Year 12/13 Product Design (Curriculum Overview)

Rationale: The A-Level Product Design curriculum is design so that it builds upon the students' knowledge from GCSE and allows the students to further explore and investigate their own problems through the completion on NEA coursework and a Physical prototype. Students will study and experience a whole range of different modules which look at the Technical principles, Designing and making principles and a non-exam assessment (NEA).

During this experience they will develop their practical and investigative skills to determine how is best to solve their chosen Design brief but also have the knowledge to understand how product are designed and manufactures to make the lives of humans easier. In turn we hope that our students will have a positive mind-set which will help them go onto further education (University)

Term/Length of Time	Outline	Assessment/Teacher Feedback Opportunities	Homework and Literacy resources
<u>Technical Principles</u> **Paper 1 – 2.5 Hour exam (120 marks)** **30% of Course** This will be taught throughout Year 12/13 over the course of 32 weeks in a 38 week period.	Students should be familiar with the different materials used to create a product and be able to identify how these materials are chosen for their working properties. They will learn how we as designers can sample and test certain materials to ensure they are fit for purpose and suitable for the job in hand. Students will continue to develop their knowledge from GCSE and deepen their understanding of more advanced materials by understanding how some materials are developed to improve their properties by blending different materials together to create modern/Smart composites. ***Materials and their applications (TP)***	Sections will be assessed at the end of topic using exam questions (End of Unit) **<u>Unit Paper 1:</u>** - Materials and their applications - Testing Materials - Performance characteristics of materials (4 Sections) - Enhancement of Materials	**<u>NEA</u>** – Will be an on-going piece of work which students will be required to complete in lesson time in addition to the course content. **A-level Course tasks and Literacy resources:** SOL and be found in Technology shared area - KS5 A-level. All PowerPoints, NEA guidance, revision resources (knowledge organisers), a range of AFL (assessment for learning) activities, Exam questions, mark schemes and all be found using the school's Exampro software. **<u>Product Design</u>** offers many opportunities to develop and extend students' literacy skills.

	Testing materials (TP) ***Performance characteristics of materials (TP):*** • ***papers and boards*** • ***Composites.*** ***Performance characteristics of materials (TP)*** • ***polymer based sheet and film*** • ***Biodegradable polymers.*** ***Performance characteristics of materials (TP)*** ***Metals*** ***Performance characteristics of materials (TP)*** ***Polymers*** ***Enhancement of materials (TP) (End of Unit)*** Students should be familiar with how materials can be used to form a product and that adding material during a process can create something new. Students will need to be able to identify different material finishes and comprehend why a finish is applied to further improve and product or make it last longer. Students will need to have an understanding of modern and industrial practice and know how materials are put together in a commercial business environment.	**Unit Paper 2:** - Forming, Redistribution & Addition processes (3 Sections) - The use Finishes (2 Sections) - Modern & Industrial Commercial Practice - Digital Design & Manufacture - Product Design & Development **Unit Paper 3:** Health & Safety - Design for manufacturing, maintenance, repair and disposal - Enterprise & Marketing in the development of products - Design Communication	There is a large amount of new, subject-specific vocabulary, and so each unit includes a range of **Knowledge Organisers** which students will engage with throughout the unit. Students will use texts to find out information for themselves, using the functional layout of such texts, including index, contents and glossary sections of text books used in class, and also at home in an online format. Students will also review and connect information within topics. **Useful websites:** **Specification guidance/ Past Papers** www.AQA.org.uk **Information Resources:** www.technologystudent.co.uk Various YouTube videos (www.youtube.com) www.brainscape.com/subjects/aqa-product-design www.senecalearning.com **Reading list:** ***Subject Textbooks: (These books have been written to aid the learning for this course. The first book is the one I would recommend you purchasing)*** Design & Technology Product Design (published late October 2017) Hodder: Will Potts, Julia Morrison, Ian Granger, Dave Sumpner

