

Swindon Academy Product Design Curriculum Map 2021-2022

The purpose of Design and Technology curriculum has been designed to prepare students to work confidently and successfully in an increasingly technological world. Students gain awareness and learn from wider influences in Design and Technology including historical, social, cultural, environmental and economic factors. Students will get the opportunity to work creatively when designing and making and apply technical and practical expertise throughout Key Stage 3.

The design of the curriculum at Swindon Academy aims to build a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users. Students are encouraged to critique, evaluate and test their ideas and products and the work of others. The course is academically rigorous, with students drawing up mathematical and scientific knowledge in order to address some of the key concepts at Key Stage 4.

Students are given an opportunity to attend extra-curricular sessions where they can catch up with course work. As a DT department we also offer lunch time sessions for those that wish to catch up with their GCSE coursework. We are fortunate enough to be a well-resourced department with access to 3D printers and laser cutters as well as a variety of CAD programs to support students learning. In the past we have welcome visits from Dyson who have run workshops with small groups to help further their understanding of the role of Design and Technology in our society.

Implementation – Rosenshine principles of instruction – please write one or two sentences to describe the implementation for each of the Rosenshine principles below these must be subject specific and observable in lessons.

		Daily Review	New Material in Small Steps	Ask Questions	Provide Models	Guide Student Practice	Check Student Understanding	Obtain High Success Rate	Scaffolds for Difficult Tasks	Independent Practice	Weekly and Monthly Review								
		Daily review is an important component of instruction. It helps strengthen the connections of the material learned. Automatic recall frees working memory for problem solving and creativity.	Our working memory is small, only handling a few bits of information at once. Avoid its overload—present new material in small steps and proceed only when first steps are mastered.	The most successful teachers spend more than half the class time lecturing, demonstrating and asking questions. Questions allow the teacher to determine how well the material is learned.	Students need cognitive support to help them learn how to solve problems. Modelling, worked examples and teacher thinking out loud, help to clarify the specific steps involved.	Students need additional time to rephrase, elaborate and summarise new material in order to store it in their long-term memory. More successful teachers build in more time for this.	Less successful teachers merely ask “Are there any questions?” no questions are taken to mean no problems. False. By contrast, more successful teachers check on all students.	A success rate of around 80% has been found to be optimal, showing students are learning and also being challenged. Better teachers taught in small steps followed by practice.	Scaffolds are temporary supports to assist learning. They can include modelling, teacher thinking aloud, cue cards and checklists. Scaffolds are part of cognitive apprenticeship.	Independent practice produces “overlearning” - a necessary process for new material to be recalled automatically. This ensures no overloading of students’ working memory.	The effort involved in recalling recently-learned material embeds it in long-term memory. And the more this happens, the easier it is to connect new material to such prior knowledge.								
R1	<ul style="list-style-type: none"> United Quizzing to help with exam questioning Lesson plenaries mid-way and end of lesson recap Questioning in class to review learning Recapping previous knowledge through questioning 	R2	<ul style="list-style-type: none"> Each new skill is taught through small steps Teacher demonstration with questioning Practical aspect of lesson is done in small steps so skills can be evaluated before moving on 	R3	<ul style="list-style-type: none"> Targeted questioning to gain a feel of how the class Clear and concise explanations of new techniques, skills and processes Thorough questioning to check understanding at every stage of the lesson/ series of lessons Getting students to recap steps through questioning and repetition 	R4	<ul style="list-style-type: none"> Exemplar work is shown from previous students High, middle and low examples shown to give students a range of work to see and set the high expectation. Teacher demonstrations during practical work of the skills required to create a product. Student led demonstrations in lessons to show progress and model how to master certain skills. 	R5	<ul style="list-style-type: none"> Through structured questioning to build on student knowledge. Chunking activities and ensuring that appropriate time is spent on theory and practical work. Revisiting theory work using starters and quizzing. 	R6	<ul style="list-style-type: none"> Use of appropriate questioning to check student understanding throughout theory and practical tasks. Mid lesson plenaries to be used to check student understanding. 	R7	<ul style="list-style-type: none"> Students must master certain practical tasks before they can move onto the next. This giving them a higher quality finished product. Always aiming for the higher mark and in GCSE and A level work. 	R8	<ul style="list-style-type: none"> Exemplar work to be used to help students aim high in achieving those difficult tasks. Differentiated worksheets and prep work to help students achieve those difficult tasks. 	R9	<ul style="list-style-type: none"> Expectation is set that students are to work independently where possible in theory tasks. And self-assess this work where appropriate. Practical work should be completed by one individual and quality checked by that individual therefore promoting independent practice in practical work. 	R10	<ul style="list-style-type: none"> QLA used to check progress on individual groups. Quizzing in lessons. End of term exams.
Term	1	2	3	4	5	6	6												
Year 7	PROJECT: Moving wooden toy – R1 Students will learn about a variety of different tools and equipment that can be found in the DT workshop. Students will be taught about health and safety and they will learn how to work safely around others. Students will be taught about modelling and how ideas can be brought to life. Students will learn about the different material that can be used and how they can be integrated together.		Assessment 1	PROJECT: Moving wooden toy – R2 Students will learn about a variety of different tools and equipment that can be found in the DT workshop. Students will be taught about health and safety and they will learn how to work safely around others. Students will be taught about modelling and how ideas can be brought to life. Students will learn about the different material that can be used and how they can be integrated together.		PROJECT: Moving wooden toy – R3 Students will learn about a variety of different tools and equipment that can be found in the DT workshop. Students will be taught about health and safety and they will learn how to work safely around others. Students will be taught about modelling and how ideas can be brought to life. Students will learn about the different material that can be used and how they can be integrated together.		Assessment 2	Review and										
						<ul style="list-style-type: none"> Health and safety in the workshop 													

