Curriculum Map

Sandringham School
'Everybody can be Somebody'

Subject: Physics **Year group: 10 & 11**

Timings are broad as classes vary depending on how many teachers the class has.

The colours denote: Higher tier only content **Separate science only content**

Time period	Topic 3 Year 10 (Autumn Term)	Topic 5 Year 10 (Autumn -Spring Term)	Topic 4 Year 10 (Spring-Summer Term)	Topic 6 Year 10 (Summer Term)	Topic 7 Year 11 (Autumn-Spring Term)	Topic 8 Year 11 (Spring Term)
Content *Declarative Knowledge – 'Know What'*	**Physics 2 - Electricity** 1. Electric charges and static. 2. Electric fields and forces 3.circuit symbols and diagrams 4. series circuits 5. parallel circuits 6. Electric current 7. Potential difference and resistance 8. Resistance RP 9. Resistors in series and parallel RP 10. Thermistors and LDR's 11.IV characteristics RP	**Physics 6 - Waves** 1. Waves in air, fluids and solids 2. Properties of waves 3. Reflection of waves 4. Sound waves 5. Waves for detection and exploration 6. Types of EM waves 7. Properties of EM waves 8. Uses and applications of EM waves 9. Lenses 10. Visible Light 11. Emission and absorption of i-red 12. Perfect black bodies and radiation	**Physics 4 - Radioactivity** 1.The discovery of the nucleus 2. Discovery of protons, neutrons and electrons 3. Alpha, Beta and Gamma 4. Activity and half-life 5. Nuclear radiation in medicine. 6. Nuclear fission 7. Nuclear Fusion 8. Nuclear issues	**Physics 8 - Space Physics** 1. The Solar System 2. Life Cycles of Stars 3.Orbital Motion 4. Red Shift and the Big Bang	**Physics 5- Forces** 1. Scalar and Vector quantities 2. Distance and Displacement 3. Contacts and Non-contact forces 4. Gravity and Weight 5. Resultant Forces 6. Newton's 3rd Law 7. Distance-time graphs 8. Speed and Velocity 9. Acceleration and Velocity-time graphs and equations of motion (HT only content within lesson - area under graph) 10. Newton's 1st & 2nd Law 11. Braking distances 12.Momentum 13. Forces and Elasticity 14. Moments, lever and gears 15. Pressures, pressure in fluids and atmospheric pressure (HT only content within lesson - archimedes principle) 16. Atmospheric pressure	**Physics 7 - Magnetism & Electromagnetism** 1.Permanent and induced magnetism, magnetic forces and fields 2.Magnetic fields 3.Electromagnetism 4.Fleming's left-hand rule 5.Electric motors 6.Loudspeakers 7.Induced potential 8.Uses of the generator effect 9.Microphones 10.Transformers

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Skills *Procedural Knowledge – 'Know How'*	**Equation application** 1.Recall and apply equations for; charge flow, Ohm's Law, resistance in series and parallel circuits, power, energy transferred. **Practical Experiments** 1.To determine how length of a wire affects its resistance 2.to investigate the effect of adding resistors in series and parallel 3.to investigate the IV characteristics of some devices.	**Equation application** 1.Students should be able to apply equations for: Period/frequency the wave equation **Practical Experiments** 1.Observations about apparatus for measuring speed, frequency and wavelength 2.Investigate reflection of light 3. Investigate amount of infra-red absorbed/radiated at a surface	**Equation application** 1. Students should be able to calculate alpha decay and beta decay 2.Students should be able to calculate half-life of a substance.	**No equation application** **Practical Experiments** 1. (NOT a required prac) Investigate the relationship between mass and force and radius and force when an object undergoes centripetal acceleration.	**Equation application** 1.Students should be able to recall, apply and link the equations for: weight, extension applied, force applied, elastic potential energy, moments, pressure, speed, acceleration, change in velocity, acceleration and displacement, force, mass and acceleration and momentum **Practical Experiments** 1. Investigate the relationship between force and extension for a spring. 2. Investigate the effect of varying the force on the acceleration of an object of constant mass, and the effect of varying the mass of an object on the acceleration produced by constant force	**Equation application** 1.Students should be able to apply the equation for force = magnetic flux density × current × length 2.students should be able to calculate the ratio of the potential differences across the primary and secondary coils of a transformer Vp and Vs depends on the ratio of the number of turns on each coil, np and ns.
Key Questions	1.What is a series and a parallel circuit? 2.What are the units of current, potential difference and resistance? 3.What is Ohm's law? 4.What are the characteristics of Ohmic and non-Ohmic conductors?	1.What is a wave, and the different types of wave? 2.What is the electromagnetic spectrum? 3.How are waves used?	1. What are alpha, beta and gamma? 2. What is radioactive decay? 3.What is an isotope? 4.What is the half-life of an element and how is it calculated? 5.What are the uses and impacts of nuclear energy?	1.What is in the solar system? 2.How do stars form and what is their life cycle? 3.What is orbital motion? 4.What was the big bang and how does it relate to red-shift?	1.What are scalars and vectors? 2. What is a force? 3.How are speed, velocity, distance and displacement related? 4.What is acceleration? 5.How does mass affect acceleration? 6.What are Newton's 1st, 2nd and 3rd laws, and how do they relate to force?	1.What is the difference between permanent and induced magnets? 2.how does a solenoid arrangement increase the magnetic effect of the current? 3.What is Fleming's left-hand rule? 4. How does a loudspeaker and a microphone work? 5.What is a transformer? 6.How do electric motors and generators work?

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Assessment	1.Required practical assessed question 2.End of topic test	1. Assessed questions for both Required Practicals 2. Mid Topic Assessment 3. End of topic Assessment	1.Assessed questions 2.End of topic assessment	1. End of Topic Assessment	1. Assessed questions for both Required Practicals (Acceleration and Springs) 2. Mid Topic Assessment 3. End of topic Assessment	1.Assessed questions 2.End of topic assessment
Literacy/ Numeracy / SMSC/ Character	**Literacy**; write and plan experiments **Numeracy**; application of equations and calculation **SMSC;** working collaboratively on experimental procedures **Character;** confidence - to have the tenacity to attempt difficult experiments with confidence.	**Literacy;** assessed questions help to develop exam technique **Numeracy;** application of equations for practical experiments **SMSC;** discussions on the uses and applications of EM waves in real-life **Character;** initiative - to take the lead on setting up and performing experiments	**Literacy;** evaluation of the uses of nuclear medicine and fission and fusion. **Numeracy;** application of decay equations and calculation of half-life **SMSC;** Discuss the use of Nuclear fission as an energy source, and the use of nuclear bombs. **Character;** tolerance - listening to the opinion of others with respect to discussions on nuclear weapons and energy.	**Literacy;** understanding and developing complex terminology relating to space physics **Numeracy;** calculations of the timeline of the universe from the big bang **SMSC;** to have collaborative discussions on theories relating to the formation of the universe, stars and celestial objects **Character;** aspiration - to aim high, and be open to new ideas and theories	**Literacy;** development of exam practice technique through assessed questions. **Numeracy;** Students should recognise and be able to use the symbol for proportionality and use ratios and proportional reasoning to convert units and to compute rates **SMSC;** working with peers to develop practical skills **Character;** integrity - to generate good data during experimental procedures	**Literacy;** Understanding technical language with regard to motors and electric currents. **Numeracy;** Draw/interpret graphs of potential difference generated in the coil against time **SMSC;** working collaboratively with peers to understand complex problems. **Character;** resilience - to work through abstract physics concepts.