

The Big Picture—INTENT

Design and Technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others’ needs, wants and values. Students acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens.

PRODUCT DESIGN 1 The intention in the first half term of product design, is to introduce students to the workshop through the material area of natural timbers. Students will learn how to use basic woodworking hand tools, and woodworking machines. They will be thoroughly briefed in the health and safety requirements of the working with timbers in the workshop. Students will learn how to manipulate timber using a variety of tools and machinery to produce a wooden robot.

PRODUCT DESIGN 2 In the second half term of product design. Students will build on their knowledge of the workshop by working with polymers and man made timbers. They will use a different type of hand saw, working with increasing accuracy and care for quality of finish. Students create design work in the style of a designer (Memphis). They annotate their design work in terms of aesthetics, function and materials. Students implement the rendering skills learnt in their Graphics projects.

GRAPHICS In year 7, students are taught the skills and knowledge to help them communicate their ideas graphically. They become aware of how colours and styles of 3D drawing can support in the communication of their ideas.

TEXTILES The overall aim of this project is to introduce students to natural fabrics and their origins and properties. They will look at absorbency using the process of tie dye. Students will be shown how to thread up a sewing machine, and should be able to stitch accurately. They will use ready made patterns to support them in creating a well made product.

All students will be able to access the main content of all lessons. They will be taught to the top, with scaffolding, adaptive teaching and stretch and challenge provided where necessary.

Implementation

- The year is split into 6 half terms, with students studying two half terms each of Food and Product Design, as well as a half term each of Graphics and Textiles. Students in year 7 will study theory for each topic area, and have the opportunity to develop practical skills, whilst learning about the health and safety implications involved with each. There is an end of year assessment that covers content from all of the D&T subject areas
- Lessons will be based around multiple representations; Concrete, Pictorial, Abstract to give a deeper understanding of concepts. Reasoning will be developed through the exploration of solving real and relevant problems within a variety of contexts.
- WAGOLL—Watching teacher step by step demonstrations, often through use of a visualiser.
- Practical skills—Use workshop machinery safely and accurately, use drawing equipment with skill, use sewing machines and textiles equipment independently. Photos—students practical work is recorded using photographs, which are glued into sketchbooks.
- Recall—Do Now activity—Questions at the start of each lesson link back to previous lesson, previous week, and previous term, to support in the recall of knowledge.
- Dedicated Improvement and Reflection Time—DIRT tasks are built in for students to improve their work based on teacher feedback.
- Literacy developed through adding definitions to list of key words used throughout the half term. These words are provided online, along with a visual guide, for students to revise from for their assessment. A knowledge organiser will be provided for each unit of work to enable students to recall keywords.

Key Summative Assessments

- Sketchbook – all assessment and subject work is recorded in lessons. Feedback in sketchbook.
 - Retrieval homework, live marking and low stakes testing.
- PRODUCT DESIGN 1 and GRAPHICS
- Practical Work
 - End of half term assessment
- PRODUCT DESIGN 2 and TEXTILES
- Design Work
 - Homework

Impact: Students will be confident selecting and using a range of workshop tools and equipment. They will know the correct names and uses of the tools. They will take pride in their work, and strive to achieve a high quality finish. Students will have gained a knowledge of the sources of timbers and polymers, their different categories, and specific names of timber and polymer materials. Students will be familiar with the work of a designer. 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. Students understand the basics of colour mixing. They recognise complementary and analogous colours. Students can identify a range of 3D drawing techniques, and explain why they are useful. They can use 3D drawing techniques, and rendering skills, to communicate their ideas. Students know how to use a set square and an isometric grid for accuracy in their drawings. Students will become familiar with a sewing machine and how to operate it. Some will be able to thread it up independently. Students will take pride in their work, and try their best to work with accuracy.

High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation. Students will know more and remember more. There will be an increase in attainment through regular, formal and interleaved assessments.

Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning	Future learning (Y8)
PRODUCT DESIGN 1 Workshop Timbers—Wooden Robot				
<ul style="list-style-type: none"> Marking out Timber Categories Hand tools Workshop machines Surface Finishes 	<ul style="list-style-type: none"> Use steel rule and try square accurately Identify different timbers Wastage techniques—sawing, abrasive paper Use a pillar drill and band facer safely Development of evaluation skills 	<ul style="list-style-type: none"> What is Design & Technology? Why do we study it as a subject? What impact does Design & Technology have on the world around us? Students look closely at health and safety and learn the procedures for spotting issues and reporting them. How to prevent accidents and the safe use of machinery in the workshop. Students learn about Hardwoods and Softwoods, as well as the environmental impact of using woods and ensuring sustainability. How to use a bench hook, tenon saw, file, abrasive paper How to use a steel rule and try square How to use a pillar drill and band facer safely Reasons for a surface finish 	<ul style="list-style-type: none"> Maths—measurements in mm, standard ruler. design purposeful, functional, appealing products for themselves and other users based on design criteria generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] select from and use a wide range of materials and components, including construction materials, according to their characteristics build structures, exploring how they can be made stronger, stiffer and more stable apply their understanding of how to strengthen, stiffen and reinforce more complex structures 	<ul style="list-style-type: none"> CAD measurements Manufactured boards Coping Saw (second half of year 7) Soldering Disc Sander Polishing wheel
PRODUCT DESIGN 2 Workshop Polymers and Timbers - Memphis Clock				
<ul style="list-style-type: none"> Work of Others Design in the style of Cut plywood piece Polymers Theory Finishing Techniques Sustainability 	<ul style="list-style-type: none"> Design in the style of Memphis Development of basic sketching skills Develop and communicate design ideas using annotated sketches. Use a coping saw effectively Identify polymers Use wastage techniques for high quality of finish Redesign a product to be more sustainable 	<ul style="list-style-type: none"> Recognise and describe the work of Memphis design group How designers and engineers use history and the work of others to inform there own work Know how and why to use a coping saw Pupils learning will focus on polymers – where they come from, the difference between Thermoplastics and Thermosetting plastics. Wastage techniques—filing, sanding The 6R’s of Sustainability—Pupils will learn about the environmental impact of plastics and other materials and evaluate their final product against a given specification 	<ul style="list-style-type: none"> Use research to inform design Select and use a range of tools and equipment Materials in Science Select and use a range of tools and equipment Geography sustainability 	<ul style="list-style-type: none"> Design in the style of Alessi CAD laser cutting Polymer industrial processes Band Facer Temporary and permanent bonds

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GRAPHICS				
Drawing skills, Packaging				
<ul style="list-style-type: none"> • Colour Theory • 3D Drawing Techniques • Rendering • Expressive Text • Packaging 	<p>Mixing Colours</p> <p>1 point perspective, 2 point perspective, Oblique, Isometric</p> <p>Rendering for solid shapes.</p> <p>Alter the appearance of text</p> <p>Assemble a packaging net by hand.</p> <p>Be able to analyse a product/package using ACCESS FM acronym.</p>	<ul style="list-style-type: none"> • What is Graphics? Why do we study it as a subject? What impact does Graphics have on the world around us? • Students learn about Hardwoods and Softwoods, as well as the environmental impact of using woods and ensuring sustainability. • How to use a bench hook, tenon saw, file, abrasive paper • How to use a steel rule and try square • How to use a pillar drill and band facer safely • Reasons for a surface finish 	<ul style="list-style-type: none"> • Maths—3D drawing • Art—knowledge of primary colours, and how to mix them to make secondary colours. • Design purposeful, functional, appealing products for themselves and other users based on design criteria • Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups. • Select from and use a range of tools and equipment to perform practical tasks [for example, hand sewing.] • Select from and use a wide range of materials and components, including fabrics materials, according to their characteristics • Build structures, exploring how they can be made stronger, stiffer and more stable • Apply their understanding of how to strengthen, stiffen and reinforce more complex structures 	<ul style="list-style-type: none"> • Using complementary and analogous Colours • Exploded Isometric, Crating using Isometric • Rendering to show various materials, transparent objects • Typography • Vinyl Cutting—cutting vector lines using CAD/CAM.
TEXTILES				
Pencil Wrap				
<ul style="list-style-type: none"> • Natural Fabrics • Tie dye fabric • Sewing Machine • Construction of pattern pieces • Stitching lines accurately 	<p>Knot and prepare fabric</p> <p>Use dyes safely and effectively</p> <p>Be able to operate the sewing machine</p> <p>Pinning</p> <p>Using sewing machine independently</p>	<ul style="list-style-type: none"> • What is Textiles? Why do we study it as a subject? What impact do textiles have on the world around us? • Pupils learning will focus on natural textiles – where they come from, the difference between plant and animal based natural textiles • Students look closely at health and safety in relation to using sewing machines, and learn the procedures for spotting issues and reporting them. How to prevent accidents. 	<ul style="list-style-type: none"> • Select and use a range of materials, including textiles • Select and use a range of materials, including textiles • Select and use a range of tools and equipment to perform practical tasks • Select and use a range of materials, including textiles • Select and use a range of tools and equipment to perform practical tasks 	<ul style="list-style-type: none"> • Synthetic Fabrics • Dye sublimation • Hand stitched embellishments • Making own pattern pieces • Complex curved line stitching

