

# Yr12 Physics – Unit 2

## MAGHULL HIGH SCHOOL – CURRICULUM MAP



	Sequence			
<b>TOPIC (S)</b> <b>Particles and Radiation</b>	1. Constituents of atoms 2. Stable and unstable nuclei 3. Particles, antiparticles and photons 4. Particle interactions	5. Classification of particles 6. Quarks and antiquarks 7. Applications of conservation laws 8. The photoelectric effect	9. Collisions of electrons with atoms 10. Energy levels and photon emission 11. Wave-particle duality	
<b>Knowledge &amp; Skills development</b>	<ul style="list-style-type: none"> <li>Describe the simple model of the atom</li> <li>Calculate specific charge</li> <li>Describe the strong nuclear force</li> <li>Describe and give equations for alpha and beta minus decay including neutrinos</li> <li>Calculating photon energy</li> <li>Knowledge of annihilation and pair production and the energies involved</li> <li>Explain the four fundamental interactions in terms of their exchange particles</li> <li>Draw Feynman diagrams to represent particle interactions</li> <li>Classify particles as hadrons, baryons, mesons, leptons giving examples of each</li> <li>Apply conservation laws (baryon number, lepton number, charge) to the interaction and decay of particles</li> </ul>		<ul style="list-style-type: none"> <li>Appreciation that particle physics relies on the collaborative efforts of large teams of scientists and engineers to validate new knowledge</li> <li>Describe particle composition in terms of quarks</li> <li>Describe the photoelectric effect in terms of the energies involved</li> <li>Understanding of ionisation and excitation in the fluorescent tube</li> <li>Use the electronvolt in energy calculations</li> <li>Describe the formation of line spectra in terms of energy levels in atoms</li> <li>Calculate the de Broglie wavelength of particles</li> <li>Describe scientific evidence that particles can act as waves and vice versa</li> </ul>	
<b>Assessment / Feedback Opportunities</b>	Exam questions – teacher assessed	Exam questions – self assessed	Extended writing task – teacher assessed and yellow box response	Topic assessment
<b>Cultural Capital</b>	<ul style="list-style-type: none"> <li></li> <li></li> </ul>			
<b>SMSC / Promoting British Values</b> (Democracy, Liberty, Rule of Law, Tolerance & Respect)	<ul style="list-style-type: none"> <li></li> <li></li> </ul>			
<b>Reading opportunities</b>	<ul style="list-style-type: none"> <li>Recommended Read: Particle Physics Brick by Brick by Dr Ben Still</li> <li>Recommended Read: The Particle Zoo: The Search for the Fundamental Nature of Reality by Gavin Hesketh</li> </ul>			
<b>Key Vocabulary</b>	Independent Variable, Dependent Variable, Control Variables, Method, Conclusion, Precaution, Evaluation, Reliable, Precision, Valid, Anomaly, Describe, Explain, Compare, Analyse, Calculate, Suggest, Absolute, Uncertainty, Error			

	Specific, Neutrino, Nucleus, Conservation, Fundamental, Interaction, Annihilation, Production, Hadron, Baryon, Meson, Lepton, Decay, Collaborate, Photoelectric, Duality, Ionisation, Fluorescent, Excitation, Quark
<b>Digital Literacy</b>	The use of excel to plot graphs and analyse data MSOffice365 apps including SharePoint
<b>Cross-Curricular Links</b>	Numeracy/Maths – averages (means), reading scales, graph plotting, lines of best fit, using and rearranging equations, using scientific calculators
<b>Careers</b>	Particle physicist, Nuclear technicians, Medical physicist, Radiographer