



INTEGRITY • COMMITMENT • RESPECT

ST JOHN'S
SCHOOL

Design & Technology

Year 7 – 13 Curriculum rationale

Curriculum intent: **CREATIVITY, CONFIDENCE & QUALITY**

The Creative Faculty takes students on a **creative journey**, where they **select, use** and understand a variety of **skills**, techniques and media. During this journey they gain life-long **confidence**, **independence** and produce **quality outcomes** to be proud of.

Literacy/Reading/Oracy opportunities: Students are involved in the process of learning a range of D&T subject specific vocabulary and learning the spelling of these words. Students are taught to hypothesise, speculate and solve problems, they are expected to be able to express themselves with precision during both the planning and manufacture of products. Opportunities are given for annotation and oral communication of their ideas and the ideas of others.

	Autumn	Spring	Summer
Year 7	<p>Brahma Game:</p> <ul style="list-style-type: none"> The design skills focused on in this project are research skills and creative thinking. Students select a target user, create a mood board, design a theme for their game and research other games and what themes of shapes their game might take. They undertake a product evaluation and draft their own specification. They learn to draw their design ideas in 2D and 3D as well as using pencil crayon shading techniques to add effect. Students learn the difference in properties and uses between Hardwoods, Softwoods and Manufactured boards Develop knowledge and understanding of Health and Safety and demonstrate this safe practice in the workshop <p>Practical Skills:</p> <ul style="list-style-type: none"> Students learn to work with softwood, manufactured boards and polymers to 	<p>Structures:</p> <ul style="list-style-type: none"> The Skills focused on in this project are teamwork, presenting information and evaluation of their own performance. Students work in a team taking on different responsibilities and roles. They are assessed on their evaluative presentation that needs to give all the key information about the process they have been through, and they are also assessed on the quality of the evaluation of their work. Students learn about frame and shell structures man made and natural. They learn about dynamic and static loads, structural failure and redundant members. They learn about forces acting on structured, Sheer, Bending, Torsion, Tension and compression. They learn about triangulation in structures and about computer modelling as an engineering tool to refine a bridge design prior to manufacture. <p>Practical Skills:</p>	<p>Slot together Toy:</p> <ul style="list-style-type: none"> Students will learn the pivotal skills needed to independently use CAD software to bring their designs to life. These skills will underpin their KS3 designing in CAD. They will learn that designers use MM to measure and explain their work for accuracy. They will work with radius measurements in CAD. Students will understand the properties of thermoplastics and work with acrylic and PET thermoforming the plastics to understand how heat changes the properties. Creative thinking is also used in the process of designing, modelling and prototyping their own design and students will learn to sequence a manufacturing task. <p>Practical Skills:</p> <ul style="list-style-type: none"> Students work with plastics using both traditional hand-based manufacturing methods and Computer Aided

	<p>use traditional manufacturing skills with a range of hand-tools.</p> <ul style="list-style-type: none"> They will use a range of hand tools and workshop machines to create a high-quality outcome. 	<ul style="list-style-type: none"> The students use the range of making skills to build a small structure which is tested to destruction with weights. The testing is modelled in excel and the structure with the highest strength to weight ratio is the winner - so the teams need to have high levels of accuracy to reduce the weight of the materials used. 	<p>Manufacture (laser Cutter) to manufacture their product.</p> <ul style="list-style-type: none"> Using 2d design computer software to draw up ideas accurately and be able to save and send information to CAM equipment (laser cutter)
Why?	<p>-This project introduces students to the workshop and practical skills needed throughout the D&T journey.</p> <p>-Builds confidence in the workshop</p> <p>-Gets students used to workshop routines and health and safety procedures e.g. goggles.</p>	<p>-This project injects fun and competition into D&T lessons with a STEM focus and aims to build a love of Engineering and D&T.</p> <p>-To motivate and inspire.</p>	<p>-This project introduces students to CAD/CAM</p> <p>-Development of modelling and prototyping skills to create an accurate outcome</p> <p>-Designing to meet a need</p>
How parents / carers can support	<p>How to play tower of Brahma: https://www.youtube.com/watch?v=bWLwzPqul</p> <p>How to play a buzz wire game video: How to Play Buzz Wire Game Kids Games mcreativequarter - YouTube</p> <p>Steady hand game world science: Steady Hand Game - Science World</p>	<p>Strong structures with triangles video: https://www.youtube.com/watch?v=mBHJtWbsiaA</p> <p>Triangles: the strongest shape video: https://sciencemadefun.net/blog/triangles-the-strongest-shape/</p>	<p>The problem with plastics: https://www.youtube.com/watch?v=526gMLHDVLg</p>
	Autumn	Spring	Summer
Year 8	<p>Night Light:</p> <ul style="list-style-type: none"> Students learn how to design their own nightlight using CAD package 2D Design. Students learn the importance of research in the design process and the use of mood boards in the design industry, through production of their own. They are introduced to quality materials, high end designs and products. They carry out case studies on Apple as a brand and Smart Materials and their uses. 	<p>Body Adornment - Jewellery:</p> <ul style="list-style-type: none"> Students learn how to create a design to solve a problem, using inspiration from the work of others, cultures and fashion trends. Students learn about the theory of metals and the sub groups. They will be working with a low melt alloy (Pewter) The use of CAD and CAM as a manufacturing tool rather than the final outcome. They will make a die to cast their completed jewellery To understand the importance of prototyping in the development of products 	<p>Gadget Stand:</p> <ul style="list-style-type: none"> Students learn how to manipulate and modify an existing graphic using CAD. They use this to produce a stand for a phone or tablet, in acrylic using the laser cutter. They independently select a suitable image, prepare it for engraving, resize and contour it so that it functions as a gadget stand. Students learn to draw and render their gadget stand design using isometric construction. Students learn the theory behind joining materials including fixtures and fittings, wood joints, joining using heat and adhesives. Selecting the correct

