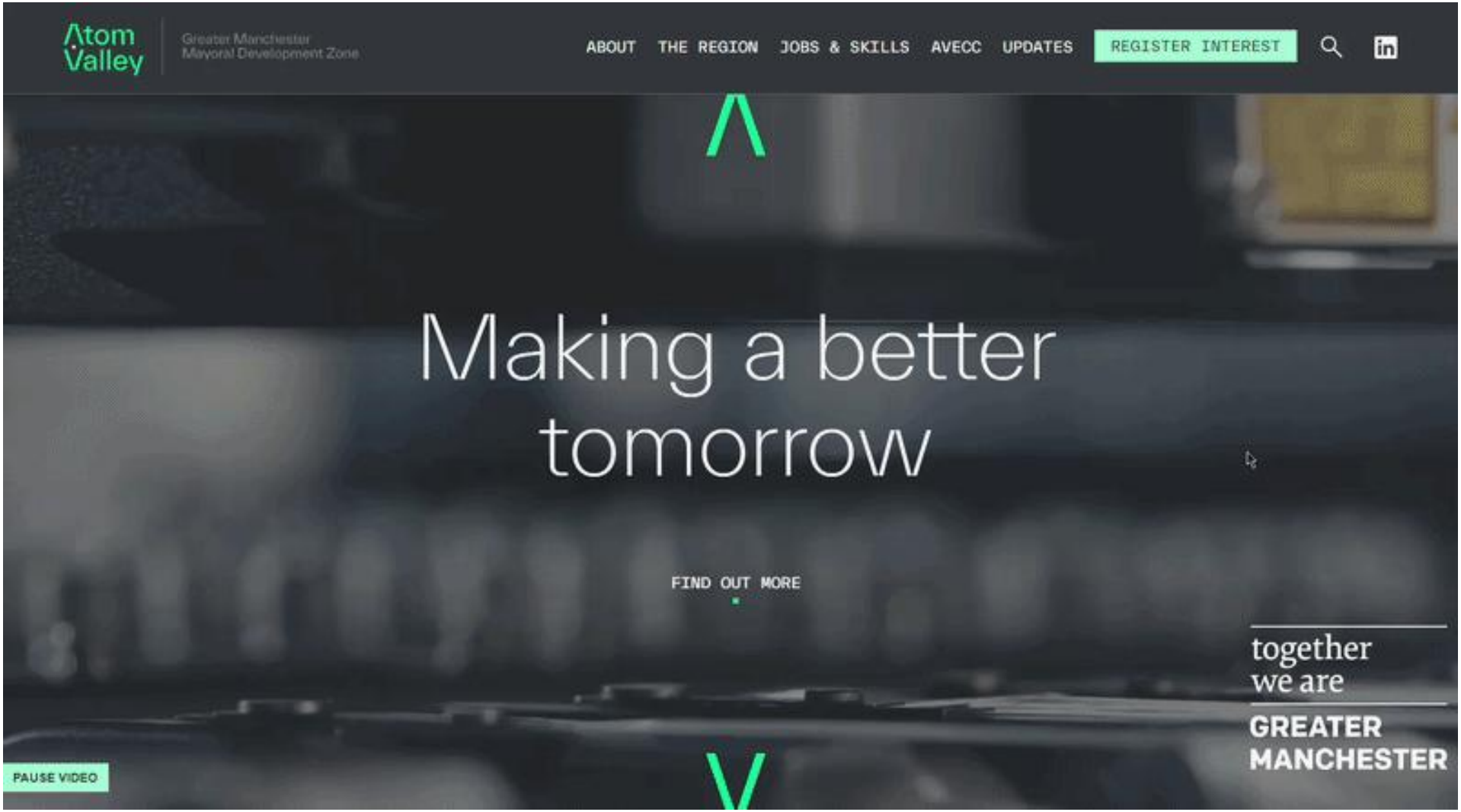

Atom Valley
Greater Manchester Mayoral Development Zone
ABOUT
THE REGION
JOBS & SKILLS
AVECC
UPDATES
REGISTER INTEREST
Making a better tomorrow
FIND OUT MORE
together we are
GREATER MANCHESTER
PAUSE VIDEO

Design & Technology Department

Design & Technology

Engineering Manufacture

Construction

Food & Nutrition

Newhouse Academy

Your Key Stage 3 Design & Technology Road Map

Year 7 Stop: Polymers & Sustainability

Your Project: The Mag & Coaster
You will design a personalised mug and create a coaster by recycling and moulding plastic.

Key Material: Polymers (Plastics)
Learn about the properties of plastics, how they are formed, and the importance of recycling them.

