Key Stage 3 Curriculum Overview- Physics

Progression from Key Stage 2 and Progression through Key Stage 3

	Autumn Term	Spring Term	Summer Term
Year 6	**Students at the end of Key Stage 2 will be able to:** • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • identify the effects of air resistance, water resistance and friction, that act between moving surfaces • recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. • recognise that light appears to travel in straight lines • use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. • associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • use recognised symbols when representing a simple circuit in a diagram.		
Year 7	Transitional content – Electricity and forces Space science enrichment (2 weeks) Energy topic – energy stores and transfers. Energy in food and fuels. Power and energy rates and cost of energy.	Forces topic – types of forces and force diagrams, speed and distance time graphs. Motion, gravity, weight and mass AP1 Waves topic – sound and hearing, sound through materials and reflection. Light waves, reflection and refraction. Seeing light and colour and lenses	Electricity topic – generating electricity, renewable and non-renewable resources, circuit symbols, series and parallel circuits. Magnetic fields and Earths magnetism AP2 RSE – see separate scheme of work
Year 8	Space science enrichment (including trip) (2 weeks) Energy – work done and levers and pulleys . Thermal energy, conduction, convection and radiation Forces topic - air resistance and drag, stretching and compression. Pressure, floating and sinking AP1	Waves topic – Wave types and properties, loudspeakers, ultrasound and microwaves, water waves. HSW – practical investigation Enrichment topic – careers in science	Electricity and magnetism – static electricity, electric fields, electromagnets AP2 RSE – see separate scheme of work

Year 9	Energy topic – Sankey diagrams, energy transfers, GPE and kinetic energy, electric energy. Heating and cooling and particle model. Internal energy, atoms and radiation, changes in the nucleus AP1	Forces – Density, scalar and vector quantities, newton's laws. Calculating resultant forces and stopping distance Waves - EM spectrum Electricity topic – Electric charge and fields, parallel and series circuits rules, current, voltage and resistance calculations.	Electricity continued – national grid and AC/DC AP2 RSE – see separate scheme of work

By the end of Key Stage 3 a student should be able to:

Have an understanding of the fundamentals of energy changes and interactions of forces, compare types and uses of waves and have an understanding of electricty and how its generated. Including the 'big ideas' in physics: that all matter in the universe is made up of particles, objects can affect other objects at distance, changing objects motion needs a forec to be applied to it, ideas of energy being created and destroyed,

Have an understanding of key scientific investigative proceedures and understand how to answer scientific questions about the natural world around them, including recording, collection and analysisng data, evaluating proceedures and identify further questions.

Be able to critially think about the uses and implications of science and scientific advancements today and for the future

Be devloping the ability to read and interpret scientific text

Develop and understanding of careers in science and how scientific disciplines link to general career opportunities

Describe associated processes and key characteristics in common language, beginning to use technical terminology accurately and precisely building an extended specialist vocabulary.

Be able to apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data, using numerical values and mathematical representations.

Be able to relate scientific explanations to phenomena in the world around them and use modelling and abstract ideas to develop and evaluate explanations.

Additional space science enrichment –

Understand how our Earth fits into the solar system, how space exploration has changed and developed over time, creation of the universe, how the motion of the earth and moon affects day and night, seasons and tides and waves.

Working scientifically – across all science disciplines

- pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility
- understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review
- Evaluate risks.
- ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience
- make predictions using scientific knowledge and understanding
- select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate
- use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety
- make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements
- apply sampling techniques.
- apply mathematical concepts and calculate results
- present observations and data using appropriate methods, including tables and graphs
- interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions
- present reasoned explanations, including explaining data in relation to predictions and hypotheses
- evaluate data, showing awareness of potential sources of random and systematic error
- identify further questions arising from their results.
- understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature
- use and derive simple equations and carry out appropriate calculations
- undertake basic data analysis including simple statistical techniques.