# Curriculum Plans: Year 9 Design & Technology

| | **Knowledge:** By the end of the unit students will know: | **Skills**: What skills will students have developed by the end of this unit? | **Key terms**: What new key terms and vocabulary will be learnt in this unit? | **Summative Assessment:** How will pupils be assessed in this unit? |
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| **Desk Lamp** Theory & Manufacture | • The structure and function of electronic systems, including the relationship between input, process, and output devices in a circuit.<br>• The purpose and use of resistors, understanding how to calculate their value using the resistor colour code.<br>• The key principles of soldering, including safety precautions, tools required, and how to solder correctly to create a functional circuit.<br>• The stages involved in prototype development, from concept to final product, and the importance of iteration in design.<br>• Material management strategies, including how to plan for efficient use of materials (minimising waste and maximising accuracy).<br>• The benefits of using plywood and MDF in manufacturing the lamp's base and stem, and how to incorporate recycled materials (e.g., pots for the lampshade).<br>• The use of a PCB (Printed Circuit Board) and how to assemble a simple LED light circuit. | **Soldering**: Safe and precise soldering of components onto a PCB to create a functioning LED circuit.<br>**Measuring and marking out**: Accurate use of tools such as rulers, try squares, and protractors to mark out the plywood stem and MDF base.<br>**Cutting and shaping**: Using saws and chisels to cut and shape the materials for the lamp, ensuring smooth and accurate edges.<br>**Material assembly**: Constructing the lamp by assembling the base, stem, and shade, while integrating the electronic components and circuit.<br>**Prototyping**: Creating multiple iterations of the lamp design to refine its functionality and aesthetics.<br>**Evaluating prototypes**: Testing and evaluating the lamp's functionality, circuit reliability, and structural integrity.<br>**Electronics**: Understanding and applying basic electronics, including the construction of a simple LED lighting circuit.<br>**Material management**: Efficient planning to minimise material waste through proper measurement and cutting strategies. | **Electronic systems**: A combination of input, process, and output components that work together to perform a function.<br>**Input/Process/Output devices**: Components in an electronic system that handle input (e.g., switches), processing (e.g., microcontrollers), and output (e.g., LEDs).<br>**Resistors**: Components used to reduce current flow in an electronic circuit, calculated using the resistor colour code.<br>Soldering: The process of joining metal components by melting solder to form electrical connections.<br>**Prototyping**: Creating a model or first version of a product to test its functionality and design.<br>**PCB (Printed Circuit Board):** A board used to support and connect electronic components through conductive tracks.<br>**LED (Light Emitting Diode):** A semiconductor light source used in circuits for energy-efficient lighting.<br>**Material Management**: Planning and organising materials to reduce waste during production. | **Practical Assessment** (Soldering and Circuit Construction): Evaluation of the accuracy and safety of their soldering work, and whether the LED circuit functions as intended.<br>**Material and Design Management**: Assessment of the planning and execution of cutting and shaping tasks, focusing on efficient material use and accurate construction of the lamp.<br>**Prototype Development**: Students will create and iterate on their lamp designs, refining elements such as the stem, base, and lampshade, with a focus on integrating electronics.<br>**Final Product Assessment**: The completed lamp will be assessed on:<br>Joint quality: Accuracy of joints, including cuts and chiselling.<br>**Surface finish**: Quality of sanding and application of finishing techniques.<br>Functionality: Whether the LED circuit functions correctly and is well-integrated into the lamp.<br>**Overall aesthetic**: Visual appeal and creativity of the final design.<br>**Written Evaluation**: Students will submit a detailed evaluation of the project, reflecting on new skills learned, challenges faced, and potential improvements.<br>**Formative assessment**: Ongoing class discussions, peer feedback, and individual reviews during the soldering, design, and construction phases. |
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| **Phone Stand** Design skills & Computer Aided Design (CAD) | • The basics of design briefs and how to interpret them.<br>• How to conduct a short product investigation, looking at existing | **Product investigation**: Analysing existing products for their design, function, and manufacturing techniques.<br>**Design thinking**: Producing creative and diverse design ideas based on different | **Design Brief**: A statement outlining the problem to be solved and the constraints to be considered during the design process. | **Design Portfolio**: Students will produce a portfolio documenting their entire design process, from initial sketches to final CAD drawings and laser-cut prototypes. |

