

Physics Curriculum Overview – Year 13

Sequencing of topics	What knowledge will students develop? (Including key terminology)	What skills will students develop? (Including literacy & numeracy)	Assessment opportunities	Homework opportunities	Personal development (Ursuline Values, Catholic Social Teaching, Cultural Capital, Cross-curricular, Careers)	Curriculum links
Autumn Half Term 1						
Fields and their consequences	<ul style="list-style-type: none"> ○ Fields ○ Gravitational fields ○ Newton’s law ○ Gravitational field strength ○ Gravitational potential ○ Orbits of planets and satellites ○ Electric fields ○ Coulomb’s law and Electric field strength ○ Electric potential ○ Capacitance ○ Parallel plate capacitor ○ Energy stored by a capacitor ○ Capacitor charge and discharge 	<ul style="list-style-type: none"> ○ Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts ○ Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences ○ Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena ○ Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment ○ Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations 	<ul style="list-style-type: none"> ○ Targeted questioning ○ Mid-topic assessment ○ End of topic assessment 	<ul style="list-style-type: none"> ○ Worksheets ○ Flipped learning activities ○ Past exam questions ○ Research ○ Practical write-ups ○ Isaac Physics 	<ul style="list-style-type: none"> ○ Grateful for waves enabling us to be able to communicate ○ Discerning when analysing data presented to us and joyful at the possibilities of science ○ Leading others in pursuit of justice when planning and carrying out a practical ○ Service and sacrifice when we recognise the scientific work that has been done before us ○ Loving and compassionate when we consider how scientific advancements can be used to help others 	<p>KS1/2</p> <ul style="list-style-type: none"> ○ Gravity ○ Magnets <p>KS3</p> <ul style="list-style-type: none"> ○ Forces ○ Electromagnetism <p>KS4</p> <ul style="list-style-type: none"> ○ Forces ○ Magnetism and electromagnetism ○ Electric fields <p>KS5</p>

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		<ul style="list-style-type: none"> ○ Make and record observations and measurements using a range of apparatus and methods ○ Evaluate methods and suggest possible improvements and further investigations ○ Presenting observations and other data using appropriate methods ○ Interpreting observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions ○ Presenting reasoned explanations including relating data to hypotheses ○ Being objective, evaluating data in terms of accuracy, precision, repeatability and reproducibility and identifying potential sources of random and systematic error ○ Use scientific vocabulary, terminology and definitions ○ Recognise the importance of scientific quantities and understand how they are determined ○ Use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate ○ Use prefixes and powers of ten for orders of magnitude (eg tera, giga, 			<ul style="list-style-type: none"> ○ Dignity of God's people ○ Community and participation ○ Care for creation ○ Dignity in work ○ Peace and reconciliation ○ Solidarity ○ Personal ○ Social ○ Moral ○ Cultural ○ Art ○ Geography ○ Maths 	

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		mega, kilo, centi, milli, micro and nano) ○ Interconvert units ○ Use an appropriate number of significant figures in calculation				

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Autumn Half Term 2						
Fields and their consequences Nuclear physics	<ul style="list-style-type: none"> ○ Capacitance ○ Parallel plate capacitor ○ Energy stored by a capacitor ○ Capacitor charge and discharge ○ Magnetic fields ○ Magnetic flux density ○ Moving charges in a magnetic field ○ Magnetic flux and flux linkage ○ Electromagnetic induction ○ Alternating currents ○ The operation of a transformer ○ Radioactivity ○ Rutherford scattering ○ α, β and γ radiation ○ Radioactive decay ○ Nuclear instability ○ Nuclear radius ○ Mass and energy 	<ul style="list-style-type: none"> ○ Understand how scientific methods and theories develop over time ○ Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts ○ Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences ○ Use scientific theories and explanations to develop hypotheses ○ Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena ○ Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment ○ Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the 	<ul style="list-style-type: none"> ○ Targeted questioning ○ Mid-topic assessment ○ End of topic assessment 	<ul style="list-style-type: none"> ○ Worksheets ○ Flipped learning activities ○ Past exam questions ○ Research ○ Practical write-ups ○ Isaac Physics 	<ul style="list-style-type: none"> ○ United in harmony when planning and carrying out a practical ○ Discerning when analysing data and joyful at the possibilities of science ○ Leading others in pursuit of justice when planning and carrying out a practical ○ Service and sacrifice when we recognise the scientific work that has been done before us ○ Care for creation ○ Community and participation ○ Dignity of God's people ○ Solidarity ○ Personal ○ Social ○ Physical 	KS1/2 <ul style="list-style-type: none"> ○ Gravity ○ Magnets KS3 <ul style="list-style-type: none"> ○ Forces ○ Electromagnetism ○ Atomic structure KS4 <ul style="list-style-type: none"> ○ Forces ○ Magnetism and electromagnetism ○ Electric fields ○ Atomic structure KS5

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	<ul style="list-style-type: none"> ○ Induced fission ○ Safety aspects 	<ul style="list-style-type: none"> ○ accuracy of measurements and health and safety considerations ○ Make and record observations and measurements using a range of apparatus and methods ○ Evaluate methods and suggest possible improvements and further investigations ○ Presenting observations and other data using appropriate methods ○ Interpreting observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions ○ Presenting reasoned explanations including relating data to hypotheses ○ Being objective, evaluating data in terms of accuracy, precision, repeatability and reproducibility and identifying potential sources of random and systematic error ○ Use scientific vocabulary, terminology and definitions ○ Recognise the importance of scientific quantities and understand how they are determined ○ Use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate 			<ul style="list-style-type: none"> ○ Moral ○ Cultural ○ Geography ○ PE ○ Food Tech ○ Maths 	

