

	Autumn		Spring	Summer
Y7	<u>Visual communication</u> <u>– Dare to Design</u>	<u>CAD Torch</u>	<u>Chef School</u>	<u>Wooden phone holder</u>
<p>Curriculum content</p> <p>**Students will complete all four rotations throughout the year but may complete these in a different order to what is shown.</p>	<p>In this unit students are introduced to a range of drawing techniques used in graphics. We begin our journey through the creation of a tangram to understand how shapes can be combined to form a variety of versatile images, We explore technical drawing including one point perspective and isometric drawing, whilst also learning how to avoid design fixation to enable the generation of unique and distinctive ideas.</p> <p>We begin to understand the design process and how to understand a customers wants and needs through the creation of a music player.</p>	<p>Students go on a creative journey learning what is required to become a designer through the production of a design specification and working to a contextual brief to produce an imaginative torch design inspired by mythical creatures. This rotation helps students discover their imagination and creativity through realising their design ideas , whilst also introducing basic electronics. We will translate hand drawn ideas into CAD/CAM software and learn how to use 2D design to manufacture the torch outcome on the laser cutter using both cut out and engraved details.</p>	<p>In this unit students acquire both theoretical knowledge and practical skills. We start our journey understanding the importance of food safety and hygiene We will discover The Eatwell Guide and how this is used to form a balanced diet, whilst also learning about food provenance and food science such as denaturation.</p> <p>Practical skills are taught through the production of both sweet and savoury recipes including flapjack, bread rolls and chicken nuggets and potato wedges, so students can become competent and safe in the kitchen.</p> <p>This rotation lays the foundation for the Y8 rotation “chef school, the return” where more complex skills are acquired.</p>	<p>This unit encourages students to become engaged in a practical workshop environment. We are introduced to the types of trees that surround us including softwoods and hardwoods and how the world is being impacted by deforestation. We look at organisations such as the FSC to understand how sustainable timber is generated. We apply basic maths including area, perimeter and accurate measuring to begin to create a phone holder. We use a range of hand tools and machinery including saws, the pillar drill, files, and try squares to support in becoming dynamic and independent learners.</p>
Assessment	Students are assessed through marking of red zones (self, peer and/or teacher) and assessments every half term. These will test student’s knowledge recall and application of knowledge. Students are also assessed on their practical ability where practical outcomes have been created. As students rotate, they will build new knowledge and will be assessed on knowledge acquired during prior rotations, as well as KS2 knowledge and understanding. All KS3 rotations build and develop knowledge required for KS4.			
Literacy links	Students will develop literacy skills through regular practice of command words such as describe, explain, assess and evaluate. Students will also build a glossary of tier 3 subject specific vocabulary and complete regular reading and extended writing tasks.			

	Autumn	Spring	Summer
Y8	<u>Metal egg cup holder</u>	<u>Chef School...The Return</u>	<u>Plastics in Production</u>
<p>Curriculum content</p> <p>**Students will complete all three rotations throughout the year but may complete these in a different order to what is shown.</p>	<p>In this unit, students are introduced to the world of metals. We begin by learning the difference between ferrous and non-ferrous metals, before understanding how automation and robotics are used in manufacturing. From this, we complete some product analysis of existing designs before creating innovative card prototypes to realise design ideas.</p> <p>We discover how important hazard and risk are and begin to generate a workshop risk assessment. We then produce a personalised egg cup using a range of hand tools including a line bender, scribe, centre punch and metal stamps.</p>	<p>This unit encourages students to build on skills and knowledge learnt in Y7 through the creation of more complex recipes including ragu pasta, pizza and chicken jambalaya.</p> <p>We begin our journey by revisiting The Eatwell Guide and learning about macro and micronutrients. We look at how our body uses and produces energy and what foods we get this from before learning about heat transfer methods including conduction, convection and radiation. Students are familiarised with raising agents and this variances between biological, mechanical and physical and how these are used to improve the structure and texture of foods. We learn about different cultural foods and how things such as religion, socioeconomics, cost, availability and education influences peoples choices of food. We finish our journey by learning how food is caught, grown and reared and the significance of food miles.