KS5 Curriculum Overview (PHYSICS)

<u>Year 12</u>

TERM 1 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
Topic 1 Working as a physicist	Math Links	Career links
1.1 Working as a physicist	Recognise and make use of	Engineering, avionics,
1. Units	appropriate units in calculations.	aerospace, materials scientist.
2. Estimation	estimate results. make order of	flight management analyst.
	magnitude calculations, use algebra to	meteorologist, armed forces.
Topic 2 Mechanics	re-arrange and solve equations.	
2.1 Motion	recognise the importance of the	British Values
1. Velocity & acceleration	straight line graph as an analysis tool	Tolerance – acceptance of
2. Motion graphs	for the verification and development	differing opinions on how to
3. Adding forces	of physical laws by experimentation.	answer questions and resolve
4. Moments	Determine the slope and intercept of	challenges.
	a linear graph, calculate the area	Individual Liberty – within Core
Topic 4 Materials	under the line on a graph, use	practical activities all students
4.1 Fluids	geometry and trigonometry.	have to work independently.
1. Fluids, density and upthrust		Rule of Law – Students have to
2. Fluid movement	Units of measurement, visualising and	follow strict safety guidance to
3. Drag act	representing 3D forms and finding	ensure their own safety and for
4. Terminal velocity	volumes of rectangular blocks.	the safety of others.
	cylinders and spheres.	Democracy – When completing
		pair and team challenges
	Calculating areas of circles, use of	realizing that they have to listen
	standard form and ordinary form.	as well discuss their own
	substituting numerical values into	opinions.
	algebraic equations.	Mutual respect - When
		completing pair and team
		challenges realizing that they
		have to listen as well discuss
		their own opinions.
		Listening to others' responses to
		answers and being willing to
		play their part.
TERM 2 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
Topic 2 Mechanics	Math Links	Career links
2.1 Motion	Units of measurement, using	Astronomer, astrophysicist,
4. Moments	Pythagoras' theorem and the angle	engineering, avionics,
5. Newton's laws of motion	sum of a triangle, using sin, cos and	aerospace, materials scientist,
6. Kinematics equations	tan in physical problems, changing the	flight management analyst,
7. Resolving vectors	subject of an equation, plotting two	meteorologist, armed forces,
8. Projectiles	variables from experimental data and	architect, structural engineer,
	understanding that y = mx + c	car manufacture, geophysicist.
Topic 4 Materials	represents a linear relationship,	
4.2 Solid material properties	standard form, solving algebraic	British Values
1. Hooke's law	equations, substituting numerical	Tolerance – acceptance of
2. Stress, strain and the Young modulus	values into algebraic equations.	differing opinions on how to
3. Stress-strain graphs		answer questions and resolve
	Calculating areas of circles, making	challenges.
	order of magnitude calculations,	Individual Liberty – within Core
	determining the slope of a linear	practical activities all students
	graph, estimate by graphical methods,	have to work independently.
	the area between a curve and the x-	Rule of Law – Students have to
	axis and recognizing the physical	follow strict safety guidance to
	significance of the area.	

		the safety of others. Democracy – When completing pair and team challenges realizing that they have to listen as well discuss their own
		opinions. Mutual respect - When completing pair and team challenges realizing that they have to listen as well discuss their own opinions. Listening to others' responses to
		play their part.
TERM 3 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
2.2 Energy 1. Gravitational potential and kinetic energies 2. Work and power 2.3 Momentum	Units of measurement, using sin, cos and tan in physical problems, changing the subject of an equation, plotting two variables from	Astronomer, astrophysicist, engineering, avionics, aerospace, materials scientist, flight management analyst, meteorologist, armed forces
 Momentum Momentum Conservation of linear momentum 	that y = mx + c represents a linear relationship, solving algebraic equations, substituting numerical values into algebraic equations, using angles in regular 2D and 3D	electrician, electrical engineer, geophysicist, archaeologist, surveyor, architect, structural engineer, car manufacture.
3.1 Electrical quantities 1. Electrical current	structures.	British Values Tolerance – acceptance of
 2.Electrical energy transfer 3. Current-voltage relationships 4. Resistivity 5. Conduction and resistance 6. Semiconductors 	Calculating areas of circles, use of standard form and ordinary form, determining the slope of a linear graph.	differing opinions on how to answer questions and resolve challenges. Individual Liberty – within Core practical activities all students have to work independently. Rule of Law – Students have to follow strict safety guidance to ensure their own safety and for the safety of others. Democracy – When completing pair and team challenges realizing that they have to listen as well discuss their own opinions. Mutual respect - When completing pair and team challenges realizing that they have to listen as well discuss their own opinions. Listening to others' responses to answers and being willing to play their part.
TERM 4 TOPIC/s	 *Key Skills/Subject Links 	*Career links & BV