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		<ul style="list-style-type: none"> ○ Use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano) ○ Interconvert units ○ Use an appropriate number of significant figures in calculation 				

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Spring Half Term 1						
Nuclear physics Turning points in physics	<ul style="list-style-type: none"> ○ Induced fission ○ Safety aspects ○ The discovery of the electron ○ Cathode rays ○ Thermionic emission of electrons ○ Specific charge of the electron ○ Principle of Milikan's determination of the electronic charge, e ○ Wave-particle duality ○ Newton's corpuscular theory of light ○ Significance of Young's double slits experiment ○ Electromagnetic waves ○ The discovery of photoelectricity 	<ul style="list-style-type: none"> ○ Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts ○ Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences ○ Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena ○ Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment ○ Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations ○ Make and record observations and measurements using a range of apparatus and methods 	<ul style="list-style-type: none"> ○ Targeted questioning ○ Mid-topic assessment ○ End of topic assessment 	<ul style="list-style-type: none"> ○ Worksheets ○ Flipped learning activities ○ Past exam questions ○ Research ○ Practical write-ups ○ Isaac Physics 	<ul style="list-style-type: none"> ○ Grateful for waves enabling us to be able to communicate ○ Discerning when analysing data presented to us and joyful at the possibilities of science ○ Leading others in pursuit of justice when planning and carrying out a practical ○ Service and sacrifice when we recognise the scientific work that has been done before us ○ Loving and compassionate when we consider how scientific advancements can be used to help others ○ Dignity of God's people 	KS1/2 <ul style="list-style-type: none"> ○ Light KS3 <ul style="list-style-type: none"> ○ Atomic structure ○ Waves KS4 <ul style="list-style-type: none"> ○ Atomic structure ○ Waves KS5

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	<ul style="list-style-type: none"> ○ Wave-particle duality and Electron microscopes ○ Special relativity ○ The Michelson-Morley experiment ○ Einstein's theory of special relativity ○ Time dilation ○ Length contraction ○ Mass and energy 	<ul style="list-style-type: none"> ○ Evaluate methods and suggest possible improvements and further investigations ○ Presenting observations and other data using appropriate methods ○ Interpreting observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions ○ Presenting reasoned explanations including relating data to hypotheses ○ Being objective, evaluating data in terms of accuracy, precision, repeatability and reproducibility and identifying potential sources of random and systematic error ○ Use scientific vocabulary, terminology and definitions ○ Recognise the importance of scientific quantities and understand how they are determined ○ Use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate ○ Use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano) ○ Interconvert units 			<ul style="list-style-type: none"> ○ Community and participation ○ Care for creation ○ Dignity in work ○ Peace and reconciliation ○ Solidarity ○ Personal ○ Social ○ Moral ○ Cultural ○ Art ○ Geography ○ Maths 	

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Spring Half Term 2						
Turning points in physics	<ul style="list-style-type: none"> ○ Wave-particle duality ○ Electron microscopes ○ Special relativity ○ The Michelson-Morley experiment ○ Einstein’s theory of special relativity ○ Time dilation ○ Length contraction ○ Mass and energy 	<ul style="list-style-type: none"> ○ Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts ○ Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences ○ Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena ○ Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment ○ Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations ○ Make and record observations and measurements using a range of apparatus and methods 	<ul style="list-style-type: none"> ○ Targeted questioning ○ Mid-topic assessment ○ End of topic assessment 	<ul style="list-style-type: none"> ○ Worksheets ○ Flipped learning activities ○ Past exam questions ○ Research ○ Practical write-ups ○ Isaac Physics 	<ul style="list-style-type: none"> ○ Grateful for waves enabling us to be able to communicate ○ Discerning when analysing data presented to us and joyful at the possibilities of science ○ Leading others in pursuit of justice when planning and carrying out a practical ○ Service and sacrifice when we recognise the scientific work that has been done before us ○ Loving and compassionate when we consider how scientific advancements can be used to help others ○ Dignity of God’s people 	<p>KS1/2</p> <ul style="list-style-type: none"> ○ Light <p>KS3</p> <ul style="list-style-type: none"> ○ Waves <p>KS4</p> <ul style="list-style-type: none"> ○ Waves

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Summer Term						
Revision		<ul style="list-style-type: none"> ○ Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts ○ Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences ○ Plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena ○ Apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment ○ Carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations ○ Make and record observations and measurements using a range of apparatus and methods 	<ul style="list-style-type: none"> ○ Targeted questioning ○ Past papers 	<ul style="list-style-type: none"> ○ Worksheets ○ Flipped learning activities ○ Past exam questions ○ Research ○ Practical write-ups ○ Isaac Physics 	<ul style="list-style-type: none"> ○ Grateful for waves enabling us to be able to communicate ○ Discerning when analysing data presented to us and joyful at the possibilities of science ○ Leading others in pursuit of justice when planning and carrying out a practical ○ Service and sacrifice when we recognise the scientific work that has been done before us ○ Loving and compassionate when we consider how scientific advancements can be used to help others ○ Dignity of God's people 	<p>KS1/2</p> <ul style="list-style-type: none"> ○ Energy ○ Forces <p>KS3</p> <ul style="list-style-type: none"> ○ Energy ○ Forces <p>KS4</p> <ul style="list-style-type: none"> ○ Energy ○ Forces

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		<ul style="list-style-type: none"> ○ Use an appropriate number of significant figures in calculation 				