</p>	<p>This unit inspires students to connect with the world they live in and looks at both how polymers cause environmental issues but also how we can use them to enhance our daily lives.</p> <p>We begin our journey exploring the classification of polymers and become familiar with thermoplastics and thermosetting plastics and their characteristics. We then discover the impact polymers have on the environment through exploring end scenarios of polymers in the landfill, ocean and recycling centres.</p> <p>Students begin to discover new advances in technology and how these are being used to generate new materials such as bioplastics, in addition to realising the scope of possibility within 3D printing and how this is being used to solve real-life issues such as affordable housing, organ transplants and sportswear for professional athletes.</p> <p>We then use Fusion 360 design software to create a range of products to meet industry standards.</p>
Assessment	Students are assessed through marking of red zones (self, peer and/or teacher) and assessments every half term. These will test student's knowledge recall and application of knowledge. Students are also assessed on their practical ability where practical outcomes have been created. As students rotate, they will build new knowledge and will be assessed on knowledge acquired during prior rotations, as well as KS2 knowledge and understanding. All KS3 rotations build and develop knowledge required for KS4.		
Literacy links	Students will develop literacy skills through regular practice of command words such as describe, explain, assess and evaluate. Students will also build a glossary of tier 3 subject specific vocabulary and complete regular reading and extended writing tasks.		

	Autumn		Spring	Summer
Y9	<u>Orthographic drawing</u>	<u>Wood Vase</u>	<u>Textiles</u>	<u>Micro bit Move</u>
Curriculum content **Students will complete all four rotations throughout the year but may complete these in a different order to what is shown.	This unit encourages students to become aligned with the disciplines of technical drawing . Students begin their journey through studying a range of technical drawing techniques, before focusing on creating an orthographic drawing to industry standards . We will learn how isometric and orthographic drawing are linked, the common features used in these drawings and why they are used in industry. We will focus on accuracy , pencil control and communicating technical information clearly.	Students go on a creative journey and begin to refine their skills designing to a specific contextual brief . We learn an in depth knowledge of manufactured boards , including how they are created, their uses and finishes that can be applied, before designing a vase to be used in a restaurant. We use a range of hand tools and machinery to realise design ideas. We focus on increasing independence and autonomy in the workshop and producing a high quality outcome .	This unit stimulates students to think about how textiles surround us and are used in daily life. We begin our journey exploring natural and synthetic fibres , their uses and material properties . Students then begin to appreciate how woven , knitted and non-woven fabrics are created through completing mini practical activities including finger knitting , weaving and applique to understand bonded and felted fabrics. Material testing and properties are a huge focus throughout the rotation as students begin to understand working and physical properties and how these impact the final use for a material. Technical textiles are learnt through real-life applications such as how Kevlar is used in the police force and Nomex in the fire service. Students also discover microencapsulation , conductive fibres , Gore-Tex and microfibres and how these are used to support the function of everyday life.	This unit inspires students to get hands on with flashing coding and basic programming . We will learn how to use pseudocode , algorithms and a range of electronic components in conjunction with Micro bit moves mini robots. These skills are applied to a real-life context when students are asked to design a product with a software solution using a microcontroller system and an automatic light for use in the home or garden. We develop a range of nets to house the final lighting design.
Assessment	Students are assessed through marking of red zones (self, peer and/or teacher) and assessments every half term. These will test student's knowledge recall and application of knowledge. Students are also assessed on their practical ability where practical outcomes have been created. As students rotate, they will build new knowledge and will be assessed on knowledge acquired during prior rotations, as well as KS2 knowledge and understanding. All KS3 rotations build and develop knowledge required for KS4.			
Literacy links	Students will develop literacy skills through regular practice of command words such as describe, explain, assess and evaluate. Students will also build a glossary of tier 3 subject specific vocabulary and complete regular reading and extended writing tasks.			

