Design and Technology: Y8
Medium term Plan
Autumn term 1

Learning Overview (Contents)	Theory: **Design Process, Materials, and Evaluation**
Assessment Opportunities	Assessment is based on classwork, homework assignments, Tri-weekly tests and end of unit tests. In addition to these students will also be assessed on their practical assignments with a 50/50 ratio in these to reflect the GCSE assessment criteria. • BBC Bitesize – KS3 Design and Technology • URL: https://www.bbc.co.uk/bitesize/subjects/zfr9wmn • Technologystudent.com • **URL:** https://www.technologystudent.com • 3. HowStuffWorks – Science & Tech • URL: https://www.howstuffworks.com • 4. IET Education (The Institution of Engineering and Technology) • URL: https://education.theiet.org
Textbooks Published Lesson Resources	• **Title:** *Collins Key Stage 3 Design and Technology Student Book* • **Title:** *Design & Technology: KS3 Textbook (9-1 GCSE Foundation),* • **Title:** *Smart Skills: Design and Technology – Key Stage 3*

Home Learning Resources	All learning material will be shared with students in their workbooks. BBC Bitesize/TES resources/Design and Technology student.
Knowledge organisers	Shared with students at the end of each lesson. This will be added to their workbooks.

Week Number	**Learning Overview / objective** (outlined above)	**What should pupils know, understand and be able to do by the end of the week?** (Use clear Success criteria)
1. Smart Materials	1. Define smart materials and their properties 2. Identify common types (e.g. thermochromic, shape memory alloy) 3. Explain how smart materials respond to stimuli 4. Suggest appropriate applications in design	Introduction to smart materials and how they differ from traditional ones. Use of real-world product examples. Optimisation challenge: Redesign a part of a product to improve one factor (e.g. cost, weight, grip). Write a paragraph explaining what trade-offs were involved in your design optimisation.
2. Product Evaluation	1. Analyse a product using ACCESS FM 2. Identify areas for improvement 3. Consider user needs and expectations 4. Evaluate materials, ergonomics and aesthetics	Teach structured product evaluation using frameworks (e.g. ACCESS FM, 5Ws). Evaluate a product (e.g. phone holder, pen, or packaging). Present findings. Choose a product at home and write a short evaluation using 3 ACCESS FM points.
3. Explore Context and Emphasise	1. Investigate real-world design contexts 2. Identify key user needs and problems 3. Link empathy to effective design 4. Define target market clearly	Using context-based challenges to drive meaningful design. Emphasising empathy and user-centered thinking. Mind-map the context of a new brief (e.g. “design for a student desk”); identify the user's needs. Interview a friend or family member to explore a design issue they face. Summarise their needs. **Tri-weekly Test**

4. Quality Standards	1. Define quality control and quality assurance 2. Understand the importance of tolerances and consistency 3. Identify quality standards in manufacturing (e.g. ISO) 4. Explain how QA/QC is applied in school-based projects	Explore real-world standards (ISO, CE marks, British Standards). Explain QA vs QC in design and manufacturing. Quality analysis task: Examine products for defects or tolerances. Discuss findings. Write a short report on why quality standards are important in mass production
5. Reverse Engineering	1. Define reverse engineering 2. Disassemble a product to understand its function 3. Identify how parts are assembled and materials used 4. Record and communicate findings clearly	Teach how to analyse an existing product by taking it apart and studying construction and function. In groups or individually, disassemble a simple product (e.g. pen, remote) and record structure. Draw a labelled diagram of the product disassembled and annotate materials used.
6. Develop Ideas and Feedback	1. Use feedback to improve design ideas 2. Explore multiple solutions to a design problem 3. Revise sketches and CAD models iteratively 4. Communicate changes effectively	Emphasise iteration in design. Types of feedback: peer, user, teacher. How to develop designs in response. Present idea to a peer, gather feedback, and improve design. Record changes made and why. Create 2 revised sketches of your design showing changes based on feedback. **Tri-weekly test**
7. Design Optimisation	1. Define design optimisation 2. Identify areas of improvement in efficiency, cost, or materials 3. Consider environmental and ergonomic factors 4. Modify a design to enhance performance	What makes a design “better”? Teach redesign for performance, sustainability, and user-friendliness. Optimisation challenge: Redesign a part of a product to improve one factor (e.g. cost, weight, grip). Optimisation challenge: Redesign a part of a product to improve one factor (e.g. cost, weight, grip).
8. Present an Idea	1. Communicate design ideas clearly and persuasively 2. Use visual aids (e.g. sketches, CAD, models) 3. Structure a verbal or written pitch 4. Respond to feedback with confidence	Teach presentation techniques and persuasive communication. Focus on clarity, confidence, and layout. Prepare and deliver a short pitch of your final design to the class or small group. Reflect on your presentation. What went well? What would you improve next time
9.	**Assessment**	**End of Unit Assessment** **Accounts for 50% of the term mark**