PRODUCT DESIGN 1

Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning	Future learning (Y8)
Marking out	Use ruler and try square accurately	How to use a rule and try square	Maths—measurements	CAD measurements
Timber Categories	Identify different timbers	Know the main categories of timbers, wood grain	Science—Plants	Manufactured boards
Hand tools	Wastage techniques—sawing, abrasive paper	How to use a bench hook, tenon saw, file, abrasive paper	Select and use a range of tools and equipment	Coping Saw (second half of year 7)
Workshop machines	Use a pillar drill and band facer safely	How to use a pillar drill and band facer safely	Select and use a range of tools and equipment	Soldering Disc Sander
Surface Finishes	Apply wax effectively	Reason for a surface finish	Select and use a range of tools and equipment	Other surface finishes

PRODUCT DESIGN 2

Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning	Future learning (Y8)
Work of Others Design in the style of	Design in the style of Memphis	Recognise and describe the work of Memphis design group	Use research to inform design	Design in the style of Alessi
Cut plywood piece	Use a coping saw effectively	Know how and why to use a coping saw	Select and use a range of tools and equipment	CAD laser cutting
Polymers Theory	Identify polymers	Know the categories of polymers	Materials in Science	Polymer industrial processes
Finishing Techniques	Use wastage techniques for high quality of finish	Wastage techniques—filing, sanding	Select and use a range of tools and equipment	Band Facer
Sustainability	Redesign a product to be more sustainable	The 6R's of Sustainability	Geography	Temporary and permanent bonds

GRAPHICS Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning	Future learning (Y8)
Colour Theory	Mixing Colours	Primary, Secondary, Tertiary Colours. Recognise complementary and analogous colours	Primary colours, mixing to make secondary colours	Using complementary and analogous Colours
3D Drawing Techniques	1 point perspective, 2 point perspective, Oblique, Isometric	How to construct various 3D drawings using set square and isometric grid. Line Weight.	Sketching to communicate ideas	Exploded Isometric, Crating using Isometric
Rendering	Rendering for solid shapes.	How to render effectively to make an object look 3D.	Shading for perspective	Rendering to show various materials, transparent objects
Expressive Text	Alter the appearance of text	How and why to express a word graphically	Sketching to communicate ideas	Typography
Packaging	Assemble a packaging net by hand. Be able to analyse a product/ package using ACCESS FM acronym.	Know what a net is. Know the purposes for packaging.	Cutting and joining materials	Vinyl Cutting—cutting vector lines using CAD/CAM.
TEXTILES Content	Skills	Knowledge	Prior Learning (Yr. 6)	Future Learning (Yr. 8)
Natural Fabrics	Knot and prepare fabric	Natural Fabrics, absorbency	Select and use a range of materials, including textiles	Synthetic Fabrics
Tie dye fabric	Use dyes safely and effectively	Know the effect of dye on fabric	Select and use a range of materials, including textiles	Dye sublimation
Sewing Machine	Be able to operate the sewing machine	Know how to thread up the sewing machine	Select and use a range of tools and equipment to perform practical tasks	Hand stitched embellishments
Construction of pattern pieces	Pinning	How parts go together	Select and use a range of materials, including textiles	Making own pattern pieces
Stitching lines accurately	Using sewing machine independently	How to use presser foot as guide for accuracy	Select and use a range of tools and equipment to perform practical tasks	Complex curved line stitching

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PRODUCT DESIGN 1 In year 8, students build on their knowledge of workshop tools and equipment from year 7. They are given the opportunity to use these tools and equipment again, embedding their confidence in using them correctly. Students learn about temporary and permanent bonds, and use these in their project. They learn about the process of soldering, and use this technique to put together a simple working electronic circuit.

PRODUCT DESIGN 2 In the second half term of product design, students use CAD/CAM, with a materials focus on polymers, and their related industrial processes. They learn different tools and techniques within the 2D Design Tools Program. They learn how to dimension their drawings to ensure absolute accuracy when they are laser cut. Students will understand the advantages of CAD/CAM through a project in which they design in the style of Alessi.

GRAPHICS The overall aim of this project is to embed basic graphic skills for students to use in the presentation and communication of their work. Students will learn about aspects of graphic design including Isometric drawing, crating, typography, logo design, colour theory and branding.

TEXTILES The overall aim of this project is to introduce students to synthetic fabrics and their origins and properties. They will look at a heat transfer technique using the process of dye sublimation. Students will recap how to thread up a sewing machine, and should be able to stitch accurately following more complex outlines than in yr. 7. They will create their own patterns, including a seam allowance.

