Subject: **Design & Technology** **Year** **9** **Ability** **Mixed**

	6 Weeks	*8 Weeks*	*7 Weeks*
Topic	The importance of primary and secondary research.	Creating and developing unique designs using the creative process.	Understanding Health and Safety through the creation of practical outcomes – Lamp project
Topic overview **Pupils will learn…**	How to analyse a range of primary and secondary research sources effectively to inform the creative process. How to create a design brief and specification using analysis from previous research work that will directly inform the design process going forward. About the importance of design and how it can influence consumer choice. (Package design).	How designers have an obligation to contribute to improving the societies we live in. How designs are influenced by client needs and external constraints. How prototyping and modelling can benefit the development of a product before it is made. How developed sketches can be turned into high quality professional working drawings using CAD packages.	How to develop technical & practical skills further in order to produce high quality outcomes to a tolerance. How to implement CAD/CAM into the final outcome to create a product finished to a professional standard How to apply a range of finishes accurately to a professional standard. How to work to a tolerance and how this might dictate the quality of a product.
Components	Students will be able to demonstrate and apply knowledge and understanding of designing and making principles in relation to the following areas: Investigation, primary and secondary data Environmental, social and economic challenge The work of others Students will be able to differentiate the differences between hardwoods, softwoods and man-made timbers. Students will understand that surface treatments and finishes are applied for functional and aesthetic purposes. Students will select and use specialist tools, equipment, techniques and processes. *(Building upon skills & knowledge from Y7/Y8)* Students to write their own design specification based on the design criteria given. *(Building upon skills & knowledge from Y8)*	Students will be able to demonstrate and apply knowledge and understanding of designing and making principles in relation to the following areas: Design strategies Communication of design ideas Prototype development How to develop & communicate working drawings based on a client's individual needs and wants. Students will be able to evaluate against the specification and identify ways of improving designs so improvements can be made. (*Built upon the basics from Y8 & Y9).* Students to further explore CAD by experimenting with a range of design solutions based around a given specification. Students will be able to create initial prototype concept models to identify weaknesses/flaws and improve the design. Students will produce their own manufacturing specification and cutting list in order to work from.	Students will be able to demonstrate and apply knowledge and understanding of designing and making principles in relation to the following areas: Selection of materials and components Tolerances Material management Specialist tools and equipment Specialist techniques and processes Students will select and use specialist tools, equipment, techniques and processes to build a final prototype lamp. *(Building upon skills & knowledge from Y7/Y8/Y9).* Students will use their knowledge of materials from KS3 to create their own design solutions. Students will be encouraged to use high level skills to manufacture a high-quality product. (*Building upon subject knowledge and practical skills from Y7 and 8*). Students will be able to use previous knowledge and new concepts to produce a successful working outcome. (*Building upon subject knowledge and practical skills from Y7*). Students will recap knowledge on working with timber and grasp new knowledge on plastic processes through the manufacture of a laser cut acrylic and vacuum forming HIPS. (*Building upon subject knowledge and practical skills from KS3*).
What pupils should already know (prior learning components)	Students should know and understand that all design and technology activities take place within a range of contexts.	They should also understand how the prototypes they develop must satisfy wants or needs and be fit for their intended use. For example, the home, school, work or leisure.	Students will apply their learned knowledge of working in a workshop to produce suitable practical outcomes.