Design and Technology: Y8

Medium term Plan
Autumn term 2

Learning Overview (Contents)	Prctical lesson: Night Light Project
Assessment Opportunities	Assessment is based on classwork, homework assignments, Tri-weekly tests and end of unit tests. In addition to these students will also be assessed on their practical assignments with a 50/50 ratio in these to reflect the GCSE assessment criteria. • BBC Bitesize – KS3 Design and Technology • URL: https://www.bbc.co.uk/bitesize/subjects/zfr9wmn • Technologystudent.com • **URL:** https://www.technologystudent.com • 3. HowStuffWorks – Science & Tech • URL: https://www.howstuffworks.com • 4. IET Education (The Institution of Engineering and Technology) • URL: https://education.theiet.org
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Week Number	**Learning Overview / objective** (outlined above)	**What should pupils know, understand and be able to do by the end of the week?** (Use clear Success criteria)
1. Researching Existing Products	1. Identify a range of existing night lights 2. Analyse function, form, and materials 3. Record key features and inspiration 4. Begin identifying target users	Exploring current night light products, disassembly, user needs, Research and analysis of 4–6 night lights using ACCESS FM, Find 2 products at home and analyse their form and function
2. Initial Night Light Isometric Sketches	1. Sketch in isometric using correct techniques 2. Communicate ideas clearly with annotations 3. Include details such as light direction and switch 4. Generate 2–3 initial ideas	How to draw isometric views and develop design ideas, Sketch 2–3 designs and annotate features/materials, Choose your favourite idea and explain why in writing.
3. Develop Initial Design	1. Modify and improve initial ideas 2. Use peer/teacher feedback to evolve the design 3. Add user-focused features 4. Link design to materials and manufacturing methods	Refining chosen idea with support from feedback, Develop one refined design showing improvements, with notes, Add material choices and user justification to sketchbook. **Tri-weekly test**
4. Draw Final Design	1. Produce a high-quality final drawing 2. Include key views (isometric,	Teach drawing standards and layout expectations, Draw final design with full annotations and colour, Finish final drawing and upload to digital portfolio

	dimensions) 3. Annotate with materials and manufacturing processes 4. Prepare for digital modelling	
5 Create Net for Packaging (2D Design)	1. Use 2D Design software (or TechSoft/Adobe) 2. Design a flatpack net 3. Include tabs and folds 4. Plan dimensions to fit product	Intro to packaging nets and layout design, Design a flat net for packaging; plan size and layout, Sketch a logo or visual graphic to go on your box
6. Add Graphics and Branding	1. Add logos, colour schemes and instructions 2. Use layers in design software 3. Consider visual appeal 4. Plan layout for cutting/printing	Teach how to add graphics to packaging in CAD, Add branding, warning labels, and design instructions, Finish final 2D design and save for laser cutting, **Tri-weekly test.**
7. Soldering Components & PCB	1. Identify electronic components 2. Follow a circuit diagram 3. Use soldering iron safely 4. Solder basic joints	Teach safety, use of PCB and components (LED, resistor, battery, switch), Place components on board and solder with guidance, Research one component used in your night light
8. Final Soldering & Circuit Testing	1. Complete all solder joints 2. Test and troubleshoot the circuit 3. Fit the electronics into the case 4. Final assembly of night light	Testing, fault-finding, and circuit integration, Test and install electronics into the printed case, Prepare for project evaluation and presentation
9. Assemble Final Packaging	1. Cut and fold net accurately 2. Assemble using glue/tabs 3. Test product fit 4. Finalise packaging aesthetics	Final assembly
	Present Projects in the main reception of the school	Students label and display their work.
10.	**Assessment**	**End of Unit Assessment** **Accounts for 50% of the term mark**

