

Curriculum Map - Design and Technology

Intent:

Vision statement:

The Design & Technology department at Dame Alice Owens School is committed to delivering a curriculum accessible to all¹. We are devoted to providing students with unique learning opportunities to become self-motivated and confident individuals, **who can work independently** and as **part of a team**⁴.

Our aim is to ensure that Students develop technical and practical competences as well as **the wider skills valued by employers**². Our main priority is for students to become **innovative problem solvers who are not afraid of making mistakes and are content to think differently**. We hope our students will **become insightful and responsible citizens**⁵ who make a positive contribution to society.

Mission statement:

Our department firmly believes that students learn best by 'doing' and by allowing students to *experiment* and *take risks*, in a **safe and positive learning environment**⁴. This is achieved through imaginative teaching that embraces *new technologies* whilst retaining the best of traditional practices.

At the heart of this mission, is a desire to deliver a curriculum in which students produce high quality outcomes and where they can learn about the social and **ethical responsibilities of being consumers, designers and engineers**. It is vital our students are prepared for the future world where **design and engineering** will play an important role in **managing finite resources**³ and securing a **sustainable future**² for our planet.

School aims: 1) OPPORTUNITY FOR ALL 2) WINDOW TO THE WORLD 3) EXCELLENCE IN EVERYTHING 4) NEVER STOP LEARNING 5) SUPPORTIVE COMMUNITY

Curriculum Planning & Context

KS3 Curriculum:

Students' experience of D&T in primary school will widely vary from no experience to having a great deal of workshop experience. Our curriculum has been developed with this in mind offering students learning opportunities that develop key knowledge and fundamental skills through design and make challenges that cover a range of material areas. (This has been amended to address the curriculum gaps following Covid challenges)

There are four key skill areas which are taught in Years 7-9 in preparation for KS4&5. These key skill areas are essential for students to effectively work through the iterative design process required of them in the NEA component of the GCSE and A Level qualifications.

Key Skills:

Investigating the context - Through conducting various research and investigations, students gain a better understanding of different contexts to be able to identify problems and design opportunities.

Ideation and Design development - By exploring and using different design strategies and approaches, students will gain a better understanding of how to think more creatively.

Planning and making skills - Planning for manufacture and making products will give students the opportunity to develop their technical and practical skills whilst also providing opportunities to develop, problem solving skills

Testing and Evaluation - This will enable students to think critically and analytically about their work.

By the end of Year 7, we would like our students to...

- Develop creative skills by using different approaches to generate ideas.
- Understand the iterative design process.
- Develop their technical drawing skills and be competent with Isometric drawing technique
- Be able to use the following range of hand tools and equipment safely and competently: Basic hand tools to include coping saw, file and soldering iron, Fret saw, belt sander, Vacuum former, Gerbil cutter, Strip heater)
- Make products that are well made.
- Be able to solve problems as they arise during practical activities.
- Understand key knowledge about the origins and classification of main material groups. (Wood/Polymers and Metals)
- Understand what CAD/CAM technology is.
- Apply knowledge from other subjects throughout the design process.

By the end of Year 8, we would like our students to build on the skills they learnt in Year 7 and...

- Use different techniques to improve design development skills
- Develop their technical drawing skills and be competent with one and two point perspective drawing technique
- Be able to use a wider range of hand tools and equipment safely and competently including the Pillar drill, Low casting system, forming and shaping equipment.
- Build on making well made products by working more accurately.
- Develop problem solving skills as they arise during practical activities.
- Understand key knowledge about the classification and benefits of using Modern and Smart materials.
- Apply knowledge from other subjects throughout the design process.

By the end of Year 9, we would like our students to build on the skills they learnt in Year 8 and...

- Use different techniques to independently steer their ideation and design development.
- Develop their technical drawing skills and be competent with orthographic drawing technique
- Be able to use a wider range of hand tools and equipment safely and competently including forming and shaping equipment, power hand tools.
- Build on making accurate products by working with more skill and care.
- Continue to develop problem solving skills as they arise during practical activities.
- Understand key issues associated use of resources and their impact on the environment
- Be able to identify materials and their applications
- Apply knowledge from other subjects throughout the design process.

