



YEAR 11 TERM 2

'An ambitious curriculum that meets the needs of all'

Medium Term Planning - Topic: Energy, materials, systems and devices



In addition to working further on objectives from Year 9 , pupils will be taught, following National Curriculum guidelines, the following this term:

Curriculum Intent

Energy generation

- Understand how power is generated from fossil and nuclear fuels
- Understand how power is generated from renewable energy sources such as: wind, solar, tidal, hydroelectric and biomass
- Be aware of the arguments for and against the selection of fossil fuels, renewable energy and nuclear power

Energy storage

- Be able to identify mechanical power and understand how it is stored
- Understand pneumatics and hydraulics as examples of kinetic pumped storage systems
- Understand the functional properties of alkaline and re-chargeable batteries

Modern materials

- Be able to recognise a range of modern materials
- Describe developments made through the invention of new or improved processes involving modern materials
- Explain how modern materials can be used to alter functionality

Smart materials

- Be able to recognise a range of smart materials
- Understand how the functional properties of a range of smart materials can be changed by external stimuli

Composite materials and technical textiles

- Understand how material properties can be enhanced by combining two or more materials
- Recognise a range of composite materials and technical textiles
- Understand how fibres can be manipulated to create technical textiles

Systems approach to designing

- Understand the principles of electronic systems
- Use systems diagrams and flowcharts to analyse and solve a given problem
- Understand the use of open and closed loop systems and subsystems
- Recognise and understand common electronic input and output components

Electronic systems processing

- Understand the difference between analogue and digital signals
- Understand how microcontrollers are programmed as counters, timers and for decision making to provide functionality to products and processes
- Understand the use of buzzers, speakers and lamps to provide functionality to products and processes

Mechanical devices

- Be able to recognise and identify a range of movements
- Understand the functions of mechanical devices to produce linear, rotary, reciprocating and oscillating movements

Skills/Assessment Objective Links

	Understand how mechanisms can be used to change magnitude and direction of force, including levers, linkages and rotary systems
Spiritual, moral, social, and cultural development	SMSC: Sustainability linking to materials and reduction in CO2 emissions PSHE/British Values: Crowd funding, Links to British car industry Skills Builder: Linking product with the type of material and the reasons why the material is used.
Numeracy	
Literacy	Vocabulary Tier 2: See highlighted above Vocabulary Tier 3: See highlighted above Reading: exam style question, text book terminology Writing: use of technical tier 3 vocabulary within an exam question and annotation Oracy: when questioned pupils are able to use technical subject specific language
Becoming future ready	Careers/Employability: Environmental industry, various industrial links as examples
Adaptation	Throughout this topic, quality first teaching will provide differentiation:
QFT/SEND Provision	By product: By resource: PG Online booklets, teacher let focus, PG Online books By Intervention: by providing different levels of supervision and support By Progressive Questioning: exploring pupils' understanding through interactive dialogue. By Grouping: according to prior attainment, gender, social preference, preferred learning style. By Task: Pupils should be involved in the identification of targets which are meaningful to them and in the selection of an appropriate task from the given range. By Offering Optional Activities: In class or as homework, to extend learning. This QFT/SEND provision will be explicit within the lesson-by-lesson schemes of work.
Implementation Curriculum Delivery	
Learning Outcomes (Knowledge)	<ul style="list-style-type: none"> • See Above <p>Red denotes interleaving; aspects of knowledge covered previously. See highlighted above</p>
Current learning to be developed in the future within:	
Assessment	End of Unit test on material areas – using PG Online resources and text book and linking to PLCs in Doodle
Impact	Pupils to have knowledge and understanding of new and emerging technologies covered in the D&T specification