light	Units of measurement, translating	Acoustic engineer, musician,
5.1 Basic waves	information between degrees and	space scientist, armed forces,
1. Wave basics	radians, translating information	communications, surveyor,
2. Wave types	between graphical, numerical and	architect, seismologist.
5.2 The behaviour of waves	algebraic form, plotting two variables	
1. Wave phase and superposition	from experimental data and	British Values
2 Stationary waves	understanding that $y = mx + c$	Tolerance – acceptance of
3. Diffraction	represents a linear relationship.	differing opinions on how to
4. Wave interference	standard form, changing the subject of an equation, solving algebraic equations, substituting numerical values into algebraic equations.	answer questions on now to answer questions and resolve challenges. Individual Liberty – within Core practical activities all students have to work independently. Rule of Law – Students have to follow strict safety guidance to ensure their own safety and for the safety of others. Democracy – When completing pair and team challenges realizing that they have to listen as well discuss their own opinions. Mutual respect - When completing pair and team challenges realizing that they have to listen as well discuss their own opinions. Listening to others' responses to
		answers and being willing to play their part.
TERM 5 TOPIC/s	 *Key Skills/Subject Links 	answers and being willing to play their part. *Career links & BV
TERM 5 TOPIC/s	*Key Skills/Subject Links Math Links	answers and being willing to play their part. *Career links & BV
TERM 5 TOPIC/s Topic 5 Waves and the particle nature of light	*Key Skills/Subject Links Math Links Units of measurement, standard form,	answers and being willing to play their part. *Career links & BV Career links Optical physicist, optometrist,
TERM 5 TOPIC/s Topic 5 Waves and the particle nature of light 5.3 Optics	 *Key Skills/Subject Links Math Links Units of measurement, standard form, changing the subject of an equation, 	answers and being willing to play their part. *Career links & BV Career links Optical physicist, optometrist, chemical engineer, materials
TERM 5 TOPIC/s Topic 5 Waves and the particle nature of light 5.3 Optics 1. Refraction	 *Key Skills/Subject Links Math Links Units of measurement, standard form, changing the subject of an equation, solving algebraic equations, 	answers and being willing to play their part. *Career links & BV Career links Optical physicist, optometrist, chemical engineer, materials engineer, artificial intelligence
TERM 5 TOPIC/s Topic 5 Waves and the particle nature of light 5.3 Optics 1. Refraction 2. Total internal reflection (TIR)	 *Key Skills/Subject Links Math Links Units of measurement, standard form, changing the subject of an equation, solving algebraic equations, substituting numerical values into 	answers and being willing to play their part. *Career links & BV Career links Optical physicist, optometrist, chemical engineer, materials engineer, artificial intelligence developer, meteorologist,
TERM 5 TOPIC/s Topic 5 Waves and the particle nature of light 5.3 Optics 1. Refraction 2. Total internal reflection (TIR) 3. Lenses	 *Key Skills/Subject Links Math Links Units of measurement, standard form, changing the subject of an equation, solving algebraic equations, substituting numerical values into algebraic equations, determining the 	answers and being willing to play their part. *Career links & BV Career links Optical physicist, optometrist, chemical engineer, materials engineer, artificial intelligence developer, meteorologist, armed forces,
TERM 5 TOPIC/s Topic 5 Waves and the particle nature of light 5.3 Optics 1. Refraction 2. Total internal reflection (TIR) 3. Lenses 4. Image formation	 *Key Skills/Subject Links Math Links Units of measurement, standard form, changing the subject of an equation, solving algebraic equations, substituting numerical values into algebraic equations, determining the slope and intercept of a linear graph 	answers and being willing to play their part. *Career links & BV Career links Optical physicist, optometrist, chemical engineer, materials engineer, artificial intelligence developer, meteorologist, armed forces, architect, structural engineer,
TERM 5 TOPIC/s Topic 5 Waves and the particle nature of light 5.3 Optics 1. Refraction 2. Total internal reflection (TIR) 3. Lenses 4. Image formation 5. Polarisation	 *Key Skills/Subject Links Math Links Units of measurement, standard form, changing the subject of an equation, solving algebraic equations, substituting numerical values into algebraic equations, determining the slope and intercept of a linear graph (y = mx + c), use of ratios and similar 	answers and being willing to play their part. *Career links & BV Career links Optical physicist, optometrist, chemical engineer, materials engineer, artificial intelligence developer, meteorologist, armed forces, architect, structural engineer, medical physicist.
TERM 5 TOPIC/s Topic 5 Waves and the particle nature of light 5.3 Optics 1. Refraction 2. Total internal reflection (TIR) 3. Lenses 4. Image formation 5. Polarisation 5.4 Quantum Physics	 *Key Skills/Subject Links Math Links Units of measurement, standard form, changing the subject of an equation, solving algebraic equations, substituting numerical values into algebraic equations, determining the slope and intercept of a linear graph (y = mx + c), use of ratios and similar triangles, identifying uncertainties in 	answers and being willing to play their part. *Career links & BV Career links Optical physicist, optometrist, chemical engineer, materials engineer, artificial intelligence developer, meteorologist, armed forces, architect, structural engineer, medical physicist.
TERM 5 TOPIC/s Topic 5 Waves and the particle nature of light 5.3 Optics 1. Refraction 2. Total internal reflection (TIR) 3. Lenses 4. Image formation 5. Polarisation 5.4 Quantum Physics 1. Wave particle duality	 *Key Skills/Subject Links Math Links Units of measurement, standard form, changing the subject of an equation, solving algebraic equations, substituting numerical values into algebraic equations, determining the slope and intercept of a linear graph (y = mx + c), use of ratios and similar triangles, identifying uncertainties in measurements. 	answers and being willing to play their part. *Career links & BV Career links Optical physicist, optometrist, chemical engineer, materials engineer, artificial intelligence developer, meteorologist, armed forces, architect, structural engineer, medical physicist. British Values
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		as well discuss their own opinions. Mutual respect - When completing pair and team challenges realizing that they have to listen as well discuss their own opinions. Listening to others' responses to answers and being willing to play their part.
TERM 6 TOPIC/s	 *Key Skills/Subject Links 	*Career links & BV
Rollover Topic 6 Further Mechanics 6.1 Further momentum 1. Energy in collisions 2. More collisions Topic 7 Electric and magnetic fields 7.1 Electric fields 1. Electric fields 2. Milikan's oil drop experiment 3. Radial electric fields 4. Coulomb's law	Math Links Use of trigonometric functions, use of Pythagoras' theorem, changing the subject of an equation, substituting values into algebraic equations, visualizing and representing 2D forms. Recognising and use of appropriate units, identifying uncertainties in measurements, solving quadratic equations,	Career links Crash analyst, road traffic officer, military, police, and scientific research. British Values Tolerance – acceptance of differing opinions on how to answer questions and resolve challenges. Individual Liberty – within Core practical activities all students have to work independently. Rule of Law – Students have to follow strict safety guidance to ensure their own safety and for the safety of others. Democracy – When completing pair and team challenges realizing that they have to listen as well discuss their own opinions. Mutual respect - When completing pair and team challenges realizing that they have to listen as well discuss their own opinions. Listening to others' responses to answers and being willing to play their part.