KS4 Curriculum:

By the end of Key Stage 4, we hope our students will be able to identify opportunities to solve problems and develop creative or innovative solutions in response to them. We want our students to develop a much deeper understanding of how the world around them has been designed and made as well as being able to identify what materials, processes and technologies have been used to make products. We hope students will acquire a stronger understanding of the wider issues created by the designed and made world and that it will make them more informed and considerate consumers.

By the end of Year 11, we would like our students to build on the skills they learnt in Year 10 and

- Be able to investigate a context in order to identify problems or design opportunities that can be further explored
- Be able to complete different methods of research and investigative work that will help inform their design process
- Work iteratively to develop successful solutions by experimenting, exploring and thinking differently.
- Use different techniques to independently steer ideas and design development.
- Develop their visual communication and technical drawing skills
- Be able to use a wider range of hand tools and equipment safely and competently including forming and shaping equipment, power hand tools and finishing equipment
- Build on making accurate products by working with more skill and precision.
- Continue to develop problem solving skills and decision making skills as they arise during practical activities.
- Understand key issues associated with the use of resources and their impact on the environment
- Be able to identify a broad range of materials components and technologies and their applications.
- Be able to independently select materials and processes appropriate for their designs and be able to justify their choices
- Be able to demonstrate safe working practices in the workshop
- Apply knowledge from other subjects throughout the design process.

Key Projects (Year 10 - Term 1: Clock and Pendant, Speaker, Term 2: Light, Term 3: Pizza cutter, Year 11 - Terms 1-3: NEA)

KS5 Curriculum

By the end of Key Stage 5, students will be able to work like professional designers where User centred design plays an important approach in the design and manufacture of products. They will be informed designers who are empathic to the stresses on the environment.

By the end of Year 13, we would like our students to:

- Be cultured about design history and key design movements and figures of the 20th and 21st century.
- Develop insightful and perceptive intelligence to be able to fully understand problems and User's and stakeholders requirements
- Solve real problems with an insightful approach with User centered Design
- Conduct research and investigations that aid product development
- Collaborate with others to become a more objective and insightful designer.
- Explore and experiment with ideas in pursuit of solving problems and being innovative.
- Demonstrate safe and effective technical skills with precision when making products.
- Use sophisticated technical language
- Visually communicate and document the design process using formal and informal sketching, drawing and annotation
- Use CAD/CAM software to model sophisticated solutions.
- Critically analyse and evaluate situations, suitability of design decisions and outcomes
- Use a range of mathematical and science skills

Key Projects (Year 12 - Term 1: Building Skills, Kitchen Gadget Term 2: Fixperts Term 3: NEA. Year 13 Terms 1-3: NEA)

