Design Technology

Our vision is to prepare and motivate our students for a rapidly changing world by encouraging them in critical thinking skills, creativity, imagination and independence.

Ultimately, we aim to foster skills that create problem solvers, critically looking at their made environment and defining needs before deploying resources to solve real world issues. We aim to instill these vital life skills, be they future designer or simply consumers, in the form of a thorough and diverse curriculum.

KS3 Year 7

Roadmap

Intro

Health and Safety

Intro into health and safety in the workshop. Setting out expectations for behaviour and learning.

Unit 1

Graphics

Explore 3D drawing, isometric drawing and rendering.

Materials

Learn about wood and plastic classifications and properties.

Unit 2

Practical Project

Plan and produce a wooden trinket box. Learn how to safely use the tools and machinery.

Evaluation

Evaluate the practical project based on the success criteria.

Scheme of Learning YEAR OVERVIEW

The Big Picture: To begin the process of designing and manufacturing a trinket box based on scraffiti drawings. To develop an understanding of the design process through both practical and theory work. Students will feel safe in the DT area, be able to follow simple Health & Safety guidelines, and demonstrate to others how to use tools and machinery correctly. They will become increasingly confident and accurate in their technique.

Year Group: Year 7 DT

Intent: Year 7 offers students the opportunity to become acquainted with the DT room, its tools, machinery, and materials. It is a year of exploration and discovery. Students will work to develop a deep understanding of the risks associated with this room. They will be able to work safely and look out for other students' safety – using emergency procedures correctly if required. They will develop their knowledge of materials – being able to identify different types of wood and the appropriate tools to work with wood. They will be able to use a limited number of tools and machinery, safely and with increased levels of accuracy. They will develop a deeper understanding of the design process – being able to draw using specific techniques, pull an idea from a larger design task, and develop manufacturing and evaluation skills.

Implementation

1-hour lesson per week. The year 7 creative curriculum will run over one full term (Autumn, Spring, Summer)

- Students will complete a set of themed tasks – H&S, research posters, drawing styles, writing tasks, and practical study.
- Students will work independently, listening to instructions and following demonstrations
- The more confident students within the groups will have the ability to show leadership by supporting their peers
- Students will be provided with their materials.
- Students will reflect on previous lessons via verbal and written response (retrieval questions). Use of key words and success criteria updates will be completed throughout.
- The aim in Year 7 is to create a WOW! Students will be genuinely excited about working in such a dynamic atmosphere; take a real interest in their work and enjoy all elements of the design process.
- The use of literacy will be developed throughout lessons by use of key word and communication as students follow instructions and demonstrations. Numeracy is a key element, expressed in measurement of lengths, widths, depth and volume.

Key assessments:

- **Students will sign off their manufacturing sheet each time they are inducted on a tool/machine**
- **Pupils Progress Trackers**
- **Regular progress checks – exit tickets and retrieval questions**
- **Homework (research/collating knowledge)**
- **Theory and knowledge will be self and peer assessed**
- **End of unit theory test**

Prior Learning

- Primary Education: Basic modelling and design practice – varies between primary schools

Future Learning

- Design Process
- Product Analysis
- Develop practical skills
- Increased access to tools and machinery
- CAD

Impact

Students will be able to successfully produce one high quality product to take home. Their confidence levels will have developed, and they will feel encouraged to expand and refine their skills. Both their practical and theory skills will develop. A clear knowledge of the design process will develop over KS3; building a skills base ready for the start of a GCSE course. Students knowledge of materials, tools, machinery, and techniques will allow them the opportunity to design and manufacture increasingly complex prototypes.
This first year will prepare them for the next stage and to ultimately gain top level GCSE grades. It also allows them to build a separate and vital life skills base in planning, organisation, IT, literacy / numeracy and meeting deadlines.

