St Peter's Collegiate Academy

Yr 10 Separate Physics Curriculum

At St Peter's we believe that a broad and balanced curriculum with a strong academic core is a right for all pupils. We seek to encourage pupils to explore subjects of interest around their in-school learning and to enhance their curriculum experience through enrichment.

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question
How do forces and motion interact?	**How do forces and motion interact?**	**How do circuits work?**	**How do circuits work?**	**How do magnets behave?**	**What is energy?**
Knowledge	Knowledge	Knowledge	Knowledge	Knowledge	Knowledge
P2.2 Newton's laws • Describe and give examples of contact or non-contact forces. • Vector and scalar quantities. • Describe the interaction between forces between pairs of objects. • Describe how to find and represent the centre of mass of an object. **P2.3 Forces in action** • Describe the relationship between mass, weight, and gravity. • Describe a gravitational field. • Recall acceleration in free fall, g. **P2.2 Newton's laws.** • **Calculate resultant force of forces acting in a straight line (HT)** • **Describe scalar and vector quantities using free body diagrams (HT)** • **Represent and interpret vector quantities using scale diagrams (HT).** • Describe energy transfers when work is done, including the effect of work done against frictional forces. • Calculate work done, force or distance given appropriate information. • Convert units where needed. • Power as the rate at which energy is transferred. **P2.3 Forces in action** • More than one force is required to stretch, bend or	**P2.1 Motion** • To measure distance and time and use these to calculate speed. • Vector and scalar quantities. • Calculating velocity and uniform and non-uniform acceleration. • Drawing and interpreting graphs of motion. • Measure acceleration through a required practical (PAG 3). • **Interpet areas of velocity time graphs (HT).** **P2.2 Newton's laws.** • Describe the effect of resultant forces on objects. • Newton's first law. • **Objects moving in a circle with constant speed have changing velocity (HT).** • Newton's second Law and calculations. • Third law and terminal velocity. • **Momentum and inertia (HT only)** • Describe examples of force that cause rotation. • Define and calculate moments. • Levers and gears. • Pressure in fluids. • How basic hydraulic systems work..	**P3.1 Static Electricity** • Describe charge as a property of matter and describe the production of charge through friction. • Interaction of opposite and like charges. • Electric fields and forces • Gold leaf electroscope. • Van der Graff generator. • Uses of electrostatics. • Define current, units and how it is measured and calculated. • How current behaves in a series circuit. • The relationship between current charge and time. **P3.2 Simple Circuits** • Circuit symbols and diagrams • Comparing series and parallel circuits. • Positive and negative terminals and conventional current.	**P3.2 Simple Circuits** • Define voltage and resistance, state their units and how they are measured. • Investigating voltage and current in series and parallel circuits involving calculations. • Investigating resistances through different components (PAG P6). • Ohm's law and graphs linking to non-linear or linear relationships. • Relate graphs of components to their functions (LDRs, fixed resistors, thermistors and lamps) • Resistance in series (quantitative) and parallel (qualitative). • Relationship of power, voltage and current.	**P4.1 Magnets and Magnetic fields** • Attraction and repulsion for like and unlike poles. • Permanent and induced magnets. • Magnetic fields. • Magnetic core of Earth and compasses. • Magnetic field around a conducting wire. • Recall how the strength of the field depends on distance from the wire. • Investigation on strength of magnetic field in a solenoid. **P4.2 Uses of magnetism** • **How a magnet and current carrying wire exert forces on one another (HT).** • **Use of Fleming's left hand rule (HT).** • **Apply the equation F = BIL (HT).** • **Electric motors (HT).** • **How an induced potential difference can be created with a magnetic field (HT).** • **Alternators and dynamos (HT).** • **How transformers work (HT).** • **How voltage and number of turns in a coil are linked in transformers (HT).** • **Microphones and loudspeakers (HT).**	**P7.1 Work Done** • Name the 8 energy stores and transfers. • Calculate the energy stored in a moving object, spring and object at height. • Use values for GPE to calculate the theoretical velocity of an object. • Explain why the maximum theoretical velocity is never actually reached. • Explain the law of conservation of energy. • Apply conservation of energy to systems involving GPE and KE • Describe the energy transfers in a bouncing object **P5.2 Power and Efficiency** • Describe how energy is dissipated and calculate efficiency. • Calculate power using energy transferred or work done • Work is done by current flow, forces and heating. • Using electrical appliances and kWh • Describe how energy is transferred from batteries or the a.c from the mains • Calculate efficiency from data • **Describe ways of making systems more efficient (HT).** • Explain a method for reducing unwanted energy transfers (lubrication and insulation) • how energy may be wasted in the transfer to and within motors and heating devices • Describe how rate of cooling is effected by the thickness and thermal conductivity (PAG 5).

