Striving for Excellence

Curriculum Overview: Ks3 - Design Technology & Engineering

Exam Board:

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
7	3d Drawing ○ Vanishing point ○ Perspective lettering ○ 3D shapes ○ Isometric drawings ○ Rendering & adding colour	3d Modelling ○ Nets ○ Modelling techniques ○ Card templates and shapes ○ Basic construction ○ Gluing and Assembly	Bug Box ○ Design brief ○ Research & design ○ Mood boards ○ Design Specification ○ Marking accurately ○ Practical cutting	Bug Box ○ Quality checks ○ Belt sanding ○ Gluing & assembly ○ Summative assessment ○ Photography ○ Evaluation	Metal Sculpture ○ Engineering careers ○ Project introduction ○ Design sheets ○ Metals & their uses ○ Metal alloys ○ Practical – marking out	Metal Sculpture ○ Steel & stainless-steel uses ○ Gold uses ○ Practical – filing metal ○ Brazing ○ Product Photography ○ Evaluation
8	Cable Wrap ○ Analysing a design problem ○ Design to a theme ○ Product research ○ Design sheet & layout ○ Creating prototypes ○ Final design & annotation	Portable Utensil ○ Problem research ○ Initial creative design ideas ○ Card prototypes ○ Peer Feedback and Evaluation ○ Product development ○ Iterative design	Desk Tidy ○ What's the problem? ○ Research & mind map ○ Categories of wood ○ Design sheets ○ Practical part 1 (back) ○ Practical part 2 (body)	Desk Tidy ○ Assembly of product – base) ○ Quality checking ○ Tool diary ○ Product Photography ○ Evaluation	Keyring ○ Marking out & tools ○ Tolerance ○ Metals & their uses ○ Measuring accurately ○ Pillar drill ○ Metal lathe	Keyring ○ Milling machine uses ○ CNC machining ○ Summative assessment ○ Photography ○ Evaluation
9	Natural Forms ○ Define nature & research ○ Research – Ernst Haeckel ○ Geometric & organic patterns ○ Pattern design creation ○ Experimenting with design ○ CAD final design & makin	Stop The Bus ○ Design analysis ○ Developing ideas and solutions ○ Scale Modelling ○ Modelling in different materials	Mood Light ○ Understanding a specification ○ Soldering techniques ○ Developing design ○ Innovation v invention ○ Intro to vacuum forming ○ Creating wooden mould	Mood Light ○ Materials – MDF & HIPS ○ Using texture in design ○ Create vacuum formed shell ○ Assembling circuit & switch ○ Product Photography ○ Evaluation	Mobile Holder ○ Accuracy & tolerance ○ Marking out & tapping ○ Cutting metal & brazing ○ Grinding & polishing ○ Understanding manufacturing ○ Lathe & milling machine	Tap Wrench ○ Engineering drawings ○ Plan of making ○ Threading holes ○ Product Photography ○ Evaluation
10						
11						

Implementation is driven through our 4 TLPs: Sequencing, Scaffolding & Modelling, Questioning, Reviewing Material and Stages of Practice

Curriculum Intent

- We believe that all learners deserve a broad and balanced curriculum that involves learners developing their practical skills and substantive knowledge through Key stage 3 and into their options at Key stage 4.
- The Technology curriculum has been developed to give learners access to a series of Design and Technology based subjects, providing meaningful links with career pathways, further education, and enrichment opportunities.
- From year 7 to 9, learners are exposed to a series of practical activities that focus on the key areas of Design and Technology, 3d Design and Engineering – These projects are mapped to introduce traditional hand making skills, digital technology, model making and design iteration. Importantly it also supports learners to nurture an innovative approach to the world around them.
- The full design cycle is explored ensuring that our leaners can research, generate ideas, and communicate these effectively. From here clear planning can be demonstrated and finally practical skills are taught to bring ideas to reality.
- A full range of materials are taught, and the practical skills encompass a range of hand tools and machines that bring together the skills and knowledge required to be successful in DT, Engineering and 3D Design. From laser cut wooden artefacts, through to metal lathe and milling work, the curriculum is designed to bring a broad range of skills and knowledge to our leaners.
- The curriculum map is both progressive and flexible to allow the inclusion of developing technologies and ideas. It is underpinned with the need to provide engaging projects, links to external vocational based concepts and the need to provide our young people with the necessary skills to equip them for the current employment opportunities locally and nationally.
- The Technology curriculum has areas for progress, stretch and challenge, resilience tasks as well as a strong link towards learners with SEND
- Learners will leave with an outstanding knowledge and understanding of their chosen vocational discipline. They will also have a clear understanding of the limitless possibilities a qualification in a Technology based subject would lead to.

