

Year: 10

Subject: GCSE Design and Technology

Autumn Term		
Overarching Topic:		
What has come before and what comes later:	<p>Year 9, students covered course content on the topics materials (woods/metals/plastics), new and emerging technologies and the work of others.</p> <p>Students developed skills through the manufacture of a picture frame, pencil case and passive amplifier (started but not complete COVID 19).</p> <p>This topic – research, design, develop and market a working prototype as part of the national Design Ventura competition. Followed by introduction to food and drink Mock NEA project.</p> <p>What comes later – independent mock NEA task.</p>	
	Core	Extension
The Big Questions (What questions will students be able to answer upon mastery of the topic?)	<ul style="list-style-type: none"> • In the design and development of a suspension bridge, what dynamic/static forces would need to be considered and why? • Why is continuous/mass production not a suitable production method if selling products in small quantities? • What is the advantage of producing products that can be batch produced? • Why is prototyping/modelling so important when developing products? • Outline the importance of a specification and understanding client/user's needs. • Why is it important to look at the work of others when designing? • How does your product solve your problem? • What could you do to reduce the retail cost? 	<ul style="list-style-type: none"> • Explain the forces that a child's high chair would be exposed to. (compression – seat, tension – straps, compression/bending – legs) • Evaluate corrugated card boards suitability for the packaging of products. How might this be better than standard single ply card?

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	<ul style="list-style-type: none"> • What could you do to reduce the manufacturing costs? • What alternate materials could be used for the product if it were commercially produced and why? • When using anthropometric data, why do we usually focus on 5th to 95th percentile rather than the average? • What specific anthropometric data would be required for the handle of a drinks carrier? • When would you consider <5% or >95% when analysing anthropometric data. • Why are ergonomics such a key factor when designing products for human interaction. 	
	Skill/Technique	How students will develop and demonstrate this
Key skills	Iterative design Problem solving during manufacture of prototypes Develop skills in use of tools, equipment and materials	<ul style="list-style-type: none"> • Design work/manufactured prototype.

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Spring Term		
Overarching Topic:		
What has come before and what comes later:	<p>Students took part in a design competition which enabled them to develop skills in research, design, develop and the marketing of a working prototype.</p> <p>Content covered – Common specialist principles – Forces and motion.</p> <p>What comes later...</p> <p>Next term students start NEA which contributes towards 50% of the final GCSE grade.</p>	
	Core	Extension
The Big Questions (What questions will students be able to answer upon mastery of the topic?)	<ul style="list-style-type: none"> • How can a manufacturer reduce its carbon footprint? • How can consumers reduce their carbon footprint? • When heat is applied to a thermochromics material, what would you expect to happen? How could this be applied to a product to improve its performance? • Evaluate the use of Nuclear energy as a power source. • Compare the two following sources of energy (Fossil fuel vs wind). • Why might people be for and against fracking? • Explain and demonstrate how to produce a physical prototype with skill and precision. • Explain what materials based on your project are suitable for your prototypes and why. 	<ul style="list-style-type: none"> • State several SMART materials and suitable application. • Biomass is considered to be a carbon neutral energy source, what does this mean? • What are the advantages of virtual modelling?

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	<ul style="list-style-type: none"> • Explain what you expect to learn from making a prototype • Explain and demonstrate how to produce a virtual prototype with skill and precision. • Explain what you have learnt from making a prototype and how this will influence future decisions. • Why is a 3rd angle orthographic projection (working drawing) so important to manufacturers of products. • Explain and demonstrate how to dimension a 3rd angle drawing to British standards. • Which standard would be most desirable on your product and why? British (BSI) or European CE • What is the advantage to the consumer buying a CE approved product rather than BSI approved product? 	
	Skill/Technique	How students will develop and demonstrate this
Key skills	Iterative design – Research and analysis skills How to develop an idea – skills in recognised drawing techniques Problem solving during manufacture of prototypes Develop skills in use of tools, equipment and materials	<ul style="list-style-type: none"> • Design portfolio/ICT portfolio

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Summer Term		
Overarching Topic:		
What has come before and what comes later:	Content covered – Common specialist principles – Energy and the environment, SMART and Modern materials. Students are mid-way through a mock NEA assignment before starting formally assessed NEA work worth 50% of the overall GCSE grade on 1 st June 2020.	
	Core	Extension
The Big Questions (What questions will students be able to answer upon mastery of the topic?)	<ul style="list-style-type: none"> Name a specific designer and explain their design style Name a specific product that has been designed by your designer of choice and evaluate it considering form and function. What are the advantages and disadvantages of virtual modelling new products? Identify and explain a range of problems based on the exams boards NEA contexts released 1st June. Why is mapping out a project plan so important before starting NEA Evaluate the benefits of primary and secondary research. Explain how you plan to solve your NEA problem. Explain and demonstrate a clear understanding of your target user. 	<ul style="list-style-type: none"> Compare and contrast two design movements that have been taught as part of the course. Why would virtual modelling be used in the development of new products.

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	<ul style="list-style-type: none"> • Explain and demonstrate how to be selective when choosing appropriate research material. • Explain and demonstrate how to carry out a detailed product analysis on existing products. • Explain the importance of a specification to a designer. What would/could happen if a designer was given a specification? • Explain and demonstrate how to produce a detailed specification based on your own findings. 	
	Skill/Technique	How students will develop and demonstrate this
Key skills	<ul style="list-style-type: none"> • Skill - how to test a products form and functionality. • Skill – identify commercial and alternate methods of manufacture • Skills – finishing techniques applied to materials • NEA - Iterative design – Research and analysis skills • NEA - How to develop an idea – further skills in recognised drawing techniques 	<ul style="list-style-type: none"> • Design/NEA portfolio