



Design, Technology & Engineering

Curriculum Intent

Key Stage 3

Year 7	Year 8	Year 9
<p>Setting a baseline of expectation of achievement from key stage 2.</p> <p>Build key skills of tools, equipment, processes and health and Safety.</p> <p>Understand the design process. Be able to work and have knowledge of a range of materials.</p> <p>Produce a maze with accuracy. Students will learn basic workshop tools, machines and joining techniques as well as CAD and use of the laser cutter.</p> <p>Produce a working mono speaker circuit and incorporate this into a casing using creative skills and technical ability.</p>	<p>Students have had a broad introduction to Design, Technology and Engineering.</p> <p>The intention now is to build on their subject knowledge of materials and manufacturing processes and allow students more independence in their design and eventual outcomes using prior knowledge and skills in CAD/CAM to produce a commercially viable lamp.</p> <p>Students analyse and evaluate their progress in more detail to inform appropriate changes and modifications in their practice that could be used in their progression to year 9.</p>	<p>Students now understand the use of CAD and how it can apply to a project. They use their knowledge of tools, processes and equipment with some skill and precision to produce a wooden game of their choice.</p> <p>The students will learn further CAD processes that they can incorporate in their work. The students need to assess their work against a specification, (linking with requirements at GCSE and GCE).</p> <p>To aid potential progression into Engineering the students work on a small set of mechanisms, problems and tasks to aid their understanding.</p>

Key Stage 4

Year 10

AQA GCSE Engineering

During the first term the students improve their knowledge of a range of Engineering skills and practical processes using materials and techniques learnt during key stage 3.

They also begin to produce more complex technical drawings and evaluate/assess the processes.

The students then progress onto electronics. These are more complex circuits than those produced in year 7 and 8 but use the skills gained in soldering. They learn how to read a circuit schematic and use breadboards to reproduce them with components.

The students also learn to program some of the circuits that use the skills gained in Key stage 3 during computing lessons. (The language is very similar to 'Scratch').

The course progresses into building different mechanical, pneumatic and structural systems similar to those learnt during KS3 Physics and DT lessons.

During the final half term the students will begin their NEA (the context sent by the examination board) with the aim of completing the first section for their first term back in year 11.

Year 11

Students complete the first research section of their NEA which then progresses to the design development and prototyping section during their first term.

They then plan and work on their practical piece for the NEA.

The practical aspect of the project incorporates mechanical and electronic parts.

Through modelling and testing they build a final working prototype showing understanding of its workings and the systems used. This will then be tested against the original specification and expectation.

The students use knowledge gained through key stage 3 and year 10 activities to produce this piece. They will also spend time learning the theory knowledge required through practice examination questions and activities.

The knowledge gained in the NEA and theory of materials and manufacturing will give the students a good grounding if they progress to A level.

A Level

Year 12

AQA Design and Technology

Building on knowledge and skills gained at KS3 and KS4 (for students from AHS, outside applicants checking prior attainment). Students build on their skills and knowledge base. There are high expectations of quality and detail early on in the course.

Working from the AQA examination board specification students carry out a range of research tasks and activities that is

Year 13

Year 13, the focus is predominantly on the NEA allowing students to produce a body of work that is context lead working closely with a client. The purpose of this is to demonstrate their understanding of both theory and manufacturing process evidenced as a practical outcome/working prototype. This will also enable the students to build a portfolio of work that they could use during interviews at a university.

