



Design and technology

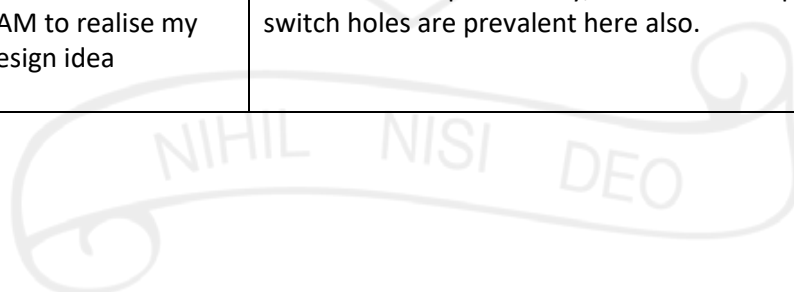


Curriculum Overview Key Stage 3 & 4

The design and technology department endeavours to cover a wide breadth of disciplines within the subject. Year Seven gives students the grounding and relevant underpinning knowledge in the subject, which is progressively built upon throughout year eight and nine through a combination of classroom based activities and practical lessons in the workshop. GCSE follows the OCR syllabus, where the student focusses on the needs of clients and stakeholders. The student follows the iterative design process to design and make a bespoke product. This is tracked using a descriptive and chronological based portfolio.

KEY STAGE 3		
	Topic	Key Themes
YEAR 7	Exploration of DT	Iterative design process, the work others, what makes a good designer? How design ideas are expressed
	Product analysis	Why analyse various products? What can be learnt from existing designs? The use of ACCESSFM in product analysis
	Materials and components	Learning about the physical and mechanical properties of materials. Selecting the correct materials for a desk tidy. The differences between the types of woods, non-ferrous metals and polymers
	Workshop safety	Safe workshop practices, the correct uses of tools and equipment, accuracy in marking out on materials
		How can CAD achieve accuracy? What sort of products use CAD? How does it link in with CAM (Computer Aided

	The use of Computer Aided Design	Manufacture). The use of 2D Design in designing and manufacturing a mini key ring torch.
	Introduction to electronics	The use of electronic components in the mini torch. How do electronics work?
	Topic	Key Themes
YEAR 8	Scaling in theatre set design	How to use scaling in designing and drawing. How to scale a prototype of varying dimensions. How theatre designers use scaling and prototyping to express their ideas.
	Producing traditional and rapid prototypes in design	The use of workshop tools and materials and CAD design to produce scale prototype models with the 3D printer. The use of prototype models to produce a theatre set design.
	Systems and controls in a theatre set design	An exploration of systems and controls in electronics. How the use of internal circuits can signal the use of lighting in a theatre set design.
	Aerodynamics and biomimicry in design	How is Biomimicry factored into the design of a racing car and other manmade objects? How does lift, drag and thrust affect the performance of a racing car?
	Engineering in racing	Using the appropriate workshop tools and equipment to manufacture the CO2 Drag Racer. How accuracy in design and manufacture is achieved through the use of precision instruments and Go-No-Go Gauges.
	Testing a prototype and evaluating performance	Testing the finished CO2 drag racer on the track and evaluating performance against time. An evaluation of the original design against the performance and how the student iterates and improves the design and engineering element. The student calculates their speed and uses this to form part of their evaluation and next steps.
	Topic	Key Themes
YEAR 9	Primary and secondary research	Analysis of existing mood lights. Establishing a suitable client or stakeholder group for making my Illumination project. Exploration of the work of others and different design movements such as Art Deco, de Stijl, the work of Tiffany and Co.
	Using graphics to express my design ideas	Learning how to express ideas like a true graphic designer. The student will draw in one- and two-point perspective, label and annotate their drawings and use shading and rendering to bring their ideas to life. Orthographic Drawings will accurately express their design to work from.
	The use of CAD and CAM to realise my design idea	Students use 2D design to accurately draw out the panels of their mood lamp. Accuracy, tolerances and placement of switch holes are prevalent here also.



		Assembly in the workshop of the students mood lamp, including the soldering of the LED circuit and selection of a suitable and appropriate finish.
	Global population issues and sustainability	Using indicative data, students investigate the issues of climate change, energy generation and overpopulation and how it will affect society in the future. Students also use secondary research to investigate existing floating cities and what makes them float.
	The use of modelling for architectural purposes	Students use drafting drawing methods to create a scale block plan of their floating city concept. They learn about the uses of jigs, templates and tessellation to be able to plan and mark out their city prototype. The students city is constructed like that of a real architectural model.
	Testing my floating city	Using a water tank and weights, the students test their finished city for buoyancy and stability in water, including forces of surge, sway, yaw, roll and heave .

KEY STAGE 4		
Examination Specification:		
	Topic	Key Themes
YEAR 10	Design Considerations	How to explore the design context and factors affecting the design process Usability Exploring Existing Designs New and Emerging Technologies Sources of Energy Wider Influences on Designing and Making Viability of Design Solutions
	Communication of design ideas	Graphic Techniques 1 Graphic Techniques 2 Approaches to design
	Material Consideration	Properties of Materials Factors Influencing Material Selection Paper and Board Timber Metals Polymers Textiles New Developments in Materials Standard Components

At this point, the students will be designing and making their controlled focussed project

	Technical Understanding	Finishing Materials Structural Integrity Motions and Levers Mechanical Devices Electronic Systems Programmable Components
	Manufacturing processes and techniques	Modelling Processes Wastage Additive Manufacturing Processes Deforming and Reforming Ensuring Accuracy Digital design tools Scales of Manufacture Large Scale Processes
	Non Exam Assessment Preparation – Identify requirements	Release of a choice of three Iterative Design Challenges, where the student chooses one and demonstrates sufficient primary and secondary research into the chosen context. The student also identifies a suitable client for their product.
	Topic	Key Themes
YEAR 11	Non Exam Assessment - Design thinking and communication	Review the definitions of Needs and Want Communication of design ideas and first concept sketches Review of ideas by stakeholders Design development with the use of SCAMPER activities
	Non Exam Assessment - Design thinking and communication	3D Prototyping, using a selection paper, foam, card, CAM Models should be highlighted with ergonomic and anthropometric considerations with stakeholder feedback Final design idea will be generated and
	Non Exam Assessment – Technical Understanding and Manufacturing Processes and Techniques	Students will have resolved key issues and have clearly selected their materials, components and manufacturing processes clearly Students will be working independently, adhering to health and safety, accuracy and displaying quality control throughout
	Non Exam Assessment - Viability of Design Solutions	The student undertakes feasibility tests of their product, prior to commencing with non-destructive testing A presentation of their product to their client and stakeholder group will record any feedback recorded The students displays Iteration by reflecting on their feasibility and referring back to successes and failures. Using the original design brief, the student lists any improvements and express these in a series of sketches, visuals or CAD rendering.
	Revision resources	Seneca Learning Online BBC Bitesize

		OCR Revision Guides
	Written Exam	Two hour paper on Principles of Design and Technology

Extracurricular and Enrichment opportunities

- Model aeronautics club
- Engineering bridge building club
- Visiting guest speakers
- STEM opportunities at Didcot Railway Centre

