CoDA Curriculum

(Design + Innovation)

Key Stage 3

City of Derby Academy

Improving the life chances of all students

Design + Innovation

The Key Stage 3 Design + Innovation curriculum uses the KS3 National curriculum for Design and technology.

- Food and Cookery (lunchtime and world foods) – learners will acquire a range of food and nutrition-related knowledge through a range of exercise. Alongside this, learners will develop their practical skills by hygienically creating a range of food products following the principles of food safety.
- Fashion and Textiles (cultural influences: Mexico and Japan) – learners will design and make two fabric pieces: a pencil-case pouch, taking inspiration from the Day of the Dead festival; and a wall-hanging fabric art piece, taking inspiration from Japanese life.
- Design and Technology: Material Properties (polymers and metals) – learners will: develop knowledge of polymers and metals, and of polymer and metal manufacturing methods; complete design processes to manufacture a series of products, including a pewter-cast key-ring and a moulded plastic wall clock.
- Design and Technology: Systems and Devices (mechanisms and electronics) – learners will: develop knowledge of types of motion, forces, levers, linkages and cams; develop knowledge of electronic components; assemble and test a working electronic circuit; use CAD/CAM to design and produce a product casing.
- Graphic Products – learners will develop knowledge and skills of: design presentation – cross-hatching, rendering & typography, Formal Elements of Art & Design, including: Line, Shape, Colour, Pattern, Texture, Space, Tone, Value & Form, Product Designing for target audiences and consumers.

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) – learners will build on the knowledge already acquired to explore how food is needed for a healthy lifestyle. Alongside this, learners will further develop their practical skills by hygienically creating a range of challenging food products following the principles of food safety.
- Fashion and Textiles (clothing and accessories) – learners will design a capsule fashion collection for a global brand. In addition, they will customise a plain white t-shirt using resist-dyeing, and will design and make a personalised/monogrammed calico tote bag, developing skills of surface decoration and machine sewing.
- Design and Technology: Materials (timbers) – learners will: develop knowledge of timber-based products and timber manufacturing methods; use iterative design principles to develop and manufacture functioning products.
- Business – learners will develop a knowledge of enterprise, leading them into the various aspects of how a business develops and continues to grow including the dynamic nature of business and how it survives.
- Computer-Aided Design (Fusion360) – learners will use tutorials to complete increasingly complex 3D models using CAD and prepare a design for CAM (3D printing).

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: ICT, Business; Construction; Engineering Design; Engineering Manufacture; Fashion and Textiles; and Food and Cookery.

At Key Stage 3 students will follow the national curriculum:

Design and technology programme of study: key stage 3.

When designing and making, pupils should be taught to:

Design

- use research and exploration, such as the study of different cultures, to identify and understand user needs
- identify and solve their own design problems and understand how to reformulate problems given to them
- develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations
- use a variety of approaches, to generate creative ideas and avoid stereotypical responses
- develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools

Make

- select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture
- select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties

Evaluate

- analyse the work of past and present professionals and others to develop and broaden their understanding
- investigate new and emerging technologies
- test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups
- understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists

Technical knowledge

- understand and use the properties of materials and the performance of structural elements to achieve functioning solutions
- understand how more advanced mechanical systems used in their products enable changes in movement and force
- understand how more advanced electrical and electronic systems can be powered and used in their products
- apply computing and use electronics to embed intelligence in products that respond to inputs, and control outputs, using programmable components.

Cooking and nutrition – Pupils should be taught to:

- understand and apply the principles of nutrition and health
- cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet
- become competent in a range of cooking techniques
- understand the source, seasonality and characteristics of a broad range of ingredients.