Year 9 Curriculum Overview – Design Technology

	Powerful Knowledge				
Content	**Substantive Knowledge**	**Disciplinary Knowledge**	**Key Formative Questions**	**Misconceptions**	**Key Vocabulary**
Unit 1: • Health and Safety • Graphics	• Have knowledge of required PPE, such as safety goggles, gloves, masks, and aprons • Gain a familiarity with the safe operation of tools and machinery • Learn the importance of keeping workspaces clean and organized to prevent accidents • Understanding of lines, shapes, colours, textures, and forms, including a basic understanding of colour theory • Develop hand-drawing techniques and sketching methods for concept development (crating, isometric drawing, one-point perspective, rendering) • Materials: Hardwoods (Deciduous, broad leaves, slow growing, dense grain, resistant), Softwoods (Coniferous, pine needles, fast growing, wide grain, cheaper), Manufactured Board (man-mad, cheap, unattractive)	• Recognizing the importance of fostering a safety-first mindset in the workshop and how to promote safe practices among peers • Knowledge of basic geometric shapes and how they combine to create complex forms • Understanding one-point perspective techniques and how to represent depth and dimension in 3D drawings • Learn how to apply different 3D drawing techniques in design work	• What do we mean by perspective in a graphic design sense? • Why is it important to understand the potential dangers in the workshop? • How can we dress safely in the workshop? • What is the difference between isometric and orthographic?	• Students have knowledge of sustainability from other subjects • Students may think design is just drawing • Knowing the difference between perspective, a point of view, and perspective, 3D drawing	• Health and Safety • Isometric • Orthographic • Render • Perspective • Crating
Unit 2: • Materials • Practical • Evaluation	• Inductions on how to safely and correctly use the tools and machinery • Develop techniques such as cutting, shaping, joining, and finishing materials • Understand the fundamentals of design elements (line, shape, form, texture, colour) • Understand dimensions, scales, and annotations in design drawings	• Apply design thinking methodologies to create a design for a clock in response to a brief • Develop the ability to gather relevant data and interpret findings to inform design decisions • Develop techniques for identifying problems and generating innovative solutions through mock-ups • Engage in user-centered design • Manufacturing – health and safety, adaptive thinking, critical thinking • Skills in working effectively with peers, sharing ideas, and integrating diverse perspectives. • Evaluation product based on functionality, sustainability and social impact. Critical analysis of product against the success criteria – WWW, EBI	• What problem needs to be solved? • How is your product going to solve the problem established? • What changes do you need to make to your product after making your mock-up? • How are you going to decide which tools to use in the manufacturing stage? • Can you name the tools and machinery you have used during this project? • What makes a successful product?	• Students are aware of what makes a successful product • All students have the same prior experiences • All students have the same practical skills • Students may think if the prototype works, it is finished	• Manufacture • Mock-up • Hardwood • Softwood • Manufactured Board • Deciduous • Coniferous • Sustainability • Coping saw • Pillar drill • Evaluate • Functionality

KS3 Year 8

Roadmap

Unit 1

Design Process

Exploring the design process from start to finish.

Product Analysis

Learn how to analyse and compare existing products.

Unit 2

CAD Intro

An introduction to CAD in preparation for the practical project.

Practical Project

Plan and produce a clock. Practise how to safely use the tools and machinery.

Evaluation

Evaluate the practical project based on the success criteria.

Scheme of Learning YEAR OVERVIEW

The Big Picture: To further develop an understanding of the design process through both practical and theory work. To design and manufacture an acrylic clock, based on a design movement of their choice. Students will be able to use a wider range of tools, machinery and techniques in their practical work. Their knowledge of material types, properties and characteristic will increase.

Year Group:
Year 8 DT

Intent: Year 8 offers students the opportunity to develop their skills and understanding of the design process. They will be able to write a detailed brief and specification. Students will be able to compare and analyze existing products against design specifications. Their practical skills and techniques will develop with investigations into different hand tools, machinery, materials and construction techniques – measuring, cutting (designs), fixings, laminating and finishing. Research into the capabilities of tools, machinery and materials will form a key part of this process. Students will be introduced to CAD, using 2D Design to create intricate additions to their clocks.

Implementation

1-hour lessons per week. The year 8 creative curriculum will run over one full term. (Autumn, Spring, Summer)

- Students will complete a set of themed tasks – set stages in design process (to incorporate drawing techniques); writing tasks and practical study
- Students will work independently, listening to instructions and following demonstrations
- The more confident students within the groups will have the ability to show leadership by supporting their peers
- Students will be provided with their materials.
- Students will reflect on previous lessons via verbal and written response. Use of key words and success criteria will be updated throughout – building up a skill vital in any future GCSE exam
- The aim in Year 8 is to continue WOW'ing! Students will be genuinely excited about working in such a dynamic atmosphere; take a real interest in their work and enjoy all elements of the design process.
- The use of literacy will be developed throughout lessons by use of key word and communication as students follow instructions and demonstrations. Numeracy is a key element, expressed in measurement of lengths, widths, depth and volume.