Skill 1: Digital Design (CAD)
Use computer spftware to turn your band-drewn sketches into a digital image for your mug.

Skill 2: Heat Transfer Printing
Learn the precees of sublimation, using heat to print your digital design permanently onto the mug.

Skill 3: Recycling in Action
Melt down recycled plastic bottle caps and use a mould to create your own unique coaster.

Year 8 Stop: Woodworking & Assembly

Your Project: The 3D MDF Clack
You will build a working 20 clock using workshop foots and machinery.

Key Material: Manufactured Boards (MDF)
Discover the difference between natural timber and manufactured boards like MDF and their properties.

Skill 1: Precision Woodworking
Preclice accurate marking out, measuring, and using sawe to cut the clock garts to the correct sise.

Skill 2: Safe Use of Machinery
Learn how to safely operate workshop equipment like the pillar driit to make precise holes.

Skill 3: Mechanical Systems
Assembic the cluch body using glues and clalops, then RI the bottory powered clock mechanism.

Year 9 Stop: Electronics & Product Design

Your Project: The LED Lamp
You will design, build, and solder the electronics for a functional LED lamp.

Key Materials: Wood/Polymer & Electronics
Select the best materials for your lamp base and learn to identify components like LEDs, resistors, and switches.

Skill 1: Understanding Circuits
Lewrn how electronic systems work (Inout, Process, Output) and draw a circuit diagram for your lamp.

Skill 2: Soldering
Masfer the technique of soldering to create permanent connections for your electronic circuit on a chcuit board.

Skill 3: Integrating Systems
Bombine your finished electronic circuit with the lamp structure you built, creating a complete, working product.

Newhouse Academy

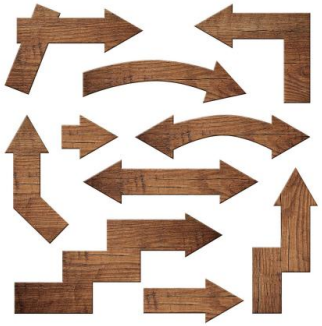
AQA Realising potential

AQA Questions matter

Subjects Qualifications Professional Development Exams Admin Services

GCSE DESIGN AND TECHNOLOGY (8552)
Specification
For teaching from September 2017 onwards
For GCSE exams in 2019 onwards
Version 1.2 6 June 2022

GCSE Design and Technology 8552



1.0 Introduction

1.1 Why choose AQA for GCSE Design and Technology

GCSE Design and Technology will prepare students to participate confidently and successfully in an increasingly technological world. Students will gain awareness and learn from wider influences on Design and Technology including historical, social, cultural, environmental and economic factors. Students will get the opportunity to work creatively when designing and making and apply technical and practical expertise.

Our GCSE allows students to study core technical and designing and making principles, including a broad range of design processes, materials techniques and equipment. They will also have the opportunity to study specialist technical principles in greater depth.

You can find out about all our Design and Technology qualifications at aqa.org.uk/designandtechnology

1.2 Support and resources to help you teach

We've worked with experienced teachers to provide you with a range of resources that will help you confidently plan, teach and prepare for exams.

1.2.1 Teaching resources

Visit aqa.org.uk/8552 to see all our teaching resources. They include:

- teaching guidance including lesson plans, and suggested teaching strategies to provide you with practical guidance to help deliver this specification
- non-exam assessment example materials and a dedicated subject adviser for every school or college to help you understand our expectations for this part of the assessment
- sample schemes of work to help you plan your course with confidence
- textbooks tailored to our specification and approved by AQA
- training courses to help you deliver AQA Design and Technology qualifications
- subject expertise courses for all teachers, from newly qualified teachers who are just getting started to experienced teachers looking for fresh inspiration.

GCSE Design and Technology: Course Overview

50%
Written Exam
Written Exam (Paper 1)

2-hour paper, 100 marks. Assesses core, specialist, and design principles.

Mandatory **Maths** (15% min.) and **Science** (10% min.) Content

50%
Non-Exam Assessment (NEA)

30–35 hour ‘design and make’ task. Results in a working prototype and a portfolio.

Concise **20-page portfolio** evidencing investigation, design, and manufacturing.

Why Choose Design & Technology?

Empowering you to innovate and succeed in a technological world by combining creativity with technical expertise to solve real-world problems.

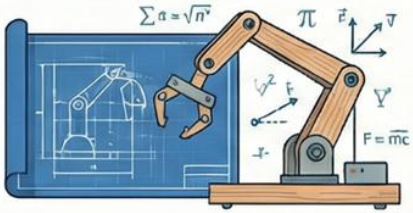
Skills for a Changing World

Real-World Problem Solving

Develop the confidence to innovate and succeed in an increasingly technological global landscape.