Design Technology	Autumn		Spring	Summer	
Y10	<u>Timbers and Wood Joints</u>	<u>Mini NEA – Animal Toy</u>	<u>Polymers</u>	<u>Exam Theory Content / NEA</u>	<u>Non Examined Assessment</u>
<p>Curriculum content</p> <p>Exam theory content is taught using 2 out of 5 lessons across a fortnight period when the NEA has started</p>	<p>We begin the year recapping and deepening prior learning of softwoods, hardwoods and manufactured boards, before learning how to apply materials to specific products through exam question practice. Students will also learn what a life cycle assessment is and how it used before exploring wood faults, processing of timber and wood joints. We create a wood joint skills stick to be competent in the creation of half lap, dowel, finger and mitre joints through the use of a range of specialist machinery and tools.</p>	<p>This unit simulates the GCSE Non-Examined Assessment (NEA) students start to complete in the Summer term. It is an opportunity to prepare for the real NEA coursework. We work through a similar structure starting with mind maps, brief, specification and product analysis before moving on to producing design sheets, developing drawing skills and prototypes. We then improve skills in evaluating, tools and machinery, whilst using iPads to create a production log.</p>	<p>This unit encourages students to return to knowledge learnt during Y8 and build a deeper understanding. We begin by recapping thermoplastics and thermosetting plastics before learning where plastic comes from. We explore fractional distillation, cracking and polymerisation and how these link before continuing the journey to learn how scientists are attempting to produce new bioplastic materials using plant starches. Students will learn stock forms, methods of wasting and abrading, drilling and sawing to produce a small keyring before learning commercial manufacturing methods used for polymers such as vacuum forming, strip heating, laminating and injection moulding. There is a strong focus on the environmental impact of plastic throughout.</p>	<p>Students are introduced to the topics featuring in the final exam. This includes, new and emerging technologies, developments in new materials, energy generation and storage, materials and their working properties, mechanical devices and understanding a systems approach when designing. Students explore each topic and complete exam style questions to develop their technique and build confidence.</p>	<p>Three contexts are provided by the exam board for students to unpick and explore. Students will choose one context to follow through into Y11. The NEA is worth 50% of the final GCSE grade. This is an opportunity to show off skills, creativity, knowledge and a passion for the subject through a personal response to a chosen context.</p>
Assessment	<p>Students are assessed through marking of red zones (self, peer and/or teacher) and assessments every half term. These will test student's knowledge recall and application of knowledge. Students are assessed using end of unit assessments, mock examinations and through the completion of a mock NEA. Students complete DIRT and reflection activities based on gaps in knowledge and misconceptions identified.</p>				
Literacy links	<p>Students will develop literacy skills through regular practice of command words such as describe, explain, assess and evaluate. Students will also build a glossary of tier 3 subject specific vocabulary and complete regular reading and extended writing tasks.</p>				

	Autumn	Spring		Summer	
Y11 Design Technology	NEA	NEA	Exam Practice	Exam Practice	
Curriculum content	<p>The NEA encourages, inspires and motivates students to develop a personal response to a chosen context provided by the exam board. Students use iterative design to solve a complex design problem faced in everyday life and produce a solution for this. Students begin by creating mind maps for potential design problems they would like to solve, before focusing on one. Students deepen their skills on how to write a brief and specification and conduct existing product analysis to understand the market. Students develop a client profile and produce a range of design ideas and developments using the iterative process and drawing styles to portray their proposed options. Students complete several prototypes of their idea and continually evaluate their work throughout. Students will create their final outcome showing the use of a range of tools and machinery. This unit enables students to showcase skills, knowledge and independence developed and enhanced throughout their school career.</p>	<p>Students continue to test, evaluate and improve their final outcome ideas before producing their final product using a range of machinery and tools in the workshop. Students continue to test, develop and evaluate ideas for their final product until the end to show in depth, considered research, evaluation and decision making. Students will have produced an extensive portfolio of work to showcase all of the work competed for the NEA using the iPads to combine written, photographic and hand drawn evidence that shows independence, skill, knowledge and a passion for the idea being created,</p>	<p>Students continue learning, revisiting and developing exam technique for the topics featuring in the final exam. This includes, new and emerging technologies, developments in new materials, energy generation and storage, materials and their working properties, mechanical devices and understanding a systems approach when designing. Students explore each topic and complete exam style questions to develop their technique and build confidence</p>	<p>Students continue to revise, develop and improve exam technique for the topics featured in the final exam. This includes, new and emerging technologies, developments in new materials, energy generation and storage, materials and their working properties, mechanical devices and understanding a systems approach when designing. Students explore each topic and complete exam style questions to develop their technique and build confidence</p>	
Assessment	Students are assessed through marking of red zones (self, peer and/or teacher) and assessments every half term. These will test student's knowledge recall and application of knowledge.				