Key assessments:

- **Students will sign off their manufacturing sheet each time they are inducted on a tool/machine**
- **Pupils Progress Trackers**
- **Regular progress checks – exit tickets and retrieval questions**
- **Homework (research/collating knowledge)**
- **Theory and knowledge will be self and peer assessed**
- **End of unit theory test**

Prior Learning

- Year 7: Trinket boxes. Health and Safety, basic practical skills, graphic design.

Future Learning

- Design Process
- Product Analysis
- Develop practical skills
- Increased access to tools and machinery
- CAD

Impact

Students will be able to successfully produce one acrylic clock to take home. Their confidence levels will be continually rising, and they will feel encouraged to expand and refine their skills. Both their practical and theory skills will develop. A clear knowledge of the design process will develop throughout KS3; building a skills base ready for the start of a GCSE course. Students' knowledge of materials, tools, machinery and techniques will allow them the opportunity to design and manufacture increasingly complex and advanced prototypes. This second year will prepare them for the next stage and to ultimately gain top level GCSE grades. It also allows them to build a separate and vital life skills base in planning, organisation, IT, working independently & as part of a team, literacy / numeracy and meeting deadlines.

Year 9 Curriculum Overview – Design Technology

	Powerful Knowledge				
Content	**Substantive Knowledge**	**Disciplinary Knowledge**	**Key Formative Questions**	**Misconceptions**	**Key Vocabulary**
Unit 1: • Design Process • Product Analysis • Design Movements • Materials	• Design Opportunity: A problem that needs to be solved or a new idea to deal with a situation. These arise out of real-life situations. • Design Brief: A short statement that outlines the problem to be solved. • Design Specification: A list of requirements that a product needs to address. It can include some or all the following: size, materials, cost, operation, and appearance or aesthetics. • Materials: Hardwoods (Deciduous, broad leaves, slow growing, dense grain, resistant), Softwoods (Coniferous, pine needles, fast growing, wide grain, cheaper), Manufactured Board (man-mad, cheap, unattractive), Thermoplastic (can be remelted), Thermoset Plastic (cannot be remelted - Sustainability).	• Understanding of the design process stages: Design Opportunity – Design Brief – Research – Design Specification – Idea Creation – Development – Manufacture – Test and Evaluate • ACCESS FM – Aesthetics, Cost, Consumer, Ergonomics, Size, Safety, Function, Materials • Evaluate the environmental and ethical implications of design choices • Have an awareness of the evolution of design technology and significant movements (Pop Art, Art Deco, Memphis) • Recognizing how culture, society, and trends impact design choices and user needs	• What are the environmental impacts of woods and plastics? • Why is important to research design movements? • How does the design process start and finish? (Product lifecycle) • What is a design opportunity? (Iterative design) • What acronym can we use to remember design specifications? • What makes a design fit for purpose?	• Students have knowledge of sustainability from other subjects • Students may think design is just drawing • Students are aware of past design movements	• Design opportunity • Design brief • Design specification • Aesthetics • Consumer • Ergonomics • Hardwood • Softwood • Manufactured Board • Deciduous • Coniferous • Sustainability • Iterative design
Unit 2: • Practical • Evaluation	• Properties of thermoplastics and thermoset plastics (specifically acrylic) • Learn how to assemble a clock mechanism accurately • Consider aesthetic, anthropogenic, and ergonomic principles in students' designs • Inductions on how to safely and correctly use the tools and machinery • Develop techniques such as cutting, shaping, joining, and finishing materials • Understand the fundamentals of design elements (line, shape, form, texture, colour) • Understand dimensions, scales, and annotations in design drawings	• Apply design thinking methodologies to create a design for a clock in response to a brief • Develop the ability to gather relevant data and interpret findings to inform design decisions • Develop techniques for identifying problems and generating innovative solutions through mock-ups • Engage in user-centered design • Manufacturing – health and safety, adaptive thinking, critical thinking • Skills in working effectively with peers, sharing ideas, and integrating diverse perspectives. • Evaluation product based on functionality, sustainability and social impact. Critical analysis of product against the success criteria – WWW, EBI	• What problem needs to be solved? • How is your product going to solve the problem established? • What changes do you need to make to your product after making your mock-up? • How are you going to decide which tools to use in the manufacturing stage? • Can you name the tools and machinery you have used during this project? • What makes a successful product?	• Students can safely and accurately use the tools and machinery that they have previously been inducted on • Students are aware of what makes a successful product • All students have the same prior experiences • All students have the same practical skills • Students may think if the prototype works, it is finished	• Manufacture • Mock-up • Coping saw • Fret saw • Cross filing • Pillar drill • Evaluate • User-centered design • Functionality • Mechanism