Year 7

Topic	Design + Technology: Polymers	Design + Technology: Mechanisms	Fashion + Textiles	Food + Cookery	Graphic Products
End Points (Knowledge & Skills)	Health & safety. Properties of polymers. Categories of polymers. Manufacturing methods. Design brief. Communicate ideas. Annotated drawings. Manufacture products. Use different tools. Equipment & machinery. Evaluation of products.	Health & safety. Categories of motions. Categories of levers. Examples of levers. Calculation of equilibrium. Types of linkages. Types of CAMs.	Use a sewing machine. Mexican culture. Tie-dye fabric. Fibres & fabrics. Design sugar skulls. Make fabric pouch. Surface decoration. Hand-embroidery.	Health & safety rules. Food preparation skills. Evaluate products. Healthy diet principles. Bacteria & food safety. Taste testing. Designing food products.	Graphic Design and Presentation skills: Cross-hatching Rendering Typography Formal Elements: Line, Colour, Pattern, Texture Product Designing: Book Jacket Blu-ray Disc Music CD/LP Cereal Packaging
What is assessed	Generate ideas. Communicate ideas. Manufacture ideas. Evaluate ideas.	Practical skills. Presentation skills. Knowledge retention.	Practical skills. Designing. Making skills.	Knowledge. Practical skills. Designing.	Generate ideas Presentation Skills Graphics Knowledge
Key Vocabulary	Thermoplastic Thermoset Design Brief Specification HIPS Vacuum Forming Manufacture Pillar Drill Coping Saw Evaluation	Linear + Rotary Reciprocating Oscillating Fulcrum Effort + Load Reverse motion Parallel motion Crank and slider Bell crank Pear CAM Circle CAM Snail CAM Heart shaped CAM	Fabric Tie-dye Fibres Natural Man-made Synthetic + Regenerated Needle + Thread Scissors + Pins Stitching + Sewing Cotton + Wool Linen + Silk Polyester + Acrylic	Eatwell Guide Taste Texture Appearance Aroma Nutrients Cross contamination Simmering Grill Bacteria Bind Glaze Creaming Independence	Cross-hatching Typography Word-Art Pattern + Texture Colour + Line Shape + Form Shape Rendering Illustration Graphic Layout + Space Tone + Value Diagram + Net
Literacy Skills Developed (Writing/Oracy/Tier 2)	Literacy skills developed through quality teaching & the embedding of high expectations regarding the presentation of books. Key words are provided during theory lesson. Opportunities taken for oracy when appropriate.				

Career Links (Employability Skills, Career Opportunities)	Product designer. D&T Teacher. Carpenter. Jewellery maker. Materials engineer. Communication. Creativity. Independence. Resilience.	Graphic Designer Digital Artist Typesetter Copywriter Product Designer Communication. Creativity. Independence. Resilience.	Textile artist. Sewing machinist. Pattern cutter. Fashion designer. Craft-maker. Communication. Creativity. Independence. Resilience.	Chef. Caterer. Nutritionist. Food scientist. Food inspector. Communication. Creativity. Independence. Resilience.	Graphic Designer Product Designer Copywriter Artist Signewriter 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 participate in and respond positively to the work of other designers. Use of imagination and creativity in designing their own products.	Sustainability and environmental impact of textiles fibres and fabrics. Creativity is encouraged to produce design work Learners are encouraged to explore cultural references and their own interests to inspire their design work. Their practical work is customised to suit their own tastes to create unique personalised products.	Learners study social and moral beliefs around foods (organic, free range etc). Learners are taught about the Health and safety specific to the food curriculum to keep themselves and others healthy and safe. Learners study other cultures' foods in the 'world foods' unit and are encouraged to share their own cultural food experiences.	Creativity is encouraged to produce design work Learners are encouraged to explore cultural references and their own interests to inspire their design work.

