Subject: Resistant Materials

Year 7 & 8
Scheme of Learning 2025 - 2026

Subject leader: DOL E Jones, specialist teacher Paul Robinson

Topics by term	Topic overview for Year 7					
	Term 1	**Term 2**	**Term 3**	**Term 4**	**Term 5**	**Term 6**
Prerequisites	The KS2 National Curriculum aims to teach students to: • Learn creative, technical, and practical skills for everyday tasks. • Gain confidence to take part in a technological world. • Build knowledge and skills to design and make quality products. • Create prototypes and products for different types of users. • Think critically by testing and improving their own work. • Evaluate the work of others to help develop their own ideas	• Students were introduced to CAD using 2D Design and learned basic skills for laser cutting and engraving. • They practiced technical drawing using isometric paper to show 3D forms accurately. • They learned how designers use technical drawings to develop and improve products and how plastics are recycled.	• They analysed the brief • Students designed a motif for their phone stand and used CAD to vectorise an image. • • Students learned practical skills, including using the laser cutter, line bender, and assembling a phone stand. • Designs were developed using card before working with materials. • Their final outcome showed how CAD/CAM and basic making skills support product development.	• They designed the shape of their phone stand and modelled it in cardboard. • Orthographic drawing was used to accurately represent their Phone Stand from different views (front, side, plan). • set criteria during the Phone Stand Project.	• They evaluated their product design using ACCESS FM • Students considered colour options for their phone stand. • They built skills in CAD and working with resistant materials such as Perspex	• Students used line bending and glue to assemble their Phone Stands

Topics taught *Students learn how to use technical drawing to develop ideas, use CAD/CAM, and build basic making skills. They follow a client brief and design within set criteria. They also gain experience working with resistant materials and evaluating their work to make improvements.*	**RESISTANT MATERIALS** ## Phone Stand *Learn about designers* *Recycled Plastics* *Intro/building on CAD skills- developing a motif* *Developing a design in card* *Transferring a design to CAD including CAM theory* *Transferring a design to CAD including CAM theory, Line Bending* ## Sports Day Badge *Learning about different types of wood* *Further Learning of CAD software for use in Laser Cutting* *Designing a product based on a design specification and material limitation* *Assembly with plywood* .
Why is this taught now?	To build a foundation in design and practical skills early on. To develop confidence using tools like CAD and equipment such as the laser cutter. To introduce key design processes, including planning, prototyping, and evaluation. To help students understand how to meet a design brief and work within constraints. To prepare students for more complex projects in later years. To encourage creative thinking and problem-solving from the start. To develop key skills in communication through technical drawing and design presentation. To begin using industry-relevant tools and frameworks (e.g., ACCESS FM, CAD/CAM).

Design and technology programmes of study: key stage 3 National curriculum in England - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/239089/SECONDARY_national_curriculum_-_Design_and_technology.pdf = 1.Design   2. Make   3. Evaluate   4. Technical knowledge

Specification o References	Big questions	Topic area: main Items and optional learning objectives	Outcomes	Key Terms/ concepts Literacy Numeracy	Assessment and homework tasks	Resources	Personal Development curriculum links (SMSC, British Values, PSHE)
Term 1- 5 *Phone Stand introduction to plastics and CAD Brief- Design and make a phone stand for teenagers aged 11-13*							
	Topic 1: Analysing the brief and artist investigation						
	What is a Brief? How can looking at the designs of others inspire our own ideas?	**What they must learn** Students need to understand that a client brief explains what a design needs to do, who it's for, and what the limits are, so they can create something that meets real needs. By looking at the work of other artists and designers, we can get new ideas and improve our own designs.	**What they must do** *Create a plan of make linked to the brief* *Artist study and Think Pair evaluation of a chosen designers work*	Client User Target audience Purpose Function Design criteria Constraints Needs	**Every Lesson** 100% participation AFL- Questions that check understanding Think, Pair, Share/Turn and Talk	The Brief Artist/Designer Hand out	*Spiritual:* *Reflect on how caring for the environment connects us to the world.* *Moral:* *Understand the importance of reducing waste and making ethical material choices.* *Social:* *Work together to find creative solutions for reusing materials responsibly.* *Cultural:* *Learn how different cultures approach recycling and sustainable design.*
	Topic 2: Health and Safety in the workshop with written Assessment						
	Why is it important to follow safe procedures in the Work Shop?	**What they must learn** Healthy and safety in the workshop Safety signs in the workshop Identify and understand health and safety aspects of the classroom	**What they must do** *Think Pair Share exercise linked to H&S* *Worksheet task linked to H&S*	*Safety equipment, Personal safety.*	**Assessment:** **Written test linked to Health and Safety- followed by EBI and PIT**	PowerPoint on workshop safety and equipment	**Cultural Capital-** See ADT Curriculum Map