KS3 Year 9

Roadmap

Unit 1

Product Analysis

Develop skills for analysing and comparing products. Recap the design process.

CAD

Recap CAD skills in preparation for practical project.

Design Process

Practice skills for GCSE. Create a plan to produce a desk tidy using each step of the design process.

Unit 2

Practical Project

Using the plan from Unit 1, produce a desk tidy. Practise how to safely use the tools and machinery.

Evaluation

Evaluate the practical project based on the success criteria.

Scheme of Learning YEAR OVERVIEW

The Big Picture: To secure a confident and competent skills base. To further develop an understanding of the design process through both practical and theory work. Students will be able to use a full range of hand tools, electric tools, machinery and techniques in their practical work. Their isometric and orthographic drawing techniques will be developed and secure. Their knowledge of material capabilities will be comprehensive.

Year Group: Year 9 DT

Intent: Year 9 offers students the opportunity to develop their skills fully and understand the full design process. They will be able to write a detailed brief and specification. Students will be able to expand on these documents by writing a client profile, a client questionnaire and a piece of market research. A mood board will be completed. They will be able to complete a series of three initial ideas in an isomeric drawing style and one final design in presentation style. Their design work will be complete with a self evaluation. Their practical skills and techniques will develop with investigations into different hand tools, machinery, electronics, materials and construction techniques – measuring, cutting, soldering, fixing, laminating and finishing. Research into the capabilities of tools, machinery and materials will form a key part of this process.

Implementation

1-hour lessons per week. The year 9 creative curriculum will run over one full term. (Autumn, Spring, Summer)

- Students will complete a set of themed tasks – set stages in design process (to incorporate drawing techniques); writing tasks and practical study.
- Students will work independently, listening to instructions and following demonstrations
- The more confident students within the groups will have the ability to show leadership by supporting their peers
- Students will be provided with their materials.
- Students will learn basic electronic equipment and different ways of constructing different materials.
- Students will reflect on previous lessons via verbal and written response. Use of key words and processes will be encouraged throughout – building up a skill vital in any future GCSE exam
- The aim in Year 9 is to continue WOW'ing! Students will be genuinely excited about working in such a dynamic atmosphere; take a real interest in their work and enjoy all elements of the design process.
- The use of literacy will be developed throughout by use of key word and phraseology as students follow instructions and demonstrations. Numeracy is a key element, expressed in measurement of lengths, widths, depth, weight and volume.

Key assessments:

- **Students will sign off their manufacturing sheet each time they are inducted on a tool/machine**
- **Pupils Progress Trackers**
- **Regular progress checks – exit tickets and retrieval questions**
- **Homework (research/collating knowledge)**
- **Theory and knowledge will be self and peer assessed**
- **End of unit theory test**

Prior Learning

- Year 7: Trinket boxes. Health and Safety, graphic design skills.
- Year 8: Clocks. Design process, product analysis, design movements.

Future Learning

- Design Process
- Product Analysis
- Develop practical skills
- Increased access to tools and machinery
- CAD

Impact

Students will be able to successfully produce a desk tidy, inspired by one of three designers researched, to take home. Their confidence levels will be continually rising, and they will feel encouraged to expand and refine their skills. Both their practical and theory skills will develop. A clear knowledge of the full design process will develop throughout; building a comprehensive skills base ready for the start of a GCSE course. Students' knowledge of materials, hand tools, electric tolls, machinery and techniques will allow them the opportunity to design and manufacture increasingly complex and advanced prototypes. This third and final KS3 year will prepare them for the next stage and to ultimately gain a top-level GCSE result. It also allows them to build a separate and vital life skills base in planning, organisation, IT, working independently & as part of a team, literacy / numeracy and meeting deadlines.