Implementation

- The year is split into 6 half terms, with students studying two half terms each of Food and Product Design, as well as a half term each of Graphics and Textiles. Students in year 7 will study theory for each topic area, and have the opportunity to develop practical skills, whilst learning about the health and safety implications involved with each. There is end of year assessment that covers content from all of the D&T subject areas
- Lessons will be based around multiple representations; Concrete, Pictorial, Abstract to give a deeper understanding of concepts. Reasoning will be developed through the exploration of solving real and relevant problems within a variety of contexts.
- WAGOLL—Watching teacher step by step demonstrations., often with the use of a visualiser.
- Practical skills—Use workshop machinery safely and accurately. Screenshots are taken and printed for sketchbooks to record CAD work done on computers. Isometric crating and exploded view drawings. Using 2D Design Tools and the Vinyl Cutter to make a graphic product. Independent threading, and use of sewing machine. Photos—students practical work is recorded using photographs, which are glued into sketchbooks.
- Recall—Do Now activity—Questions at the start of each lesson link back to previous lesson, previous week, and previous term, to support in knowledge recall.
- Dedicated Improvement and Reflection Time—DIRT tasks are built in for students to improve their work based on teacher feedback.
- Literacy developed through adding definitions to list of key words used throughout the half term. These words are provided online, along with a visual guide, for students to revise from for their assessment. A knowledge organiser will be provided for each unit of work to enable students to recall keywords.

Key Summative Assessments:

- Sketchbook – all assessment and subject work is recorded in lessons. Feedback in sketchbook.
 - Retrieval homework, live marking and low stakes testing.
- PRODUCT DESIGN 1 and Graphics
- Practical/Drawing Work
 - End of half term assessment
- PRODUCT DESIGN 2 and Textiles
- Design Work
 - Homework

Impact: Students are able to select and use appropriate tools and equipment in the workshop. They are familiar working by hand with timbers and polymers. They know how to achieve a high quality finish, and are aware of possible surface finishes. Students know how to use 2D Design Tools and the laser cutter to achieve accuracy and repeatability. They begin to understand the idea of automation, and how this effects manufacturing on a larger scale. 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. Students understand how to use analogous and complementary colours. They will have built on their basic 3D drawing skills in year 7, to demonstrate more complicated crating and exploded view diagrams. Students can use their rendering skills, and backgrounds, to communicate their ideas effectively. Students can use basic tools in 2D Design Tools for CAD, and have an awareness of the advantages of CAM when they cut their work out using the Vinyl cutter.

Students will become more confident with a sewing machine and how to operate it. Most will be able to thread it up independently. Students will take pride in their work, and try their best to work with accuracy. They will work with more detailed pieces in year 9, and use the applique technique.

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Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning (Y7)	Future learning (Y9)
PRODUCT DESIGN 1: Electronics and Polymers—USB Lamp				
<ul style="list-style-type: none"> • Timber Theory—manufactured boards • Marking Out • Cutting Materials by hand • Workshop Machines • Temporary and Permanent Bonds • Electronic Components • Soldering 	<ul style="list-style-type: none"> • Identify manufactured boards • Use try square, steel rule, and centre punch accurately • Use tenon saw • Use a pillar drill independently • Use both temporary and permanent bonds. • Be able to solder a simple electronic circuit. • Development of evaluation skills 	<ul style="list-style-type: none"> • Students learn about the construction of man made boards as well as the environmental impact of using timbers and ensuring sustainability. • Students will learn components used to make a circuit that includes an LED. They will learn component names, what they do and the symbols for each component. • How to mark out accurately—selection of tools and equipment • Students learn how to solder safely before making their circuit. • How to set up a bench hook and tenon saw. • How to use a pillar drill accurately and with independence • Now what a temporary and permanent bonds are. • Know what various electronic components look 	<ul style="list-style-type: none"> • What is Design & Technology? Why do we study it as a subject? What impact does Design and Technology have on the world around us? • Students look closely at health and safety and learn the procedures for spotting issues and reporting them. How to prevent accidents and the safe use of machinery in the workshop. • Students learn about Hardwoods and Softwoods, as well as the environmental impact of using woods and ensuring sustainability. • What is electricity and how does it move around a circuit. • How to use a bench hook, tenon saw, file, abrasive paper • How to use a steel rule and try square • How to use a pillar drill and band facer safely 	<ul style="list-style-type: none"> • Metal Theory—categories of metals, Ferrous and non-ferrous • Cutting and abrading metals using a hacksaw and metal file • Drilling metals, using polishing wheel with metals • Fixing components • Addition—casting method
PRODUCT DESIGN 2: 2D CAD CAM - Ruler and Egg Cup				
<ul style="list-style-type: none"> • CAD (Computer Aided Design) • Drawing out 2D CAD Ruler • CAM (Computer Aided Manufacture) use of laser cutter • Polymers Theory • CAD/CAM Egg Cup design 	<ul style="list-style-type: none"> • Trace an image using 2D Design Tools • Follow instructions to accurately draw ruler in CAD • Prepare computer file from CAD design to send file to CAM laser cutter. • Be able to identify polymers • Draw design idea on 2D Design for an egg cup. • Problem solve design issues 	<ul style="list-style-type: none"> • Advantages of CAD over hand drawing • How to draw and adjust nodes. • How to specific dimensions in 2D Design • Advantages of CAM over hand manufacture • Categories of Polymers • Know what a specification is. 	<ul style="list-style-type: none"> • Design style of Memphis • Natural Fabrics • Tie Dye • Sewing Machine—straight lines • Fabric construction 	<ul style="list-style-type: none"> • 3D CAD • 3D CAD measuring tools • CAM Milling Machine • Metals Theory • Design Ideas