Assessment Rubric – Night Light Project (KS3, Levels 1–9)

Level	Measuring & Marking Out	Safe Soldering	Electronic Component Installation	2D Design (CAD)	Use of Hand Tools	Finishing	Working Prototype
9–8	Extremely accurate; all measurements and markings are precise with no errors. Independent and confident use of tools.	Excellent soldering technique with clean, strong joints and no bridging. Full understanding of safety.	All components correctly installed with correct polarity and alignment. Flawless circuit performance.	Highly proficient in 2D Design. Independent file creation, correct layering, exported properly for CAM.	Handles tools confidently, independently, and safely. Excellent control and technique.	Finish is smooth, even, and professional. No visible glue or tool marks. High attention to detail.	Fully working, attractive night light. Reliable, stable, meets brief completely.
7–6	Mostly accurate measuremen	Good soldering. Joints are	Most component s correctly	Competent use of 2D Design.	Safe and effective tool use.	Good overall finish.	Functional and assembled

	ts with only minor errors. Clear understanding of marking techniques.	mostly clean and strong. Good safety awareness.	installed; minor faults that don't affect overall function.	Some guidance needed. Files correctly formatted.	Minor slips, but work is controlled.	Some small imperfections, but generally clean and neat.	to a good standard. May need slight adjustment.
5–4	Some measurements are inaccurate. Inconsistent marking technique. Basic understanding shown.	Basic soldering achieved with some weak joints. Occasional safety reminders needed.	Some components incorrectly placed, affecting performance. Errors identified and mostly corrected.	Basic file created in 2D Design with support. Limited use of layers or grouping.	Uses tools with supervision. Inconsistent control, but safe.	Finish is rushed or uneven. Tool marks or glue may be visible.	Light works intermittently or has flaws, but shows working understanding.
3–2	Most measurements inaccurate. Struggles to mark materials independently.	Soldering is inconsistent or messy. Safety reminders frequently required.	Components placed incorrectly, affecting functionality. Frequent errors needing guidance.	Minimal CAD knowledge. Struggles to complete task without direct help.	Unsafe or incorrect tool use. Requires close supervision.	Poor finish. Little to no attempt to refine appearance.	Incomplete or non-working product. Requires major rework.
1	No attempt or understanding of measuring or marking out.	Unsafe use of soldering iron. Unable to complete without full supervision.	Unable to install components or circuit not attempted.	No understanding of 2D Design or file not usable.	Unable to use tools safely. May present a hazar		

Design & Planning	**15%**
Measuring & Marking Out	15%
Tool Use & Safety	20%
Accuracy & Dexterity	20%
Finishing Techniques	15%
Assembly & Functionality	15%

