

TECHNOLOGY

CURRICULUM OVERVIEW





TECHNOLOGY CURRICULUM- LONG TERM PLAN

CURRICULUM INTENT

At Nottingham Academy, our Design and Technology curriculum is designed to be enjoyable, engaging, challenging, and practical. It encourages students to think and work creatively to solve problems both individually and as members of a team. Our design team actively promotes the use of creativity and imagination to design and make products that address real and relevant problems within various contexts, considering their own and others' needs, wants, and values.

Students will develop a broad understanding of material properties, design thinking, and systems technology, equipping them for the 21st-century work environment. Our curriculum aims to create strong links to other STEM disciplines such as mathematics, science, engineering, and computing. Additionally, students have opportunities to reflect upon and evaluate past and present technologies, learn the history of design, and study the work of iconic designers.

Through the study of Design and Technology, students are encouraged to become innovators and risk-takers, developing creativity and practical skills that can lead to careers in the creative, construction, and civil sectors. Design and Technology is a well-subscribed and popular subject at GCSE at Nottingham Academy, enabling students to study the designed world around them creatively and practically.

Adaptations for students with SEND needs include differentiated instruction and resources tailored to diverse learning requirements. We use visual aids, hands-on activities, and technology to support understanding and engagement. Regular assessments and personalized feedback ensure all students know more, remember more, and do more. By focusing on these principles, we aim to ensure every student can excel and thrive in Design and Technology, gaining more knowledge, retaining it effectively, and applying it confidently.

Our ultimate goal is to inspire students to become creative and skilled individuals who can contribute meaningfully to the designed world, fostering a lifelong appreciation and understanding of Design and Technology.

Design Thinking

- Emphasis on creative problem-solving and innovative thinking in designing products or systems.
- Example: Developing a unique design for a sustainable water bottle that addresses user needs and environmental concerns.

Nutrition and Health

- Understanding the principles of nutrition, healthy eating, and the impact of diet on health.
- Example: Preparing a balanced meal that incorporates all essential nutrients while considering dietary restrictions.

Material Properties

- Understanding the characteristics, uses, and limitations of various materials.
- Example: Learning about the properties of recycled plastics and their applications in creating eco-friendly products.

Drawing and Rendering

- Learning and applying both basic and advanced drawing techniques, including the use of CAD software.
- detailed isometric and orthographic drawings of a mechanical part using CAD software like TinkerCAD.

Safety and Procedures

KEY CONCEPTS

- Applying health and safety rules to ensure a safe working environment in practical settings.
- **Example**: Implementing safety protocols while using a lathe machine in the workshop to prevent accidents.

Practical Skills

- Gaining hands-on experience and proficiency with tools, equipment, and machining techniques.
- **Example**: Mastering the use of a milling machine to create precise components for a mechanical project.

Prototyping and Modeling

- Developing physical models and prototypes from design concepts to test and refine ideas.
- **Example**: Constructing a prototype of a new ergonomic chair design using cardboard and other materials for initial testing.

Industry Knowledge

- Exploring various engineering sectors, career opportunities, and understanding production and manufacturing processes.
- **Example**: Researching the automotive industry to understand the manufacturing process of electric vehicles and the career paths available in this sector.

KEY CONCEPTS MAPPING



	Term 1	Term 2	Term 3	
Year 7	Introduction to Design Technology Recycled Materials and BLOK-BOT Project	Food Technology: Nutrition & Healthy Eating	Basic Drawing Techniques: World Architecture Project	
Year 8	Design Movements and Iterative design	Food Technology: Developing Kitchen Skills and Nutrition	Developing CAD/CAM Techniques	
Year 9	Understanding Manufacturing	Systems and Control	Food Technology: Cultural and Ethical Food Practices	
Year 10	Introduction to Engineering: Sectors, Primary Materials and Processing	Engineering Drawing and Structures	Machining Techniques and Coursework	
Year 11	Engineering Design Unit 2 Coursework	Engineering Manufacturing (Unit 1)	Unit 3 Exam Content and Revision	

TECHNOLOGY KEY CONCEPTS

Design Thinking	Material Properties	Safety and Procedures	Practical Skills
Nutrition and Health	Drawing and Rendering	Prototyping and Modeling	Industry Knowledge