Year 8

Topic	Design + Technology: Material Properties	Design + Technology: Systems + Devices	Fashion + Textiles	Food + Cookery
End Points (Knowledge & Skills)	Health & safety. Properties of polymers. Properties of metals. Categories of polymers. Categories of metals. Manufacturing methods. Design brief. Design specification. Product analysis. Communicate ideas. Annotated drawings. Create & use a template. Manufacture products. Use different tools. Equipment & machinery. Evaluation of products.	Health & safety. Use of soldering irons. Types of different components. Resistor colour codes. Quality Assurance. Use CAD/CAM. Categories of motions. Categories of leavers. Types of CAMs. Types of linkages.	Use a sewing machine. Mexican culture. Tie-dye fabric. Fibres & fabrics. Design sugar skulls. Make fabric pouch. Japanese culture. Shibori dyeing. Fabric construction. Use CAD/CAM. Sublimation printing. Surface decoration. Hand-embroidery.	Health & safety rules. Food preparation skills. Evaluate products. Healthy diet principles. Nutrients – sources. Nutrients - functions. Bacteria & food safety. Taste testing. Social & moral issues. Functions of ingredients. Designing food products.
What is assessed	Generate ideas. Communicate ideas. Manufacture ideas. Evaluate ideas.	Practical skills. Presentation skills. Knowledge retention.	Practical skills. Designing. Making skills.	Knowledge. Practical skills. Designing.
Key Vocabulary	Thermoplastic, Thermoset, Ferrous, Non-Ferrous, Alloy, Vacuum Former, Pewter Casting, Coping Saw, HIPS, Vinyl, Pewter, MDF, Design Brief, Specification, Wasting, Forming, Ergonomics, Molecular Structure, Evaluate, Analysis, Compare, Sustainable, Aesthetics, Negative Space	Resistor, Ceramic Capacitor, Electrolytic Capacitor, Printed Circuit Board, Soldering Iron, Solder, Polarity, Computer Aided Design (CAD, Vector, Computer Aided Manufacture (CAM), Laser Cutter, Acrylic, Linear, Rotary, Reciprocating, Oscillating, Fulcrum, Crank & Slider, Bell Crank, CAMs	Fabric, Needle + Thread, Stitching + Sewing, Scissors + Pins, Tie-dye, Embroidery, Embellishment, Surface Decoration, Fibres, Natural, Sustainable, Cotton + Wool, Linen + Silk, Man-made, Synthetic + Regenerated, Polyester + Acrylic, Nylon + Elastane, Shibori, Resist-dyeing, Yarn, Woven / Weaving, Warp + Weft, Knitted / Knitting, Non-woven, Bonded, Felted	Eatwell guide, Taste, Texture, Appearance, Aroma, Nutrients, Carbohydrate, Fat, Protein, Vitamins, Minerals, Bacteria, Free range, Fairtrade, Organic, Cross contamination, Sustainability

Literacy Skills Developed (Writing/Oracy/Tier 2)	Literacy skills developed through quality teaching & the embedding of high expectations regarding the presentation of books. Key words are provided during theory lesson. Opportunities taken for oracy when appropriate.			
Career Links (Employability Skills, Career Opportunities)	Product designer. D&T Teacher. Carpenter. Jewellery maker. Materials engineer. Communication. Creativity. Independence. Resilience.	Graphic Designer Digital Artist Typesetter Copywriter Product Designer Communication. Creativity. Independence. Resilience.	Textile artist. Sewing machinist. Pattern cutter. Fashion designer. Craft-maker. Communication. Creativity. Independence. Resilience.	Chef. Caterer. Nutritionist. Food scientist. Food inspector. 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 participate in and respond positively to the work of other designers. Use of imagination and creativity in designing their own products.	Sustainability and environmental impact of textiles fibres and fabrics. Creativity is encouraged to produce design work Learners are encouraged to explore cultural references and their own interests to inspire their design work. Their practical work is customised to suit their own tastes to create unique personalised products.	Learners study social and moral beliefs around foods (organic, free range etc). Learners are taught about the Health and safety specific to the food curriculum to keep themselves and others healthy and safe. Learners study other cultures' foods in the 'world foods' unit and are encouraged to share their own cultural food experiences.