Design and Technology: Y8
Medium term Plan
Spring Term 1

Learning Overview (Contents)	Theory: Scales of production, materials, manufacturing.
Assessment Opportunities	Assessment is based on classwork, homework assignments, Tri-weekly tests and end of unit tests. In addition to these students will also be assessed on their practical assignments with a 50/50 ratio in these to reflect the GCSE assessment criteria. • BBC Bitesize – KS3 Design and Technology • URL: https://www.bbc.co.uk/bitesize/subjects/zfr9wmn • Technologystudent.com • **URL:** https://www.technologystudent.com • 3. HowStuffWorks – Science & Tech • URL: https://www.howstuffworks.com • 4. IET Education (The Institution of Engineering and Technology) • URL: https://education.theiet.org
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Week Number	**Learning Overview / objective** (outlined above)	**What should pupils know, understand and be able to do by the end of the week?** (Use clear Success criteria)
1. Scales of Production	1. Define different scales of production (one-off, batch, mass, continuous) 2. Compare advantages and disadvantages of each 3. Identify appropriate scales for various products 4. Understand cost implications of scaling	Introduce all four scales; relate to real-world examples, Match products to production scales; group discussion on pros and cons, Choose 2 products and identify their production scale with justification
2. Timber Properties	1. Distinguish between hardwoods and softwoods 2. Identify physical and working properties of timber 3. Match timber types to appropriate uses 4. Consider sustainability in timber selection	Timber types, grain, moisture content, durability, sustainability, Choose 2 products and identify their production scale with justification, Create a visual revision sheet of 4 timbers with uses and properties.
3. Collaborative Design	1. Understand the role of teamwork in design 2. Identify roles within a design team (e.g. designer, engineer, maker) 3. Develop communication and idea-sharing techniques 4. Appreciate feedback as part of the design cycle	How designers work in teams and share responsibilities, Small group task: brainstorm and present a design collaboratively, Reflect on the benefits and challenges of working in a group. **Tri-weekly test.**
4. Manufacturing Specification	1. Write a clear and detailed manufacturing specification 2. Identify measurable criteria	What makes a good specification; examples and non-examples, Write a specification for a simple product (e.g. desk tidy),

	3. Link spec points to materials and processes 4. Use specification to guide decision-making	Annotate your own specification with justifications for each point.
5. Quality Control	1. Define quality control (QC) and its importance 2. Identify QC checks in manufacturing 3. Understand tolerances and go/no-go gauges 4. Relate QC to real-world examples	Introduction to QC tools, measuring accuracy, defects, inspection stages, QC card matching activity; use examples from industry, Research one QC method and explain how it improves product reliability.
6. Batch Production	1. Explain the process of batch production 2. Identify when and why batch production is used 3. Understand tooling and setup implications 4. Describe how jigs, templates, and moulds support batch production	Focus on medium-scale production and support tools, QC card matching activity; use examples from industry, Research one QC method and explain how it improves product reliability. **Tri-weekly test.**
7. Batch Assembly	1. Understand how batch assembly lines operate 2. Identify the benefits of dividing tasks 3. Learn about balancing workloads and efficiency 4. Recognise issues such as human error or delays	Assembly lines, time trials, lean manufacturing, teamwork, Simulate a batch assembly task in class; rotate roles, Reflect on how assembly lines improve or reduce efficiency.
8. Evaluate and Refine Principles	1. Use structured methods to evaluate a product 2. Identify strengths and weaknesses in design 3. Suggest realistic improvements 4. Use feedback to refine ideas	Methods of product evaluation (e.g. SWOT, user testing), Evaluate a classmate's design and suggest refinements, Redraw your own design showing refinements and changes made.
9. Designing for Manufacture	1. Understand the relationship between design and production methods 2. Identify how materials and tools impact design 3. Adapt designs for efficient manufacture 4. Minimise waste through design choices	Design constraints, standardisation, tolerances, nesting, Analyse how a product has been designed for ease of manufacture, List three design changes that could make your own idea easier to produce. **Tri-weekly test**
10.	**Assessment**	**End of Unit Assessment** **Accounts for 50% of the overall term mark**