YEAR 8 CURRICULUM OVERVIEW — Design & Technology (Pd, Gr, Tx)

Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning (Y7)	Future learning (Y9)
GRAPHICS 1				
<ul style="list-style-type: none"> Exploded View Crating Colour theory, rendering, backgrounds Typography CAD Logo CAM Vinyl Cutter 	<ul style="list-style-type: none"> Know how to draw using an isometric grid, how to draw freehand designs, how to use CAD to draw design ideas, how to label and annotate designs, how to render drawings. Draw an exploded view in isometric Draw ellipses. Crating Technique Blend colours, select analogous and complementary colours Design logo 2D Design Tools Prepare CAD file and send to CAM machine 	<ul style="list-style-type: none"> Students will learn about isometric drawing and enhancing drawings with thick/thin lines, tone and by rendering materials. Isometric grid structure Know why and how to use the crating technique What analogous and complementary colours are Letter structures—serif and sans serif How to use 2D Design Tools with text. Know what decals are and how they are made 	<ul style="list-style-type: none"> Basic isometric cubes Basic isometric cubes Colour theory yr. 7 Expressive Text Laser cut parts for Robot project 	<ul style="list-style-type: none"> Metal Theory—categories of metals, Ferrous and non-ferrous Cutting and abrading metals using a hacksaw and metal file Drilling metals, using polishing wheel with metals Fixing components Addition—casting method
TEXTILES				
<ul style="list-style-type: none"> Work of Others Synthetic Fabrics Dye Sublimation Sewing Machine Construction 	<ul style="list-style-type: none"> Design in the style of Jon Burgerman Work with synthetic fabric to print design Dye sublimate own design onto synthetic fabric Stitch around complex shape accurately. Hand Stitching 	<ul style="list-style-type: none"> Recognise the work of Jon Burgerman Synthetics fabrics and their properties The process of dye sublimation How to thread and operate the sewing machines To construct pieces inside out 	<ul style="list-style-type: none"> Design style of Memphis Natural Fabrics Tie Dye Sewing Machine—straight lines Fabric construction 	<ul style="list-style-type: none"> Design in style of chosen designer Iconic Design Technical Textiles Applique for design Sewing Machine—applique Accurate hand stitching, embellishments

YEAR 8 CURRICULUM OVERVIEW—Design & Technology (Pd, Gr, Tx)

PRODUCT DESIGN 1 Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning (Y7)	Future learning (Y9)
Timber Theory—manufactured boards	Identify manufactured boards	Know how different manufactured boards are constructed.	Timbers—Natural categories	Metal Theory—categories
Marking Out	Use try square, steel rule, and centre punch accurately	How to mark out accurately—selection of tools and equipment	Ruler	2D CAD measuring tools
Cutting Materials by hand	Use tenon saw	How to set up a bench hook and tenon saw.	Coping Saw	Cutting metals, hacksaw
Workshop Machines	Use a pillar drill independently	How to use a pillar drill safely and accurately	Band Facer	Drilling metals Polishing Wheel
Temporary and Permanent Bonds	Use both temporary and permanent bonds.	Now what a temporary and permanent bond are.	Bonding clock project parts.	Fixing Components
Electronic Components Soldering	Be able to solder a simple electronic circuit.	Know what various electronic components look like, their circuit symbols, and what they do	Science—electronic circuits	Addition—casting
PRODUCT DESIGN 2 Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning (Y7)	Future learning (Y9)
CAD	Trace an image using 2D Design Tools	Advantages of CAD over hand drawing How to draw and adjust nodes.	3D hand drawing techniques	3D CAD
Ruler	Follow instructions to accurately draw ruler in CAD	How to specific dimensions in 2D Design	Using a ruler for technical drawings	3D CAD measuring tools
CAM	Send ruler file to CAM laser cutter.	Advantages of CAM over hand manufacture	CADCAM acrylic parts for robots	CAM Milling Machine
Polymers Theory	Be able to identify polymers	Categories of Polymers	Timbers Theory	Metals Theory
CADCAM Egg cup	Draw design idea on 2D Design for an egg cup	Know what a specification is.	Design criteria	Design Ideas

YEAR 8 CURRICULUM OVERVIEW — Design & Technology (Pd, Gr, Tx)