	Students will continue to develop their knowledge of how products go through a design process where the product is subject to constant development in order for the product to continue to be a commercial success. ***Forming, redistribution and addition processes (TP)*** ***Forming, redistribution and addition processes (TP)*** ***Forming, redistribution and addition processes (TP)*** ***The use of finishes (TP)*** ***The use of finishes (TP)*** ***Modern and industrial commercial practice (TP)*** ***Digital design and manufacture (TP)*** ***Product design and development (TP) (End of Unit)*** Students must be apply to identity why Heath & Safety is so important in the workplace and how employers and employees have to work together to work safely when in and around a working environment. Students will need to be able to understand how hazards can be minimize and prevented through the use of risk assessments.	**Unit Paper 4:** - Performance characteristics of materials - Forming, redistribution & Addition processes -The use of finishes - Modern & Industrial commercial practice - Digital Design & Manufacture - The requirements for product design and development. **Unit Paper 5:** Protecting design & Intellectual property - Design for manufacturing, maintenance, repair and disposal - Feasibility Studies -Enterprise & marketing in the development of products	A sample is available here: http://filestore.aqa.org.uk/textbooks/sample/as-and-a-leveldesign-andtechnology/AQA-7551-7552-HODDER-SAMPLE.PDF AQA Design and Technology: Product Design (3-D, Design). Nelson Thornes: Brian Evans & Will Potts. ISBN 978-0-7487-8257-4 ***Further Reading: (You are not expected to buy these to read, but may be able to access them from a library)*** Design Museum: Contemporary Design Catherine McDermott Process: 50 Product Designs from Concept to Manufacture Paperback – 25 Jennifer Hudson The Eco-Design Handbook Alastair Faud –Luke Designs of the Times Lakshmi Bhaskaran Arts & Crafts Companion Pamela Todd Bauhaus Benedict Taschen Memphis Bigitte Fitoussi The Measure of Man and Women: Human Factors in Design Alvin R. Tilley & Henry Dreyfuss Associates

	Students will need to have a sound knowledge of why certain products are design to be maintained and repair to increase the life of the product but also understand what happens to a product after its end of life. Students will continue to develop their knowledge of how enterprise and marketing is used in the development of all products and failing to do this successfully can have a detrimental impact on a product. Students will also need to understanding how a designer can communicate a design through traditional and modern techniques (CAD) ***Health and safety (TP)*** ***Design for manufacturing, maintenance, repair and disposal (TP)*** ***Enterprise and marketing in the development of products (TP)*** ***Design communication (TP) (End of Unit)***	- Modern manufacturing systems	

	Students will look into the more advanced performance characteristics of materials and understand the technical principles behind why a business might chose and development them. Product designers will always use a range of finishes when creating their products and will have to understand the use of a finish and how this might be for the product to last longer but also to improve its aesthesis look. Students will look to improve upon their GCSE knowledge of CAD/CAM and how they can use digital design to aid in their production of products. This section will also be to linked to commercial practice with many huge global companies using modern CAD/CAM techniques to aid development and manufacture. ***Performance characteristics of materials (A-level specific) (TP)*** ***Forming, redistribution and addition processes (A-level specific) (TP)*** ***The use of finishes (A-level specific) (TP)*** ***Modern and industrial commercial practice (A-level specific) (TP)*** ***Digital design and manufacture (A-level specific) (TP)***		

		The requirements for product design and development (TP) (End of Unit)		
		Students will look into the reasons why designers/companies will want to protect their designs and how some ideas are referred to as intellectual property. Students will look into case studies and understand that products or components will conduct a feasibility test or study to see if the product is worth investment. Students will also be able to see how a business can be streamlined and modern manufacturing systems used to do this from barcoding to QR systems. Students will look into how modern technology can have an impact on different societies but also cultures. Global companies who want to sell their product across the world have to take this into consideration not to cause offence but be able to understand what could happen if it goes wrong.		
		Protecting designs and intellectual property (TP)		
		Design for manufacturing, maintenance, repair and disposal (TP)		
		Feasibility studies (TP)		

