# DT/Engineering Curriculum Overview

Our KS3 curriculum is designed to reflect the curriculum structure if pupils choose to continue with our subjects in KS4, where they would complete an exam-based theory Unit, along with 2 portfolio-based Units, covering Design & manufacture skills. We have emulated this with a Unit structure for each year at KS3, allowing pupils to become more familiar with the demands of exam preparation & portfolio building, progressively building on their knowledge & skills each year. We aim for pupils to enter the KS4 cycle with confidence in their ability to produce high quality projects and a good knowledge base to build on with more technical topics.

| **Year 9** | **Students will study either Block 1 or 2 for half the year and then swap to the other block** | | | | | |
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| Year 9 continues to build on the basic knowledge, mixing previous material with more practice in applying their learning. We aim to focus pupils more on evaluative thinking in their approach to their skill development in design & manufacture projects, aiming to encourage pupils to self-review, identifying & addressing areas for further development in their learning so that they can complete more challenging and rewarding projects. Theory knowledge such as materials, properties, design principles, etc. more closely reflect the demands of the KS4 curriculum. | **Practical : Picture Frame Project:**<br>• Corner halving joints/mitred halving joints<br>• Practising sawing with the grain<br>• Marking & cutting tenons<br>• Drilling for a dowel<br>• Shaping for decoration<br>• Making the base: mark out & chop mortices<br>• Using a coping saw, belt sander & spindle sander | Cutting, beading & assembling the frame to contain the acrylic base & rear board<br>Final assembly of the frame, finishing: paint, varnish, stain<br>**Practical Assessment:** | **Materials:** recapping on woods & metals, types qualities & properties, uses sourcing & environmental issues<br>**Materials: Plastics** Uses, sources & sustainability<br>**Composite Materials:** eg, carbon fibre, GRP & Kevlar composites & smart materials<br>**Material Properties:** Correct selection for purpose<br>• | **Engineering Maths Lesson:**<br>• Calculation of area & volume<br>**Basics of Electronics:**<br>• Voltage current resistance<br>**Engineering, Drawing & Sketching:**<br>• Producing technical drawing<br>• Annotation & key vocabular<br>• Ortho graphic, isometric/oblique projection<br>• The impact of CAD<br>**Sustainability & Design:**<br>• Features of sustainable design<br>**Written Assessment** | **Design unit:**<br>• Understanding design briefs & design specifications<br>**Analysis of initial ideas:**<br>• Annotating & evaluating design ideas<br>**Design evaluation & development:**<br>• Decide on final design<br>**Development of final design concept:** Produce a poster to showcase the design solution chosen including materials, parts etc. | **Design Realisation & Prototyping:** Produce a prototype of the chosen design<br>**Evaluate the final design** |
| **Year 10** | | | | | | |
| The course content will be divided between theory and practical lessons aimed at building upon learning from KS3 DT and developing students' skills in processing materials using relevant tooling techniques and the use of manned and CNC machinery and advancing their understanding of the engineered world and industrial considerations | • Developments: Structural, mechanical and electronic engineering. Engineers involved in the UK and international. Key outputs, applications, technologies and materials.<br>• Effects: In the home, industry and society.<br>• Environmental issues: uses, disposal, recycling, materials | • Tests: Destructive and Non-destructive.<br>• Materials: ferrous, non-ferrous, thermoplastics, thermosetting, smart and composites.<br>• Processes: Marking out, cutting, finishing, preparing, shaping, drilling and turning.<br>• Applications: for material removal, | • Mathematical techniques: Ohms law, efficiency, areas and volumes.<br>• Mathematical techniques: Measuring, estimation, mean and units of measurement<br>. | • Convert: Section views, construction lines, centre lines, hidden detail and standard conventions.<br>• Analyse: Filter Information, Synthesise information, identify salient points & Identify requirements.<br>• Propose solutions: Communication & logical structure. | • Interpret: symbols, conventions, information, calculations, sketches, drawings and design specifications.<br>• Properties: Tensile strength, hardness, toughness, malleability, ductility, conductivity, corrosive, resistance, environmental | • Engineering information: Data charts, data sheets, job sheets, specifications and tolerances. |

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| relevant to this. The course will be largely delivered alternating between full theory and practical lessons, allowing pupils to engage in the use of processing techniques and interact with materials to support and consolidate learning from theory aspects of the course | development, processes, costs, transportation, sustainability. | shaping and manipulation, joining and assembly and heat and chemical treatment. | | | degradation and elasticity. | |
| **Year 11** | | | | | | |
| In their second year students will now be applying principles of engineering design and manufacture, investigation of engineered products, planning recording and evaluating production of their own artefacts, including considerations for material choice based on specifications and limitations including important criteria such as sustainability issues along with the importance of best practice and safety procedures. This will form the basis of two NEA units. | • Sequence: Priortise activities, which is needed before something else can be done, within design parameters, consideration of resources available and contingencies<br>• Tools: Hand tools, lathe tools, turning tools, portable tools. H&S: Awareness and application of safe working practices<br>• Equipment: Centre lathe, drilling machine, milling machine, portable power tools, mustimeters, UV PCB light box and PCB tank | • Materials: Metals and non-metals. Engineering processes: Marking out, cutting, finishing, preparing, shaping, drilling, turning, brazing, joining, filing and soldering.<br>• Evaluate: Inspection techniques, against success criteria and against engineering information | • Features: Of component parts, electrical components, mechanical components, and properties of component materials.<br>• Requirements: Aesthetic, environment, user/client, cost, safety, ergonomics, size, limits and sustainability.<br>• Function: How components interrelate. | • Draw: 3rd angle orthographic projection, isometric, dimensions, conventions, hidden detail and scale.<br>• Communicate: using meaning, appropriate language, logical structure, presentation, clarity, appropriate terminology, audiences and CAD.<br>• Evaluate: constraints, design requirements, fit for purpose, best fit, operating performance and reliability. | • Design specifications: clear communication, demands/wishes, using prepared templates and using set criteria | |