GRAPHICS Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning (Y7)	Future learning (Y9)
Exploded View	Know how to draw using an isometric grid, how to draw freehand designs, how to use CAD to draw design ideas, how to label and annotate designs, how to render drawings. Draw an exploded view in isometric	Students will learn about isometric drawing and enhancing drawings with thick/thin lines, tone and by rendering materials. Isometric grid structure	Basic isometric cubes	Orthographic Drawing
Crating	Draw ellipses. Crating Technique	Know why and how to use the crating technique	Basic isometric cubes	Orthographic Drawing
Colour theory, rendering, backgrounds	Blend colours, select analogous and complementary colours	What analogous and complementary colours are	Colour theory yr. 7	Rendering 3D design sketches
Typography CAD Logo	Design logo 2D Design Tools	Letter structures—serif and sans serif How to use 2D Design Tools with text.	Expressive Text	3D CAD/CAM
CAM Vinyl Cutter	Prepare CAD file and send to CAM machine	Know what decals are and how they are made	Laser cut parts for Robot project	2D CAD—more complex 2D Design and Laser Cutter
TEXTILES Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning (Y7)	Future learning (Y9)
Work of Others	Design in the style of Jon Burgerman	Recognise the work of Jon Burgerman	Design style of Memphis	Design in style of chosen designer
Synthetic Fabrics	Work with synthetic fabric to print design	Synthetics fabrics and their properties	Natural Fabrics	Technical Textiles
Dye Sublimation	Dye sublimate own design onto synthetic fabric	The process of dye sublimation	Tie Dye	Applique for design
Sewing Machine	Stitch around complex shape accurately.	How to thread and operate the sewing machines	Sewing Machine—straight lines	Sewing Machine—applique
Construction	Hand Stitching	To construct pieces inside out	Fabric construction	Accurate hand stitching, embellishments

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PRODUCT DESIGN 1 In this half term, there is a materials focus on metals, following on from learning about Papers and Boards, Timbers and Polymers in years 7 and 8. In relation to metals, students learn more in depth about the process of casting. They design and make their own moulds, based on a designer that they study. They casting their moulds using Pewter. Students learn techniques to improve their quality of finish, and are encouraged to take price in their work.

PRODUCT DESIGN 2 In this half term, students are taught to become familiar with the 3D software Onshape. They are taught to understand the advantages of using CAD/CAM over hand making. They design and 3D print their own ideas to see the process from start to finish.

GRAPHICS The overall aim of this project is to embed graphic communication and card modelling skills, for students to use in the 2D and 3D presentation and communication of their design ideas. Students will learn about aspects of design including how paper is made, cardboard construction techniques, iterative design and prototyping. Students are taught about placement of designs, so as to create very little waste material.

TEXTILES The intention of this project is to introduce students to technical textiles, whilst developing their practical skills working with a range of fabrics. The project is designed to capture the interest of the students through the use of familiar everyday products.

All students will be able to access the main content of all lessons. They will be taught to the top, with scaffolding, adaptive teaching and stretch and challenge provided where necessary.

Implementation

- The year is split into 6 half terms, with students studying two half terms each of Food and Product Design, as well as a half term each of Graphics and Textiles. Students in year 7 will study theory for each topic area, and have the opportunity to develop practical skills, whilst learning about the health and safety implications involved with each. There is end of year assessment that covers content from all of the D&T subject areas
- Lessons will be based around multiple representations; Concrete, Pictorial, Abstract to give a deeper understanding of concepts. Reasoning will be developed through the exploration of solving real and relevant problems within a variety of contexts.
- WAGOLL—Watching teacher step by step demonstrations. And the use of a visualiser
- Practical skills—Use workshop machinery safely and accurately. Screenshots are taken and printed for sketchbooks to record CAD work done on computers. Photos—students practical work is recorded using photographs, which are glued into sketchbooks. Students will evaluate by annotating their photos to explain what went well (www) and even better if (ebi).
- British Values— working as part of a group. Group work—work as part of a team of 4 to make a range of card construction examples. Sustainability in relation to making paper. Awareness of well known designers and architects.
- Recall—Questions at the start of each lesson link back to previous lesson to support in the recall of knowledge.
- Literacy developed through adding definitions to list of key words used throughout the half term. These words are provided online, along with a visual guide, for students to revise from for their assessment. A knowledge organiser will be provided for each unit of work to enable students to recall keywords.