Curriculum Implementation

- Learners will enjoy a wide range of activities that require learners to utilise their practical ability as well as their ability to retain required knowledge and understanding of each subject. Learners will work and collaborate on extra-curricular activities with industry professionals, to not only develop expert knowledge and understanding but to gain an insight into how skills learners develop can transfer over to a professional setting. They will also develop cultural capital that will help remove barriers to achievement in school, future learning, and the world of work.
- Produce work which can act as a live portfolio to advertise their developing skills to prospective employers in the future. They will also allow learners to articulate and express their ideas, views, and opinions about a wide range of topics clearly, confidently, and respectfully
- Teachers will help develop character, including resilience, confidence, and independence, so that they contribute positively to the life of the school, their local community, and the wider environment.
- Design and Technology staff use explicit and implicit vocabulary instruction, such as using the Frayer model and Glossaries for learners to develop their understanding of words.
- Teachers will use 20% adaptation of the SMART curriculum developed by the CTL, to differentiate and personalise the lessons for learner progression.
- All schemes of work regardless of level or specialism will show clear and transparent progression, be purposefully sequenced and regularly revisit skills to promote a persistent change in long term memory.
- Throughout lessons, teachers use cold-calling strategies to assess the learning and to stretch learners understanding. Through intellectual preparatory work, teachers may pre-plan the questions to probe responses to texts.
- Following the Design and Technology department feedback policy, teachers give regular feedback to learners against key assessment objectives through strategies such as ‘demonstrate and connect’, WWW and EBI and verbal feedback during the lesson. Learners respond to this feedback to make incremental improvements to their work, identified in green pen (Green for Growth).
- Through regular tracking and monitoring, teachers can identify learners who may need intervention through assessments such as NGRT in KS3 and mock exams in KS4. Through monitoring and follow ups, we make sure that learners have the appropriate amount of support, which requires a regular liaison with class teachers, SENCO, parents/guardians and learning managers to identify what might help each pupil make the next steps in their learning

Impact

- Based on feedback from students Design Technology as a subject has been re-introduced at GCSE KS4 for the first time in several years. Numbers of learners selecting this in Yr 9 as an option remains positive with a group in both Yr10 and Yr11 planned for next academic year

- Engineering is offered to align with the local job market where Manufacturing is listed within the top 3 largest industry and employers. Engineering for manufacture continues to be a popular qualification with the following:
  - 2021 = 25 learners
  - 2022 = 55 learners
  - 2023 = 49 learners
  - 2024 = 57 learners (predicted)

- Close links with Dudley College sees a high percentage of learners going on to further education within technology and engineering locally

- KS3 and KS4 assessments show improved breadth & depth of learning. The feedback cycle now supports the development of knowledge and skills for future careers

- The curriculum is fluid, and the success of projects is assessed regularly by the teaching team to ensure relevance and fit to skills required by employers

- Recent visits and talks by Alstom Engineering, Thomas Dudley, Wolverhampton Grammar School, SciSports showcase, Doocey civil engineering apprentices, Dudley Collge and Wolverhampton University.

- A group of yr10 learners are 18 months into a project working to build a full size, working airplane as part of the STEM Highfliers project. Developing engineering and STEM skills as well as teamwork and transferable skills.

- Extra curriculum enrichment clubs are well attended with additional projects and topics being added this academic year to develop engagement and wider links to the curriculum.

Striving for Excellence

Curriculum Overview: KS4 - Design Technology

Exam Board: OCR

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
7						
8						
9						
10	Introduction to Course ○ Introduction to materials classifications and properties key terms. ○ Development of skills in sketching, modelling and making functional prototypes – hidden storage project.	Material and Modelling ○ Introduction of a wide variety of materials examples and their specific properties, and applications. ○ Development of modelling and CAD skills in ergonomic chair project,	Material and Modelling ○ Development of knowledge of materials groups including paper and boards, timbers, polymers, and metals, ○ Developed making/modelling skills in tablet stand project.	Iterative design ○ Understanding materials stock forms, original sources and conversion processes. ○ Development of modelling skills against inclusive design challenge.	CAD CAM ○ Skills and knowledge of communicating design ideas; isometric and orthographic. ○ CAM skills development tasks.	Scales of Manufacture ○ Knowledge of scales of manufacture and mass production techniques. ○ Introduction and start of the NEA element of the course,
11	Polymer Manufacture ○ Development of knowledge of mass production methods specific to polymers. ○ NEA research completion and ideas generation section.	Design Development ○ In depth knowledge section of exam preparation surrounding polymers. ○ Design development section of NEA work.	Final Idea Production ○ Exam practice and revision activities. ○ Final idea manufacturing and evaluation section of NEA work.	Revision and Submission ○ Exam practice and revision activities. ○ Completion and internal submission of NEA element of work.	Exam Preparation ○ Final examination and NEA submission.	

In

Stages of Practice

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Striving for Excellence

Curriculum Overview: Engineering Manufacture

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7						
8						
9						
10	Intro to GCSE Engineering ○ Intro to specification ○ Reading engineering drawings ○ Risk assessment in the workshop ○ Practical engineering drawing ○ Intro to coursework R015	Intro to GCSE Engineering ○ Label engineering drawing ○ Engineering materials (categories, properties & testing) ○ Marking out on materials ○ Plan of making	Materials & Properties ○ Manufacturing processes (wasting) ○ Turning & milling ○ Marking out ○ Photography ○ Developing CWR015	Materials & Properties ○ Manufacturing processes (finishing, joining) ○ Drilling, bending & threading ○ Assembly ○ Photographs ○ Hand in R015	Processes ○ Manufacturing processes (shaping, injection moulding, casting) ○ 3 x skills tests ○ Final touches and rework off R015 if required	Processes ○ Manufacturing processes (forming, pressing, forging) ○ 3 x skills tests ○ Mock exam revision ○ Mock exam
11	Manufacturing ○ Scale of manufacture ○ Robotic, automation, CNC ○ CAD software ○ 2D Design on shape ○ Introduction to R016 ○ Making templates	Programming ○ Quality control ○ CAD & Programming ○ Post processing ○ G Code ○ Standard Operating Procedures	Globalisation ○ Inventory management ○ Lean manufacturing ○ Operating laser cutter using CNC ○ Evidence of CAD photos ○ Evidence of making photos	Globalisation ○ Globalising ○ Digital technology ○ Using templates (accuracy & tolerance) ○ Quality control photos ○ R016 - hand in coursework	Exam Prep & Exam ○ Final exam revision ○ Final touches and rework of R016 if required	- ○ NA

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