Applied Maths and Science

Put theory into practice by applying scientific and mathematical knowledge to physical projects.



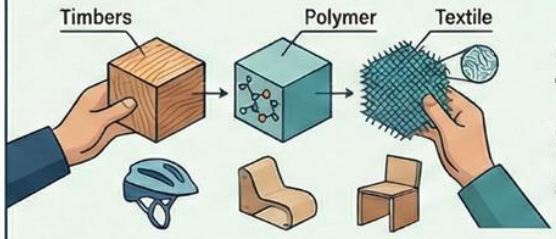
The Iterative Design Process

Master the cycle of exploring, creating, and evaluating to refine and improve ideas.

Designing with Purpose

Global and Social Awareness

Understand how historical, cultural, environmental, and economic factors influence every design decision.



Specialist Technical Expertise

Gain in-depth knowledge of materials like polymers, timbers, and textiles to build prototypes.

Sustainability and Ethics

Learn to design responsibly by considering the ecological footprint and social impact of products.

The Iterative Design Process: From Concept to Creation

The Three Pillars

Investigate and Define

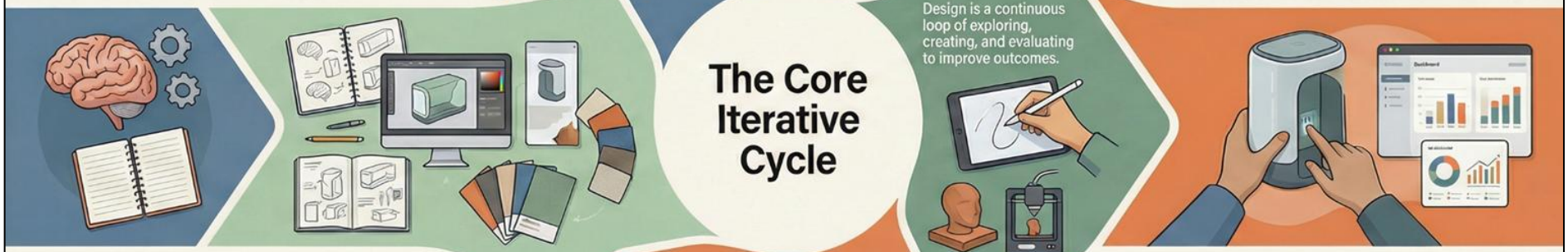
Identify user needs and social challenges to produce a clear design brief.

Generate and Develop

Use imaginative sketching and physical modelling to refine ideas into a manufacturing specification.

Realise and Evaluate

Build a functional prototype and test it against the requirements of the original brief.



A Cyclical Approach

Investigate and Define

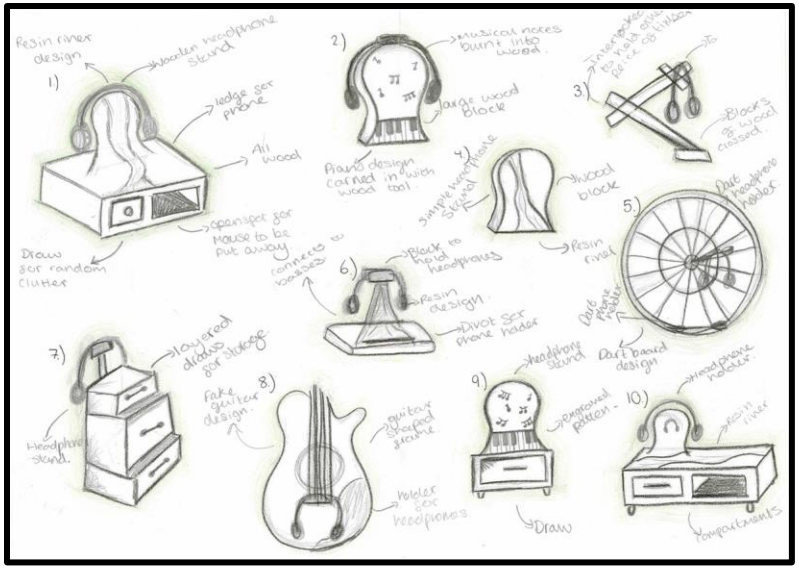
Identify user needs and social challenges to produce a clear design brief.