	Topic 3: Isometric drawing						
	What is isometric drawing?	**What they must learn** Isometric drawing concept Teacher explains isometric drawing using Teacher led demonstration (on visualiser). Identify and understand how to draw isometric shapes, remembering to follow the lines and keep rulers to only 30◦ angles and vertical lines only. ***Stretch and Challenge-*** *Be able to explain, will be very independent and will move onto extension tasks.*	**What they must do** *Practice isometric drawing skill using Isometric worksheets* *Move on to plain paper and observational drawing.* *Demonstrate understanding of the principles - 30◦ angle and vertical lines only.*	ACCESSFM Target market Copy right intellectual property Isometric Guide lines Grids **Numeracy:** Isometric 30◦ angle lines Vertical lines Ruler	**Homework:** Practice Isometric drawing at home. **Every Lesson** 100% participation AFL- Questions that check understanding Think, Pair, Share/Turn and Talk	Power Point on isometric drawing. Visualiser Isometric worksheets Isometric grid/paper Board and board pens. PowerPoint Isometric worksheets	
	Topic 4: Rendering						
Technical Knowledge understand and use the properties of materials and the performance of structural elements to achieve functioning solution	What is rendering?	**What they must learn** Technical Drawing - Rendering 3D products. Use plain paper to develop a Crossy Roads character and observational drawings of isometric shapes. Rendering to create form, texture, and depth. Design and draw a Crossy Roads character Extension work- Render all drawings, in different colours. ***Stretch and Challenge-*** *Be able to explain what the light is doing to the object and demonstrate an excellent technique.*	**What they must do** *Crossy roads character and Isometric shapes*	Rendering Shading Layers Tone Depth Texture Crossy Roads 3D	**Homework:** Practice Isometric drawing at home. **Every Lesson** 100% participation AFL- Questions that check understanding Think, Pair, Share/Turn and Talk	Rendering PowerPoint HB pencils Isometric rulers Coloured pencils for extension	

	Topic 5: 2D Design Crossy Roads						
DESIGN: *identify and solve their own design problems and understand how to reformulate problems given to them*	What is CAM? What is CAD?	**What they must learn** Technical Drawing – Designing Drawing & Rendering 3D Crossy Roads style character on 2D design. Using 'TECHSOFT 2D DESIGN' software. Use of 2D Design programme to draw an isometric shape, render a cube. Use 2D Design programme to create a simple geometric shape Use 2D design to make a Crossy Roads character Teacher demonstration on using 2D Design programme to render a simple geometric shape Use 2D design to render a simple geometric shape ***Stretch and Challenge-*** *Draw and render a Crossy Roads style character in coloured pencil rendering neatly and creating original designs to a high standard.*	**What they must do** *Digital Crossy roads character* *Rendered shapes* *Work printed and inserted into book*		**Every Lesson** 100% participation AFL- Questions that check understanding Think, Pair, Share/Turn and Talk	HB pencils Isometric paper PowerPoint of Crossy Roads characters Handouts of Crossy Roads characters for inspiration PowerPoint for 2D design. Handout 2D design tools and how too. Computers, Laser Cutter 2D design software	
	Topic 6: 2D Design Introduction to programme						
DESIGN: *develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital*	What are the different marks and textures that can be programmed into the laser cutter? What materials can be cut, scored, or etched on a Laser Cutter?	**What they must learn** How different images that could be etched onto phone holder. How to draw a continuous line around a simple silhouette and Vectorise an image.	**What they must do** 4 designs to etch onto phone holder Vectorise best image Work printed and inserted into book	2D Design Vectorising Laser Cutter Acrylic **Numeracy:** Scaling and measuring lines on TECHSOFT 2D Design	**Homework:** Research imagery to use for vector images **Every Lesson** 100% participation AFL- Questions that	PowerPoint for 2D design. Handout 2D design tools and how too. Lap tops, Laser Cutter, 2D Design Software	