Literacy links	Students will develop literacy skills through regular practice of command words such as describe, explain, assess and evaluate. Students will also build a glossary of tier 3 subject specific vocabulary and complete regular reading and extended writing tasks.				

	Autumn		Spring	Summer
Y10 Engineering	<u>Metals Theory</u> <u>Unit 1 practice</u>	<u>Unit 1 – Manufacturing Engineering Products</u>	<u>Unit 1 – Completed and handed in 2 weeks before the Easter holidays.</u> <u>Unit 3 Theory</u>	<u>Unit 3 Theory – Solving Engineering Problems</u>
Curriculum content	<p>Students begin by refreshing knowledge of metals including ferrous and non-ferrous and learn where metals come from, including how they are extracted from the ground and the processes used to gain the metal ore such as refining and smelting. We learn how to improve the properties of metals by alloying them with other elements and what makes a metal pure. Students discover the ethical and environmental issues around the creation of mines and the impact this has on habitats, population, pollution and communities. Students complete a practical unit to create a padlock that simulates their Unit 1 coursework module where they are introduced to new machinery such as the milling machine, drilling machine, use of jigs, tap and die and laser cutting. Students also learn how to complete risk assessments, annotate engineering drawings, how to use a job sheet and take photos of their practical process using the iPads.,</p>	<p>This unit is worth 40% of the final course grade and encourages students to apply skills and knowledge to make an engineered product provided by the exam board. Students will begin by annotating engineering drawings to understand the parts required in the making, before learning about hazard and risk to complete detailed risk assessments for machinery used in making. Students also complete a job sheet, gant chart and contingency planning to document the practical making of their engineered product, as well as show how this would be manufactured in industry. From this students have to work to tolerance in the workshop to create the product, students will use a range of machinery and tools and will be required to complete quality control measures and evaluate the processes they have used in detail.</p>	<p>Unit 1 continues at the start of the Spring term and is handed in approximately two weeks before the Easter holidays. Students continue to produce their engineered product and continue to complete the written coursework that accompanies this.</p> <p>Students will begin Unit 3 for the second half of the Spring term. The purpose of this unit is for learners to use their knowledge and understanding of engineering processes and material properties to solve problems. Problem solving is critical to working in engineering. In this unit you will learn about how engineers in the past have found solutions to problems and how other engineers use their ideas to solve problems today. You will learn about materials, processes and maths that engineers use and how they are used to solve problems. In solving problems, you will learn to follow a process and develop drawing skills to communicate your solutions.</p>	<p>Students continue to delve into structural, mechanical and electronic engineering. What materials can be used to go into space? Are some vacuum cleaners really innovative? How important was the development of the jet engine? Do robots make better engineers than people? How do I install a gate? How can engineers help communities after an earthquake? How do engineers use computers and technology? How do I tell steel from aluminium? Does it matter? Engineers can have a major impact on industry and society. The achievements they have made have improved the quality of our everyday life, from the buildings we live and work, in to the transport we use to get around and how we enjoy our leisure time. Engineers are able to find solutions to problems, whether it is adapting or combining materials used to produce a product to make it withstand severe weather conditions or fixing materials in a different way to make something more portable.</p>
Assessment	<p>Students are assessed through marking of red zones (self, peer and/or teacher) and assessments every half term. These will test student's knowledge recall and application of knowledge. Students are assessed through marking of red zones (self, peer and/or teacher) and assessments every half term. These will test student's knowledge recall and application of knowledge. Students are assessed using end of unit assessments, mock examinations and through the completion of a mock NEA. Students complete DIRT and reflection activities based on gaps in knowledge and misconceptions identified.</p>			