	Half Term 1	Half Term 2	Half Term 3
Year 7	 Introduction to Design Technology: design, creativity, workshop, tools, equipment, safety, materials, skills, procedures, health Recycled Materials and BLOK-BOT Project: prototype, model, evaluation, recycled, robot, project, design, BLOK-BOT, creativity, innovation. 	Nutrition & Healthy Eating: nutrition, healthy, eating, knife, cooking, food, hygiene, bacteria, preparation, diet.	Architecture Drawing Project Basic Drawing Techniques: drawing, proportion, shading, perspective, rendering, techniques, CAD, isometric, shapes, TinkerCAD
Year 8	Developing as Designers: designers, skills, tools, creativity, STEM, design, clock, materials, plastics, evaluation	Developing Kitchen Skills and Nutrition: kitchen, skills, chopping, pairing, dicing, nutrition, combining, raising, shortening, seasoning	Developing CAD Techniques: TinkerCAD, advanced, techniques, Techsoft, 2D, design, laser, cutter, software, CAD
Year 9	Understanding Manufacturing: night-light, project, CAD, CAM, electronics, circuits, manufacturing, quality	Systems and Control Unit Systems and Control: systems, control, flow, modeling, inputs, processes, outputs, CAD, CAM, circuits	Cultural and Ethical Food Practices: cultures, dietary, faith, food, miles, organic, stewardship, welfare, diseases, Mediterranean
Year 10	Introduction to Engineering: engineering, sectors, careers, metals, polymers, SMART, modern, primary, processing, materials	Engineering Drawing: isometric, orthographic, structures, forces, movements, motions, CAD, drawing, accuracy, specifications Structures and Forces: structures, forces, movements, motions, stability, equilibrium, load, stress, strain, dynamics	 Machining Techniques and Coursework Machining Techniques: machining, lathe, milling, disassembly, analysis, coursework, techniques, precision, lathing, milling. Coursework for Engineering Design (WJEC): coursework, disassembly, analysis, product, engineering, WJEC, specifications, evaluation, prototyping, design
Year 11	Design Development: development, drawing, brief, specification, evaluation, coursework, WJEC, rendering, design, innovation.	Engineering Manufacturing (Unit 1) Manufacturing to Specification: manufacturing, tolerance, stock, precision, accuracy, materials, safety, procedures, production, specification	Unit 3 Exam Content and Revision Exam Preparation: exam, content, revision, review, concepts, skills, preparation, industry, knowledge, unit

ADAPTATIONS FOR SEND STUDENTS IN TECHNOLOGY LESSONS



GENERAL TECHNOLOGY SEND STRATEGIES

READING SUPPORT

- Use visual dictionaries and glossaries specific to design terms. Implement reading sessions with design magazines, articles, and case studies to enhance understanding of real-world applications.
- Provide annotated diagrams and visual aids to support reading material. Use interactive e-books and videos to explain the properties and uses of different materials.
- Create visual guides and safety manuals with illustrations and simple language. Use posters and signage in the workshop to reinforce safety protocols and procedures.
- Incorporate instructional videos and step-by-step guides with pictures. Use practical demonstrations and hands-on practice to reinforce reading material.
- Incorporate recipe reading and comprehension exercises. Use food labels, nutritional information charts, and interactive food-related activities to develop reading skills related to food and health.
- Provide step-by-step drawing guides with visual aids. Use drawing books and online tutorials to support reading and comprehension in drawing and rendering techniques.
- Use instructional manuals with clear, illustrated steps. Incorporate project-based learning with written reflections and evaluations to develop reading and writing skills
- Provide industry-related articles, case studies, and profiles of engineers and designers. Use multimedia resources such as videos, podcasts, and interactive websites to support reading and comprehension.

EXAM PREPARATION

- Offer practice exams with extended time and breaks. Use hands-on projects and practical demonstrations to reinforce learning.
- Provide visual aids and summaries of key concepts. Use sample questions and practical exercises for familiarisation.
- Create visual and written safety checklists. Practice safety procedures through roleplaying scenarios.
- Conduct mock practical exams with modified tools and one-on-one support. Offer detailed feedback and additional practice.
- Use visual aids and simplified recipes. Conduct practice cooking sessions with clear, step-by-step instructions.
- Provide guided tutorials and extra practice sessions. Use step-by-step exercises and mock exams.
- Use pre-made kits and clear guides for mock exams. Offer additional support and practice opportunities.
- Provide summaries and interactive review sessions. Use practice questions and case studies to reinforce understanding.