Year 9

Topic	Computer-Aided Design	Business	D+T: Materials: Timber	Fashion + Textiles	Food + Cookery
End Points (Knowledge & Skills)	Navigate around Fusion 360 software. Application of Fusion 360. Creation of a working drawing. Creation of a rendered design. Preparing a design for CAM. 3D printing process & its uses.	How to start a business customer needs market research revenue and costs break-even ownership and liability marketing the economy legislation.	Health & safety in a workshop environment. Properties of timbers. Types of wood joints. Design brief & specification. Client Profile. Analyse a product. Communicate ideas - drawings & annotations. Iterative design process Manufacture of a product using tools & machines. Evaluation of product.	Design a capsule-collection. Explore formal elements. Hand-sketching skills. Fashion illustration skills. Textiles fibres & fabrics. Sewing machine skills. Constructed textiles. Surface decoration skills. Drawing & painting.	Advanced food preparation skills. Evaluate products Recap nutrients & the Eatwell guide The health benefits of a variety of vitamins Allergens & seasonal products Food provenance Designing food products to meet a dietary need
What is assessed	Fusion skills. Work to a brief. Evaluation of ideas.	Knowledge and understanding through assessments.	Generate/communicate ideas. Manufacture ideas. Evaluate ideas.	Practical skills. Designing. Making skills.	Knowledge, practical skills & designing.
Key Vocabulary	CAD, CAM, Extrude, Assembly, 3D Printing, Dimension, Fillet, Chamfer, Components, Rendering, STL, GCODE, PLA, Slicing, Plane.	Entrepreneur Revenue Innovation Stakeholder Market segment Franchise Risk Reward Profit Partnership Cash flow Break-even Sole trader Business plan Limited liability	Softwood, Hardwood, Manufactured Board, Lap Joint, Housing Joint, Tenon Saw, Chisel, Mitre Joint, Mortise & Tenon, Design Brief, Specification, Steel Rule, Bench-hook, Tri-square, Marking Gauge.	Fashion Design Contemporary Capsule Collection Formal Elements Features + Details Embellishment Embroidery Colourways Illustration Fabric Painting Surface Decoration Woven/Weaving Knitted/Knitting Printed/Printing Improvement	Hygiene Dice, baton, strips Cross contamination Eatwell Guide Knead Calories Caramelisation Vitamins Dough Rubbing in Whisk Allergens Shortening Tempering Independence

Literacy Skills Developed (Writing/Oracy/Tier 2)	Literacy skills developed through quality teaching & the embedding of high expectations regarding the presentation of books. Key words are provided during theory lesson. Opportunities taken for oracy when appropriate.				
Career Links (Employability Skills, Career Opportunities)	CAD Technician. 3D Artist. Mechanical engineer. Architect. Product designer. Communication. Creativity. Independence. Resilience.	Accountancy. Marketing. Administration. Finance. Logistics. Communication. Creativity. Independence. Resilience.	Product designer. D&T Teacher. Carpenter. Furniture Maker. Materials engineer. Communication. Creativity. Independence. Resilience.	Textile artist. Sewing machinist. Pattern cutter. Fashion designer. Craft-maker. Communication. Creativity. Independence. Resilience.	Chef. Caterer. Nutritionist. Food scientist. Food inspector. Communication. Creativity. Independence. Resilience.
SMSC Links	Sense of enjoyment and fascination in new technologies like 3D printing. Willingness to participate in and respond positively to the work of other designers. Use of imagination and creativity in designing their own products.	Encourage to consider ethical and environmental aspects in the world of business. Use creativity in exploring various ways in what enterprise could be beneficial and altruistic to all. Explore social enterprises and the fairness of legislation.	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.	Creativity is encouraged to produce design work Learners are encouraged to explore their own cultural identity and interests to inspire their fashion design work. Their practical work is customised to suit their own tastes to create unique personalised products. Sustainability and environmental impact of textiles fibres and fabrics.	Learners study spiritual beliefs around food (vegan and vegetarianism, religious foods etc). Learners cook a range of recipes from various influences across the globe. Leaners explore the spiritual, moral, social, and cultural reasons why people choose to eat different foods. Learners are taught about the FSA - Food Standards Agency and how they monitor food businesses, Natasha's law which helps to protect people with allergies.