	<ul style="list-style-type: none"> Students learn that components need to be connected in a basic circuit in order to function. <p>Practical Skills:</p> <ul style="list-style-type: none"> During this project students focus on producing a night light project to an excellent standard with a focus on carrying out processes with accuracy. At this point they are able to use tools and equipment safely to produce a box softwood frame, acrylic elements and confidently make an electronic LED circuit. Students are therefore introduced to the concept of quality control and accuracy when measuring, marking, drilling and sawing. Students are taught to use the callipers and instilled with a desire to be accurate and trouble shoot/rectify when this is not evident. Students also build on their 2D Design Skills to produce an acrylic centrepiece for their light. 	<ul style="list-style-type: none"> The use of packaging to display the design in-store. Considering environmental impact <p>Practical Skills:</p> <ul style="list-style-type: none"> Generate a range of quality ideas that are further developed through modelling to create a final outcome Create a die using 2d design software. Complex understanding of negative shapes to create the positive form. Laser cutting die, checking for accuracy to create a quality outcome and accurately assembling their die Die casting with a low melt alloy and health and safety considerations. Filing and polishing pewter to create a high-quality outcome. 	<p>Joint for the correct material and function. This knowledge will be applied in the next project which increases student independence.</p> <p>Practical Skills:</p> <ul style="list-style-type: none"> Students learn various techniques used to join wood including a cross halving joint which involves accurate measurement to less than 1mm and cutting and chiselling a joint. They learn to join copper with heat and to thermo form acrylic using a jig for accuracy. They learn to apply finishes to wood and copper to create a finished product of high quality.
Why?	<ul style="list-style-type: none"> -To consolidate soldering skills. -To address gaps in subject knowledge. -To instil pride in our work. 	<ul style="list-style-type: none"> -To develop knowledge of Metals -To introduce CAD/CAM as a manufacturing process -To develop practical skills working with metal 	<ul style="list-style-type: none"> -To introduce metal work including; Brazing, Soldering, Flux and Oxidisation. -To encourage independent creative thinking in preparation for Year 9 projects.
How parents / carers can support	<p>Apple: https://www.apple.com/uk/ B&Q night lights research: https://www.diy.com/lighting/indoor-lights/night-lights.cat</p>	<p>Ohyo water bottle: Ohyo bottle - Design It, Make It, Use It schools film - YouTube Olympics 2012 torch design: Going for Gold at London 2012 - Design Museum</p>	<p>Joining methods: Timber video: Joining methods - Timbers - Eduqas - GCSE Plastics wastage: Design and Technology Revision - Eduqas - BBC Bitesize</p>
	Autumn	Spring	Summer
Year 9	<p>Design Ventura:</p> <ul style="list-style-type: none"> This is an annual competition run by the Design Museum, each year they launch a new brief. Students work in groups of 4-6 to create a product costing no more than 	<p>Block Clock:</p> <ul style="list-style-type: none"> Students embark on a mini research and design task by researching the Memphis Design Movement and to give students an idea of how designers can design in an abstract way and use pattern to achieve creative results. 	<p>Sweet Dispenser:</p> <ul style="list-style-type: none"> Students learn to use market research, questionnaires and product analysis of existing products to help design development. Students also learn how to design a specification fit for purpose.