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	Students be able to write design brief and specifications in order to drive successful design ideas and practical outcomes. Students should be able to consider the work of others and how it could be improved upon.	Student should be able to draw simple 2D and 3D. (*Building upon knowledge from project work in Y7&Y8*) Students should know how to sketch and annotate design ideas in improve communication skills. (Yr7 &Y8)	Students will have further understanding of potential hazards in a workshop through an introduction to new tooling. Students will develop their understanding of how to use specific tooling safely, confidently & independently in order to produce an outcome. (*Building upon knowledge throughout KS3)*
Golden Knowledge	**Golden Knowledge:** Research **Golden Threads** • Context/scenario • Primary and Secondary research • Design brief • Specification	**Golden Knowledge:** Designing and development **Golden Threads** • Annotation • SCAMPER • Card prototyping/modelling. • 2D / 3D drawings (Isometric) • Orthographic drawing	**Golden Knowledge:** Making **Golden Threads** • CAD/CAM • Finishes • Tolerance • Vacuum Forming • Soldering
Transferrable knowledge (skills)	How to analyse a more complex context/scenario (*Building upon knowledge from project work in Y7&Y8*) and extract further key information. How to select and use primary and secondary research to help develop a basis to create a design brief and specification. How to justify opinions based on information that is researched/provided to draw conclusions that will inform future work. How to evaluate research work and identify information that will be of use to the creative process including considerations for the views of intended users.	How to use a range of design strategies such as ACCESS FM and SCAMPER to develop designs and create innovative solutions. How to generate, annotate and communicate high quality 3D design ideas. How to use CAD packages in order to produce high quality working drawings. How to 3D model an idea using physical materials to test a prototype prior to making. How to evaluate and refine their ideas and products against a specification, considering the views of intended users and other interested groups.	How to reduce waste in a workshop environment in terms of sustainability. How to select and use workshop tools in order to produce a high-quality outcome. How to work safely in the workshop to produce a high-quality outcome. How to innovatively use CAM within a design to help create a professional quality to the end product. How to select a wide range of appropriate timber, metal and polymer materials to make an innovative product. How to select specialist techniques and processes to produce a complex and innovative final outcome using a range of materials with accuracy.
Key vocabulary pupil will know and learn	Inform ideas through research, demands and constraints, intentions, specification, ergonomics, packaging, CAD/CAM, Analysis, manufacture, model / prototype, casting, pewter, consumer choice, technology push and market pull.	Initial sketches, concept ideas design brief, aesthetics, functional, cutting mats, modelling foam, craft knife, safety rulers, Techsoft-2D design, google sketch-up.	Plywood, Acrylic, softwood, timber joints, finishes, adhesives, jig, Bradawl, Chisels, tolerance, Tenon Saw, Bench Hook, Pencil, Accuracy, Precision, Lap joint, Hazard, Control Measure, Disc Sander, Softwood, coniferous, deciduous, Manufactured Boards, Medium Density Fibreboard, Risk Assessment, Sustainable. 6 rs, strip heater, thermo plastic, thermosetting plastics, lap joint, finger joint, dowel joint, Soldering iron, PCB (printed circuit board), LED (light Emitting Diode), wood lathe, vacuum former, scroll saw, HIPS (High-Impact Polystyrene)
Assessment activities	Milestone formative assessment – covers all research work as a collective. Verbal feedback used as formative assessment throughout the project. Live marking and purple pen used at regular intervals.	Practical outcome assessed - summative. Verbal feedback used as formative assessment throughout the project. Live marking and purple pen used at regular intervals.	Milestone summative assessment – assessed piece of the final making. Practical outcome assessed. Verbal feedback used as formative assessment throughout the project during the making.
Resources available	Resources for lesson delivery attached to the PPT's – print out prior to the lesson. PowerPoint: PowerPoint: sites/TCADT/Shared Documents/KS3 Design Technology/KS3 Design Technology/Y9 lamp project	Cutting mats, modelling card, craft knife, safety rulers, Techsoft-2D design & Google Sketch-up, rendering markers/pencils. PowerPoint: sites/TCADT/Shared Documents/KS3 Design Technology/KS3 Design Technology/Y9 lamp project	9mm and 12mm Plywood sheets. 6mm dowel, coping saw, tenon saws, try square, marking gauges, PVA glue, strip heater, laser cutter, 3mm Acrylic, HIPS sheets. PowerPoint: sites/TCADT/Shared Documents/KS3 Design Technology/KS3 Design Technology/Y9 lamp project