Year 9 Curriculum Overview – Design Technology

	Powerful Knowledge				
Content	**Substantive Knowledge**	**Disciplinary Knowledge**	**Key Formative Questions**	**Misconceptions**	**Key Vocabulary**
Unit 1: • Design Process • Product Analysis • Past Designers • Materials • Client Profile	• Design Opportunity: A problem that needs to be solved or a new idea to deal with a situation. These arise out of real-life situations. • Design Brief: A short statement that outlines the problem to be solved. • Design Specification: A list of requirements that a product needs to address. It can include some or all the following: size, materials, cost, operation, and appearance or aesthetics. • Materials: Hardwoods (Deciduous, broad leaves, slow growing, dense grain, resistant), Softwoods (Coniferous, pine needles, fast growing, wide grain, cheaper), Manufactured Board (man-mad, cheap, unattractive), Thermoplastic (can be remelted), Thermoset Plastic (cannot be remelted - Sustainability).	• Design Process: Design Opportunity – Design Brief – Research – Design Specification – Idea Creation – Development – Manufacture – Test and Evaluate • Design Specification: ACCESS FM – Aesthetics, Cost, Consumer, Ergonomics, Size, Safety, Function, Materials • Evaluate the environmental impacts of materials • Investigating past designers • Conduct research including producing a client profile • Evaluate the environmental and ethical implications of design choices • Have an awareness of the evolution of design technology and significant past designers (Breuer, Sottsass, Hadid) • Recognizing how culture, society, and trends impact design choices and user needs	• What are the environmental impacts of woods and plastics? • Why is important to research past designers? • How does the design process start and finish? (Product lifecycle) • What is a design opportunity? (Iterative design) • What acronym can we use to remember design specifications? • What makes a design fit for purpose?	• Students have knowledge of sustainability from other subjects • Students may think design is just drawing	• Design opportunity • Design brief • Design specification • Aesthetics • Consumer • Ergonomics • Hardwood • Softwood • Manufactured Board • Deciduous • Coniferous • Sustainability • Iterative design
Unit 2: • Practical • CAD • Evaluation	• Properties of thermoplastics and thermoset plastics (specifically acrylic) • How to manipulate plastics using heat – strip heater • Gain familiarity with relevant CAD software (2D Design) and CAM equipment (laser cutter) and understand the role of technology in enhancing the design process • Identify products that have been manufactured using CAD/CAM • Consider aesthetic, anthropogenic, and ergonomic principles in students' designs • Inductions on how to safely and correctly use the tools and machinery • Develop techniques such as cutting, shaping, joining, and finishing materials • Understand the fundamentals of design elements (line, shape, form, texture, colour) • Understand dimensions, scales, and annotations in design drawings	• Apply design thinking methodologies to create a design for a desk tidy in response to a brief • Develop the ability to gather relevant data and interpret findings to inform design decisions • Develop techniques for identifying problems and generating innovative solutions through mock-ups • Engage in user-centered design • Manufacturing – health and safety, adaptive thinking, critical thinking • Skills in working effectively with peers, sharing ideas, and integrating diverse perspectives • Evaluation product based on functionality, sustainability and social impact (client review. Critical analysis of product against the success criteria – WWW, EBI	• What problem needs to be solved? • How is your product going to solve the problem established? • What changes do you need to make to your product after making your mock-up? • How are you going to decide which tools to use in the manufacturing stage? • Can you name the tools and machinery you have used during this project? • What makes a successful product?	• Students can safely and accurately use the tools and machinery that they have previously been inducted on • Students are aware of what makes a successful product • All students have the same prior experiences • All students have the same practical skills • Students may think if the prototype works, it is finished	• Manufacture • Mock-up • Coping saw • Fret saw • Strip heater • Draw filing • Evaluate • CAD/CAM • Anthropogenic • User-centered design • Functionality