presentations and computer-based tools	Use 2D Design programme to draw a continuous line around a simple silhouette Use 2D Design to vectorise an image How to research, copy and paste a silhouette into 2D design programme to draw a continuous line around it. Use 2D design to vectorise an image Use instruction sheets on vectorising a simple shape. **Learn about the laser cutter-** • Laser cutters can cut lots of materials like wood, plastic, paper, and fabric. • Thin materials are easier to cut than thick ones. • Some materials, like plastic called PVC, are dangerous to cut because they make bad smoke. • Laser cutters can cut all the way through or just make pictures on the surface. • Different materials look different after cutting—wood might look burnt, and plastic edges are smooth. • Materials should be clean and flat so the laser cutter works well. • The laser machine needs special settings depending on the material to cut it just right. ***Stretch and Challenge-*** *Use 2D design to draw geometric shapes, render shapes, draw around simple shapes, and vectorise images*	Demonstrate an understanding of how to turn a picture into a vectorised image. Show understanding of the difference between a raster and vector image. Written task linked to Laser Cutter		check understanding Think, Pair, Share/Turn and Talk	Exemplar model

		(making sure lines are all 'attached') and that the images they drew around or vectorised have kept the same proportion by using the shift key when resizing. Will use instruction sheets in order to work more independently					
	Topic 7: Card board construction						
	How can we utilise cardboard to create a 3D mock up of our Phone Stand?	**What they must learn** Health and Safety for cutting card and using hot glue gun. Use Isometric drawing to sketch different shapes for the Phone stand Make a 3D card board mock up of preferred design ***Stretch and Challenge-*** *Design and create innovative 3D cardboard models for their phone stand, making clear links to the design brief and the work of relevant designers.*	**What they must do** *3D card board Mock up*	Cardboard Constuction Measuring Scoring Assemble	**Assessment:** **Card Construction of phone stand including a pause to reflect, generate EBI and improve through PIT** **Every Lesson** 100% participation AFL- Questions that check understanding Think, Pair, Share/Turn and Talk		
	Topic 8: Orthographic drawing of Phone Stand						
	How can we use Orthographic drawing to support our Phone Stand design?	**What they must learn** How to use orthographic drawing to show the design clearly from different angles – front, side, and top views. How to give accurate measurements so the parts can be made correctly.	**What they must do** *Parts ready to be laser cut*	Orthographic Front view Side view Top view 2D Scale Dimensions Accuracy	**Every Lesson** 100% participation AFL- Questions that check understanding Think, Pair, Share/Turn and Talk		

| | | The importance of others (like teachers, clients, or manufacturers) being able to understand exactly what the final product will look like.

That is makes it easier to spot problems in shape or proportion before making the real thing.

Stretch and Challenge-
Use accurate measurements and advanced line techniques to create a detailed orthographic drawing, including annotations and extra views (e.g. isometric or sectional) to fully communicate your design. | | Projection
Layout
Measurements
Proportion | | | |

Topic 9: Planning, Preparation & practical skills Acrylic Phone Holder –Vectorization for 2D Design (CAD)

| DESIGN: *develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools* | How do I use the 2D Design programme to adapt an existing image?

How do I use the 2D Design programme to create a bold original image? | <u>**What they must learn**</u>

Creating the phone holder motif
Using 'TECHSOFT 2D DESIGN' software. To create a design for an etched acrylic phone stand.

The use of the 2D Design programme to vectorise an image and add text onto a template ready to be etched on the laser cutter.

Recap on using 2D Design to vectorise an image.

Research, copy and paste an image onto 2D design template.

Use 2D design to vectorise an image Use instruction sheets on vectorising a simple shape.

Arrange Text and shapes in exact layout desired

Stretch and Challenge- | <u>What they must do</u>

Work printed and inserted into book

Etched Acrylic ready for Line Bending | 2D Design
Vectorising
Laser Cutter
Acrylic | **Homework:**
Mind map themes for motif e.g. *Hobbies, personality, fashion, music, pattern etc.*

<u>**Every Lesson**</u>
100% participation AFL- Questions that check understanding Think, Pair, Share/Turn and Talk | PowerPoint for 2D design.

Handout 2D design tools and how too.

Laptops,

Laser-cutter,

2D Design Software | |

		Use 2D design to vectorise a highly suitable found image, keeping the same proportion by using the 'shift' key and using instruction sheets in order to work more independently					

Topic 10: Line bending and construction

| MAKE: *select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture* | How do I bend/shape an acrylic sheet?

How do I assemble my phone stand? | **What they must learn**

Independently explore Isometric drawing while waiting turn to Line Bend Acrylic.