Design and Technology: Y8
Medium term Plan
Spring Term 2

Learning Overview (Contents)	Practical Lesson: Desk Organiser
Assessment Opportunities	Assessment is based on classwork, homework assignments, Tri-weekly tests and end of unit tests. In addition to these students will also be assessed on their practical assignments with a 50/50 ratio in these to reflect the GCSE assessment criteria. • BBC Bitesize – KS3 Design and Technology • URL: https://www.bbc.co.uk/bitesize/subjects/zfr9wmn • Technologystudent.com • **URL:** https://www.technologystudent.com • 3. HowStuffWorks – Science & Tech • URL: https://www.howstuffworks.com • 4. IET Education (The Institution of Engineering and Technology) • URL: https://education.theiet.org
Textbooks Published Lesson Resources	• **Title:** *Collins Key Stage 3 Design and Technology Student Book* • **Title:** *Design & Technology: KS3 Textbook (9-1 GCSE Foundation),* • **Title:** *Smart Skills: Design and Technology – Key Stage 3*

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Week Number	**Learning Overview / objective** (outlined above)	**What should pupils know, understand and be able to do by the end of the week?** (Use clear Success criteria)
1. Product Analysis	1. Identify the purpose and features of existing desk organisers 2. Evaluate materials and construction methods 3. Use ACCESS FM for analysis 4. Record findings visually and in writing	Analyse a variety of desk organiser examples (real or digital)
2. Reverse Engineering	1. Disassemble or inspect a product 2. Understand how parts are joined and shaped 3. Sketch and label components 4. Suggest improvements or changes	Hands-on analysis of a product to see how it's made
3. Initial Designs	1. Create 2–3 design ideas 2. Use isometric sketching 3. Annotate designs with materials and features 4. Reflect on how designs meet the user need	Drawing and annotation techniques; creativity and variety
4. Design Development (SketchUp)	1. Use SketchUp to build a 3D model 2. Apply correct dimensions 3. Create grouped components 4. Begin developing the chosen idea digitally	SketchUp skills: drawing, push/pull, measuring, grouping
5. Final Design	1. Finalise the 3D model with details	Finalising and refining digital models; exporting drawings

Using SketchUp	2. Ensure parts align correctly 3. Export 2D views or sections 4. Evaluate the 3D model against the brief	
6. Draw Components (2D Design)	1. Draw accurate 2D components 2. Use CAD tools (TechSoft or equivalent) 3. Apply line colours and layer settings for cutting 4. Prepare files for laser cutting	Create 2D cutting profiles for components
7. Laser Cutting – Part 1	1. Set up files for laser cutting 2. Understand machine safety 3. Cut or engrave components 4. Manage materials and minimise waste	Laser cutter introduction; loading materials and files
8. Laser Cutting – Part 2	1. Continue cutting all required parts 2. Check accuracy and fit 3. Organise parts for assembly 4. Reflect on precision and potential errors	Continue cutting; supervise for accuracy
9. Assembly of Components	1. Dry fit parts for accuracy 2. Use adhesives or fixings correctly 3. Clamp and hold joints 4. Ensure stability and alignment	Gluing, fixing, and assembling techniques
10. Sanding & Surface Prep	1. Prepare surfaces using correct tools 2. Sand safely and effectively 3. Remove burn marks or rough edges 4. Test fit all parts before final finishing	Demonstrate sanding blocks, files, wet/dry paper, Sand organiser ready for finishing and decoration, Create a finishing plan (colour, style, materials)
11. Display Project in Reception	1. Prepare product for display 2. Create a short product label or display card 3. Set up presentation neatly and securely 4. Take pride in quality and finish	Final cleanup and public display set-up, Clean and present organiser; create info card for reception, Take photo for portfolio; reflect on whole project journy
12	Present project	Label and display projects in the main reception of the school

Assessment Rubric – Desk Tidy Project (KS3, Levels 9–1)

Level	Design & Planning	Measuring & Marking Out	Tool Use & Safety	Accuracy & Dexterity	Finishing Techniques	Assembly & Functionality
9–8	Highly creative and detailed design; clear link to user needs and specification; excellent CAD or sketch work.	All measurements are highly precise. Tools and templates used expertly. Excellent layout and consistency.	Independent, confident, and safe tool use. Demonstrates leadership in workshop safety.	Exceptional control and fine motor skills. Perfect fitting joints/parts. No visible defects.	Flawless surface preparation and application. Paint/varnish is even, refined, and professional.	Fully functional, stable, and visually balanced. High-quality build and presentation.

