



Lessons Sequence						
TOPIC (S) WAVES	1. Transverse and longitudinal waves 2. Properties of waves 3. Wave speed (required practical) 4. Reflection of waves (required practical) 5. Refraction of waves (required practical)	6. Sound Waves 7. Waves for detection and exploration 8. Electromagnetic waves 9. Properties of electromagnetic waves 10. Uses of electromagnetic waves	11. Absorption of waves (required practical) 12. Lenses 13. Visible Light 14. Blackbody Radiation			
Knowledge & Skills development	<ul style="list-style-type: none"> Describe the difference between longitudinal and transverse waves Describe evidence that, for both ripples on a water surface and sound waves in air, it is the wave and not the water or air itself that travels Recall, use and rearrange equations for frequency and wave speed Identify amplitude and wavelength from given diagrams Describe a method to measure the speed of sound waves in air Describe a method to measure the speed of ripples on a water surface Construct ray diagrams to illustrate the reflection of a wave at a surface Describe the effects of reflection, transmission and absorption of waves at material interfaces Describe, with examples, processes which convert wave disturbances between sound waves and vibrations in solids Explain why such processes only work over a limited frequency range and the relevance of this to human hearing Explain how the differences in velocity, absorption and reflection between different types of wave in solids and liquids can be used both for detection and exploration Describe similarities and differences between the waves of the electromagnetic spectrum 			<ul style="list-style-type: none"> Give brief explanations why each type of electromagnetic wave is suitable for the practical application Use wave front diagrams and ray diagrams to explain refraction in terms of the change of speed that happens when a wave travels from one medium to a different medium Describe factors that affect the absorption of electromagnetic waves Describe the change in atoms when electromagnetic waves are absorbed Construct ray diagrams to illustrate the similarities and differences between convex and concave lenses Apply the equation for magnification Explain how the colour of an object is related to the differential absorption, transmission and reflection of different wavelengths of light by the object Explain the effect of viewing objects through filters or the effect on light of passing through filters Explain why an opaque object has a particular colour Explain that all bodies (objects) emit radiation Explain that the intensity and wavelength distribution of any emission depends on the temperature of the body Use information, or draw/interpret diagrams to show how radiation affects the temperature of the Earth's surface and atmosphere 		
Assessment / Feedback Opportunities	Targeted questioning throughout topic	Teacher assessment of practical skills during investigation - verbal	Knowledge Recall Quizzes	Deep marking of written task in students books	Topic Test	Targeted exam questions – teacher or self-assessed

Cultural Capital	
SMSC / Promoting British Values (Democracy, Liberty, Rule of Law, Tolerance & Respect)	<ul style="list-style-type: none"> • Listening to others during presentations • Working in groups during practicals or research tasks
Reading opportunities	<ul style="list-style-type: none"> • Recommended Read: Strange Glow: The Story of Radiation (Timothy J Jorgensen) • Recommended Read: All About Physics (Richard Hammond) • Recommended Read: Storm in a Teacup: The Physics of Everyday Life (Helen Czerski)
Key Vocabulary	<p>Independent Variable, Dependent Variable, Control Variables, Method, Conclusion, Precaution, Evaluation, Reliable, Precision, Valid, Anomaly, Describe, Explain, Compare, Analyse, Calculate, Suggest</p> <p>Transverse, Longitudinal, Vibration, Oscillation, Frequency, Amplitude, Wavelength, Medium (in physics terms), Transmission, Absorption, Reflection, Refraction, Spectrum, Electromagnetic, Lens, Convex, Concave, Magnification, Emit, Opaque, Transparent, Translucent, Filter, Blackbody</p>
Digital Literacy	<p>SahrePoint resources including topic quizzes, use of digital light meters and dataloggers</p> <p>Possible use of excel to plot graphs and analyse data, powerpoint, word, etc to present information, internet for research</p>
Cross-Curricular Links	<p>Numeracy/Maths – averages (means), reading scales, graph plotting, lines of best fit, using and rearranging equations, using scientific calculators, angles, use of protractors</p> <p>Geography – P and S Waves during earthquakes</p>
Careers	Telecommunications, Astrophysicist, Lighting technicians, Radiographer, X-ray technician, Medical physicist