SEND WITHIN TECHNOLOGY KEY CONCEPTS

Design Thinking

Adaptations: Use of visual aids, graphic organizers, and mind maps to help students brainstorm and organize ideas. Provide step-by-step instructions with visual cues and examples to support creative problemsolving.

Material Properties

Adaptations:
 Incorporate hands-on activities with tactile feedback and use simplified explanations of material properties.
 Utilize visual aids like charts and diagrams to illustrate the characteristics and uses of different materials.

Safety and Procedures

Adaptations: Provide visual and verbal reminders for safety protocols. Use clear, concise instructions with demonstrations. Offer personalized support to ensure students understand and can apply safety procedures effectively.

Practical Skills

Adaptations: Offer one-on-one assistance and modify tools to accommodate different abilities. Provide repetitive practice with simpler tasks to build confidence before advancing to more complex skills.

Nutrition and Health

• Adaptations: Use pictures, videos, and interactive activities to explain concepts. Provide hands-on, sensory-based activities to reinforce learning. Simplify recipes and instructions to ensure comprehension.

Drawing and Rendering

Adaptations:
 Provide guided practice with stencils, templates, and tracing exercises.
 Utilize technology like drawing tablets or CAD software with simplified interfaces.
 Offer extra practice sessions and step-bystep tutorials.

Prototyping and Modeling

Adaptations: Use pre-made kits for easier assembly and break tasks into smaller, manageable steps. Provide clear visual instructions and offer scaffolding to support students through the process.

Industry Knowledge

Adaptations: Use
 visual presentations,
 videos, and guest
 speakers to convey
 information. Simplify
 text with key points
 highlighted and
 provide summaries of
 complex concepts.
 Offer interactive
 activities to engage
 students in learning
 about different
 engineering sectors
 and careers.



LONG TERM PLAN- A CURRICULUM OVERVIEW

	Rotation 1	Rotation 2	Rotation 3
Year 7	 Students will understand what Design Technology is, explore creativity, learn about materials and skills, and understand workshop health and safety while gaining key skills with tools and equipment. Recycled Materials and BLOK-BOT Project Students will explore different recycled materials and engage in the BLOK-BOT project to design, prototype, and model a robot using recycled materials, followed by evaluation and review. 	Food Technology: Nutrition & Healthy Eating • Students will learn about nutrition, healthy eating, and food groups, develop key cooking and knife skills, and understand the impacts of diet and health, with an emphasis on hygiene and cooking techniques.	Basic Drawing Techniques: World Architecture Project Students will be introduced to various drawing materials and techniques, learn about proportion and shapes, and practice shading, rendering, and perspective drawing, as well as basic CAD using TinkerCAD.
Year 8	• Students will build on their skills and creativity in Design Technology by developing advanced skills with tools and equipment, researching, designing, and manufacturing an analogue clock inspired by a design movement, and understanding the properties of materials such as plastics, leading to design development, creativity, evaluation, and review.	Food Technology: Developing Kitchen Skills and Nutrition • Students will further develop their kitchen skills, including advanced knife and equipment techniques, explore nutrition throughout life, practice food combining, and master advanced cooking methods such as raising, shortening, and seasoning.	• Students will learn more advanced techniques in TinkerCAD, build on skills acquired in Year 7, and use Techsoft 2D Design Tools software to create and output designs to a laser cutter.

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Year 9	• Students will engage in reverse engineering to produce an LED night-light project using workshop equipment, learn CAD/CAM skills, understand basic electronics and electrical circuits, participate in production line manufacturing, and focus on accuracy and quality control in manufacturing.	Students will delve into systems and control by learning CAD/CAM, basic electronics and electrical circuits, flow modeling, and developing control systems using inputs, processes, and outputs within a production line manufacturing context.	Food Technology: Cultural and Ethical Food Practices • Students will explore foods from different cultures, understand specific dietary requirements including faith-based diets, examine food miles and organic products, discuss food stewardship and animal welfare, understand the impacts of diet on health and related diseases, and prepare practical dishes from European (Mediterranean), Indian, and Middle Eastern cuisines.
	Introduction to Engineering	Engineering Drawing and Structures	Machining Techniques and Coursework
Year 10	 Students will explore various engineering sectors and careers, learn about the properties of materials such as metals, polymers, SMART, and modern materials, and understand the primary processing of these materials. 	 Students will develop skills in isometric, orthographic, and computer-aided design (CAD) drawing, and learn about different structures, forces, movements, and motions in engineering contexts. 	 Students will gain hands-on experience with machining techniques for a centre lathe and milling machine and start their coursework units for Engineering Design, focusing on product disassembly and product analysis according to the WJEC Exam Board specification.
	Engineering Design Unit 2 Coursework	Engineering Manufacturing (Unit 1)	Unit 3 Exam Content and Revision
	Students will work on their Unit 2 coursework,	Students will use a given specification to	Students will review Unit 3 exam content,