Line- bending etched acrylic and assembling Phone stand

Line-bending etched acrylic to required shape.

Line-bending an etched acrylic rectangle

How to assemble a phone stand with a small amount of adhesive.

Extension Task- Complete a step by step recap of how they designed and made their phone stand in whole grammatically correct sentences using correctly spelt keywords

Stretch and Challenge-
Be able to use the Line-bending machine to bend etched acrylic and change it to the right shape and assemble their phone stand to a high standard independently. | **What they must do**

Line-bend own etched acrylic rectangle

Fully Assembled Acrylic Phone Stand | Acrylic
Adhesive
Assembly

Numeracy:
Measuring for cardboard base mock up | **Every Lesson**
100% participation
AFL- Questions that check understanding
Think, Pair, Share/Turn and Talk | Card board
PowerPoint for line-bending
Teacher demonstration
Handout step by step instructions.

Laser cut etched acrylic | |

Topic 11: Evaluation Acrylic Phone Holder

		What they must learn	What they must do		Homework:	
EVALUATE: *test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups*	How do I use ACCESSFM to evaluate my Phone Stand?	**What they must learn** Evaluation of Phone Stand quality as assessment task Using ACCESSFM Complete a final evaluation answering all questions fully with explanation for each. Add sketches and notes if necessary. ***Stretch and Challenge-*** *Write an evaluation with detailed explanation in grammatically correct whole sentences with correct spelling and key words with detailed annotated diagrams.*	**What they must do** *Photograph and evaluation of Completed Phone Stand in book*	Evaluation Annotation Quality Control Specification	**Homework:** Evaluate something in your house using ACCESSFM **Every Lesson** 100% participation AFL- Questions that check understanding Think, Pair, Share/Turn and Talk	PowerPoint on ACCESSFM and Product evaluation. ACCESSFM handout and evaluation sheet

Term 6 *Sports Day Badge Brief- Design and make a badge inspired by the House Animal Logos*

	Topic 1: Wood material and manufacturing					
TECHNICAL KNOWLEDGE: *understand and use the properties of materials and the performance of structural elements to achieve functioning solutions*	Is wood manufacturing sustainable for the planet?	**What they must learn** Learn about the production of wood. Where does wood come from? Hard and soft woods and what the differences are between these. Learn about manufactured boards such as plywood, medium density fibreboard and chipboard. Learn about deforestation	**What they must do** Create a grid of material properties for each type of wood. E.G. identifying factors between hard and soft wood. What is MDF?	Soft and hard wood Medium density fibreboard Chipboard Plywood Sustainability Forestry Manufacture and production of wood.	**Homework:** Worksheet about material properties of wood and paper **Every Lesson** 100% participation AFL- Questions that check understanding	Grid task in book PPT – Wood Source, Production and Sustainability

		and sustainable sourcing of wood. Where is wood sourced? What is the process used to produce wood and what are the impacts of wood production? Identify the differences between hard and soft wood, medium density fibreboard, chipboard, and plywood. ***Stretch and Challenge-*** *Be able to show a clear understanding of the differences between hardwoods, softwoods, and manufactured boards along with their uses and applications.*			Think, Pair, Share/Turn and Talk		

Topic 2: Analysing the brief and Logo look

| | | **What they must learn**

Students need to understand that a client brief explains what a design needs to do, who it's for, and what the limits are, so they can create something that meets real needs.

By looking at the work of other artists and designers, we can get new ideas and improve our own designs. | **What they must do**

Create a plan of make linked to the brief

Artist study and Think Pair evaluation of a chosen designers work | Client
User
Target audience
Purpose
Function
Design criteria
Constraints
Needs | **Every Lesson**
100% participation
AFL- Questions that check understanding
Think, Pair, Share/Turn and Talk | The Brief Artist/Designer Hand out | |

What is a Brief?

What is a logo and How can looking at the designs of others inspire our own ideas?

