

## Subject: Design & Technology – Resistant Materials / Product Design

Faculty Leader	Subject Leader
Dave Hewitt	Rebecca Gregory
National Curriculum	
The Ecclesbourne School follows the Design & Technology national curriculum.	
Curriculum Intent	
<p>It is our intent in Resistant Materials and Product Design to offer our students the chance to use creative thinking, problem solving and design and making skills, within a defined purpose to produce a tangible outcome. Through a variety of creative and practical activities, pupils are taught the knowledge, understanding and skills needed to engage in a process of designing and making and to understand and appreciate the creative and manufactured world around them. They work on a variety of contexts through our wide range of subject topics to design, make and evaluate a wide range of practical based projects.</p> <p>Through the study of Resistant Materials and Product Design students acquire a broad range of subject knowledge and draw on and enhance their application of disciplines such as mathematics, science, engineering, computing, ethics and art. Students learn how to and are encouraged to take risks, become resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. Our students will learn about the wider impact of global issues such as Sustainability and modern manufacturing techniques, the development of modern materials and processes to ensure that our students are equipped and empowered with the skills and knowledge that they need to make a positive difference to our society and become well rounded knowledgeable citizens.</p> <p>High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation. Our Key Stage 3 curriculum has been designed to adhere to the National Curriculum as well as underpin and feed into the Key Stage 4 curriculum.</p>	

Curriculum Implementation				
		Term	Content	Assessment
Year 7	Autumn Term	1	<p>All students have a health and safety induction and tour of the Design &amp; Technology workshops prior to baseline assessments to ascertain prior understanding.</p> <p><b><u>Jigsaw puzzle project</u></b>                      Students will be introduced to the core design process and essential designing skills.                      Learning about the design process from consultation with a client, writing a design brief &amp; specification through to the design and development of a design proposal for an educational jigsaw puzzle.                      Product analysis and suitability for different clients and age ranges.                      Learn about different wood categories with a focus on manufactured boards.</p>	<p>Baseline assessment.                      ½ term assessments.                      Learning ladders which enable students to understand what they need to do to reach each level.                      2 formal assessment points of practical work and work in student's books each ½ term where students will formally respond to feedback and have the opportunity to complete focussed targeted improvement work.</p>

Year 7		2	<p>Students will conduct modelling and testing to explore the suitability of design ideas and how materials respond to different tools and techniques.</p> <p>Students will then use the skills they have learnt to manufacture a jigsaw puzzle that meets their design brief and specification.</p> <p>Students will learn how to evaluate and draw conclusions about the effectiveness of their project and complete their end of project assessment.</p> <p><b>This</b></p> <p><b><u>Christmas themed mini project</u></b></p> <p>Students will undertake a focussed practical task on how to shape acrylic to create a twisted naturally formed Christmas decoration. Students will learn how to accurately drill plastic, finish edges and deform plastic.</p>	
	Spring Term	3	<p><b><u>Nightlight project</u></b></p> <p>Core design skills including refining the writing of a more detailed specification than the puzzle project and the application of these skills to a new project.</p> <p>Students to be introduced to the different categories of plastics, thermosetting and thermoplastics, and be able to identify the difference between them.</p> <p>Students will learn about vacuum forming and how to use a disc cutter, finishing edges of plastics then use this knowledge to form and cut out the base for their night light.</p> <p>This project provides a basic introduction to electronic components including resistors, transistors, light dependent resistors, light emitting diodes and variable resistors and the function each component performs within the circuit.</p> <p>Students will learn how to assemble, correctly populate and solder a printed circuit board in order to build a functioning nightlight. Students will learn about Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM), using TechSoft 2D Design and a laser cutter to create an acrylic plaque, which is illuminated and sits on the top of the vacuum formed base containing the electronics.</p> <p>Students will learn how to evaluate and draw conclusions about the effectiveness of their product and complete an end of project assessment.</p> <p><b><u>Inspirational females' celebration project</u></b></p> <p>Students will design and make a tea light holder to celebrate an inspirational female in their life. They will learn how to shape and drill softwood. They will also use finishing techniques to apply a desirable finish of their choice.</p>	<p>½ term assessments.</p> <p>Learning ladders which enable students to understand what they need to do to reach each level.</p> <p>2 formal assessment points of practical work and work in student's books each ½ term where students will formally respond to feedback and have the opportunity to complete focussed targeted improvement work.</p>
	Summer Term	4	<p>Students will learn how to assemble, correctly populate and solder a printed circuit board in order to build a functioning nightlight. Students will learn about Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM), using TechSoft 2D Design and a laser cutter to create an acrylic plaque, which is illuminated and sits on the top of the vacuum formed base containing the electronics.</p> <p>Students will learn how to evaluate and draw conclusions about the effectiveness of their product and complete an end of project assessment.</p> <p><b><u>Inspirational females' celebration project</u></b></p> <p>Students will design and make a tea light holder to celebrate an inspirational female in their life. They will learn how to shape and drill softwood. They will also use finishing techniques to apply a desirable finish of their choice.</p>	
		5	<p><b><u>Metal work project</u></b></p> <p>This project aims to teach students about the different categories of metals and provides students with the experience of working with metals. The project will complement the work they have done this year on plastics, woods and electronics.</p> <p>Students will follow the design process from a brief through to evaluation and will manufacture a product made from metal.</p>	<p>½ term assessments.</p> <p>Learning ladders which enable students to understand what they need to do to reach each level.</p> <p>2 formal assessment points of practical work and work in student's books each ½ term where students will</p>