	<p>£10 to be sold in the Design Museum shop</p> <ul style="list-style-type: none"> • Students take on job roles and responsibilities and work to deadlines. • Students present their ideas via presentation and design sheets, in the style of a Dragon's Den pitch, the winning group in the School is put forward to the competition final. <p>Practical Skills:</p> <ul style="list-style-type: none"> • Working collaboratively, they generate a range of ideas, further develop these and create a final prototype. • Using a range of primary and secondary research to generate and further develop their ideas • Work as a business (Finance, Communications, Design etc) to create a feasible product based on materials, manufacturing processes and cost. • Use previous knowledge and understanding of materials and processes in decision making. • Create design sheets and a 2 minute pitch for their product to include all processes and costs. 	<ul style="list-style-type: none"> • Building on skills from the previous project students use questionnaires and product analysis to help design development. They carry out an evaluation of clocks by the designer George Nelson to gain inspiration. • This leads to designing using a variety of design strategies to develop a range of innovative ideas. <p>Practical Skills:</p> <ul style="list-style-type: none"> • Students learn the benefits of modelling and model their clock design to clearly understand misconceptions and potential issues. • They then manufacture a block clock using an extensive variety of the materials, processes and skills obtained during previous projects. Students work independently selecting the processes, materials and finishes that they want to use in their clock. • CAD/CAM is used in conjunction with hand processes and students select when to use it and draw and cut their parts independently. The students produce a sophisticated and challenging clock which has a high-quality finish. 	<ul style="list-style-type: none"> • Students are introduced to Mechanisms and Movements, where they learn about movement and mechanisms, so that they can understand how movement can be used within their products (to drop sweets). • Skills required to complete this project require students to think independently and be able to communicate their design needs through both graphic and verbal communication. They will develop the ability to work alongside their peers, the technician and teacher to bring their ideas to fruition. <p>Practical Skills:</p> <ul style="list-style-type: none"> • In the first half of this project, students will learn about large scale production. The class will adopt roles in a simulated factory to work as a team and create the main parts needed to make a sweet dispenser. The students then use their design and making skills to adapt this batch produced design to produce a customised and fun design using a wide variety of the materials, processes and skills obtained during the previous project.
<p>Why?</p>	<p>-To develop team work and presentations skills -To work on a live brief -To develop design generation and development skills</p>	<p>-To gain an appreciation of historical context -To understand contemporary culture -To enable ownership of a project/skill</p>	<p>-To introduce Quality control, batch production and the continued use of jigs and templates. -To allow project ownership. -To introduce types of motion e.g reciprocating</p>
<p>How parents / carers can support</p>	<p>About Design Ventura and short video: https://ventura.designmuseum.org/about/</p>	<p>George Nelson video: 40 George Nelson Clocks in 40 Seconds - YouTube Memphis Group Art video: Memphis Group Art at the Modernism Museum genxtra (Museum) - YouTube</p>	<p>How does a gumball machine work video: How does a Gumball Machine work? - YouTube DIY CARDBOARD GUMBALL MACHINE - hello, Wonderful (hellowonderful.co)</p>