compress an object. ● Compare elastic and plastic deformation. ● Recall and use a formula to calculate extension, force or spring constant. ● Use graphs to explain the limit of proportionality and linear/non-linear relationships of force and extension. ● Relate stretching and compression to work done and calculate this.					
Skills & Procedural Knowledge	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**
● Identify variables to change, measure, and control in a given hypothesis. ● Construct a table for results, including units. ● Explain the steps in the method to test a given hypothesis. ● Collect and display data accordingly. ● Plot and use graphs of force and extension.	● Identify variables to change, measure, and control in a given hypothesis. ● Construct a table for results, including units. ● Explain the steps in the method to test a given hypothesis. ● Collect and display data accordingly. ● Calculate areas under a line of best fit.				
Key Assessment Task (KAT)	**Key Assessment Task (KAT)**	**Key Assessment Task (KAT)**	**Key Assessment Task (KAT)**	**Key Assessment Task (KAT)**	**Key Assessment Task (KAT)**
Y10 Separate Physics KAT 1	**Y10 Separate Physics Assessment 1**	**Y10 Separate Physics KAT 2**	**Y10 Separate Physics Assessment 2**	**Y10 Separate Physics KAT 3**	**Y10 Separate Physics Assessment 3**

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Yr 11 Separate Physics Curriculum

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Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question	Unit of Work/Big Question
What is a wave?	**How is a substance radioactive?**	**How does physics relate to the real world?**	**Exam Revision**	**Exam Revision**	
Knowledge	Knowledge	Knowledge	Knowledge	Knowledge	Knowledge
P5.1 Wave Properties • Define amplitude, frequency, velocity and wavelength. Their relationship and units. • Compare transverse and longitudinal waves. • How variables change when waves are transmitted from one medium to another. • Effects of transmission, reflection and absorption of waves. • Refraction of light (PAG 8). • **Structure of the ear (HT).** • **Conversion of sound waves to vibrations (HT).** • **Human hearing (HT).** • Examples of transverse and longitudinal waves. • Refraction in a ripple tank (PAG 8). • The transfer of energy moves but mediums stay stationary. **P5.2 The electromagnetic spectrum** • EM waves are transverse with the same velocity. • Relationship of frequency and wavelength of the EM spectrum. • Define all main groups of the EM spectrum. • Eyes can only detect the visible part of the EM spectrum. • Practical uses of EM waves. • How some EM waves can have hazardous effects. • **Medical uses of EM waves based on velocity, absorption and reflection (HT).** • **Production of radio waves (HT).**	**P6.1 Radioactive emissions** • Constituents of nuclei. • Isotopes. • Unstable nuclei emit three types of radiation and how they change the mass or charge of a nucleus. • Symbols of radiation and decay equations. • Penetration and ionisation properties of radiation. • Electron arrangement and excitation/de-excitation. • Half life. • **Half-life graph analysis and net decline during radioactive emissions (HT).** **P6.2 Uses and Hazards** • Contamination and irradiation. • How hazardous effects are linked to half life. • Nuclear radiation and exploration of internal organs or destruction of unwanted tissue. • Nuclear fission and chain reactions. • Nuclear fusion and mass/energy conversions.	**P8.1 Physics on the move** • Everyday speeds for walking, cycling and running. • Magnitude for everyday accelerations. • Conversion of units. • Human reaction times. • Factors affecting braking, stopping and thinking distances. • How stopping distances vary with speed.s • Dangers linked with large decelerations/accelerations. • **Forces involved in typical situations on public roads (HT).** **P8.2 Powering Earth** • Renewable and non-renewable energy resources. • The national grid and transformers. • Efficiency of the national grid. • **Potential difference and turns in a transformer (HT).** • Domestic supply in UK as 50Hz and 230 Volts. • Direct and alternating voltages. • Wires in a plug and dangers that are associated. **P8.3 Beyond Earth** • Red shift among galaxies and how it links to evidence of the BIg-Bang model. • Life cycle of stars. • Emission of radiation from all bodies. • Intensity and wavelength of	**Exam Revision**	**Exam Revision**	

P5.3 Wave interactions ● **Effects of transmission, reflection and absorption of waves (HT).** ● Ray diagrams of convex and concave lenses. ● Ray diagrams to illustrate reflection and refraction. ● Explanation of how we see colour.		radiation and how it depends on temperature. ● Structure and components of the solar system. ● **Circular orbits and speed/velocity (HT).** ● **Temperature of the Earth and radiation (HT).** ● **Waves and reflection/absorption between liquids and solids including knowledge of P and S waves (HT).**			
Skills & Procedural Knowledge	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**	**Skills & Procedural Knowledge**
● How to use a ripple tank and take measurements and calculations. ● How to cause light to refract/reflect.	● Graph analysis	● How to wire a plug			
Key Assessment Task (KAT)	**Key Assessment Task (KAT)**	**Key Assessment Task (KAT)**	**Key Assessment Task (KAT)**	**Key Assessment Task (KAT)**	**Key Assessment Task (KAT)**
Y11 Separate Physics KAT 1	**Y11 Separate Physics Assessment 1**	**Y11 Separate Physics Mock Exam 1**	**Y11 Separate Physics Mock Exam 2**		