In addition students are given practice exam style questions and preparation for the written

<p>reinforced through practical tasks and small focused projects.</p> <p>Students are prepared for the examination format through regular practice of exam questions that are then reviewed for understanding to ensure they are confident with the contents.</p> <p>During the final half term the students will begin their NEA (the context chosen by themselves) with the aim of completing the first section for their first term back in year 13.</p>	<p>paper and review and revise theory content. This theory knowledge delves deeper into the materials and manufacturing methods used in industry and develops more of a working knowledge of the processes including CAD/CAM and automation.</p>
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Curriculum Implementation

Key Stage 3

Year 7	Year 8	Year 9
<p>Students are taught the correct Health and Safety techniques for the workshop. They gradually develop confidence with the materials and equipment. They currently produce an MP3 speaker/ docking station and a wooden framed maze game.</p> <p>The teachers follow a detailed SoW on a shared google drive which ensures that groups are taught the same materials throughout the project</p>	<p>The students build on the knowledge gained during year 7 and the focus this year is design and structures. They first work in teams to produce structures which are tested using different rigs. This follows onto a lamp project.</p> <p>The teachers follow a detailed SoW on a shared google drive which ensures that groups are taught the same materials throughout the project</p>	<p>At this point in Key Stage 3 the students are more confident in the workshop and are able to improve and enhance their designs using a range of techniques including 3D and Sublimation printing, vinyl and Laser cutting. They design a wooden game of their choosing and also improve their Graphical abilities and basic mechanics by producing mechanisms using card and other materials.</p> <p>The teachers follow a detailed SoW on a shared google drive which ensures that groups are taught the same materials throughout the project</p>

Key Stage 4: GCSE (AQA)

Year 10	Year 11
AQA GCSE Engineering	Students focus on their NEA piece during this

<p>During this year the students are set a number of Designing and practical tasks to improve their confidence and abilities. They will further develop their theoretical knowledge of materials and processes to aid in their NEA piece in Year 11.</p> <p>Practical assessment of skills focusing on accuracy, technique and quality of completion.</p> <p>Engineering drawing by hand and using CAD.</p> <p>Electronics programming, circuit building and reading schematics.</p> <p>Understanding mechanisms, pneumatics and structures.</p>	<p>year. The AQA examination board sent the context for this at the beginning of June prior to the students starting Year 11.</p> <p>Non Examined Assessment (NEA) worth 40% of the final grade</p> <p>The NEA work is broken down into marked sections for the required 20 A3 pages.</p> <p>The practical engineered piece is completed in February</p> <p>Revision for summer examination</p>
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Key Stage 5: A Level (AQA)

Year 12	Year 13
<p>Design creation and development</p> <p>Modelling throughout a variety of material areas development of a design solution</p> <p>Materials, Components and Application</p> <p>Production of practical pieces</p> <p>Design and Market Influences</p> <p>Processes and Manufacture Revision for examination</p>	<p>Selection of Project for Non Examined Assessment (NEA)</p> <p>Development of design ideas through modelling</p> <p>Design and Market Influence</p> <p>Production and evaluation of final product</p> <p>Processes and Manufacture</p> <p>Revision for examination</p>

Impact

Key Stage 3

Students in year 7 are given health and safety advice on tools, materials and machines used. This is based on, hopefully, prior knowledge but we have found it best to re implement to each group as machines, tools and materials are used. Students in year 7 are charged for the material costs for the projects produced during Key stage 3. This helps to ensure the department can pay for not only the necessary materials but the renewed equipment required. This has already had a very big impact ensuring that we have whole class amounts of some of the tools required by each student. Year 7, 8 and 9 produce exciting and original results to the projects each year.

Key Stage 4

GCSE Engineering has been a popular subject with good group numbers. The move to engineering has allowed teaching staff to use a wider range of tools and equipment compared to the GCSE 3D products specification. The specification is taught primarily at GCSE by one member of staff. The subject continues to increase in popularity. The teaching and practical materials change each year to experiment with new technologies and equipment. This is based on how things work with

group sizes and availability of equipment and machines required. The students have achieved some excellent results since the specification started.

Key Stage 5

The content has worked well between the two teachers ensuring that the students gain the knowledge of the specification. Materials are shared with the students and tutorials work really well with the individuals to ensure they continue to progress. New techniques for manufacturing are taught during this period that they would not have during key stage 3 or 4 which enable more complicated and creative design work. Students have often chosen a context for their NEA which is linked to their desired course at university. Many of the past students have gone onto Engineering and Design courses at university.