Literacy links	<p>Students will develop literacy skills through regular practice of command words such as describe, explain, assess and evaluate. Students will also build a glossary of tier 3 subject specific vocabulary and complete regular reading and extended writing task.</p>			

	Autumn	Spring	Summer
Y11 Engineering	<u>Unit 2 – Designing Engineered Products</u>	<u>Unit 2 – Designing Engineered Products - Finish off</u> <u>Unit 3 – Solving Engineering Problems- Exam Practice</u>	<u>Unit 3 – Solving Engineering Problems - Exam Practice</u>
Curriculum content	<p>Students begin their journey by starting their Unit 2 coursework worth 20% of their final course grade. This unit links directly to Unit 1 completed in Y10. This is a design unit where students receive a new brief and design specification form the exam board that asks students to develop the product manufactured in Unit 1. Students begin by completing some existing product analysis to support their understanding of current ideas and concepts that could be used to resolve the design problem, before moving onto creating initial design ideas and design developments. Students are required to write their own specification and produce a costings and manufacturing sheet to show how the modified design solution may be created in industry, as well as suggesting industrial manufacturing processes that would be used to make their design solution. Students will produce CAD drawings for their design using Fusion 360 to realise their ideas.</p>	<p>Through Unit 2, students will continue to learn how to interpret different types of engineering information in order to plan how to make engineered products. Students will develop the skills needed to work safely with a range of engineering processes, equipment and tools. With these skills, students will learn to make a range of engineered processes that are fit for purpose.</p> <p>Students will come back to Unit 3 once Unit 2 is completed to return to the knowledge developed in Y10. The purpose of this unit is for learners to use their knowledge and understanding of engineering processes and material properties to solve problems. Students will spend further time applying this knowledge to exam-style questions to improve their technique and skills in preparation for their exam.</p>	<p>Students will continue to study Unit 3 topics such as structural, mechanical and electronic engineering until they sit their exam, using their time to practice and reflect upon exam style-questions through model examples and teacher support in lesson.</p>
Assessment	Students are assessed through marking of red zones (self, peer and/or teacher) and assessments every half term. These will test student's knowledge recall and application of knowledge.		
Literacy links	Students will develop literacy skills through regular practice of command words such as describe, explain, assess and evaluate. Students will also build a glossary of tier 3 subject specific vocabulary and complete regular reading and extended writing tasks		

	Autumn	Spring	Summer	
Y12 A-Level Product Design	<u>Polymers</u> <u>Timbers</u> <u>Design process</u> <u>Mini NEA</u>	<u>Design methods</u> <u>Industrial practice</u> <u>Product design</u> <u>Responsible design</u> <u>Metals</u>	<u>Smart, modern and composite materials</u> <u>NEA</u>	<u>NEA</u>
<p>Curriculum content</p> <p>Students will study up to three modules at a time with three different teachers to ensure all content is covered effectively.</p>	<p>Students will have three teachers for A-Level and will begin studying three different topics, one per teacher.</p> <p>Students will begin their journey by deepening their knowledge of materials, more specifically polymers and timbers from GCSE. This is completed through a range of theory and practical based lessons aimed to broaden their understanding of industrial and commercial practices and develop exam technique by applying these to exam style questions. Students will also be introduced to design process where they will discover prototype development, third party testing, critical analysis, industrial contexts, accuracy and use of a design process. This provides a broad and varied knowledge base for students to continue to build on and support their knowledge of industry standards and processes.</p>	<p>Students will discover design methods, industrial practice, product design and responsible design in the Spring term.</p> <p>Students will learn about design influences, designers and their work, socio-economic influences on design, developments in technology and what a product life cycle is before delving into topics such as circular economies, conservation of energy, environmental issues and British standards. From this, students will gain an deep and wide understanding of how design impacts the world and the responsibilities designers have to uphold in terms of safety and environmental impression.