Design and Technology - Resistant Materials & Land-Based Studies at Elemore Hall School

Rationale

Design and Technology is an exciting, valuable and practical subject. At Elemore Hall School it is a compulsory subject which encourages pupils to learn to think creatively, to solve problems and communicate effectively, both as individuals and as members of a team. Pupils gain experiences of a range of materials and processes and an appreciation of how products are manufactured in an industrial context.

Knowledge, skills and techniques developed through Design and Technology are invaluable in our ever-changing technological world, ensuring that our young people are equipped for the next life stages, gaining a heightened awareness of practical know-how they can utilise in their own lives.

INTENT

Pupils are encouraged to use their creativity and imagination to design and create products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. Concepts covered throughout the curriculum are: Health and Safety, Design for Sustainability, Environmental and Ethical Awareness, Computer Aided Design (CAD), Computer Aided Manufacture (CAM) Materials and their properties and New and Emerging Technologies. See Curriculum Map for breadth of study.

In Key Stage 4, pupils are offered Level 1 BTEC Land Based Studies.

Curriculum Map

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
7	- Intro to RM - Assessment - Health & Safety - Machine safety - Vacuum forming CAD/CAM	- Intro: Laser cutter & *Inkscape* - Fidget spinners - Christmas artefacts - Theoretical skills - Sustainability	- Wooden car CAD/CAM - Materials properties - Smart materials - Theoretical skills - Bird House (basic)	- Technical skills - Measuring / Cutting - Wooden artefacts - Theoretical skills - DMA Project	- Technical skills - Wooden container CAD/CAM - Grounds work - Theoretical skills	- Technical skills - Assessment - Acrylic artefact - DMA project - Grounds work
8	- Health & safety - Wooden container - Machine safety - New & emerging technologies / Smart materials - Halloween artefacts	- Lasercut acrylic artefacts - Christmas artefacts CAD/CAM - Theoretical skills - Advanced technology / robotics	- Wooden racing cars - Research skills - Technical skills - Bird box - Theoretical skills - New technology & design	- Wood work skills - Environmental issues - ICT skills / *Inkscape* software - Theoretical skills - 'How it's made' / mass production	- Children's toy - Design & make project - Extension work - Theoretical skills - Grounds work	- Lasercut designs - Finishing skills - DMA extension work - Assessment - Theoretical skills - Grounds work
9	- Health & safety - Machine safety CAD/CAM - Environmental issues - Theoretical skills	- Materials & their properties - Christmas artefacts - Finishing skills - Theoretical skills - DMA project	- Polymers / fossil fuels - Lasercut wooden racing car - Research skills - Theoretical skills - 3D design	- *Inkscape* software design - Acrylic lasercut / artefacts - Environmental issues - Evaluate products - Theoretical skills - Bird box	- Acrylic artefacts - Sublimation printing - DMA extension - Theoretical work - CAD/CAM sticker design - 3D design (advanced)	- Design & make project - Research skills - Technical skills - Grounds work - Assessment
	Land-Based Studies - BTEC Portfolio					

10	- Health and safety **BTEC portfolio intro** - Environmental issues - New & emerging technologies	- Polymers & uses - Design for sustainability - Robotics & the future of design	- Maintenance skills - Environmental issues - Polymers & impact on the planet - Fossil fuels	- Tools & equipment - Maintenance skills - Sustainability	- Sustainability / environmental issues - Grounds work / Real life skills - Upcycling - Machine safety	- Woodwork skills - Machine skills - Upcycling - Technical skills - 3D design
11	**Land-Based Studies - BTEC Portfolio**					
	- CAD/CAM - Technical skills - Design for sustainability recap - Workshop tools	- Workshop tools - Product design - Research skills	- Growing plants - Manufacturing - Product design	- Growing plants	- Completion	

IMPLEMENTATION

Design and Technology allows pupils to combine theoretic, academic and practical knowledge and skills, using a variety of media, resources and processes. As pupils move through school, they revisit concepts and key knowledge with increasing levels of depth. They are encouraged to use technology and media to engage in topic research. Pupils are expected to use key vocabulary in discussions and to develop and refine practical skills.