	Enterprise and marketing in the development of products (TP)		
	Modern manufacturing systems (TP)		
Design & Making Principles These topics will be taught over an 18 week period and will be delivered alongside the **'Technical Prinicples'** **(DMP)**	***Design methods and processes (DMP)***	**<u>Unit Paper 6:</u>** - Design methods & Processes - Design Theory Technology & Cultural Changes -Design Processes - Critical analysis & Evaluation -Selecting appropriate tools, equipment & Processes -Accuracy in design & Manufacture **<u>Unit Paper 7:</u>** - Responsible Design - Design for manufacture - Technology & Cultural Changes - Design Processes (Prototype Development)	
	Design theory (DMP)		
	Technology and cultural changes (DMP)		
	Design processes (DMP)		
	Critical analysis and evaluation (DMP)		
	Selecting appropriate tools, equipment and processes (DMP)		
	Accuracy in design and manufacture (DMP) (End of Unit)		
	Students will look into why it is import for designers and companies to be responsible and if they are not what implications this can have on the sale/use of the product. Students will need to understand that designers and engineers have to work closely together to ensure that a design can be manufacture and if so what are the positives and negatives on the design. This impact can also come from a change in technology or if the product is to be sold		

	somewhere else in the world what are the cultural differences. Students will gain a better understanding of the different design processes in relation to prototype development but also iterative design and its impact on commercial businesses.	- Design Theory **Unit Paper 8:** - Selecting appropriate tools, equipment and processes - Responsible Design - Design for manufacture & Project Management - National & International standards in Product Design.		
	Responsible design (DMP)			
	Design for manufacture (DMP)			
	Technology and cultural changes (DMP)			
	Design processes – prototype development (DMP)			
	Design processes (DMP) – iterative design in commercial contexts			
	Design theory (A-level specific) (DMP)			
	Design theory (A-level specific) (DMP) (End of Unit)			
	Finally student's will understand the importance of selecting the correct tools, equipment and processes for a Design/Make principles and relate that project management. Students will gain an understanding of why companies and benefit from national and			

	international standards and what impact think can have on the companies image. ***Selecting appropriate tools, equipment and processes (A-level specific) (DMP)*** ***Responsible design (A-level specific) (DMP)*** ***Design for manufacture and project management (A-level specific) (DMP)*** ***National and international standards in product design (A-level specific) (DMP) (End Of Unit)***		
Non-Exam Assessment (NEA) 52 lessons (including assessment and responding to feedback lessons)	Start of ***NEA portfolio*** ***AO1 Section A*** – Identifying and investigating design possibilities (20 marks) Rationale for chosen context clearly identified. Investigation including: disassembly, practical experimentation, visits, surveys and interviews, focus groups, primary and secondary research. Investigation material thoroughly analysed and initial concepts generated.	(Exam Question) Written and verbal feedback given throughout module through in-class activities and homework.	

	AO1 Section B – Producing a design brief and specification (10 marks) Produce a clear and challenging design brief and fully detailed design specification reflecting thorough consideration of investigations undertaken.	**NEA – Verbal Feedback Only** • Assesses practical application of technical principles and designing and making principles. • Substantial design and make project. • Written or digital portfolio not exceeding 45 pages. • Candidate developed brief. ***50% of the A-level qualification***.	

	AO2 Section C – Development of design proposal(s) (25 marks) Generate design proposals that take full account of the design brief and specification. Design proposals should reflect on first concepts and may use a variety of media in the development of a prototype that can be manufactured by the student. Constant reference to the design brief and design specification should be evident. Modelling is a key element of this assessment criterion. Produce a comprehensive and fully detailed manufacturing specification. ***A02 Section D*** – Development of design prototype(s) (25 marks) Manufacturing a prototype using all potential resources, tools machines and equipment to a high level. On-going development and directly related to the design proposals. On-going testing and evaluation ***A03 Section E*** – Analysing and evaluating (20 marks) On-going analysis and evaluation that informs the manufacture of the prototype. Testing and fitness for the needs of the client/user. Critical analysis of the final prototype. Modifications and improvements including consideration of levels of production.	***Internal moderation and submission of NEA centre marks to AQA.***	