</p> <p>Students return to more materials knowledge through deepening their understanding of metals from GCSE through theory and practical based lessons, before recapping the importance of efficient use of materials, digital design and modelling, computer systems and scales of production. Students consider design communication, communicating data and enterprise and how these concepts link to support designers in creating original and exciting ideas. Students will undertake exam-style questions that link to the topics to support in upskilling their exam technique.</p>	<p>New and modern materials surround our daily lives. This unit allows students to develop a knowledge and understanding of how these materials work. Students will be exploring how smart, modern and composite materials are applied to products and how they are used to support our daily lives. Students will gain a hands on experience through testing and handling smart materials in lessons.</p>	<p>Students will choose their own design problem to unpick and explore for their NEA. Students will research, develop, test and evaluate a range of ideas towards their end goal. The NEA is a perfect opportunity for students to create a portfolio towards their university application and focus on something they are passionate about. The NEA is worth 50% of the final A-Level grade. This is an opportunity to show off skills, creativity, knowledge and a passion for the subject through a personal response to a chosen context.</p>
Assessment	Students are assessed through marking of red zones (self, peer and/or teacher) and assessments every half term. These will test student's knowledge recall and application of knowledge.			
Literacy links	Students will develop literacy skills through regular practice of command words such as describe, explain, assess and evaluate. Students will also build a glossary of tier 3 subject specific vocabulary and complete regular reading and extended writing tasks.			

	Autumn	Spring		Summer
Y13 A-Level Product Design	<u>NEA</u>	<u>NEA</u>	<u>Exam Practice</u>	<u>Exam Practice</u>
Curriculum content	<p>The NEA encourages, inspires and motivates students to develop a personal response to a chosen context. Students use iterative design to solve a complex design problem faced in everyday life and produce a solution for this. Students begin by creating mind maps for potential design problems they would like to solve, before focusing on one. Students deepen their skills on how to write a brief and specification and conduct existing product analysis to understand the market. Students develop a client profile and produce a range of design ideas and developments using the iterative process and drawing styles to portray their proposed options. Students complete several prototypes of their idea and continually evaluate their work throughout. Students will create their final outcome showing the use of a range of tools and machinery. This unit enables students to showcase skills, knowledge and independence developed and enhanced throughout their school career.</p>	<p>Students continue to test, evaluate and improve their final outcome ideas before producing their final product using a range of machinery and tools in the workshop.</p> <p>Students continue to test, develop and evaluate ideas for their final product until the end to show in depth, considered research, evaluation and decision making.</p> <p>Students will have produced an extensive portfolio of work to showcase all of the work competed for the NEA using the iPads to combine written, photographic and hand drawn evidence that shows independence, skill, knowledge and a passion for the idea being created.</p>	<p>Students continue learning, revisiting and developing exam technique for the topics featuring in the final exam. This includes, new and emerging technologies, developments in new materials, energy generation and storage, materials and their working properties, mechanical devices and understanding a systems approach when designing. Students explore each topic and complete exam style questions to develop their technique and build confidence</p>	<p>Students continue to revise, develop and improve exam technique for the topics featured in the final exam. This includes, new and emerging technologies, developments in new materials, energy generation and storage, materials and their working properties, mechanical devices and understanding a systems approach when designing. Students explore each topic and complete exam style questions to develop their technique and build confidence</p>
Assessment	Students are assessed through marking of red zones (self, peer and/or teacher) and assessments every half term. These will test student's knowledge recall and application of knowledge.			
Literacy links	Students will develop literacy skills through regular practice of command words such as describe, explain, assess and evaluate. Students will also build a glossary of tier 3 subject specific vocabulary and complete regular reading and extended writing tasks.			