Taking into consideration individual needs and abilities, pupils work individually, in pairs and in groups to achieve required outcomes. In order to promote robust learning and practical capability, a variety of learning styles (such as: visual, auditory, reading, writing and kinaesthetic), as well as various teaching strategies (such as: direct instruction, collaborative learning, situated learning and self-directed learning) are employed. Pupils have opportunities to do written tasks, take part in discussions, carry out practical activities and enjoy experiences, including:

- short tasks, which may involve specific learning objectives
- long tasks, which may cover a range of learning
- fast thinking activities - to introduce group work or as a stimulus for certain concepts, including the use of active learning strategies such as, simulation and discussion
- research tasks - to extend learning or to focus on particular knowledge
- investigations - to find out a principle or consolidate knowledge
- class assignment, in the form of activities, which structure the learning of a set of skills or knowledge and may be designed to focus learning
- demonstration - to indicate good working practices when showing specific know-how, procedures and processes.
- skills practice - to reinforce learning and to develop manipulative skills
- factual tasks - to impart knowledge and information
- resource based tasks – to enable independent structured learning through a variety of resources or as a way of introducing or researching skills, possibly involving audio visual or I.T. resources
- visiting timber yards and parts manufacturing/stocking units to gain insights into industrial practices
- focused practical activities in which specific skills and knowledge are targeted and used as a foundation which can inform a more open activity where pupils have more influence over the origin and direction of their projects, having a greater responsibility for their work

- oral activities – where pupils are expected to show sound communication skills and encouraged to present outcomes of their work through display and verbal reporting to their peers
- design and make tasks which will foster independent thinking and technical skills

Concepts are constantly reinforced across all class groups in both Key Stages with the ultimate aim being that pupils can utilise their knowledge and technical skills to use tools and equipment safely and productively throughout their lives.
The Key Stage 3 curriculum is heavily biased toward the practical element of the subject, with health and safety being at the core of everything. Pupils have the opportunity to use a wide range of tools and equipment in order to develop their practical and technological skills, in preparation for Key Stage 4 and the BTEC qualification.

The subject has strong links to other areas of the curriculum, such as Mathematics, Science, ICT and Art, Craft & Design.

Reading Development in RM

Keywords are fundamental to the subject and displayed in both classrooms. Keywords reflect levels and pupils are expected to read and understand them. Pupils read during lessons and reading is used extensively in researching products, materials, equipment and machinery.

Additional/Adapted Support & Stretch/Extend/Challenge

More able pupils are encouraged to evaluate and improve work/products.

Enrichment

Pupils have opportunities to visit recycling plants and tool & material warehouses, as well as conduct in project based work that is linked with charities. For land-based studies, year 10 and 11 pupils do beekeeping to complement the ‘small animal husbandry’ topic.

Links with evening activities

Pupils are involved in looking after the school building, like helping to decorate the basements. This links in with the land-based studies ‘estate management’ topic.

Steps and Assessment

Each project is evaluated by both pupils and teachers – during as well as upon completion. Feedback is given. Steps are updated regularly on Classroom Monitor.

IMPACT

Pupils will develop key skills and knowledge that will give them the tools to be prepared for the next stage in their education or working life. Along with the opportunity to gain qualifications, they will have acquired knowledge, skills and understanding of:

- Environmental issues and social responsibility
- Technical and practical skills
- Economic and moral value judgements
- Communication
- Working with others

- Problem solving
- Numeracy
- Use of ICT (computer aided design and manufacture)
- Industrial practices
- An appreciation of Health and Safety
- Improving their own learning

Accreditation

BTEC Level 1 (Land-based Studies)