Science – Physics

MAGHULL HIGH SCHOOL – CURRICULUM MAP

	Lessons Sequence					
TOPIC (S) **MOTION** **(Forces)**	1. Distance and displacement 2. Speed and Velocity 3. Distance-time graphs 4. Acceleration		5. Velocity-time graphs 6. Terminal velocity 7. Newton's Laws 8. Acceleration (Required practical)		9. Stopping Distance 10. Momentum **11. Changing momentum**	
Knowledge & Skills development	• Explain the vector–scalar distinction as it applies to displacement, distance, velocity and speed • Recall typical values of speed for a person walking, running and cycling as well as the typical values of speed for different types of transportation systems • Recall, use and rearrange the equation for speed • Be able to draw distance–time graphs from measurements and extract and interpret lines and slopes of distance–time graphs, translating information between graphical and numerical form • Draw velocity–time graphs from measurements and interpret lines and slopes to determine acceleration • Interpret enclosed areas in velocity–time graphs to determine distance travelled (or displacement) • Draw and interpret velocity–time graphs for objects that reach terminal velocity • Interpret the changing motion as objects reach terminal velocity in terms of the forces acting • Apply Newton's First Law to explain the motion of objects moving with a uniform velocity and objects where the speed and/or direction changes • Recall, use and rearrange the equation of Newton's 2nd law • Apply Newton's Third Law to examples of equilibrium situations			• Explain methods used to measure human reaction times and recall typical results • Interpret and evaluate measurements from simple methods to measure the different reaction times of students • Evaluate the effect of various factors on thinking distance based on given data • Explain the factors which affect the distance required for road transport vehicles to come to rest in emergencies, and the implications for safety • Recall, use and rearrange the equation for momentum • Describe and explain examples of momentum in an event, such as a collision • **Complete calculations involving an event, such as the collision of two objects** • **Explain safety features such as: air bags, seat belts, gymnasium crash mats, cycle helmets and cushioned surfaces for playgrounds with reference to the concept of rate of change of momentum** • Apply equations relating force, mass, velocity and acceleration to explain how the changes involved are inter-related	
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	• Possible University Physics Department Outreach • Possible workshop visit from Tomorrow's Engineers (making and toy racing cars – experiments with motion)					

SMSC / Promoting British Values **(Democracy, Liberty, Rule of Law, Tolerance & Respect)**	• Listening to others during presentations • Working in groups during practicals or research tasks
Reading opportunities	• Recommended Read: Jack Dogg's Useful Facts about the Physics of the Universe: The Principles of Speed, Velocity And Acceleration!: Volume 1 Mr Xavier Claudio Salazar Rhodes • Recommended Read: All About Physics (Richard Hammond) • Recommended Read: Storm in a Teacup: The Physics of Everyday Life (Helen Czerski)
Key Vocabulary	Independent Variable, Dependent Variable, Control Variables, Method, Conclusion, Precaution, Evaluation, Reliable, Precision, Valid, Anomaly, Describe, Explain, Compare, Analyse, Calculate, Suggest Vector, Scalar, Speed, Velocity, Distance, Displacement, Acceleration, Gradient, Momentum, Reaction, Inertia, Crumple Zone, Thinking Distance, Braking Distance, Stopping Distance, Collision, System, Conservation, Terminal Velocity, Resultant
Digital Literacy	SharePoint resources including topic quizzes Possible use of excel to plot graphs and analyse data, powerpoint, word, etc to present information, internet for research
Cross-Curricular Links	Numeracy/Maths – averages (means), reading scales, graph plotting, lines of best fit, using and rearranging equations, using scientific calculators
Careers	Car designers, Sports scientists, Aerospace Engineers, Engineering, Crash Investigators