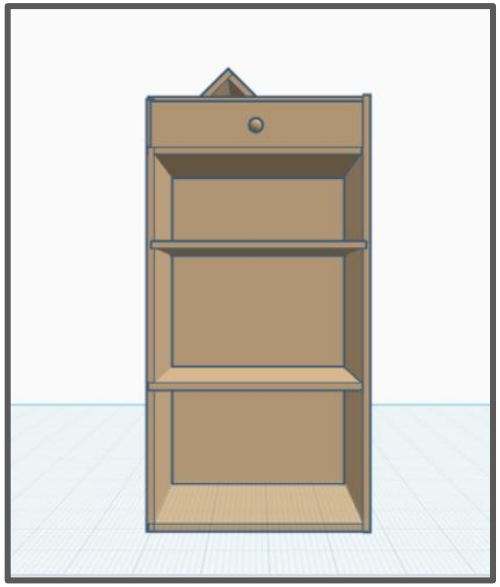
Generate and Develop

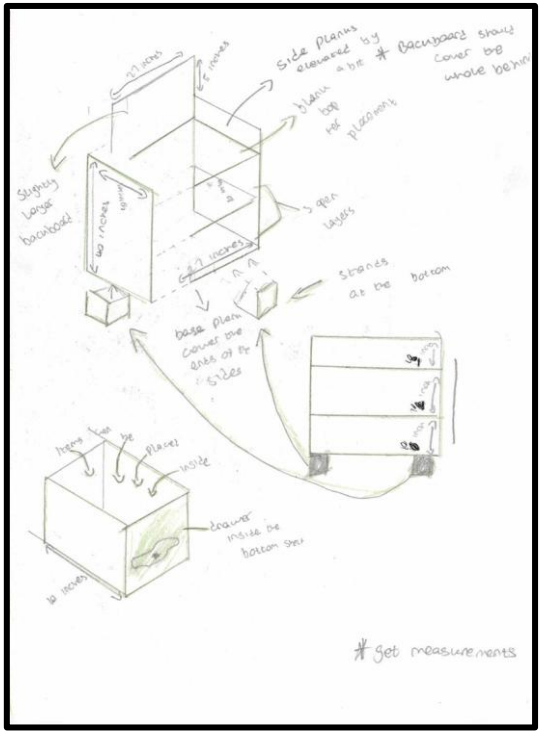
Use imaginative sketching and physical modelling to refine ideas into a manufacturing specification.

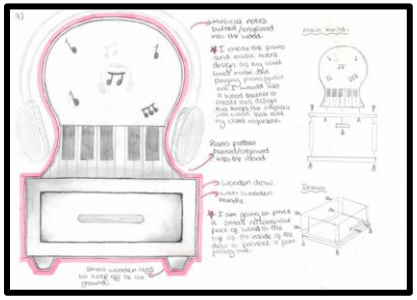
Realise and Evaluate

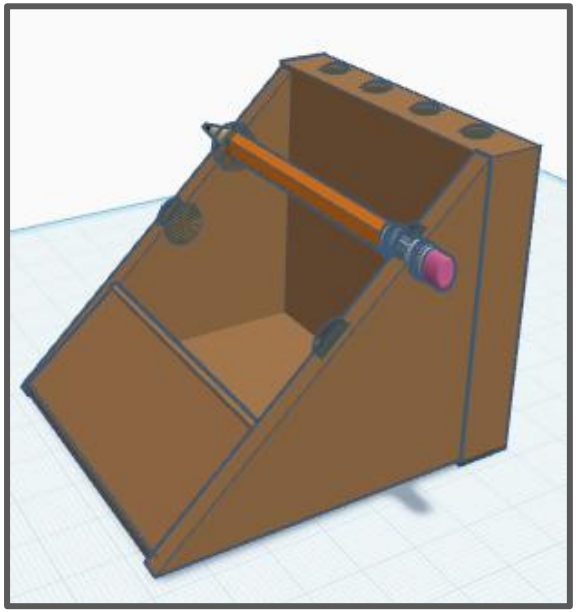
Build a functional prototype and test it against the requirements of the original brief.

