in Hz)
Period	The time for one complete wave
Ultrasound	Sound above 20,000Hz
Superposition	When two waves meet and affect each other
Reflection	When waves bounce off a surface
Echo	Reflection of sound that can be heard

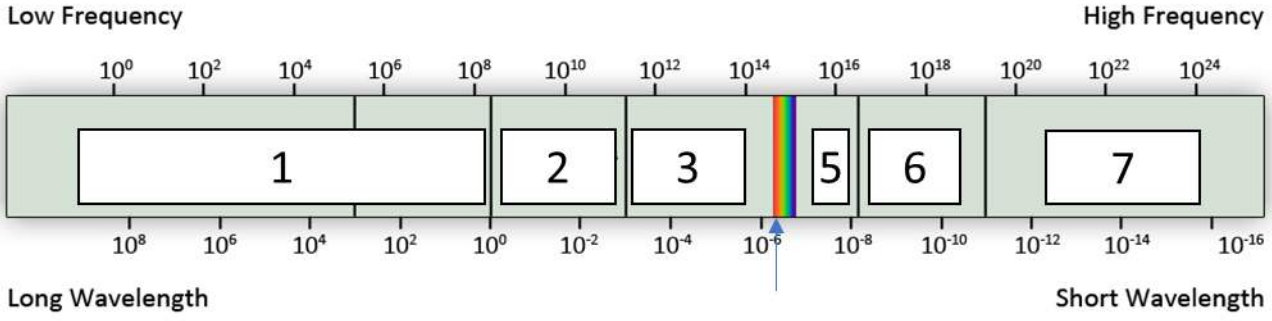
3. Comparing types of wave





Comparing waves:	Light wave	Mechanical wave
Type of wave	Transverse	Longitudinal
Can they travel through a vacuum?	Yes	No. Mechanical waves can only pass through a solid, liquid or gas
Can they be reflected?	Yes. By smooth shiny surfaces	Yes. By smooth surfaces
Can they be absorbed?	Yes. By dark surfaces	Yes. Rough surfaces absorb sound
Can superposition occur?	Yes	Yes

7. The electromagnetic spectrum



1	Radio	Produced by oscillations in circuits
2	Microwaves	
3	Infrared	Thermal energy
4	Visible	
5	Ultra violet	Skin damage
6	X rays	Cause cancer
7	Gamma rays	Cause cancer

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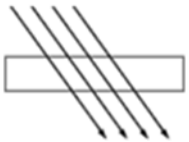
The properties of EM waves on materials (HT ONLY)	
1	Transmit
2	Specular Reflection
3	Diffuse Reflection
4	Absorb
5	Refract



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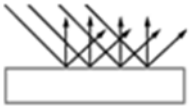

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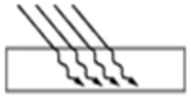

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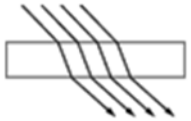

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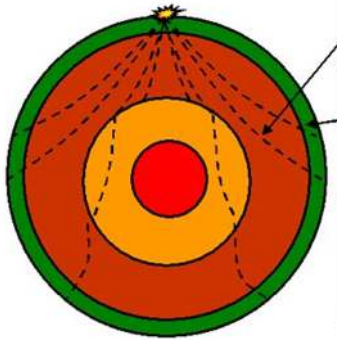
Period and frequency	
$T=1/f$	
T	Period (s)
f	Frequency (Hz)

Wave equation	
$v=f \times \lambda$	
v	Wave speed (m/s)
f	Frequency (Hz)
λ	Wave length (m)

Uses of EM waves	
Name	Use
Radio	Radio and TV
Micro-waves	Satellite communica-tion, cooking food
Infrared	Electric heaters, cook-ing food, infra-red cam-eras
Visible	Fibre optic communica-tion
Ultra violet	Energy efficient lamps, sun tanning
X rays	Imaging bones
Gamma rays	Radiotherapy, medical imaging

Seismic waves produced by earthquakes (HT PHYSICS ONLY)			
1	S waves	Transverse	Only travel through solid
2	P waves	Longitudinal	Travel through the earth and are refracted when they pass through different density medium



Lenses (physics only)
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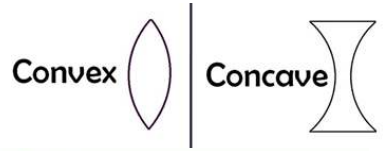
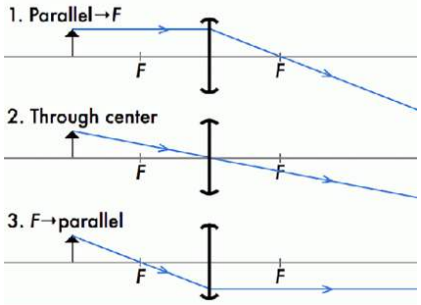


Black body radiation (physics only)	
emit	give out
absorb	Take in
Black body	An object that absorbs all the radiation shone on it. It is the best possible emitter



Perfect black bodies and radiation	
1	The intensity of black body radiation depends on temperature
2	The hotter the object the more radiation is emitted
3	The hotter the object the greater the increase in the proportion of shorter wave-lengths
	White hot is hotter than red hot