	Autumn	Spring	Summer
Year 10 – AQA GCSE D&T	<p>Project: Cutlery</p> <ul style="list-style-type: none"> This project is a good induction to the course, working in the style of the NEA (Non-examined assessment) Looking at designing for others to solve a problem - inclusive design, ergonomics and anthropometrics Develop knowledge and understanding of the iterative design process <p>Practical Skills: Sketching, modelling, prototyping, analysing and developing as per the iterative design process</p> <p>Theory Skills: Core technical principles – Materials and their working properties; Designing and making principles – design strategies, communication of design ideas and prototype development</p>	<p>Project: Lamps</p> <ul style="list-style-type: none"> Practical skills, working with a variety of materials, processes and electronics to manufacture a high quality outcome <p>Practical Skills: Selecting materials and components, Development of making skills, tolerance and allowance, material management and marking out, use of a variety of tools, equipment techniques and processes, surface treatment and finishes</p> <p>Theory Skills: Core technical principles – New and emerging technologies; Energy, materials, systems and devices. Specialist technical principles – Timber based materials</p>	<p>June – Begin NEA – 50% of final outcome</p> <ul style="list-style-type: none"> Students will choose from three contexts released by the exam board in June each year. They will work with a live client to create a product to solve a problem or need <p>Year 10 end of year exam</p> <p>Practical Skills: Understanding the NEA, working with a client to solve a problem or need, gathering relevant research and analysis, development of a design brief and design specification</p> <p>Theory Skills: Designing Principles – Investigation, primary and secondary data, research; the work of others. Plus focused revision for the year 10 mock exam.</p>
Why?	-Develop core subject knowledge and practical skills to enable them to meet AQA specification requirements.	- Build on core skills, knowledge and understanding to support their future NEA and Exam.	-To allow progression of their practical skills -To ensure correct working practices in the workshop and other practical environments -To introduce students to their NEA project
How parents / carers can support	AQA GCSE D&T specification information https://www.aqa.org.uk/subjects/design-and-technology/gcse/design-and-technology-8552/specification-at-a-glance	BBC Bitesize AQA GCSE D&T course content https://www.bbc.co.uk/bitesize/examspecs/zy2bdm And Technology student: https://www.technologystudent.com/	Active revision to help with year 10 mocks - Any thing that is interactive: questions on post it notes around the house, mind maps, quizzes etc
	Autumn	Spring	Summer
Year 11 – AQA GCSE D&T	<p>NEA – 50% of final outcome</p> <ul style="list-style-type: none"> Students continue to work independently on the NEA, developing their design concepts through to a made outcome. <p>Practical Skills: The iterative design process – generating idea, gathering client feedback and further investigations, modelling, prototyping, final design using isometric and 3rd angle orthographic, manufacturing specification</p>	<p>Complete NEA – 50% of final outcome</p> <ul style="list-style-type: none"> Completion of the NEA with a high-quality outcome fully evaluated, work evidenced in a portfolio From March focus will be on theory content for the exam <p>Practical Skills: Manufacturing chosen product demonstrating high quality making skills, working to tolerance to demonstrate accuracy</p>	<p>Revision and Exam preparation</p> <ul style="list-style-type: none"> Ensure specification content covered Revision and practice papers <p>Theory Skills: Recap, revisit and revise core technical principles, specialist technical principles and designing and making principles. Use of a variety of active revision techniques to help with retrieval.</p>

	Theory Skills: Designing and making principles	using a variety of skills and to construct and apply finishes. Evaluation Theory Skills: Designing and making principles	
Why?	- To work independently with guidance from the mark scheme to solve real life design problems -To meet requirements of the specification.	-Complete NEA independently and demonstrate excellent outcomes and high level skills. - Develop and embed key theory	-To recap, revisit and consolidate. -To check for gaps in students' subject knowledge.
How parents / carers can support	Check the NEA mark scheme, ask questions about the task they have chosen, who their user is and what they are designing	Encourage revision – Use a revision guide, BBC Bitesize, also Seneca learning is a great interactive resource (senecalearning.com)	On-going revision support
	Autumn	Spring	Summer
Year 11 – WJEC Engineering level 1&2 – 23/24 only	Task 2 – Designing Engineering Products (20%/ 10 hours) Practical Skills: Research and analysis into existing products, generating a range of engineering design solutions - sketching, communicating ideas, modelling, prototyping, produce a manufacturing specification, creating engineering drawings, selecting suitable materials and justifying suitable manufacturing processes Theory Skills: Understanding and producing engineering drawings. Using mathematical techniques for solving engineering problems. Demonstrating knowledge and understanding of materials, manufacturing methods. Use of CAD &CAM	Mini Project: Lighting Practical Skills: Project designed to deliver unit 3 exam content theory through practical. Designing, modelling and prototyping ideas. Material removing, shaping, joining and finishing with high quality and accurate finish, demonstrating safe working practices. Theory Skills: Material properties and tests, destructive and non-destructive. Understanding methods of preparation, forming, joining and finishing of engineering processes. Explaining how environmental issues affect engineering applications.	Revision and Exam (40%/ 80 questions/ 1hr 30) Theory Skills: Recap, revisit and revise the four topics; understanding the effects of engineering achievements, understanding properties of engineering materials, understanding methods of preparation, forming, joining and finishing of engineering material, solving engineering problems. Use of a variety of active revision techniques to help with retrieval.
Why?	- To work independently with guidance from the mark scheme to solve a design problem. -To meet requirements of the specification.	- Develop and embed key theory	-To recap, revisit and consolidate. -To check for gaps in students' subject knowledge.
How parents / carers can support	Ask questions about the task and the research they have undertaken.	Encourage revision – Use notes, the text book or technology student has some good resources: https://www.technologystudent.com/	On-going revision support