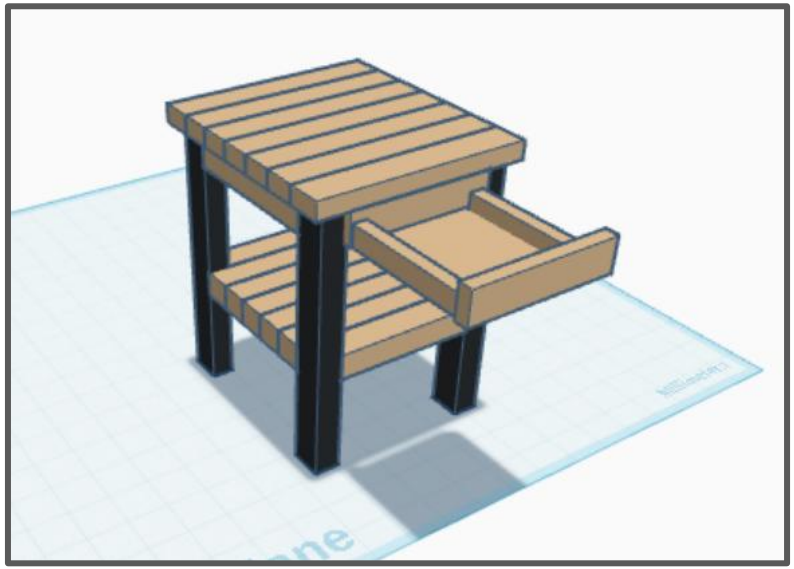

Resin river design
1)
wooden headphone stand
ledge for phone
All wood
openspace for Mouse to be Put away
Draw for random clutter
2)
musical notes burnt into wood.
large wood Block
Piano design carved in with wood tool
3)
Blocks of wood crossed.
4)
simple headphone stand
wood block
5)
Dark headphone holder
Resin river
Dark board design
6)
Black to hold headphones
Resin design.
Divot for phone holder
7)
layered drawer for storage
Headphone stand.
8)
Fake Guitar design.
guitar shaped handle
holder for headphones
9)
headphone stand
engraved pattern
Draw
10)
headphone holder
resin river
compartments

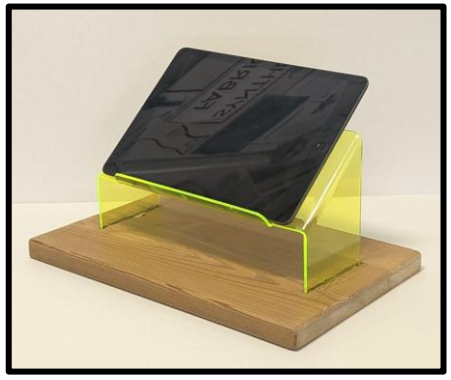


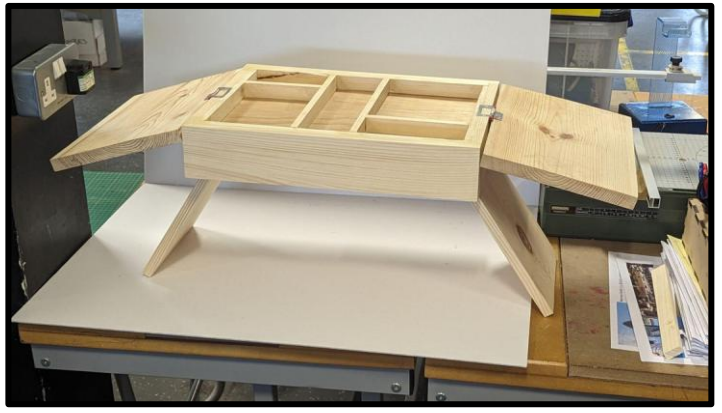

Side planks elevated by the * Backspace stays cover the whole behin
Slightly Large backboard
Blanks top for placements
open layers
Strands at the bottom
base plank cover the ends of the sides
Layer inside the bottom shelf
get measurements


Musical notes burnt/engraved into the wood.
Piano pattern burnt/engraved into the wood.
Wooden drawer with wooden handle.
Drawer









GCSE Design and Technology: Your Path to Success

The Written Paper
(50% of Total Grade)

Two-Hour Final Examination
A 100-mark paper taken at the end of Year 11.

Three Core Assessment Sections

Section A
(Technical)

Section B
(Specialist)

Section C
(Designing/Making)

Integrated Maths and Science
15% of marks assess Maths and 10% assess Science.

Component	Weighting	Key Requirements
Written Exam	50% (100 Marks)	Core knowledge, specialist materials, and design theory.

Non-Exam Assessment
(50% of Total Grade)

The "Design and Make" Project
A substantial 30–35 hour project based on an AQA "Contextual Challenge".