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| | phone stands and identifying key features and design influences.<br>• The different manufacturing processes involved, such as laser cutting, line bending, and vacuum forming, and their applications in product design.<br>• Strategies for avoiding design fixation, including exploring influences like geometric forms, biomimicry, and cultural influences.<br>• The importance of producing a detailed design specification to guide the creation of their product.<br>• How to use CAD software (Techsoft 2D Design) to produce accurate technical drawings for laser cutting.<br>• The principles of prototyping and testing, including the importance of iterative design and testing for functionality and aesthetics.<br>• The importance of evaluation, focusing on both the functionality of the product and how well it meets the design specification. | influences (geometric, biomimicry, cultural).<br>**Cardboard prototyping**: Creating models to test the dimensions and functionality of their design before moving to final production.<br>**CAD skills**: Using Techsoft 2D Design to create accurate, laser-cut-ready technical drawings.<br>**Laser cutting**: Understanding how to set up and operate a laser cutter to produce the acrylic phone stand.<br>**Vacuum forming**: Understanding this process and its applications for creating curved or moulded parts.<br>**Testing and evaluation**: Testing their prototype for fit, stability, and usability, and evaluating how well it meets their design specification.<br>**Manufacturing techniques**: Learning and applying skills such as line bending to shape materials. | Product Investigation: The process of researching existing products to inform new designs.<br>**Laser Cutting**: A manufacturing process that uses a laser to cut precise shapes from materials such as acrylic.<br>**Line Bending**: A process of heating and bending thermoplastics along straight lines to create shapes.<br>**Vacuum Forming**: A manufacturing process that involves heating a sheet of plastic and moulding it over a form using a vacuum.<br>**Design Fixation**: The inability to consider multiple design possibilities, often leading to less creative solutions.<br>**Biomimicry**: Design inspired by patterns and forms found in nature.<br>**Geometric Design**: Designs based on simple geometric shapes and forms. - Cultural Influence: Designs inspired by the art, architecture, and symbols of different cultures.<br>**CAD (Computer-Aided Design**): Software used for creating precise technical drawings.<br>**Prototyping**: Creating a preliminary model of a product to test its function and form.<br>**Specification**: A detailed list of criteria that a design must meet. | **Assessment criteria**: Creativity, diversity of design ideas, adherence to design influences (geometric, biomimicry, cultural), quality of research, and presentation.<br>**CAD Technical Drawings**: Submission of the final technical drawing in Techsoft 2D Design for laser cutting.<br>**Assessment criteria**: Accuracy, completeness, and readiness for laser cutting.<br>**Laser Cut Prototype**: Students will produce a laser-cut acrylic phone stand based on their design.<br>**Assessment criteria**: Accuracy of cutting, assembly of the flat-pack components, and functionality.<br>**Testing and Evaluation**: Students will test their phone stand and write an evaluation on its success and areas for improvement.<br>**Assessment criteria**: How well the product meets the specification, functionality, and the depth of the written evaluation.<br>**Formative assessments**: Ongoing feedback during the design development, CAD drawing, and laser cutting phases to guide improvements. |
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| Food Technology | • A synopsis of KS4 material including sensory evaluation, cake making methods, functions of ingredients in cakes, cereals and their production plus foods around the world.<br>• In sensory evaluation students taste biscuits and use a star profile to ascertain various attributes and properties in response to profiles.<br>• In cake making students will review key elements of functional and chemical properties of ingredients in | **Practical cooking skills**: Continue to develop knife skills, safe equipment use, some new equipment introduced, learn new preparation methods and techniques for cooking various types of food (e.g. meats, bread, pastry, whisked cakes).<br>**Time management**: Organising tasks efficiently in a practical cooking session to ensure a timely finish whilst working in a team collaboratively. | **Skills**: Rubbing in method, baking, shaping, proving, sautéing, preparation of raw chicken, seasoning using herbs and spices, shaping pastry, (standard component) whisking method of cake making, creating a foam, folding and rolling.<br>**Food Safety**: All procedures and practices followed to prevent cross contamination.<br>**Sensory evaluation**: Star profiles, ranking test, hedonic tests, difference test, | **Practical assessment (50% mark):** Students assessed against the following criteria:<br>**Practical preparation**: Accuracy, speed & execution.<br>**Hygiene & safety**: safe knife use, cross contamination avoided, hygienic practices.<br>**Procedure**: Ability to follow practical recipe, work independently and collaboratively when required.<br>**Outcome**: Palatable dish produced. |

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| | different cake making methods with a review from previous years, in addition to year 9 practical lessons.<br>• Food around the world and cereals will introduce new foods and factors affecting food choice, such as economic, climate, cultural, ethical with an introduction to staple foods from all continents. | | sensory attributes, Aroma, taste and texture profiles.<br>**Science**: Cake making methods: Ratios in cake making, rubbing in, whisking method, creaming method and melting method.<br>**Cereals**: Staple cereals and food around the world, primary and secondary production of wheat. | **Post Practical**: Hygienically clean up, in an organised manner working collaboratively.<br>**Written test (50% of mark) 20-minute test that assesses all areas of the year 9 course.** Formative assessment: Self and peer assessments of practical work, online practical preparation learning (homework video) assessed via a quiz. Teacher offering constructive feedback to practical and written work. |