	<ul style="list-style-type: none"> Health and safety in the workshop Design brief and mood boards Task analysis Design specifications Research into different materials Introduction into different equipment Introduction to different machines that can be used How to evaluate your work and think about modifications 	<ul style="list-style-type: none"> Health and safety in the workshop Design brief and mood boards Task analysis Design specifications Research into different materials Introduction into different equipment Introduction to different machines that can be used How to evaluate your work and think about modifications 	<ul style="list-style-type: none"> Design brief and mood boards Task analysis Design specifications Research into different materials Introduction into different equipment Introduction to different machines that can be used How to evaluate your work and think about modifications
Vocabulary instruction	Identify Evaluate Compare Improve Annotate Research Analyse	Identify Evaluate Compare Improve Annotate Research Analyse	Identify Evaluate Compare Improve Annotate Research Analyse
Year 8	<p>PROJECT: Art Deco clock R1 Students will learn about the work of others and how a design movement can inspire their design. Drawing techniques will also be investigated and used to show their ideas. Students will be taught about the importance of analysing existing products and client profiles to perfect their designs. Students will also learn about the different -</p> <ul style="list-style-type: none"> Health and safety in the workshop Design brief and mood boards Task analysis Product Analysis Client Profiles Drawing techniques Recap on workshop techniques Introduction to different machines that can be used to create their clock 6R's and sustainability 	<p>PROJECT: Art Deco clock R2 Students will learn about the work of others and how a design movement can inspire their design. Drawing techniques will also be investigated and used to show their ideas. Students will be taught about the importance of analysing existing products and client profiles to perfect their designs. Students will also learn about the different -</p> <ul style="list-style-type: none"> Health and safety in the workshop Design brief and mood boards Task analysis Product Analysis Client Profiles Drawing techniques Recap on workshop techniques Introduction to different machines that can be used to create their clock 6R's and sustainability 	<p>PROJECT: Art Deco clock R3 Students will learn about the work of others and how a design movement can inspire their design. Drawing techniques will also be investigated and used to show their ideas. Students will be taught about the importance of analysing existing products and client profiles to perfect their designs. Students will also learn about the different -</p> <ul style="list-style-type: none"> Health and safety in the workshop Design brief and mood boards Task analysis Product Analysis Client Profiles Drawing techniques Recap on workshop techniques Introduction to different machines that can be used to create their clock 6R's and sustainability
Vocabulary instruction	Design Movement Research Sustainability Analyse Improve Evaluate	Design Movement Research Sustainability Analyse Improve Evaluate	Design Movement Research Sustainability Analyse Improve Evaluate
Year 9	<p>Desk Tidy R1 Students will investigate the work of four specific designers within Product Design and evaluate each of their styles. They will then look at design briefs and a specification before moving on to perspective drawing. There will be a recap on workshop safety and the importance of risk assessment before being the manufacture of the desk tidy project.</p> <p>The origin of materials will be investigated before looking at polymers. Thermoforming technique will also be introduced, and students will be taught the difference between thermoplastic & thermosetting</p>	<p>Desk Tidy R2 Students will investigate the work of four specific designers within Product Design and evaluate each of their styles. They will then look at design briefs and a specification before moving on to perspective drawing. There will be a recap on workshop safety and the importance of risk assessment before being the manufacture of the desk tidy project.</p> <p>The origin of materials will be investigated before looking at polymers. Thermoforming technique will also be introduced, and students will be taught the difference between thermoplastic & thermosetting plastic. Students will then be</p>	<p>Desk Tidy R3 Students will investigate the work of four specific designers within Product Design and evaluate each of their styles. They will then look at design briefs and a specification before moving on to perspective drawing. There will be a recap on workshop safety and the importance of risk assessment before being the manufacture of the desk tidy project.</p> <p>The origin of materials will be investigated before looking at polymers. Thermoforming technique will also be introduced, and students will be taught the difference between thermoplastic & thermosetting plastic. Students will then be able to explain with advantages and disadvantages for the use of each one.</p>