The Iterative Design Journey

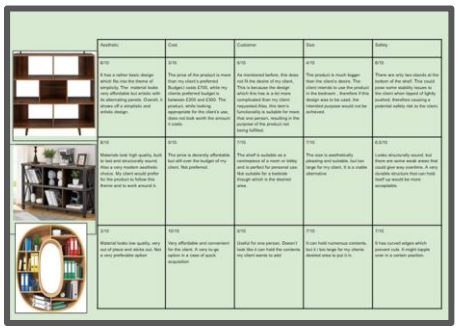
Research

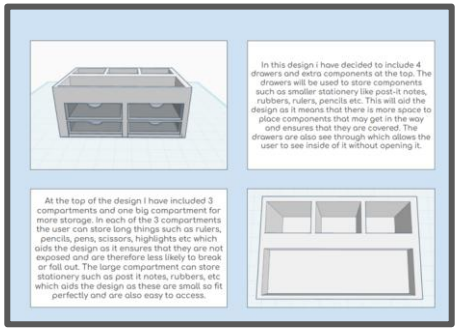
Design

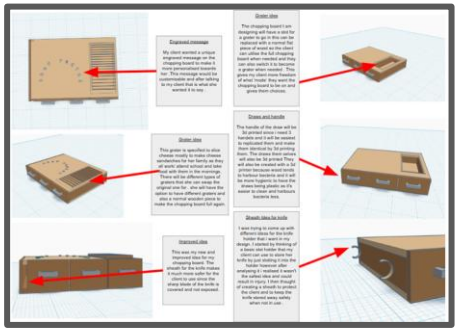
Develop & Prototype
You will research, design, and develop a working prototype for a user.

20-Page Evidence Portfolio
A concise digital or paper folder documenting your entire design process.

Component	Weighting	Key Requirements
NEA Project	50% (100 Marks)	Investigation, design ideas, prototype realisation, and evaluation.







Your Future in Design & Technology: Skills, Careers, and Pathways

Design and Technology skills are in high demand across a vast array of modern industries. This guide maps out the core sectors, specific job roles, and the academic or vocational pathways available to students pursuing this field.

INDUSTRIES AND CAREER ROLES

Engineering, Manufacturing, and Technology

Develop aircraft, medical implants, or digital interfaces using mechanical and software engineering skills.

Creative, Fashion, and Architecture

Design sustainable clothing, functional products for mass production, or entire urban environments.

High-Demand Roles

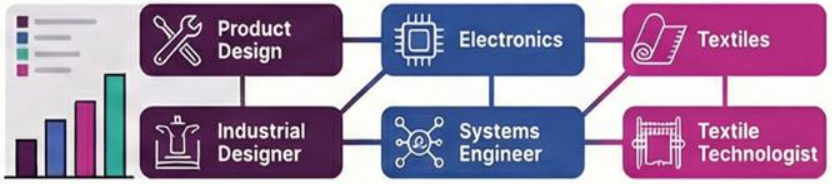
CAD Technicians

UX/UI Designers

Materials Scientists

Architectural Technologists

D&T Specialism & Potential Career



EDUCATION AND PATHWAYS

Post-16 Further Education

A-Levels

T-Levels (Engineering/Construction)

BTECs,

Higher Education Degrees

Pursue specialized B5c or BA degrees in Architecture, Fashion Design, or Engineering (BEng/MEng)

Vocational Routes

Apprenticeships offer hands-on training for roles like Junior 2D/3D Designer or Carpentry

Engineering

OCR sites | About | Contact us | Google

Subjects | Qualifications | Administration | Students

Home > Qualifications > Cambridge Nationals > Engineering Manufacture Level 1/Level 2 – J823

Cambridge Nationals

Engineering Manufacture Level 1/Level 2 – J823

- Qualification at a glance
- Why choose us?
- Planning and teaching
- Assessment
- Administration
- Textbooks & endorsed resources

