



# Curriculum Overview – Design and Technology - Year 13

Unit Title	Learning	How can parents best support?
<b>2.1 Design methods and processes</b>	<p>Students should be aware of, and able to explain, different approaches to user centred design. That in approaching a design challenge there is not a single process, but that good design always addresses many issues, including:</p> <ul style="list-style-type: none"><li>• designing to meet needs, wants or values</li></ul> <p>Investigations to inform the use of primary and secondary data:</p> <ul style="list-style-type: none"><li>• market research</li><li>• interviews</li><li>• human factors</li><li>• focus groups</li><li>• product analysis and evaluation</li><li>• the use of anthropometric data and percentiles</li><li>• the use of ergonomic data</li><li>• the development of a design proposal</li><li>• the planning and manufacture of a prototype solution</li><li>• the evaluation of a prototype solution to inform further development.</li></ul>	<p>Encourage your child to revise the topics throughout the topics researching the key investigation points shown regarding secondary data</p>

<p><b>2.2 Design theory</b></p>	<p>Students should be aware of, and able to discuss, how key historical design styles, design movements and influential designers that have helped to shape product design and manufacture.</p> <p>Students should be aware of, and be able to discuss, key design styles and movements and their principles of design, including:</p> <ul style="list-style-type: none"> <li>• Arts and Craft movement</li> <li>• Art Deco • Modernism, eg Bauhaus</li> <li>• Post modernism, eg Memphis.</li> </ul>	<p>Encourage your child to research the different designers and design movement.</p> <p>Pupils can research and evaluate each designer/design style against each other</p>
<p><b>2.3 How technology and cultural changes can impact on the work of designers</b></p>	<p>Students should be aware of, and able to discuss, how socio economic influences have helped to shape product design and manufacture, including:</p> <ul style="list-style-type: none"> <li>• post WW1: the Bauhaus and development of furniture for mass production</li> <li>• WW2: rationing, the development of 'utility' products</li> </ul> <p>Contemporary times:</p> <ul style="list-style-type: none"> <li>• fashion and demand for mass produced furniture</li> <li>• decorative design.</li> </ul> <p>Students should be aware of, and able to discuss, how major developments in technology are shaping product design and manufacture, including:</p> <ul style="list-style-type: none"> <li>• micro electronics</li> <li>• new materials</li> </ul>	<p>Encourage a discussion with your child regarding the different types of changes between fashion, technology and design over the past 50 years</p>

- new methods of manufacture
  - advancements in CAD/CAM.
- Students should be aware of, and able to discuss, the responsibilities of designers and manufacturers, including:
- products are made using sustainable materials and ethical production methods
- The development of products that are:
- culturally acceptable
  - not offensive to people of different race, gender or religious belief
  - the development of products that are inclusive
  - the design and manufacture of products that could assist with social problems, eg poverty, health and wellbeing, migration and housing
  - the impact of Fairtrade on design and consumer demand
  - designing products to consider the six Rs of sustainability.

<p><b>2.4 Design processes</b></p>	<p>Students should be aware of, and able to discuss and implement, the stages of a range of design processes in order to apply personal judgement and relevant criteria in the appraisal of products and systems, including:</p> <ul style="list-style-type: none"> <li>• those used in the NEA</li> <li>• investigations and analysis</li> <li>• use of inspiration materials, eg mood boards</li> <li>• ideas generation</li> <li>• illustration</li> <li>• development of a design specification</li> <li>• modelling</li> <li>• planning</li> <li>• evaluating and testing.</li> </ul> <p>Students should be aware of, and able to discuss and demonstrate, the development of a prototype from design proposals. This knowledge should influence the development of design ideas for the NEA so that students may make high quality products that meet the needs of identified users.</p> <p>Students should be aware of, and able to discuss, how different design methodologies are used by designers in the corporate world when designing products including collaborative working and the cyclic nature of commercial design and manufacture.</p>	<p>Encourage your child to explore the design process, the variety of stages and developments. Focusing initially on the iterative design process.</p> <p>Pupils can complete a mini project which is inspired by the iterative design process they have researched.</p>
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<p><b>2.5 Critical analysis and evaluation</b></p>	<p>Students should be aware of, and able to discuss, their own and commercial products leading to possible improvements/modifications of the original idea.</p> <p>Students should be aware of, and able to discuss, how products are required to undergo rigorous testing, and the testing methods used, before they become commercially available for sale</p> <p>Students should be aware of, and able to discuss, how the use of feedback and testing informs the evaluation process, including:</p> <ul style="list-style-type: none"> <li>• informing future modification and development</li> <li>• the importance of ensuring the views of other interested parties in order to have objective and unbiased feedback.</li> </ul>	<p>Encourage your child to watch 'Brinell Hardness Test' 'Vickers Hardness Test' 'Rockwell Hardness Test' on youtube and make notes</p>
<p><b>2.6 Selecting appropriate tools, equipment and processes</b></p>	<p>Students should be aware of, and able to discuss and demonstrate, good and safe working practices, including:</p> <ul style="list-style-type: none"> <li>• the importance of using the correct tools and equipment for specific tasks</li> <li>• the importance of ensuring their own safety and that of others when in a workshop situation</li> <li>• how designs are developed from a single prototype into mass produced products</li> <li>• the effect on the manufacturing process that is brought about by the need for batch and mass manufacture</li> <li>• how to select the most appropriate manufacturing process to be able to realise their, or others', design proposals</li> </ul>	<p>Encourage your child to discuss the tools and equipment they would use to make certain manufactured products if they were to make them in the workshop.</p>