Key Summative Assessments:

- Sketchbook – all assessment and subject work is recorded in lessons. Feedback in sketchbook.
 - Retrieval homework, live marking and low stakes testing.
- PRODUCT DESIGN 1 and Graphics**
- Practical/Modelling Work
 - End of half term assessment
- PRODUCT DESIGN 2**
- Design/Practical Work
 - Homework

Impact: Students are now aware of three main material areas, metals, timbers and polymers, having studied them over years 7, 8 and 9. They know how metal is cast to create complex shapes. They know which tools and equipment can be used as wastage techniques with metals. Students are well equipped to study GCSE Design and Technology in year 10, in both their theory knowledge and practical skills. Students are aware of technologies used in the modern world. They have an understanding of both 2D and 3D CAD, having studied them in years 8 and 9. They know the CAM processes of vinyl cutting, laser cutting and 3D printing. Students will be familiar with the work of a designer. 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. In Graphics, students are able to work collaboratively as part of a team. Students are able to create detailed 3D models, which support the communication and development of their ideas. In Textiles, students become confident in selecting appropriate fabrics, and stitching techniques, to create successful outcomes. They will be able to work independently at their own ability level, striving to achieve a high quality outcome.

High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation. Students will know more and remember more. There will be an increase in attainment through regular, formal and interleaved assessments.

Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning (Y8)	Future learning (Y10)
PRODUCT DESIGN 1: Workshop Metals—Casting Pewter				
<ul style="list-style-type: none"> Work of Others Aljoud Lootah Design Ideas Create a mould Metals Theory Metal Casting Quality of Finish 	<ul style="list-style-type: none"> Students will study the work of a designer, Aljoud Lootah. They will then be able to design in the style of that designer. Students will use the oblique drawing technique for their design ideas, to embed their knowledge of a range of 3D drawing techniques. Students will use quality rendering to improve the presentation of their design work. 2D Design Tools to create profile for mould Prepare file for CNC Milling Students will be able to Identify a range of metals Cast safely Improve quality using wastage techniques—files, abrasive paper 	<ul style="list-style-type: none"> Recognise work of a modern designer—Aljoud Lootah, taken from the updated GCSE specification Students will understand the purpose of a mould Students will recognise and know the uses of the CNC Milling process Students will learn about the categories of metals, and their different uses. Students will learn about the casting process Students will learn about a range of tools and techniques to improve their quality of finish when working with metals. 	<ul style="list-style-type: none"> The construction of man made boards as well as the environmental impact of using timbers and ensuring sustainability. Polymers theory. Students recognise the work of a design company, Alessi How to mark out accurately—selection of tools and equipment How to set up a bench hook and tenon saw. How to use a pillar drill accurately and with independence Know what various electronic components look like, their circuit symbols, and what they do Addition technique—permanent and temporary bonds Wastage techniques with timbers and polymers 	<ul style="list-style-type: none"> Generate Design Ideas Communicate design ideas Designer Research for modelling 2D and 3D CAD CAM 3D printer Smart and Modern Materials Lamination Surface finishes
PRODUCT DESIGN 2: 3D CAD/CAM—Onshape prototype				
<ul style="list-style-type: none"> Onshape 2D drawing 3D Extrude—Dice Cut and Fillet Revolve 3D Model own design Export file as .stl 	<p>Students will be able to demonstrate their ability to perform the following using Onshape:</p> <ul style="list-style-type: none"> Draw 2D shapes Extrude Extruded Cut Fillet Revolve Prepare file for 3D printing 	<ul style="list-style-type: none"> Advantages and disadvantages of 3D CAD Advantages and disadvantages of 3D CAM 	<ul style="list-style-type: none"> Advantages of CAD over hand drawing 3D drawing and rendering by hand How to draw and adjust nodes using 2D CAD How to specific dimensions in 2D Design Advantages of CAM over hand manufacture, using the laser cutter. Categories of Polymers Know what a specification is. 	<ul style="list-style-type: none"> 3D CAD assemblies of multiple parts 3D print for development of design ideas

Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning (Y8)	Future learning (Y10)
GRAPHICS: Card Model Pencil Sharpener				
<ul style="list-style-type: none"> • How Paper is made • 3D drawing • Card Construction Methods • Card Model of pencil sharpener • Iconic Design • Work of Others • In the Style of 	<ul style="list-style-type: none"> • Use notes and sketches to write up how paper is made—exam style question • Complex Crating and Exploded View techniques, adding small details • Use a craft knife safely • Create a 3D card prototype model. Use a glue gun safely • Be able to develop a design, based on given criteria. • Conduct independent research to find out about a designer and their style. Create design ideas in the style of that designer. 	<ul style="list-style-type: none"> • Source of paper/card • Construction of an isometric grid. Reasons of crating and exploded view • Know a range of card construction techniques • What a prototype is. H&S for craft knife and glue gun • Recognise what makes a design iconic • Recognise the work of a chosen designer. 	<ul style="list-style-type: none"> • Timbers Theory • Simple cube Exploded View and simple crating for a cylinder • Packaging Nets yr. 7 • Packaging Nets yr. 7 • Memphis design in year 7 	<ul style="list-style-type: none"> • Unit 3.1 Papers/Boards • Section C: Communicate Design Ideas • Section D Development: Prototyping • Unit 6.4 Communication of Design Ideas • Unit 6.2 Iconic Design • Unit 6.2 Work of Others