Sign up for updates >

Support and FAQs >

Contact the team >

01223 553998

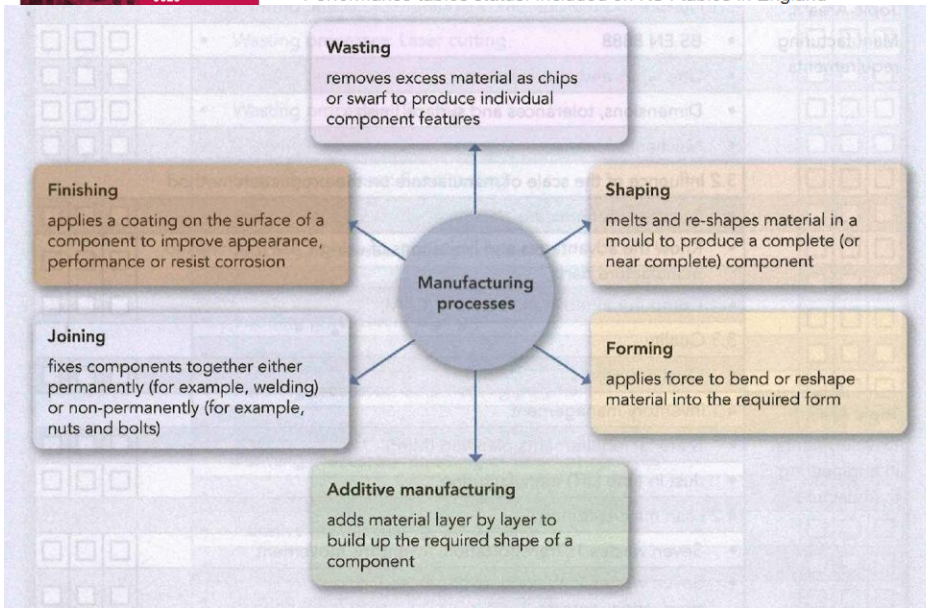
engineering@ocr.org.uk

@OCR_Vocational

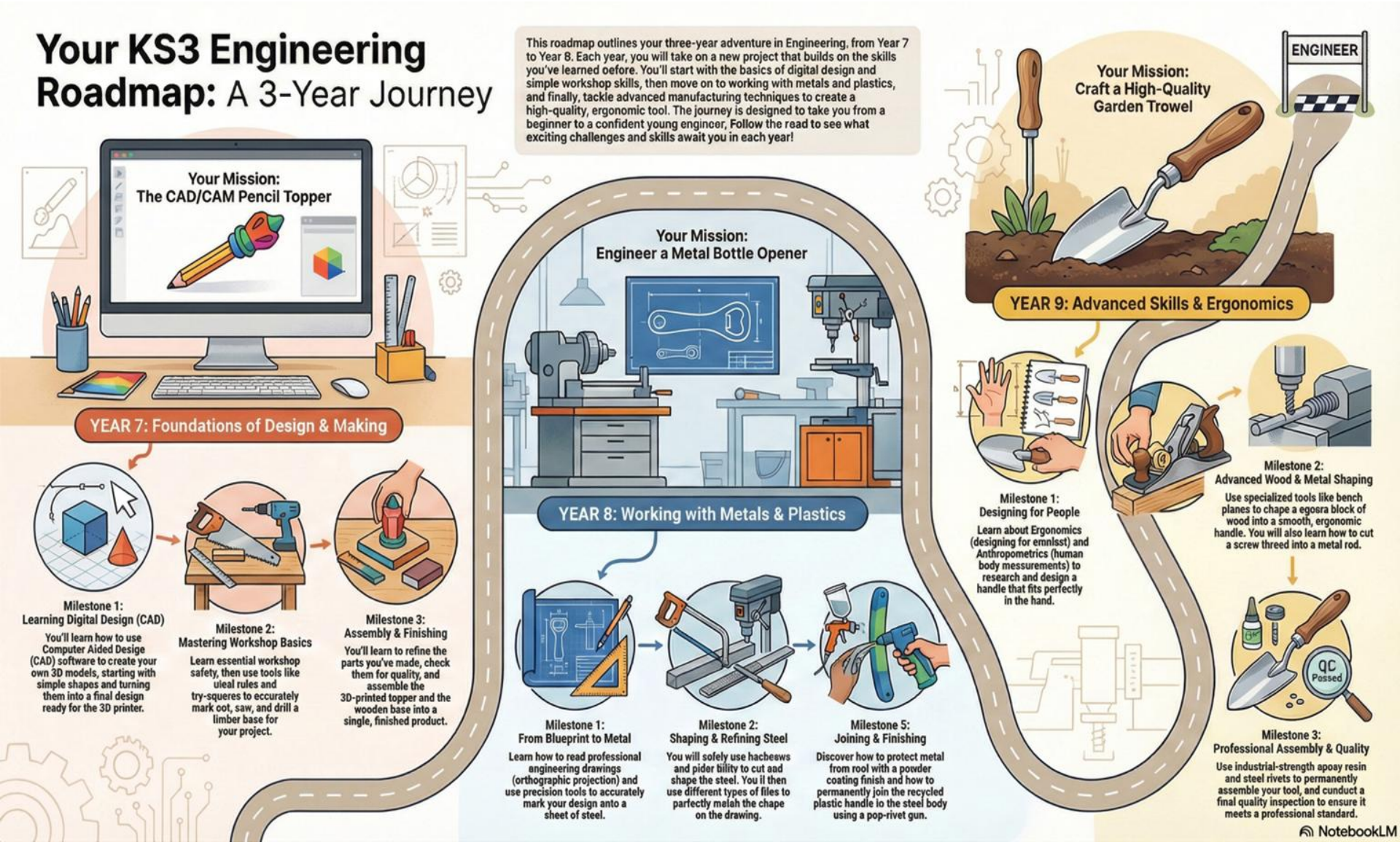
Set assignments for this qualification, for students submitting in the January and June 2025 series, are on our secure teacher website, Teach Cambridge.

