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| **YEAR 11 2023-2024 TERM 2**  **‘An ambitious curriculum that meets the needs of all’**  **Medium Term Planning - Topic: Energy, materials, systems and devices** | |
| **Curriculum Intent** | **In addition to working further on objectives from Year 9 , pupils will be taught, following National Curriculum guidelines, the following this term:**  **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   Understand how mechanisms can be used to change magnitude and direction of force, including levers, linkages and rotary systems |
| **Skills/Assessment Objective Links** |
| **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 teminology  **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:  **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. |
| **QFT/SEND Provision** |
| **Implementation**  **Curriculum Delivery** | * See Above   Red denotes interleaving; aspects of knowledge covered previously. See highlighted above |
| **Learning Outcomes (Knowledge)** |
| **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 Doddle |
| **Impact** | Pupils to have knowledge and understanding of new and emerging technologies covered in the D&T specification |