7–6	Design shows good creativity and addresses the brief. Clear planning and use of CAD or annotated sketches.	Mostly accurate with only minor measurement or marking errors. Good attention to detail.	Good use of hand tools with safe practice and minimal supervision.	Careful workmanship. Minor flaws in fit or shape, but work is neat and controlled.	Finish is neat and carefully applied. Some small imperfections but shows care.	Well-assembled and works as intended. Minor alignment or stability issues.
5–4	Design meets the basic brief. Some planning or sketches provided. CAD or 2D layout used with guidance.	Some inconsistencies in measurements or layout. Acceptable but needs improvement.	Tools used correctly with reminders for safety. Needs occasional supervision.	Control developing. Some rough or uneven edges. Parts may not align perfectly.	Finish attempted but uneven or incomplete. Rushed or lacking final detail.	Functional but may not be stable or polished. Assembly shows some flaws.
3–2	Limited design work. Lacks clarity or focus on function/user. Sketches basic or incomplete.	Measurements often inaccurate. Layout lacks order or consistency.	Requires constant supervision. Struggles with safe tool handling.	Lack of control in cutting or joining. Frequent errors or breakages.	Poor or no finishing applied. Surfaces rough or unfinished.	Poorly assembled, not functional or safe. Major stability or alignment issues.
1	No planning or design attempt. No evidence of understanding the task.	No correct measurement or marking. Does not understand basic layout.	Unsafe use of tools. Unable to work independently.	Cannot complete shaping or joining tasks. No usable parts created.	No finish applied. Project left incomplete or in poor condition.	Product not assembled or unusable. Does not meet any design brief elements.

Assessment weighting:

Category	Weight
Design & Planning	15%
Measuring & Marking Out	15%
Tool Use & Safety	20%
Accuracy & Dexterity	20%
Finishing Techniques	15%
Assembly & Functionality	15%

Design and Technology: Y8
Medium term Plan
Summer term 1

Learning Overview (Contents)	Theory: **Design Process, Materials, and Evaluation**

Assessment Opportunities	Assessment is based on classwork, homework assignments, Tri-weekly tests and end of unit tests. In addition to these students will also be assessed on their practical assignments with a 50/50 ratio in these to reflect the GCSE assessment criteria. • BBC Bitesize – KS3 Design and Technology • URL: https://www.bbc.co.uk/bitesize/subjects/zfr9wmn • Technologystudent.com • **URL:** https://www.technologystudent.com • 3. HowStuffWorks – Science & Tech • URL: https://www.howstuffworks.com • 4. IET Education (The Institution of Engineering and Technology) • URL: https://education.theiet.org
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Week Number	Learning Overview / objective (outlined above)	What should pupils know, understand and be able to do by the end of the week? (Use clear Success criteria)
1. Systems in Design	1. Define systems in D&T. 2. Identify input, process, output. 3. Apply systems thinking to products. 4. Analyse a product using a systems diagram.	Introduce Systems Thinking using real-life examples (e.g., kettle, hand dryer).- Explain Input → Process → Output model using diagrams and animation.- Highlight how designers use systems thinking when solving problems.- Use a whiteboard demo or interactive digital system map.
2. Systems in Technology	1. Understand mechanical/electrical systems. 2. Identify control systems. 3. Compare open- vs closed-loop. 4. Create a system map.	- Explain how mechanical and electrical systems interact (e.g., automatic doors).- Teach control systems (manual vs automatic).- Introduce open-loop vs closed-loop systems with video clips.- Reinforce prior learning from Lesson 1.
3. Programming	1. Understand logic (loops, conditionals). 2. Write simple code. 3. Debug simple code. 4. Explain physical system control.	- Explain basic programming structures: inputs, conditionals (`if`), loops (`while`, `for`).- Use block-based coding (e.g., Scratch, Micro:bit, TinkerCAD).- Show live coding demos with clear explanations.- Discuss how programs interact with physical outputs (e.g., LEDs, buzzers, motors). **Tri-weekly test**
4. Bionic Animals	1. Define biomimicry. 2. Identify examples. 3. Explain influence of nature. 4. Evaluate pros and cons.	- Introduce biomimicry with short video and examples (e.g., sharkskin swimsuits, Velcro).- Link to natural movement, efficiency, and structure.- Present design case studies (e.g., kingfisher-inspired bullet train).- Discuss benefits of copying nature and ethical issues.
5. Pet Technology	1. Describe existing products. 2. Explain sensors and systems. 3. Design a concept. 4. Discuss ethical issues.	- Explore current pet tech (GPS collars, treat dispensers, behaviour trackers).- Explain how sensors collect data and activate responses.- Discuss how user needs and animal welfare affect design.- Introduce basic design specification writing.
6. Servo Motor	1. Define a servo motor. 2. Identify applications. 3. Connect and test one. 4. Compare with other motors.	- Show what a servo motor is using physical or virtual demo.- Explain how servo motors differ from DC/stepper motors.- Teach pulse-width modulation (PWM) basics for movement control.- Demonstrate basic servo setup using Micro:bit or Arduino.