		6	<p><b>Inspirational males' celebration project</b></p> <p>Students will design and make a metal keyring to celebrate an inspirational male in their lives. They will learn how to shape and drill aluminium. They will also use a range of finishing techniques to apply a desirable finish of their choice, as well as letter stamping.</p>	formally respond to feedback and have the opportunity to complete focussed targeted improvement work.
	<b>Term</b>		<b>Content</b>	<b>Assessment</b>
Year 8	Autumn Term	1	<p><b>Bauhaus trinket box project</b></p> <p>Students look into the design school of Bauhaus and its influence on design. They research famous designers who were part of the Bauhaus movement and are able to identify the key characteristics of Bauhaus design. They will use this information to design and develop a range of design ideas for their box lids and will develop their annotation and analysis skills, in order to critically analyse and explain reasons for selecting their chosen design, linking back to the specification.</p> <p>Students will then re-cap and re-visit writing a brief and specification, as these are vital parts of a design process to ensure project success. They will also build on their knowledge of wood categories learning in more depth about softwoods and wood jointing techniques. The trinket box project consists of a range of wood joints that include a Lap, Comb and Domino joint. They will learn about different manufacturing processes and the use of manufacturing aids to ensure quality assurance and learn about quality control techniques in manufacturing. Students will learn how to draw Isometric projections as well as further enhance their CAD/CAM skills to design and laser cut a Bauhaus inspired lid for their box.</p> <p>Students will use their specification to review the success of their project and evaluate their products success and suggest modifications.</p>	<p>½ term assessments.</p> <p>Learning ladders which enable students to understand what they need to do to reach each level.</p> <p>2 formal assessment points of practical work and work in student's books each ½ term where students will formally respond to feedback and have the opportunity to complete focussed targeted improvement work.</p>
		2	<p><b>Christmas themed mini project</b></p> <p>Students will design and make a laser cut Christmas card. This project aims to further develop their CAD/CAM skills, applying them to an alternative medium, expanding students' knowledge of CAM processes and materials.</p>	
	Spring Term	3	<p><b>Lamp Project</b></p> <p>Students will follow a traditional design process, refining their skills of writing a specification and investigating their client to ensure product success and suitability. Students will refine their wood working skills to create a poised arm made up of linkages, which will allow it to be adjusted as desired by their client. Accuracy of drilling and cutting will be developed as well as an open brief for students to develop their own lamp shade solution out of either laser cut/engraved acrylic or ply wood, further developing and enhancing student's design decision making and knowledge of the physical and aesthetic properties of materials, whilst further refining CAD/CAM skills.</p> <p>Students will construct a basic light electronics circuit for the lighting element and learn about knock down fittings in order to attach the arm to the base.</p> <p>Students will evaluate their work in line with the expectations of evaluations at KS4, to ensure students will be able to develop the necessary skills required at KS4, thus enabling them to make a smooth and successful transition.</p>	
		4	<p><b>Inspirational females' celebration project</b></p> <p>Students will design and make a plastic photograph frame to celebrate an inspirational female in their lives. Students learn how to shape, finish and bend plastic at an angle using a JIG to produce</p>	