	<p>plastic. Students will then be able to explain with advantages and disadvantages for the use of each one.</p> <p>Projects that will be completed and assessed by outcome include: Desk tidy based on the work of others – skills covered include – workshop tools, machinery and finishes. Accuracy in manufacture becomes more relevant with the inclusion of smaller tolerances for error.</p> <ul style="list-style-type: none"> Investigation of the work of others - Charles Rennie Mackintosh, Ettore Sottsass, Norman Foster and Gerrit Rietveld Design brief and mood boards Specification Advanced drawing techniques Recap on workshop techniques Health and safety in the workshop Introduction to different machines that can be used to create their desk tidy Thermoforming Third party evaluation 		<p>able to explain with advantages and disadvantages for the use of each one.</p> <p>Projects that will be completed and assessed by outcome include: Desk tidy based on the work of others – skills covered include – workshop tools, machinery and finishes. Accuracy in manufacture becomes more relevant with the inclusion of smaller tolerances for error.</p> <ul style="list-style-type: none"> Investigation of the work of others - Charles Rennie Mackintosh, Ettore Sottsass, Norman Foster and Gerrit Rietveld Design brief and mood boards Specification Advanced drawing techniques Recap on workshop techniques Health and safety in the workshop Introduction to different machines that can be used to create their desk tidy Thermoforming Third party evaluation 	<p>Projects that will be completed and assessed by outcome include: Desk tidy based on the work of others – skills covered include – workshop tools, machinery and finishes. Accuracy in manufacture becomes more relevant with the inclusion of smaller tolerances for error.</p> <ul style="list-style-type: none"> Investigation of the work of others - Charles Rennie Mackintosh, Ettore Sottsass, Norman Foster and Gerrit Rietveld Design brief and mood boards Specification Advanced drawing techniques Recap on workshop techniques Health and safety in the workshop Introduction to different machines that can be used to create their desk tidy Thermoforming Third party evaluation 	
Vocabulary instruction	<p>Work of others Design style Thermoforming Finish Tolerance Accuracy</p>		<p>Work of others Design style Thermoforming Finish Tolerance Accuracy</p>	<p>Work of others Design style Thermoforming Finish Tolerance Accuracy</p>	

Term	1	2	3	4	5	6	6
Year 10	<ul style="list-style-type: none"> CAD/CAM lamp project Introduction to CAD Advanced CAD skills Advanced workshop safety Introduction to CAM Manufacturing skills with use of hand tools and CAM machines. Introduction to electronics Soldering skills 	<ul style="list-style-type: none"> Advanced workshop safety Introduction to CAM Manufacturing skills with use of hand tools and CAM machines. Introduction to electronics Soldering skills Exam Prep 	<ul style="list-style-type: none"> NEA practice – iterative design NEA project based on previous NEA tasks to give an introduction into their final project and prepare them for the final year. NEA design process to be covered. Primary and secondary research Identifying a client Design skills – isometric, one- and two-point perspective, exploded. Modelling skills 	<ul style="list-style-type: none"> NEA practice NEA project based on previous NEA tasks to give an introduction into their final project and prepare them for the final year. NEA design process to be covered. Smart Materials Additional CAD skills Prototyping Additional CAM skills Evaluation skills 	<ul style="list-style-type: none"> Small scaled manufacture. Evaluation techniques Metal work project Introduction to ferrous and non-ferrous metals Phone Holder Project Combining two or more materials Use of polymers <p>Introduction to NEA once design tasks have been released on 1/7/21 Students will undertake a single 'design and make' activity, which will arise from investigating one of three Contextual Challenges set by AQA.</p>	<ul style="list-style-type: none"> Primary research – Product Analysis, questionnaire Secondary research - Design based on work of others Design specification Initial design ideas Development work Modelling and testing Model development Evaluation to improve outcomes Materials investigation and selection with justification 	
Vocabulary instruction	<p>CAM Soldering Metal Manufactured board Tolerance Client</p>		<p>CAM Soldering Metal Manufactured board Tolerance Client</p>		<p>CAM Soldering Metal Manufactured board Tolerance Client</p>		<p>Assessment 1</p>
							<p>Assessment 2</p>
							<p>Review and reteach</p>

