

# CoDA Curriculum

Design + Innovation

(AQA Design and Technology)



CITY OF DERBY  
ACADEMY

*Improving the life chances of all students*

### Design + Innovation

The Key Stage 3 Design + Innovation curriculum combines the KS3 National curriculum for Design and technology with the KS3 National curriculum for Computing.

For the first 13 weeks of Year 7 learners complete an Introduction to D+I unit, where they experience different subject areas within the faculty. After this they commence a regular carousel rotation program until the end of Year 8, where they do units of work in: Food and Cookery (lunchtime and world foods); Fashion and Textiles (cultural influences: Mexico and Japan); Design and Technology: Material Properties (polymers and metals); Design and Technology: Systems and Devices (mechanisms and electronics); and Information and Computer Technology (e-Safety, computing basics, and Programming).

In Year 9, learners have the opportunity to study a curriculum designed to join the skills and knowledge developed in Years 7 and 8 to those needed for subjects which may be taken in Year 10. The Year 9 units of work are: Food and Cookery (food for life); Fashion and Textiles (clothing and accessories); Design and Technology: Materials (timbers); Computer-Aided Design (Fusion360); and Creative iMedia (visual identity and digital graphics).

The Key Stage 4 Design + Innovation curriculum intends to give learners the skills and knowledge needed to make progress onto the next step following their secondary education, and currently includes qualifications in: Business; Construction; Creative iMedia; Design and Technology; Engineering Manufacture; Fashion and Textiles; and Food and Cookery.

### Design and Technology Curriculum Intent

In Design and Technology we aim to deliver a curriculum that will give the students the skills and knowledge to:

- Investigate new and emerging technologies including CAD/CAM
- Know a range of different materials, their categories, sources and uses
- Know a range of different strategies and approaches to designing
- Assess the ecological, social and moral footprint of products and industry
- Be able to consistently and effectively apply health and safety skills and knowledge when creating a product
- Apply knowledge and principles to the design process (Researching, designing, making and evaluating)

At Key Stage 4 students will follow the specifications:

<b>SUBJECT TITLE AQA Design and Technology will encourage and enable students to:</b>	
<ul style="list-style-type: none"> <li>• demonstrate their understanding that all design and technological activity takes place within contexts that influence the outcomes of design practice</li> <li>• develop realistic design proposals as a result of the exploration of design opportunities and users' needs, wants and values</li> <li>• use imagination, experimentation and combine ideas when designing</li> <li>• develop the skills to critique and refine their own ideas whilst designing and making</li> <li>• communicate their design ideas and decisions using different media and techniques, as appropriate for different audiences at key points in their designing</li> <li>• develop decision making skills, including the planning and organisation of time and resources when managing their own project work</li> <li>• develop a broad knowledge of materials, components and technologies and practical skills to develop high quality, imaginative and functional prototypes</li> <li>• be ambitious and open to explore and take design risks in order to stretch the development of design proposals, avoiding clichéd or stereotypical responses</li> <li>• consider the costs, commercial viability and marketing of products</li> <li>• demonstrate safe working practices in design and technology</li> <li>• use key design and technology terminology including those related to: designing, innovation and communication; materials and technologies; making, manufacture and production; critiquing, values and ethics.</li> </ul>	
<b>Students will be taught and assessed on their ability to:</b>	
<b>AO1</b>	Identify, investigate and outline design possibilities to address needs and wants.
<b>AO2</b>	Design and make prototypes that are fit for purpose.
<b>AO3</b>	Analyse and evaluate: <ul style="list-style-type: none"> <li>• design decisions and outcomes, including for prototypes made by themselves and others.</li> <li>• wider issues in design and technology.</li> </ul>
<b>AO4</b>	Demonstrate and apply knowledge and understanding of: <ul style="list-style-type: none"> <li>• technical principles.</li> <li>• designing and making principles.</li> </ul>