		Tri-Weekly Test
9.	**Assessment**	**End of Unit Assessment** **Accounts for 50% of the term mark**

Assessment Rubric

Level	SketchUp CAD Skills	Layout & Spatial Planning	Aesthetics & Style Application	Scale & Dimension Accuracy	Planner 5D Virtual Model	Design Justification & Evaluation
9	Demonstrates exceptional proficiency with advanced tools (e.g., groups, components, layers); model is clean, logical, and precise.	Layout is highly functional and ergonomic; excellent use of zones (cook, prep, store) with logical appliance placement.	Style is consistently and professionally applied; materials, colours, and textures strongly reflect a chosen theme.	All elements precisely scaled; measurements reflect real-world accuracy. Plans are annotated with full understanding.	3D model is fully realised with lighting, materials, and rendered views. Renders are industry quality.	Justification is insightful, critical, and clearly linked to user needs. Evaluation shows deep reflection and design thinking.
8	Uses a wide range of SketchUp tools effectively and independently; modelling is neat and accurate.	Layout is very functional and shows clear understanding of kitchen workflow. Excellent placement of key items.	Strong application of a chosen design style with clear visual consistency.	Work is accurately scaled and shows attention to realistic sizes. Small errors are minor.	3D model is detailed, with good use of space, light, and materials. Walkthrough or renders are strong.	Justification is clear and reasoned; evaluation identifies key strengths and areas for improvement.
7	Competently uses key SketchUp tools (e.g., Push/Pull, Move, Paint); few errors in execution.	Layout is functional and shows good consideration of user movement and space.	Style is mostly consistent and visually appropriate. Some creative choices.	Most measurements are correct; attempts at real-world accuracy are clear.	Final 3D model includes appropriate fixtures and materials. Some rendering or 3D features used.	Explanation of choices is relevant and supported with reasoning. Evaluation includes some critique.
6	Uses SketchUp tools with growing confidence; minor support needed. Basic structure created accurately.	Layout has functional intent but may lack ergonomic refinement or logical flow.	Elements of style are used, though inconsistently. Visual direction is apparent.	Includes dimensions that show awareness of scale, but with notable inaccuracies.	Model has core structure and furnishings; use of Planner 5D is evident but basic.	Provides basic reasoning for decisions. Evaluation may be brief or descriptive.
5	Uses basic SketchUp functions with support. Simple	Layout is recognisable but lacks clear functionality or thought about movement.	Some aesthetic choices present but style is	Some evidence of measurement but not to scale. Needs	3D model is basic or incomplete; limited detail added.	Reasoning is general or vague. Evaluation lacks depth.