Term	1	2	3	4	5
Year 11	<ul style="list-style-type: none"> Design ideas / ideas development Design ideas modelling Evaluation of modelling from peer feedback Prep & theory lessons covers materials and their properties. The main categories are papers and boards, timbers, polymers, metals and textiles 	<ul style="list-style-type: none"> CAD Modelling/ orthographic drawings Full size card model manufacture and evaluation Further research e.g. standard components Manufacture including CAM – laser cutter, CNC Router or 3D printer Theory lesson and prep covers energy, smart, modern and composite materials, systems and mechanisms. 	<ul style="list-style-type: none"> Flow diagram to show investigative thinking Testing of the product e.g. durability, stability and suitability Manufacturing diary with detailed annotation of different steps 	<ul style="list-style-type: none"> Evaluation plus 3rd party feedback Manufacture developments based on feedback Evaluation against spec and summary Modifications 	Revision and past paper practice to embed knowledge and apply skills
Vocabulary instruction	Iterative design Specification Modelling Design techniques Modifications Third party evaluation	Iterative design Specification Modelling Design techniques Modifications Third party evaluation	Iterative design Specification Modelling Design techniques Modifications Third party evaluation		
	Exams to take place in lessons		Mock 1	Mock 2	

Term	1	2	3	4	5	6	6
Year 12	<ul style="list-style-type: none"> An introductory project of a composite material project Looking at technical principles such as material properties Plastic processes e.g. vacuum forming, line bending and other moulding techniques 	<ul style="list-style-type: none"> Year 12 will sit a mock exam based on GCSE/A-level content to get a baseline of where the student's knowledge is at Students complete a mock NEA based on last year's contextual challenges 2/3 lessons a week. Health and safety at work act 1974 Safe working practices 	<ul style="list-style-type: none"> Theory lesson and prep covers core designing and making principals e.g. Design methods, processes, critical analysis and evaluation Iterative design process in detail Research investigation methods Ergonomics and anthropometric data theory Responsible design Theory lesson and prep covers core technical principals e.g. Materials and their properties and design communication 	<ul style="list-style-type: none"> Accuracy in design manufacture – how to use a range of measuring and marking out equipment Introduction to A level NEA substantial design and make task. Produce a final prototype based on a context student have developed. Identifying and investigating design possibilities Produce a design brief and specification Identify client/end user 	<ul style="list-style-type: none"> Development of design proposals Development of design prototypes Build prototype using a range of materials, tools and equipment e.g. CAM equipment such as 3D printers, laser cutters, router, milling machine, lathes and vinyl cutters 	<ul style="list-style-type: none"> Continue with building prototype using a range of materials, tools and equipment e.g. CAM equipment such as 3D printers, laser cutters, router, milling machine, lathes and vinyl cutters Analysing and evaluating – involve client and target user Testing prototype Suggest improvements 	
		Assessment 1		Assessment 2			Assessment 3
							Review and reteach

Vocabulary instruction	Composite Plastic processes Contextual design H&S act Ergonomics Anthropometric data	Critical analysis Research investigation Material properties Responsible design Iterative design Design and making principals		Design possibilities Design development Prototypes 3D printing CAM Testing
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Term	1	2	3	4	5
Year 13	<ul style="list-style-type: none"> NEA prototype evaluation continued Client feedback – obtain expert opinion by getting feedback on final piece – specific product forum for their design 	<ul style="list-style-type: none"> Further modifications – In response to feedback from third party user and consumer views Review final project before submitting 	<ul style="list-style-type: none"> Further introduction into the A level paper – technical principles Multiple choice questions Focus on mathematics-based questions Focus on science-based questions Identify command words – Look at the key word before answering the question 	<ul style="list-style-type: none"> Further introduction into the A level paper 2 – designing and making principles Section A – Product Analysis Section B – Commercial manufacture 	Revision and past paper practice to embed knowledge and apply skills
Vocabulary instruction	Prototype evaluation Client feedback Third part evaluation Modifications Consumer views Review		Technical principles revision Cross curricular Multiple choice Designing and making principles Product Analysis Commercial manufacture		