manufacture an engineering product to

tolerance using given stock materials,

focusing on precision and accuracy in

manufacturing processes.

focusing on key concepts and skills

learned throughout the course, and

prepare for their final exams.

engage in intensive revision sessions to

including design development, engineering drawing,

evaluating designs against the specification (WJEC).

creating a design brief and specification, and

TECHNOLOGY AT PRIMARY PHASE- AT A GLANCE



	Half Term 1	Half Term 2	Half Term 3
EYFS	Term 1: Construction - Design and make a home for a pet	Term 2: Construction - Design and make a Chinese New Year Dragon	Term 3: Mechanisms - Design and make a pop-up chick
Year 1	 Term 1: Mechanisms (levers and sliders) - Design and make moving pictures (Little Red Riding Hood) 	Term 2: Construction & mechanisms - Design and make a moving windmill (linked to History)	Term 3: Food and Nutrition - Design and make a healthy snack for breaktime
Year 2	Term 1: Textiles - Design and make a Christmas decoration	Term 2: Construction - Design and make a Tudor house	Term 3: Mechanisms (wheels and axles) - Design and make a moving vehicle.
Year 3	 Term 1: Mechanisms (levers and linkages) - Design and make a moving Stone Age character 	Term 2: Construction - Design and make a Roman shield	Term 3: Food and Nutrition - Design and make Egyptian bread
Year 4	Term 1: Construction/electrical systems - Design and make a replica of the Iron Man	Term 2: Food and Nutrition - Design and make Mayan corn tortillas	 Term 3: Construction - Design and make an interactive model to show how the digestive system works
Year 5	Term 1: Textiles - Design and make Christmas stockings (focus on sewing)	Term 2: Construction/mechanisms - Design and make a Mars Rover with a working pulley	Term 3: Construction/mechanisms - Design and make a model rainforest with a CAM mechanism
Year 6	Term 1: Construction/electrical systems - Design and make a theme park ride powered by an electrical circuit	Term 2: Food and Nutrition - Design and make a simple Greek dish	Term 3: Textiles - Design and make a sunglasses case for summer holidays

TECHNOLOGY KEY CONCEPTS

Design Thinking	Material Properties	Safety and Procedures	Practical Skills
Nutrition and Health	Drawing and Rendering	Prototyping and Modeling	Industry Knowledge



NOTTINGHAM ACADEMY TECHNOLOGY & NATIONAL CURRICULUM COMPLIANCE

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
Nottingham Academy Curriculum Alignment:	Nottingham Academy Curriculum Alignment:	Nottingham Academy Curriculum Alignment:
 Year 9: Term 3: Cultural and Ethical Food Practices Year 4: Term 2: Food and Nutrition (Mayan Corn Tortillas) Year 7: Rotation 3: Architecture (Drawing Techniques) Year 8: Rotation 1: Developing Designers (Clock Design Inspired by Design Movement) 	 Year 10: Term 3: Machining Techniques and Coursework Year 7: Rotation 1: Recycled Materials and BLOK-BOT Project Year 11: Term 1: Engineering Design Unit 2 Coursework Year 8: Rotation 3: Advanced CAD Techniques 	 Year 11: Term 1: Engineering Design Unit 2 Coursework Year 8: Rotation 1: Developing Designers Year 9: Term 1: Reverse Engineering and Manufacturing (Night-Light Project) Year 10: Term 1: Introduction to Engineering
Use a variety of approaches, such as biomimicry and user-centred design, 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	
Nottingham Academy Curriculum Alignment:	Nottingham Academy Curriculum Alignment:	
 Year 7: Rotation 1: Introduction to Design Technology Year 8: Rotation 1: Developing Designers Year 9: Term 3: Cultural and Ethical Food Practices Year 11: Term 1: Engineering Design Unit 2 Coursework 	 Year 9: Term 1: Reverse Engineering and Manufacturing Year 8: Rotation 3: Advanced CAD Techniques Year 7: Rotation 3: Architecture (Drawing Techniques) Year 10: Term 3: Machining Techniques and Coursework 	