			their photograph frame. They will then learn about die cutting to produce decorations for the frame to celebrate an inspirational female in their lives.	
	Summer Term	5	<p><b><u>Metalwork Based Project</u></b> This project aims to build on the knowledge that students gained in Year 7 regarding metal, refining knowledge and skills about the different categories of metal and provide students with the experience of working with metals. The project will complement the work that they have done this year with plastics, woods and electronics.</p>	<p>½ term assessments. Learning ladders which enable students to understand what they need to do to reach each level. 2 formal assessment points of practical work and work in student's books each ½ term where students will formally respond to feedback and have the opportunity to complete focussed targeted improvement work.</p>
		6	<p>Students will follow the design process from a brief through to evaluation and will manufacture a product made from metal.</p> <p><b><u>Inspirational males' celebration project</u></b> Students will design and dye sublimate a personalised mug. Students will learn how to use Photoshop to design a personalised mug as a gift to celebrate an inspirational male in their lives. Students will learn basic techniques within Photoshop to create their graphic design and the modern printing technique of dye sublimation, in which an image is transferred onto the surface of an object.</p>	
<b>Term</b>	<b>Content</b>		<b>Assessment</b>	
Year 9	Autumn Term	1	Students rotate around specialist members of staff to complete the following projects;	<p>½ term assessments. Learning ladders which enable students to understand what they need to do to reach each level. 2 formal assessment points of practical work and work in student's books each ½ term where students will formally respond to feedback and have the opportunity to complete focussed targeted improvement work.</p>
		2	<p><b><u>Heritage themed stool project</u></b> Students research into our community's history rich Derbyshire Heritage Sites and Industries, and learn how these have influenced and supported the growth and development of not only our community, but the country and world at large. Information, imagery and influential research is collated, developed and transformed into a piece of commemorative artwork, designed by the student. During the initial stages of the project, students will analyse a range of existing products and draw conclusions about the effectiveness of existing stool designs. They will also have to work out material areas and costings for certain products from a pricelist of materials. The artwork is used as a design for a stool top, by students drafting their design onto CAD software. The CNC Router is then used to manufacture the stool top, giving students exposure to CAD/CAM production. Traditional woodworking methods and joints, which will build on the practical experiences they had in Year 7 and 8 to construct more complex joints such as mortice and tenons, are then used to make a softwood stool. Alongside the practical element, students conduct further research into their target market, existing products, materials and joints and use this knowledge to assist writing a process of manufacture. Students are also encouraged to document health and safety considerations, tools and equipment used and their timings, in order to generate a comprehensive, retrospective manufacturing log. An evaluation at the end of the project, reviews and compares their soft wood stool to their specification and initial research, along with testing and consumer feedback, which allows and enables students to measure the success of their product.</p>	
	Spring Term	3	<p><b><u>3D Printed USB memory stick case project</u></b> Students extend their knowledge of Computer Aided Design and Computer Aided Manufacture to encompass 3D CAD modelling and 3D Printing. An increasingly popular method of manufacturing in industry, students learn how rapid prototyping through addition, is benefiting companies by saving time and money during the design process. Students are introduced to SolidWorks, a CAD package</p>	
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	Summer Term	5		
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		<p>that enables students to model their design ideas in three dimensions. Students learn the fundamental stages of creating a 3D model through a range of hands-on tasks, in which they learn to sketch, dimension and use different features to create parts and assemblies. Once students have developed the necessary skills and knowledge required to effectively model in 3D, students embark on a project that tests their knowledge of design constraints and tolerances, in which they design a bespoke 3D printed case to encapsulate an uncased memory stick.</p> <p><b><u>Christmas themed mini project</u></b> Dye sublimated Christmas decoration. Students will learn and develop their skills using Photoshop to design an image for a Christmas decoration. Students will learn a range of techniques within Photoshop and the modern printing technique of dye sublimation, to transfer an image onto the surface of an object.</p> <p><b><u>Inspirational females' celebration project</u></b> Wine bottle and glasses storage stand. Students develop their woodworking skills to create a stand for wine glasses which is suspended around the neck of a wine bottle. Students will develop their precision drilling and cutting skills to create a product that they can finish using a method of their choice, the finished product can be given as a gift to an inspirational female of their choice.</p> <p><b><u>Inspirational males' celebration project</u></b> Students will learn about positive and negative spaces and use CAD/CAM to design and make a drinks coaster using precision inlay techniques. The finished product can be given as a gift to an inspirational male of their choice.</p>	
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### Extra-Curricular Opportunities

Access to rooms and ICT equipment in the department from 8am every morning, during breaks and lunch times and Thursday evenings until 5pm.  
Access to workshops and specialist staff during breaks and lunch times to do additional or catch up/support work.

### Resources

- CGP KS3 D&T KS3 Design & Technology Study Guide
- CGP GCSE D&T 9-1 Revision - New Grade 9-1 GCSE Design & Technology AQA Revision Guide
- CGP GCSE D&T 9-1 Revision New Grade 9-1 GCSE Design & Technology AQA Revision Question Cards
- AQA GCSE (9-1) Design and Technology 8552 2017 By M. J. Ross
- [www.technologystudent.com](http://www.technologystudent.com)
- [www.mr-dt.com](http://www.mr-dt.com)
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