	<ul style="list-style-type: none"> <li>• the importance of health and safety in a commercial setting including workforce training and national safety standards.</li> </ul>	
<p><b>2.7 Accuracy in design and manufacture</b></p>	<p>Students should be aware of, and able to discuss and demonstrate, the importance of accuracy in manufacturing, whatever the scale of production, including:</p> <ul style="list-style-type: none"> <li>• how testing can eliminate errors</li> <li>• the value in the use of measuring aids, eg templates, jigs and fixtures in ensuring consistency of accuracy and the reduction of possible human error.</li> </ul>	<p>Encourage your child to research tolerances and how they are applied to a variety of different manufacturing products</p>

<p><b>2.8 Responsible design</b></p>	<p>Students should be aware of, and able to discuss, the importance environmental issues in design and manufacture, including:</p> <ul style="list-style-type: none"> <li>• the responsibilities of designers and manufacturers in ensuring products are made from sustainable materials and components</li> <li>• the environmental impact of packaging of products, eg the use of excessive packaging and plastics.</li> </ul> <p>Students should be aware of, and able to discuss, the concept of a circular economy, including:</p> <ul style="list-style-type: none"> <li>• how products are designed to conserve energy, materials and components</li> <li>• the design of products for minimum impact on the environment including raw material extraction, consumption, ease of repair, maintenance and end of life</li> <li>• sustainable manufacturing including the use of alternative energy and methods to minimise waste</li> <li>• the impact of waste, surplus and by products created in the process of manufacture including reuse of material off-cuts, chemicals, heat and water</li> <li>• cost implications of dealing with waste</li> <li>• the impact of global manufacturing on product miles. .</li> </ul>	<p>Encourage your child to research into a variety of environmental impacts that affect a product during manufacture</p>
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<p><b>2.9 Design for manufacture and project management</b></p>	<p>Students should be aware of, and able to discuss and demonstrate, the importance of planning for accuracy when making prototypes and making recommendations for small, medium and large scale production.</p> <p>Students should be aware of, and able to discuss and demonstrate, the procedures and policies put in place to reduce waste and ensure manufactured products are produced accurately and within acceptable tolerances, including quality assurance systems including Total Quality Management (TQM), scrum, Six Sigma and their applications to specific industrial examples including critical path analysis</p> <p>Students should be aware of, and able to discuss and demonstrate, quality control, including:</p> <ul style="list-style-type: none"> <li>• the monitoring, checking and testing of materials, components, equipment and products throughout production to ensure they conform to acceptable tolerances</li> <li>• specific quality control methods including the use of 'go-no go' gauges, laser or probe scanning and measuring</li> <li>• use of digital measuring devices such as vernier callipers and micrometers</li> <li>• non-destructive testing such as x-rays and ultrasound.</li> </ul>	<p>Encourage your child to research the different scales of production and create an advantage/disadvantage sheet for both</p>
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<p><b>2.10 National and international standards in product design</b></p>	<p>Students should be aware of, and able to discuss, the importance of national and international standards in product design, including:</p> <ul style="list-style-type: none"> <li>• British Standards Institute (BSI)</li> <li>• International Organisation for Standardisation (ISO)</li> <li>• Restriction of Hazardous Substances (ROHS) directive</li> <li>• battery directive</li> <li>• polymer codes for identification and recycling</li> <li>• packaging directives</li> <li>• WEEE directives</li> <li>• energy ratings of products</li> <li>• eco-labelling: <ul style="list-style-type: none"> <li>• the Mobius Loop</li> <li>• the European Eco-label</li> <li>• NAPM recycled mark</li> <li>• the EC energy label</li> <li>• the Energy Efficient label and logo</li> </ul> </li> <li>• Forest Stewardship Council (FSC)</li> <li>• EPA energy star.</li> </ul>	<p>Encourage your child to research the differences of standards required for a designer. Create either flashcards, mood boards or mindmaps for each.</p>
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