# Year 10

Topic	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
End Points (Knowledge and Skills)	<b>Unit 1 New Technologies:</b> <ul style="list-style-type: none"> <li>Industry and enterprise</li> <li>Sustainability and the environment</li> <li>People, culture and society</li> <li>Production techniques and systems</li> <li>Informing design decisions</li> </ul> <b>Practical</b> – New and emerging technology research project. Investigate recent technologies and where they are used and how successful they are.	<b>Unit 3 Materials</b> Define, categorise and describe the primary sources of materials for producing: Papers & Boards <ul style="list-style-type: none"> <li>Timbers</li> <li>Metals and alloys</li> <li>Polymers</li> <li>Textiles</li> </ul> <b>Practical</b> - Box Project. Marking out, cutting and making a simple box using different types of joints.  <b>Unit 4 Common Specialist Tech Principles including:</b> <ul style="list-style-type: none"> <li>Forces &amp; Stresses</li> <li>Improving functionality</li> <li>Ecological &amp; social footprint</li> <li>The 6 R's</li> <li>Scales of production</li> </ul>	<b>Unit 2 Energy, Materials, Systems and Devices:</b> <ul style="list-style-type: none"> <li>Energy generation</li> <li>Energy storage</li> <li>Modern materials</li> <li>Smart materials</li> <li>Composite materials and technical textiles</li> <li>Systems approach to designing</li> <li>Electronic systems processing</li> <li>Mechanical devices</li> </ul> <b>Practical</b> – Mechanical and electrical systems research project. Investigate an internal combustion engine making links to its electrical and mechanical systems.	<b>Unit 5B Timber:</b> <ul style="list-style-type: none"> <li>Sources and origins</li> <li>Working with timbers</li> <li>Commercial manufacturing</li> </ul> None Exam Assessment (NEA) mock practice to familiarise pupils with NEA process  <b>Practical</b> – Phone holder project to consider lamination and surface finishing techniques.	<b>Unit 6 Designing Principles:</b> <ul style="list-style-type: none"> <li>Investigation of primary &amp; secondary data</li> <li>The work of others</li> <li>Design strategies               <ul style="list-style-type: none"> <li>Communication of design ideas</li> </ul> </li> </ul> <b>Practical</b> – Drawing and designing skills are examined. Isometric, perspective and orthographic projection with some styrofoam modelling.	<b>Unit 7 Making Principles including:</b> <ul style="list-style-type: none"> <li>Selection of materials and components</li> <li>Tolerances</li> <li>Material management</li> <li>Tools, equipment, techniques and finishes</li> <li>Surface treatments and finishes</li> <li>None Exam Assessment (NEA) mock practice to familiarise pupils with NEA process</li> <li>Around June 1st: Pupils are given the NEA contextual challenges and work on section A.</li> </ul>
What is assessed	Unit 1 - End of unit assessment /34	Unit 3 - End of unit assessment /34 Unit 4 – End of unit assessment /30	Unit 2 – End of unit assessment /48	Unit 5B - End of unit assessment /40	Unit 6 – End of unit assessment /41	Unit 7 – End of unit assessment /28 NEA Section A /10
Key Vocabulary	Life cycle assessment Just in time production Flexible manufacturing systems Computer Aided Design Computer Aided Manufacture Finite Non-finite Technology Push Market Pull Planned Obsolescence	GSM Microns Softwood Coniferous Hardwood Deciduous Manufactured Board Natural Fabric Synthetic Fibre Thermoset Thermoplastic Ferrous	Renewable Non-renewable Pneumatics Hydraulics Modern Material Smart Material Composite Material GRP/CRP Open loop Closed loop Analogue Digital	Conversion Rough sawn PAR Seasoning Air dry Kiln dry FSC Lamination Planar Concealed hinge Modesty block CAM lock fitting	Primary research Secondary research Ergonomics Anthropometrics User centered design Iterative design Collaboration Isometric drawing Orthographic Projection Styrofoam Annotation	Aesthetics Availability Precision Allowance Tessellation Datum Point Jigs Template Pattern PPE Tools Techniques