Topic 3: Designing and making the badge

EVALUATE analyse the work of past and present professionals and others to develop and broaden their understanding DESIGN: *develop and communicate*	How can we draw images on 2D design ready for laser cutting?	**What they must learn** Further develop skills in Computer aided design Vectorise images 2D design how to vectorise an image making a vectorised image bank ***Stretch and Challenge-***	**What they must do** Vectorised animal shapes Evaluation of product Assemble Badge	Ideate – Research and ideas Vectorise **Numeracy:** Drawing according to a scaled size.	**Homework:** Collect animals for House **Assessment:** **EBIs linked to designs with PIT** **Every Lesson**	House Animal picture resource Worksheet guide for 2D Design	

design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools		*Be able to confidently make modifications to their ideas using the tracing programme to prepare layout for laser cutting.*			100% participation AFL- Questions that check understanding Think, Pair, Share/Turn and Talk	

AQA GCSE Art and Design- National Assessment Criteria

MARKS & Approx. Grades	Assessment Objective 1 Develop their ideas through investigations demonstrating critical understanding of sources. Candidates evidence:	Assessment Objective 2 Refine work by exploring ideas, selecting and experimenting with appropriate media, materials, techniques and processes. Candidates evidence:	Assessment Objective 3 Record ideas, observations and insights relevant to their intentions as work progresses. Candidates evidence:	Assessment Objective 4 Present a personal and meaningful response that realises intentions and demonstrates understanding of visual language. Candidates evidence:
24 Convincingly 23 Clearly 22 Adequately 21 Just Y11 7-8	An exceptional ability to effectively develop ideas through creative and purposeful investigations. An exceptional ability to engage with and demonstrate critical understanding of sources.	An exceptional ability to thoughtfully refine ideas with discrimination. An exceptional ability to effectively select and purposefully experiment with appropriate media, materials, techniques and processes.	An exceptional ability to skilfully and rigorously record ideas, observations and insights through drawing and annotation, and any other appropriate means relevant to intentions, as work progresses.	An exceptional ability to competently present a personal and meaningful response and realise intentions with confidence and conviction. An exceptional ability to demonstrate understanding of visual language.
20 Convincingly 19 Clearly 18 Adequately 17 Just Y11 5-6	A highly developed ability to effectively develop ideas through creative and purposeful investigations. A highly developed ability to demonstrate critical understanding of sources.	A highly developed ability to thoughtfully refine ideas. A highly developed ability to effectively select and purposefully experiment with appropriate media, materials, techniques and processes.	A highly developed ability to skilfully record ideas, observations and insights through drawing and annotation, and any other appropriate means relevant to intentions, as work progresses.	A highly developed ability to competently present a personal and meaningful response and realise intentions with confidence and conviction. A highly developed ability to demonstrate understanding of visual language.
16 Convincingly 15 Clearly 14 Adequately 13 Just Y9 4-5	A consistent ability to effectively develop ideas through purposeful investigations. A consistent ability to demonstrate critical understanding of sources.	A consistent ability to thoughtfully refine ideas. A consistent ability to effectively select and purposefully experiment with appropriate media, materials, techniques and processes.	A consistent ability to skilfully record ideas, observations and insights through drawing and annotation, and any other appropriate means relevant to intentions, as work progresses.	A consistent ability to competently present a personal and meaningful response and realise intentions. A consistent ability to demonstrate understanding of visual language.

12 Convincingly 11 Clearly 10 Adequately 9 Just **Y8 3-4**	A moderate ability to effectively develop ideas through purposeful investigations. A moderate ability to demonstrate critical understanding of sources.	A moderate ability to thoughtfully refine ideas. A moderate ability to effectively select and purposefully experiment with appropriate media, materials, techniques and processes.	A moderate ability to skilfully record ideas, observations and insights through drawing and annotation, and any other appropriate means relevant to intentions, as work progresses.	A moderate ability to competently present a personal and meaningful response and realise intentions. A moderate ability to demonstrate understanding of visual language.
8 Convincingly 7 Clearly 6 Adequately 5 Just **Y7 2-3**	Some ability to develop ideas through purposeful investigations. Some ability to demonstrate critical understanding of sources.	Some ability to refine ideas. Some ability to select and experiment with appropriate media, materials, techniques and processes.	Some ability to record ideas, observations and insights through drawing and annotation, and any other appropriate means relevant to intentions, as work progresses.	Some ability to present a personal and meaningful response and realise intentions. Some ability to demonstrate understanding of visual language.
4 Convincingly 3 Clearly 2 Adequately 1 Just **1**	Minimal ability to develop ideas through investigations. Minimal ability to demonstrate critical understanding of sources.	Minimal ability to refine ideas. Minimal ability to select and experiment with appropriate media, materials, techniques and processes.	Minimal ability to record ideas, observations and insights through drawing and annotation, and any other appropriate means relevant to intentions, as work progresses.	Minimal ability to present a personal and meaningful response and realise intentions. Minimal ability to demonstrate understanding of visual language.