	Autumn	Spring	Summer
<p style="text-align: center;">Year 12 – AQA A level Product Design</p>	<p>Project: Inclusive Design and the iterative process</p> <ul style="list-style-type: none"> This project is a good induction to the course, working in the style of the NEA Designing for others to solve a problem - inclusive design, ergonomics and anthropometrics Considering environmental impact and the responsibility of the designer Implementing the iterative design process <p>Practical Skills: Working with a variety of materials and practising a variety of forming, redistribution and addition processes. Development of design sketching, rendering and prototyping skills.</p> <p>Theory Skills: Technical principles – Materials and their applications; Performance characteristics and enhancement of materials; Forming, redistribution and addition processes; The requirements for product design and development.</p>	<p>Project: Manufacturing with quality and to tolerance</p> <ul style="list-style-type: none"> Practical skills, working with a variety of materials, processes and techniques to manufacture a high-quality outcome Incorporating inspiration from the work of others (design movements, designers and companies) Evidence of responsible design, technological advancement and cultural changes. <p>Practical Skills: Selecting materials and components, Development of making skills, tolerance and allowance, use of a variety of tools, equipment techniques and processes to assemble and apply finishes</p> <p>Theory Skills: Technical principles -completion of Autumn term topics plus the use of finishes; digital design and manufacture; Design for manufacturing, maintenance, repair and disposal.</p> <p>Designing and making principles – Design theory; Technology and cultural changes; Responsible design.</p>	<p>NEA – 50% of final outcome</p> <ul style="list-style-type: none"> Independent project, student is responsible for identifying context, problem and brief Using the knowledge and understanding they have gained they will apply this to meet the criteria They will work with a live client to create a product to solve a problem or need – It is essential that it is a real life client and someone that can be access throughout the project for feedback <p>Year 12 end of year exams</p> <p>Practical Skills: Evidence of a broad range of research to understand the task, setting the context, brief and design specification, working with a client, generating ideas and evaluating</p> <p>Theory Skills: Technical principles- Modern and industrial scales of practice; Health and safety Designing and making principles – Design processes.</p>
Why?	-Develop subject knowledge and practical skills to enable them to meet AQA specification requirements.	- Build knowledge and understanding to support their future NEA and Exams. -To allow progression of their practical skills -To ensure correct working practices in the workshop and other practical environments	-To work independently and follow the exam board guidance to begin their NEA project - To gain experience of the 2 exams
How parents / carers can support	AQA A level Product Design course information: https://www.aqa.org.uk/subjects/design-and-technology/a-level/design-and-technology-product-design-7552	Revision support – It is important for students to consolidate their learning throughout the course – A word bank of key terms is essential: the key terms are at the end of every topic. NEA support – discuss possible themes, clients and possible inspiration	Revision check in - Active revision to help with year 12 mocks - Anything that is interactive: questions on post it notes around the house, mind maps, quizzes etc NEA support – research could be visits or activities outside of school, do they need help to find and chat with their client?

	Autumn	Spring	Summer
Year 13– AQA A level Product Design	<p>NEA – 50% of final outcome</p> <ul style="list-style-type: none"> Students continue to work independently on the NEA, developing their design concepts through to a made outcome. <p>Practical Skills: NEA: Continue the iterative design process – generating idea, gathering client feedback, further investigations and testing, modelling & prototyping to generate a final design with manufacturing specification. Manufacturing product.</p> <p>Theory Skills: Technical principles- Protecting designs and intellectual property, feasibility studies. Designing and making principles – selecting appropriate tools, equipment and processes</p>	<p>NEA – 50% of final outcome</p> <ul style="list-style-type: none"> Completion of the NEA with a high-quality outcome fully evaluated, work evidenced in a portfolio From March focus will be on theory content for the exam <p>Practical Skills: Continue with Manufacturing chosen product demonstrating high quality making skills. Fully evaluate outcome with client and generate further modifications</p> <p>Theory Skills: Technical principles- Enterprise and marketing in the development of products. Designing and making principles – critical analysis and evaluation, accuracy in design and manufacture, design for manufacture and project management, national and international standards in product design</p>	<p>Revision and Exam</p> <ul style="list-style-type: none"> Ensure specification content covered Revision and practice papers <p>Theory Skills: Recap, revisit and revise content for both papers; Technical Principles (30%) and Design and Making Principles (20%). Use of a variety of active revision techniques to help with retrieval.</p>
Why?	<ul style="list-style-type: none"> To work independently with guidance from the mark scheme to solve real life design problems To meet requirements of the specification for the exams. 	<ul style="list-style-type: none"> -Complete NEA independently and demonstrate excellent outcomes and high-level skills. - Develop and embed key theory 	<ul style="list-style-type: none"> -To recap, revisit and consolidate. -To check for gaps in students' subject knowledge.
How parents / carers can support	Ask questions about the NEA, support with communication with client and any research and inspiration that can be gathered outside of school	Encourage revision – Use a revision guide, text book, key words and course notes	On-going revision support