Textiles: Applique packet replica				
<ul style="list-style-type: none"> • Technical Textiles • Creating Fabric Patterns • Cutting pieces • Applique 	<ul style="list-style-type: none"> • Make comprehensive visual notes • Make a pattern, including seam allowance. • Pin and cut fabric accurately • Use different stitches on sewing machine • Can independently thread up and operate a sewing machine. 	<ul style="list-style-type: none"> • What is iconic design? Students should understand what makes a design iconic, and be able to give an example. • Students know how various technical textiles work, and their uses in the world around us. • Students will know how to use a stimulus material to make a template or pattern • Students will know techniques for accurate use of patterns. Avoiding waste • 	<ul style="list-style-type: none"> • Synthetic Fabrics • Templates • Simple pattern design • Dye Sublimation 	<ul style="list-style-type: none"> • Unit 3.5 Textiles • Unit 4.5 Scales of Production • Unit 7.3 Material Management • Unit 3.5 Textiles

PRODUCT DESIGN 1 Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning (Y8)	Future learning (Y10)
Work of Others Aljoud Lootah Design Ideas	Design in the style of a designer Oblique drawing Rendering	Recognise work of a designer	Design in the style of Alessi 3D Drawing and rendering	Generate Design Ideas Communicate design ideas Designer Research for modelling
Create a mould	2D Design Tools to create profile for mould Prepare file for CNC Milling	The purpose of a mould CNC Milling process	CAD 2D Design Tools CAM laser cutter	2D and 3D CAD CAM 3D printer
Metals Theory	Identify metals	Categories of metals	Polymers Theory	Smart and Modern Materials
Metal Casting	Cast safely	Casting process	Addition technique—permanent and temporary bonds	Lamination
Quality of Finish	Improve quality using wastage techniques—files, abrasive paper	Tools and techniques to improve quality of finish	Wastage techniques with timbers and polymers	Surface finishes

PRODUCT DESIGN 2 Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning (Y8)	Future learning (Y10)
Onshape 2D drawing 3D Extrude—Dice Cut and Fillet Revolve	Draw 2D shapes Extrude Extruded Cut Fillet Revolve	Advantages and disadvantages of 3D CAD	2D Design Tools	3D CAD assemblies of multiple parts
3D Model own design Export file as .stl	Prepare file for 3D printing	Advantages of 3D CAM	Laser cutter	3D print for development of ideas

YEAR 9 CURRICULUM OVERVIEW — Design & Technology (Pd, Gr, Tx)

GRAPHICS Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning (Y8)	Future learning (Y10)
How Paper is made	Use notes and sketches to write up how paper is made—exam style question	Source of paper/card	Timbers Theory	Unit 3.1 Papers/Boards
3D drawing	Complex Crating and Exploded View techniques, adding small details	Construction of an isometric grid. Reasons of crating and exploded view	Simple cube Exploded View and simple crating for a cylinder	Section C: Communicate Design Ideas
Card Construction Methods	Use a craft knife safely	Know a range of card construction techniques	Packaging Nets yr. 7	Section D Development: Prototyping
Card Model of pencil sharpener	Create a 3D card prototype model. Use a glue gun safely	What a prototype is. H&S for craft knife and glue gun	Packaging Nets yr. 7	Unit 6.4 Communication of Design Ideas
Iconic Design	Be able to develop a design, based on given criteria.	Recognise what makes a design iconic		Unit 6.2 Iconic Design
Work of Others In the Style of	Conduct independent research to find out about a designer and their style. Create design ideas in the style of that designer.	Recognise the work of a chosen designer.	Memphis design in year 7	Unit 6.2 Work of Others

TEXTILE Content	Disciplinary Knowledge (Skills) This is the actions taken within a topic to gain substantive knowledge	Substantive Knowledge This is the specific, factual content for the topic, which is connected into a careful sequence of learning	Prior Learning (Y8)	Future learning (Y10)
Technical Textiles	Make comprehensive visual notes	How various technical textiles work	Synthetic Fabrics	Unit 3.5 Textiles
Creating Fabric Patterns	Make a pattern, including seam allowance.	How to make a pattern	Templates	Unit 4.5 Scales of Production
Cutting pieces	Pin and cut fabric accurately	Techniques for accurate use of patterns. Avoiding waste	Simple pattern design	Unit 7.3 Material Management
Applique	Use different stitches on sewing machine	Know how to thread up sewing machine.	Dye Sublimation	Unit 3.5 Textiles