		Non-ferrous Alloy Origin Properties  Static load Dynamic load Tension Compression Torsion Bending Shearing Reinforcing Carbon Footprint Deforestation Mining Product miles Sustainable 6 R's One-off production Batch production Mass production Continuous production	Linear Rotary Reciprocating Oscillating First class lever Second class lever Third class lever Effort Load Fulcrum Reverse motion Parallel motion Crank and slider Bell Crank Eccentric CAM Pear CAM Heart CAM Snail CAM	Connecting block Mitre joint Housing joint Mortise and Tenon joint CNC Tolerances Tanalising		Processes Risk assessment Treatment Application VOC  Client Profile Questionnaire Design Strategy
Literacy Skills Developed (Writing/Oracy/Tier 2)	Writing – Exam style questions (1-8 Markers) and research project.  key words are provided every theory lesson. Opportunities taken for oracy when appropriate.	Writing – Exam style questions (1-8 Markers).  key words are provided every theory lesson. Opportunities taken for oracy when appropriate.	Writing – Exam style questions (1-8 Markers) and research project.  key words are provided every theory lesson. Opportunities taken for oracy when appropriate.	Writing – Exam style questions (1-8 Markers).  key words are provided every theory lesson. Opportunities taken for oracy when appropriate.	Writing – Exam style questions (1-8 Markers).  key words are provided every theory lesson. Opportunities taken for oracy when appropriate.	Writing – Exam style questions (1-8 Markers) and NEA section A.  key words are provided every theory lesson. Opportunities taken for oracy when appropriate.
Career Links (Employability Skills, Career Opportunities)	CAM Programmer Software engineer Robotics engineer	Metallurgist Materials engineer Research and Development scientist  Urban Planner Stress Analyst Structural engineer	Control systems engineer Systems engineer Mechanical engineer	Carpenter Cabinet Maker Arborist	Graphic Designer Product Designer Architect	Craftsperson Model Maker Artisan
SMSC Links	Ability to be reflective on the impact of disabilities, elderly and religious group.  Sense of enjoyment and fascination in new and emerging technologies, automation and robotics.	Understanding of consequences of resource consumption and sustainability.  Interest in investigating and offering reasoned views about ethical factors of ecological and social footprint.	Sense of enjoyment and fascination in smart, modern and composite materials.	Understanding of consequences of health and safety of wood working tools and machines.	Willingness to participate in and respond positively to the work of other designers.	Willingness to reflect critically on students own designs and prototypes.

# Year 11

Topic	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
End Points (Knowledge and Skills)	<b>NEA based on relevant contextual challenge:</b> <ul style="list-style-type: none"> <li>Power point folder work (20 – 30 sheets)</li> <li>Computer aided design solutions</li> <li>Hand drawn design ideas</li> <li>Practical modelling</li> <li>Practical prototype solution to contextual challenge</li> </ul>			<b>Exam Preparation</b> <ul style="list-style-type: none"> <li>Discussions of previous units to complete any missing knowledge (driven by pupils RAG rating of each delivered unit)</li> <li>Practice of exam style questions</li> <li>Mock exam practice using previous exam papers</li> </ul>		
What is assessed	Students are given generic feedback to revise and redraft work before submitting the final piece for assessment. NEA is internally assessed and externally moderated. 100 marks, 50% of GCSE  Section B, C, D, E and F marked throughout this time period.			Externally assessed written exam: 2 hours, 100 marks, 50% of GCSE  Made up of: Section A – Core technical principles (20 marks). Section B – Specialist technical principles (30 marks). Section C – Designing and making principles (50 marks).		
Key Vocabulary	Annotations Evaluation Development Iterative Design Working Drawing	Manufacturing Specification Computer Aided Design Prototype Modelling	Modifications Design Problem Context	Revisit of Year 10 keywords based on Mock results (QLA)	Revisit of Year 10 keywords based on Mock results (QLA)	
Literacy Skills Developed (Writing/Oracy/Tier 2)	Writing – Evaluative and Descriptive for NEA Section B and C.  Opportunities taken for oracy when appropriate.	Writing – Evaluative and Descriptive for NEA Section D and E.  Opportunities taken for oracy when appropriate.	Writing – Evaluative for section F.  Opportunities taken for oracy when appropriate.	Writing – Exam style questions (1-8 Markers).  key words are provided every theory lesson. Opportunities taken for oracy when appropriate.	Writing – Exam style questions (1-8 Markers).  key words are provided every theory lesson. Opportunities taken for oracy when appropriate.	
Career Links (Employability Skills, Career Opportunities)	Graphic Designer Product Designer Architect Craftsperson Model Maker Artisan  Communication. Creativity. Independence. Resilience.					
SMSC Links	Willingness to participate in and respond positively to the work of other designers. Use of imagination and creativity in designing their own products. Understanding of the consequences of their behaviours and actions in a workshop environment. Willingness to reflect on the NEA project and suggest modifications/improvements.					