	kitchen created.		unclear or mixed.	support with dimensioning.		
4	Limited SketchUp use; significant support needed to build model.	Layout is underdeveloped or confused. Appliance placement is unrealistic.	Very little attention to style or design consistency.	Scale is incorrect or missing. Little understanding of proportion.	Model is unfinished or lacks recognisable features.	Minimal or unclear reasoning. Evaluation is brief or incomplete.
3	Struggles to use SketchUp; little meaningful work produced.	Layout lacks function and coherence.	No evident application of style or theme.	No evidence of scale or dimensioning.	3D model not completed or started.	No evaluation or justification present.
2	Unable to use CAD tools independently; off-task or incomplete.	No layout understanding demonstrated.	No design intent shown.	Unable to use measurements or scale.	No digital modelling attempted.	No written reflection or rationale.
1	No engagement or attempt at project tasks.	–	–	–	–	–

Design and Technology: Y8
Medium term Plan
Summer term 2

Learning Overview (Contents)	Practical Project: Kitchen Design
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Week Number	Learning Overview / objective (outlined above)	What should pupils know, understand and be able to do by the end of the week? (Use clear Success criteria)
1. SketchUp Revisit	1. Recall SketchUp tools and workspace.2. Use 3D tools to create basic kitchen shapes.3. Apply accurate dimensions.4. Import and place furniture components.	Recap interface and toolset (Push/Pull, Orbit, Offset, Tape Measure).- Live demo: Create kitchen shell with correct wall sizes.- Explain dimensions and real-world scale in SketchUp.- Show how to import items from 3D Warehouse (sinks, ovens, units).- Scaffold with checklist or starting template.- Differentiate by complexity of layout tasks.
2. Product Analysis & Initial Design	1. Compare existing kitchen layouts.2. Understand the "work triangle" and user ergonomics.3. Begin rough kitchen layout sketch.4. Justify key layout decisions.	Teach different layouts: L-shape, U-shape, galley, island.- Use images or virtual tours of real kitchens.- Explain the "work triangle" and space zoning (prep, cook, store).- Model annotating a sketch for layout reasoning.- Use guided questions: "Why is the fridge here?", "What if the sink was on the island?"
3. Scaling	1. Understand and apply scale in planning.2. Use correct room and unit measurements.3. Convert real dimensions into SketchUp.4. Finalise digital kitchen layout.	Explain scale types (1:20, 1:50, 1:100) and real-world relevance.- Demo: Convert a 4m x 3m kitchen into SketchUp using Tape Measure tool.- Measure real objects in classroom for scale awareness.- Reinforce accuracy and spatial awareness.- Provide measuring guides for lower-ability students.
4. Functionality & Aesthetics	1. Identify functional kitchen needs.2. Select materials for surfaces/furniture.3. Apply textures and colours in SketchUp.4. Balance looks and usability.	Show examples of materials (laminate vs granite, tile vs wood).- Discuss user needs: family use, space-saving, safety.- Teach how to use SketchUp Paint Bucket tool.- Show mood board examples (digital or print).- Promote design decisions based on use case (e.g., slip-resistant floors).
5. Design Style	1. Recognise different kitchen design styles.2. Apply a consistent theme.3. Refine layout and decoration.4. Communicate your concept clearly.	Introduce styles: modern, rustic, minimalist, industrial, traditional.- Use a visual presentation to compare styles (colour, materials, shapes).- Model updating a SketchUp model to match a selected style.- Discuss how to keep aesthetic consistency.- Scaffold with style choice template.
6. 3D Virtual Modelling with Planner 5D	1. Replicate layout in Planner 5D.2. Customise lighting, furniture, and textures.3. Create rendered views and walkthroughs.4. Present final design with evaluation.	Introduce Planner 5D and its user interface.- Demonstrate importing room dimensions and adding components.- Show how to adjust camera angles, lighting, and render quality.- Explain how 3D rendering is used in industry (e.g., interior design, client pitches).- Promote peer feedback and critique.
	Label Product	**Students display their work in the main reception of the school**