KS5 Curriculum Overview (PHYSICS)

<u>Year 13</u>

TERM 1 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
Rollover Topics continued.	Math Links	Career links
Topic 6 Further Mechanics	Use of trigonometric functions, significant	Sports analyst, astronomer,
6.2 Circular motion	figures, use of small angle approximations,	road traffic officer, military,
1.Circular motion basics	changing the subject of an equation, translating	police, scientific research,
2. Centripetal force	information between numerical and graphical	and electrician.
	forms, determining the slope of a linear graph.	
Topic 7 Electric and magnetic		British Values
fields	Use of calculators to work with exponential and	Tolerance – acceptance of
7.1 Electric fields	logarithmic functions, calculating the area	differing opinions on how to
1. Electric fields	under a curve, interpreting logarithmic plots,	answer questions and
2. Milikan's oil drop experiment	understanding that y=mx + c represents a linear	resolve challenges.
3. Radial electric fields	relationship, use of spreadsheet modelling,	Individual Liberty – within
4. Coulomb's law	understanding the slope of a tangent to a curve	Core practical activities all
7.2 Capacitors	as a measure of rate of change, use of angles in	students have to work
1. Capacitor basics	2D and 3D structures, distinguishing between	independently.
2. Charging and discharging	instantaneous and average rates of change.	Rule of Law – Students have
capacitors		to follow strict safety
3. Capacitor mathematics	Recognising and use of appropriate units,	guidance to ensure their
7.3 Electromagnetic effects	finding arithmetic means, use of ratios,	own safety and for the
1. Magnetic fields	estimating results, substituting numerical	safety of others.
2. Electric motors	values into equations.	Democracy – When
		completing pair and team
Topic 9 Thermodynamics		challenges realizing that they
9.1 Heat and temperature		have to listen as well discuss
1. Heat and temperature		their own opinions.
2. Internal energy		wittual respect - when
		completing pair and team
		baye to liston as well discuss
		their own opinions
		Listening to others'
		responses to answers and
		being willing to play their
		part
TERM 2 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
Topic 9 Thermodynamics	Math Links	Career links
9.1 Heat and temperature	Recognising and use of appropriate units,	Materials scientist,
(continued)	finding arithmetic means, use of ratios,	engineering, medical
3. Heat transfer	estimating results, substituting numerical	physicist.
4. Ideal gas behavior	values into equations.	Britich Volues
Topic 13 Oscillations	Draw and use the slope of a tangent to a curve	Tolerance – accentance of
13.1 Oscillations	as a measure of rate of change use of small	differing opinions on how to
1 Simple Harmonic Motion	angle approximation changing the subject of a	answer questions and
(SHM)	non-linear equation, sketching and interpreting	resolve challenges
2. SHM Mathematics	relationships shown graphically applying the	Individual Liberty – within
3. SHM Energy	principles of calculus	Core practical activities all
4. Resonance and damping		students have to work
	Use of angles in 2D and 3D structure	independently
Topic 7 Electric and magnetic	distinguish between instantaneous and average	Rule of Law – Students have
fields	rates of change.	to follow strict safety
7.3 Electromagnetic effects		guidance to ensure their
	1	