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
Nottingham Academy Curriculum Alignment:	Nottingham Academy Curriculum Alignment:
 Year 10: Term 3: Machining Techniques and Coursework Year 9: Term 1: Reverse Engineering and Manufacturing Year 11: Term 2: Engineering Manufacturing (Unit 1) Year 8: Rotation 3: Advanced CAD Techniques 	 Year 10: Term 1: Introduction to Engineering Year 8: Rotation 1: Developing Designers Year 7: Rotation 1: Recycled Materials and BLOK-BOT Project Year 9: Term 1: Reverse Engineering and Manufacturing

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
Nottingham Academy Curriculum Alignment:	Nottingham Academy Curriculum Alignment:	Nottingham Academy Curriculum Alignment:	Nottingham Academy Curriculum Alignment:
 Year 10: Term 3: Machining Techniques and Coursework Year 7: Rotation 1: Recycled Materials and BLOK-BOT Project Year 8: Rotation 1: Developing Designers Year 9: Term 1: Reverse Engineering and Manufacturing 	 Year 11: Term 3: Unit 3 Exam Content and Revision Year 9: Term 2: Systems and Control Unit Year 10: Term 1: Introduction to Engineering Year 8: Rotation 3: Advanced CAD Techniques 	 Year 11: Term 1: Engineering Design Unit 2 Coursework Year 8: Rotation 1: Developing Designers Year 7: Rotation 1: Recycled Materials and BLOK-BOT Project Year 10: Term 3: Machining Techniques and Coursework 	 Year 9: Term 3: Cultural and Ethical Food Practices Year 10: Term 1: Introduction to Engineering Year 11: Term 3: Unit 3 Exam Content and Revision Year 8: Rotation 1: Developing Designers



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
 Year 10: Term 1: Introduction to Engineering Year 7: Rotation 1: Recycled Materials and BLOK-BOT Project Year 8: Rotation 1: Developing Designers Year 9: Term 1: Reverse Engineering and Manufacturing 	 Nottingham Academy Curriculum Alignment: Year 9: Term 1: Reverse Engineering and Manufacturing Year 8: Rotation 3: Advanced CAD Techniques Year 10: Term 3: Machining Techniques and Coursework Year 11: Term 2: Engineering Manufacturing (Unit 1) 	 Year 9: Term 1: Reverse Engineering and Manufacturing Year 10: Term 3: Machining Techniques and Coursework Year 9: Term 2: Systems and Control Unit Year 11: Term 2: Engineering Manufacturing (Unit 1) 	Nottingham Academy Curriculum Alignment: • Year 9: Term 2: Systems and Control Unit • Year 8: Rotation 3: Advanced CAD Techniques • Year 10: Term 3: Machining Techniques and Coursework • Year 11: Term 2: Engineering Manufacturing (Unit 1)

Cooking & Nutrition

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: Rotation 2: Nutrition & Healthy Eating Year 9: Term 3: Cultural and Ethical Food Practices Year 10: Term 1: Introduction to Engineering (Nutrition Component) Year 8: Rotation 2: Advanced Kitchen Skills and Nutrition 	 Year 7: Rotation 2: Nutrition & Healthy Eating Year 9: Term 3: Cultural and Ethical Food Practices Year 8: Rotation 2: Advanced Kitchen Skills and Nutrition Year 10: Term 1: Introduction to Engineering (Nutrition Component) 	 Nottingham Academy Curriculum Alignment: Year 7: Rotation 2: Nutrition & Healthy Eating Year 8: Rotation 2: Advanced Kitchen Skills and Nutrition Year 9: Term 3: Cultural and Ethical Food Practices Year 10: Term 1: Introduction to Engineering (Nutrition Component) 	Nottingham Academy Curriculum Alignment: • Year 9: Term 3: Cultural and Ethical Food Practices • Year 7: Rotation 2: Nutrition & Healthy Eating • Year 8: Rotation 2: Advanced Kitchen Skills and Nutrition • Year 10: Term 1: Introduction to Engineering (Nutrition Component)