Curriculum Map

	Autumn Term - Puzzle Project	Spring Term - Box Project	Summer Term- Mobile phone holder
Year 7	<p>Design Skills:</p> <ul style="list-style-type: none"> Investigating the context Testing and Evaluation Knowledge and communication <p>Core Knowledge:</p> <ul style="list-style-type: none"> Woods - Origins and classification Polymers - Origins and classification <p>Built on: It has been assumed that students have no prior experience of Design and Technology</p>	<p>Design Skills:</p> <ul style="list-style-type: none"> Investigating the context Design Development Making Skills 2D design software <p>Core Knowledge:</p> <ul style="list-style-type: none"> Metals- Origins and classification Scales of production <p>Built on:</p> <ul style="list-style-type: none"> Woods - Origins and classification Polymers - Origins and classification 	<p>Design Skills:</p> <ul style="list-style-type: none"> Design Development Making Skills Testing and Evaluation 2D design software <p>Core Knowledge:</p> <ul style="list-style-type: none"> Smart materials - Origins and classification Modern materials & Technology - <p>Built on:</p> <ul style="list-style-type: none"> Woods - Origins and classification Polymers - Origins and classification Metals- Origins and classification Scales of production
	<p>Enrichment Programme: Engineering club. Building Centre competition. Cultural enrichment: 'Material of the Month'</p>		
	Autumn Term - Bird Feeder Project	SpringTerm - Moisture Sensor Project	Summer Term - Structures and Paper engineering
Year 8	<p>Design Skills:</p> <ul style="list-style-type: none"> Design Development: Making Skills Testing and Evaluation <p>Core Knowledge:</p> <ul style="list-style-type: none"> Woods - Working properties and applications Scales of production -Aids and techniques <p>Built on:</p> <ul style="list-style-type: none"> Polymers - Origins and classification in Yr 7 Scales of production in Yr 7 	<p>Design Skills:</p> <ul style="list-style-type: none"> Investigating the context: Design Development: Making Skills <p>Core Knowledge:</p> <ul style="list-style-type: none"> Metals- Working properties and applications Polymers- working properties and applications <p>Built on:</p> <ul style="list-style-type: none"> Investigating the context skills Metals & Wood- Origins and classification in Yr 7 Working properties and applications of wood 	<p>Design Skills:</p> <ul style="list-style-type: none"> Design Development: Making Skills: Testing and Evaluation <p>Core Knowledge:</p> <ul style="list-style-type: none"> Smart materials- Working properties and applications Modern technology - <p>Built on:</p> <ul style="list-style-type: none"> Design Development/ Making/ Testing & Evaluation skills Smart materials & Modern materials- Origins and classification in Yr 7 Working properties and applications of wood and polymers and metals Scales of production
	<p>Enrichment Programme: V&A Innovate challenge, F1 in schools Cultural enrichment: 'Designer of the month'</p>		

Year 9	Autumn Term - Speaker Project	Spring Term - Bug Hotel	Summer Term - Educational pack
	Skills: <ul style="list-style-type: none"> Investigating the context: Design Development: Making: Knowledge: <ul style="list-style-type: none"> Woods - Manufacturing techniques Polymers - Manufacturing techniques Built on: <ul style="list-style-type: none"> Woods - working properties and applications Polymers- working properties and applications 	Skills: <ul style="list-style-type: none"> Investigating the context: Design Development: Making Skills Knowledge: <ul style="list-style-type: none"> Metals- Manufacturing techniques Scales of production Built on: <ul style="list-style-type: none"> Metals- working properties and applications Scales of production 	Skills: <ul style="list-style-type: none"> Design Development: Making Skills: Testing and Evaluation Knowledge: <ul style="list-style-type: none"> Smart materials-working properties and applications Built on: <ul style="list-style-type: none"> Smart materials - Classification and origins Modern technology
	Enrichment programme: Design Ventura competition Cultural enrichment: Careers guidance, Job of the week		
Year 10	Autumn Term - Clock/Pendant/ Speaker	Spring Term - Speaker/ Lighting	Summer Term - Pizza cutter/NEA
	Skills: <ul style="list-style-type: none"> Investigating the context: Design Development: Making Skills Testing and Evaluation 2D Design Knowledge: <ul style="list-style-type: none"> Sections 1: New & emerging technologies Section 2: Energy, Materials, systems & devices Built on: <ul style="list-style-type: none"> Key skills built in KS3 (IC/DD/M/T&E) KS3 Core theory which includes: Origins, classification working properties and applications of Wood, polymers, metals, smart and modern materials 	Skills: <ul style="list-style-type: none"> Investigating the context: Design Development: Making Skills Testing and Evaluation: Fusion 360 Knowledge: <ul style="list-style-type: none"> Sections 3: Materials & their working properties Section 4: Common specialist technical principles Built on: <ul style="list-style-type: none"> Origins, classification working properties and applications of Wood, polymers, metals, smart and modern materials Sections 1: New & emerging technologies Section 2: Energy, Materials, systems & devices 	Skills: <ul style="list-style-type: none"> Investigating the context: Design Development: Making Skills Testing and Evaluation: Knowledge: <ul style="list-style-type: none"> Sections 5B & 5C -Timber based materials & Metal Materials Section 5D Polymers Built on: <ul style="list-style-type: none"> Origins, classification working properties and applications of Wood, polymers, metals, smart and modern materials Sections 3: Materials & their working properties
	Enrichment programme: Investin STEM workshops,		
Year 11	Autumn Term - NEA	Spring Term - NEA	Summer Term- Exam Practise
	Skills: <ul style="list-style-type: none"> Investigating the context: Design Development: 2D design & Fusion 360 	Skills: <ul style="list-style-type: none"> Making Skills Testing and Evaluation 2D design & Fusion 360 	Skills: <ul style="list-style-type: none"> Exam preparation Knowledge:

	Knowledge: <ul style="list-style-type: none"> Section 6: Designing principles Exam technique Built on: <ul style="list-style-type: none"> Key skills built in KS3 (IC/DD/M/T&E) Sections 1: New & emerging technologies Section 4: Common specialist technical principles 	Knowledge: <ul style="list-style-type: none"> Section 7 Making principles Exam technique Built on: <ul style="list-style-type: none"> Sections 3: Materials & their working properties Sections 5B,5C&5D - Timber based materials & Metal Materials, Polymers 	Revisit Sections 1,2,3,4,5B,5C,5D,6&7 and address any gaps in learning Built on: Sections 1,2,3,4,5B,5C,5D,6&7
	Enrichment programme: Arkwright scholarship		
Year 12	Autumn Term - 2up2down/Product study	Spring Term: Fixperts/Mini Major'	Summer Term: NEA
	Skills: <ul style="list-style-type: none"> Explore Create: Design Thinking Create: Design Communication Create: Final Prototype Evaluate Knowledge: <ul style="list-style-type: none"> Key skills built in KS3&4 (IC/DD/M/T&E) KS4 Knowledge & understanding- Section 1 Identifying requirements Section 2 Learning from existing products Section 3 Implications of the wider issues Built on: KS4 content: <ul style="list-style-type: none"> Common specialist technical principles 	Skills: <ul style="list-style-type: none"> Explore Create: Design Thinking Create: Design Communication Create: Final Prototype Evaluate Knowledge: <ul style="list-style-type: none"> Section 4 Design thinking and communication Section 5 Material and component considerations Section 6 Technical understanding Built on: <ul style="list-style-type: none"> New & emerging technologies Materials & their working properties 	Skills: <ul style="list-style-type: none"> Explore Create: Design Thinking Create: Design Communication Create: Final Prototype Evaluate Knowledge: <ul style="list-style-type: none"> Section 7 Manufacturing processes and techniques Section 8 Viability of design solutions Section 9 Health and safety Built on: <ul style="list-style-type: none"> New & emerging technologies Timber, Polymers and Metal based materials Common specialist technical principles
	Enrichment programme: Design in Action conference day, New designers Graduate show, Cultural enrichment: Students actively encouraged to attend exhibitions,workshops and talks: at the design museum, throughout Design London/Design festival and Open house Reading list: Wider reading list given to students		
Year 13	AutumnTerm -NEA	Spring Term - NEA	Summer Term- Exam Practise
	Skills: <ul style="list-style-type: none"> Investigating the context: Design Development Exam technique Knowledge: Section 1 Identifying requirements Section 2 Learning from existing products Section 3 Implications of the wider issues Built on: Knowledge and understanding of the specification in Yr	Skills: <ul style="list-style-type: none"> Making Skills Testing and Evaluation Exam technique Knowledge: Section 4 Design thinking and communication Section 5 Material and component considerations Section 6 Technical understanding Built on: Knowledge and understanding of the specification in Yr 12 of	Skills: Exam technique Knowledge: Section 7 Manufacturing processes and techniques Section 8 Viability of design solutions Section 9 Health and safety Built on: Knowledge and understanding of the specification in Yr 12 of the following:

	12 of the following: Section 7 Manufacturing processes and techniques Section 8 Viability of design solutions Section 9 Health and safety	the following: Section 7 Manufacturing processes and techniques Section 8 Viability of design solutions Section 9 Health and safety	Section 7 Manufacturing processes and techniques Section 8 Viability of design solutions Section 9 Health and safety
--	--	--	--