 Magnetic fields Electric motors Magnetic forces Generating electricity Alternating current 		own safety and for the safety of others. Democracy – When completing pair and team challenges realizing that they have to listen as well discuss their own opinions. Mutual respect - When completing pair and team challenges realizing that they have to listen as well discuss their own opinions.
		Listening to others' responses to answers and being willing to play their part.
TERM 3 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
Topic 11.1 Gravitational fields 1. Gravitational forces 2. Gravitational fields Topic 12 Space Topic 12.1 Space 1. Starshine 2. Stellar classification 3. Distances to the stars 4. Age of the Universe Topic 8 Nuclear and particle physics 8.1 Probing matter 1. A nuclear atom 2. Electrons from atoms 8.2 Particle accelerators and detectors 1. Particle accelerators 2. Particle detectors 3. The Large Hadron Collider (LHC)	Solving algebraic equations, changing the subject of a non-linear equation, sketching and interpreting relationships shown graphically, distinguish between instantaneous and average rates of change. Use of angles in 2D and 3D structures, use of small angle approximations. Recognising and use of appropriate units, making order of magnitude calculations, estimating results, substituting numerical values into equations using appropriate units.	Nuclear physicist, medical physicist, astronomer, astronaut, research scientist. British Values Tolerance – acceptance of differing opinions on how to answer questions and resolve challenges. Individual Liberty – within Core practical activities all students have to work independently. Rule of Law – Students have to follow strict safety guidance to ensure their own safety and for the safety of others. Democracy – When completing pair and team challenges realizing that they have to listen as well discuss their own opinions. Mutual respect - When completing pair and team challenges realizing that they have to listen as well discuss their own opinions. Listening to others' responses to answers and
TERM 4 TOPIC/s		*Career links & BV
	 *Key Skills/Subject Links 	

Topic 8 Nuclear and particle	Math Links	Career links
physics	Recognising and use of appropriate units, use of	Nuclear physicist, medical
8.3 The particle zoo	standard form, considering orders of	physicist, astronomer.
1. Particle interactions	magnitude, changing the subject of an	astronaut, research scientist.
2. The particle zoo	equation, substituting numerical values into	radiographer
3 Particles and forces	equations using appropriate units	radiographen
A Particle reactions		British Values
	Use of exponential and logarithmic functions	Tolerance – acceptance of
Topic 10 Nuclear radiation	use of the principles of calculus use of	differing opinions on how to
10 1 Padioactivity	logarithmic graph plots calculating surface	answer questions and
1 Nuclear radiation		rosolvo challongos
2. Data of radioactive decay	aleas.	resolve challenges.
2. Rate of radioactive decay		Core prostical activities all
3. Fission and fusion		core practical activities all
4. Nuclear powerstations		students have to work
Devision and success		ndependently.
Revision programme.		Rule of Law – Students have
		to follow strict safety
		guidance to ensure their
		own safety and for the
		safety of others.
		Democracy – When
		completing pair and team
		challenges realizing that they
		have to listen as well discuss
		their own opinions.
		Mutual respect - When
		completing pair and team
		challenges realizing that they
		have to listen as well discuss
		their own opinions.
		Listening to others'
		responses to answers and
		being willing to play their
		part.
TERM 5 TOPIC/s	 *Key Skills/Subject Links 	*Career links & BV
Revision programme.		
TERM 6 TOPIC/s	 *Key Skills/Subject Links 	*Career links & BV
Exam preparation.		