



Curriculum map – Design & Technology Y10

| YEAR 10 | AUTUMN 1 | AUTUMN 2 | SPRING 1 | SPRING 2 | SUMMER 1 | SUMMER 2 |
|----------------|--|--|---|--|--|---|
| TOPIC(s) | New and emerging technologies | Energy, materials systems and devices | Materials – including specialist materials. Materials processing | Common specialist technical principles | Designing principles | Non exam assessment – Investigating design possibilities |
| Prior learning | Sustainability Carbon Footprint Product Life Cycle Assessment Know the differences of the different categories of timbers and boards. | Properties of materials Timber origins and categories Y9 (Y7) Polymers Y8 (currently) Know the differences of the different categories of timbers and boards. 6R's Renewable Energy | Plywood manufacture Timber Processing | Carbon footprint and product miles. Basic consumerism habits. 6Rs. Levers covered in physics | Students have learned about primary and secondary sources of research. | Y10 course content, including practice NEA project. |

What students will know

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| <p>Understand the impact of new and emerging technologies on: the design and organisation of the workplace and equipment Be aware of how computers and automation have changed manufacturing through the use of robotics How innovation can drive product development and enterprise including the use of crowd funding and virtual marketing Understand co-operative and fair trade organisation. Understand how the environment can be protected by responsible design and manufacturing Understand how waste can be disposed of with the least impact on the planet Understand the positive and negative impacts new products have on the environment and the assessment of the product life cycle</p> | <p>How power is generated from fossil and nuclear fuels and from renewable energy sources such as: wind, solar, tidal, hydroelectric and biomass. Mechanical power and understand how it is stored Pneumatics and hydraulics as examples of kinetic pumped storage systems The functional properties of alkaline and re-chargeable batteries Recognise a range of smart/modern materials and how smart/modern materials can be used to alter functionality Be able to recognise a range of composite materials Understand how the functional properties of a range of composite materials. Be able to recognise and identify a range of movements Understand the functions of mechanical devices to produce linear, rotary, reciprocating and oscillating movements</p> | <p>Learn how the primary sources of materials for producing timber, paper, board, metals, alloys, polymers and textiles are and how they are converted into products Be able to recognise and characterise different types of timber, paper and board, metals, alloys, polymers and textiles. Understand how the physical and working properties of a range of materials effect their performance</p> | <p>Recognise and characterise tension, compression, bending, torsion and shear forces and stresses How materials may be enhanced to resist and work with forces and stresses to improve functionality Understand that greenhouse gases and carbon are produced during the manufacture of products. Understand the impact that a consumer society has on natural resources and the environment including deforestation, mining, drilling, farming and product miles Be aware of the need for social and governmental responsibility to address safe working conditions and pollution. Be aware of the role that consumers play in reducing waste and the demand on finite resources. Understand the hierarchy of options in responsible and sustainable design. Understand how products are produced in different volumes</p> | <p>Investigate, analyse and evaluate the work of others Understand how investigating the work of others including design companies can inform designing Understand the variety of strategies that companies and individuals can employ to complete a design project including; Collaborative design User-centered, Systems approach and Iterative design Understand how to develop, communicate, record and justify design ideas Be aware of a range of techniques to support clear communication of design ideas Know how to design and develop prototypes in response to client wants and needs</p> | <p>During this half term students will learn what contexts they can choose from for their NEA. They will be introduced to the marking criteria and what the exam board will be looking for and given access to resources to support them with the NEA.</p> |
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| | | <p>Understand how mechanisms can be used to change magnitude and direction of force, including levers, linkages and rotary systems</p> <p>Understand the principles of electronic systems</p> <p>Use systems diagrams and flowcharts to analyse and solve a given problem</p> <p>Understand the use of open and closed loop systems and subsystems</p> <p>Recognise and understand common electronic input and output components</p> | | <p>Explain when and why different manufacturing methods are used for different production volumes</p> <p>Be able to link the use of relevant specialist processes to the appropriate level of production</p> | | |

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| What students will be able to do | <p>Explain how computers and new technologies/working practices can affect production and job roles.</p> <p>Explain the components in a manufacturing system</p> <p>Explain the advantages of automation on manufacturing</p> <p>Explain CAD/CAM naming input and output devices</p> <p>Devise a detailed life cycle assessment for a given product.</p> <p>Apply the 6Rs to a product.</p> <p>Explain the meaning of social footprint. Consider the social footprint of a given product.</p> | <p>Describe finite energy sources.</p> <p>Describe nonfinite/renewable energy sources. Explain the advantages and disadvantages of finite and renewable energy sources. Name modern and smart materials and applications for their use. Explain ways in which energy can be stored and select whether it is potential or kinetic.</p> <p>Identify types of motion. Identify how different mechanisms such as linkages and gears can change motion.</p> <p>Identify/name circuit components and symbols.</p> <p>Draw schematic diagrams. Identify input and output devices.</p> | <p>Produce descriptions of the material processes including diagrams for timber, paper and boards, metals, polymers and textiles.</p> <p>Select materials for a product/use based on the material properties.</p> | <p>Identify different types of forces and calculate static and dynamic forces. Explain the impact consumers have society and nature including deforestation, mining, pollution, product miles and strategies to reduce impact including sustainable designing.</p> <p>Identify and justify appropriate scales of production in relation to production volumes.</p> | <p>Students are able to name popular designers and design companies and the characteristics of their products.</p> <p>Students are able to use the work of others to inform their own ideas.</p> <p>Students are able to use a range of presentation/ design methods to present their own ideas appropriately.</p> <p>Be able to critically evaluate prototypes and suggest modifications</p> | <p>Choose and analyse a context. Identify design possibilities and a relevant client. Create a client profile, design brief and specification</p> |
| Assessment | End of unit assessment test | End of unit assessment test | End of unit assessment test | End of unit assessment test | End of unit assessment test | |

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| Tier 3 vocabulary | Obsolescence Automation Co-Operative Ecological Sustainability Manufacture Disposability | Fracking Turbine Generator Photovoltaic cell Hydroelectric Biofuel Pneumatics Hydraulics Graphene Composite | Ductile Tensile Strength Density Galvanize Anodize Deciduous Felling Seasoning Polymer Cellulose Fibers | Static Load Dynamic Load Tension Compression Torsion Bending Shear Lamination Reinforcing | Society Influence Design Movement Cultural Ethical | Context Analysis Client Design Brief Specification |
| Extended reading opportunities | https://technologystudent.com/despro_flsh/NEW_GCSE3.html https://www.bbc.co.uk/bitesize/examspecs/zy2bdm | https://technologystudent.com/despro_flsh/NEW_GCSE3.html https://www.bbc.co.uk/bitesize/examspecs/zy2bdm | https://technologystudent.com/despro_flsh/NEW_GCSE3.html https://www.bbc.co.uk/bitesize/examspecs/zy2bdm | https://technologystudent.com/despro_flsh/NEW_GCSE3.html https://www.bbc.co.uk/bitesize/examspecs/zy2bdm | https://technologystudent.com/despro_flsh/NEW_GCSE3.html https://www.bbc.co.uk/bitesize/examspecs/zy2bdm | https://technologystudent.com/despro_flsh/NEW_GCSE3.html https://www.bbc.co.uk/bitesize/examspecs/zy2bdm |