Our Cambridge National in Engineering Manufacture will inspire and equip students with the confidence to use skills that are relevant to the engineering, manufacturing, process and control sector and more widely. It covers manufacturing processes, engineering materials, manufacturing requirements and developments in engineering manufacture.

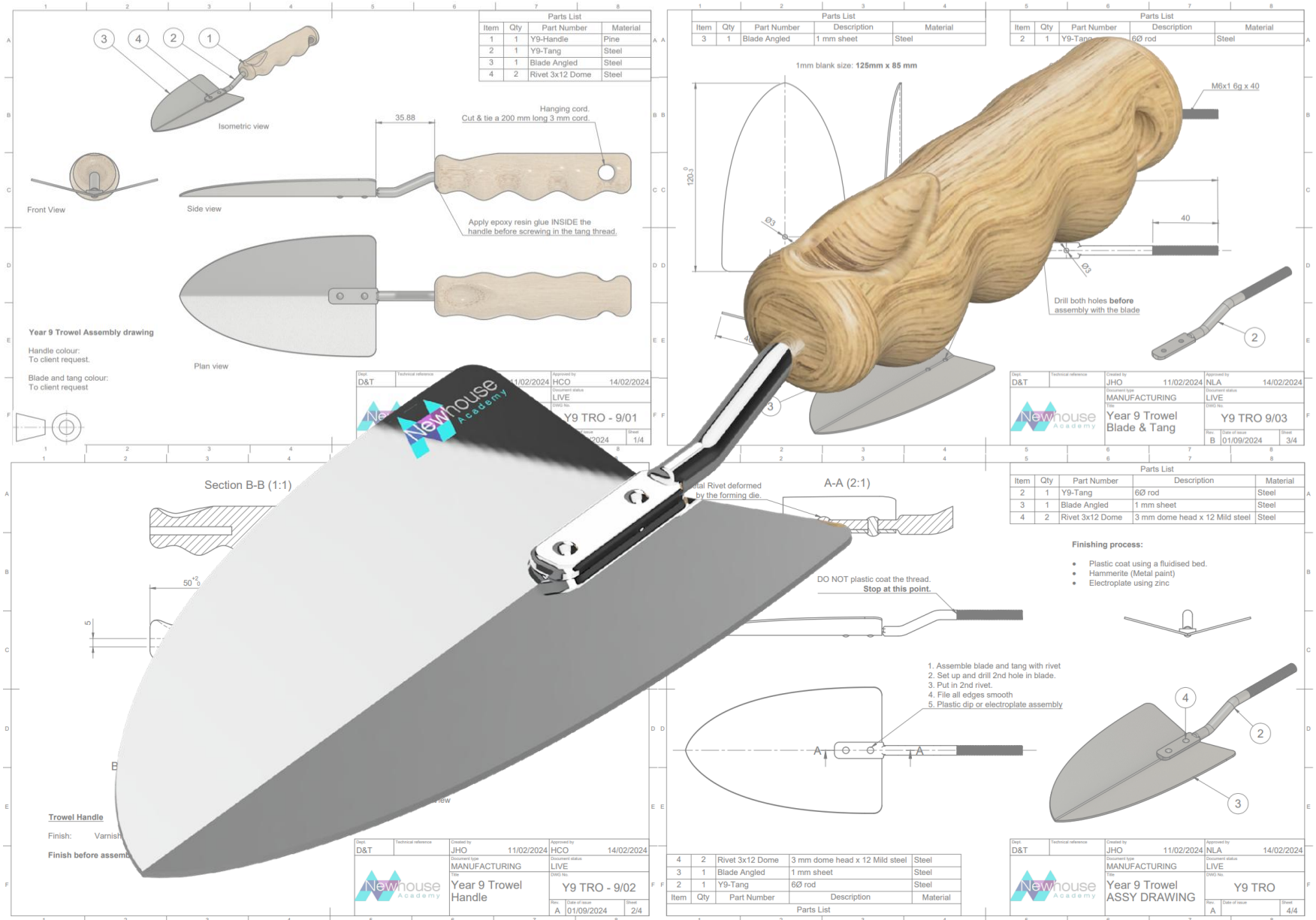
Specification code: J823
Available in England only
Performance tables status: Included on KS4 tables in England



Materials, process, quality control, jigs, fixtures, production.



Materials, process, quality control, jigs, fixtures, production.



Assessment

OCR Engineering Manufacture (J823): Assessment Overview

QUALIFICATION ASSESSMENT STRUCTURE

MANDATORY UNIT PATHWAY

Students must complete all three units to achieve the full J823 qualification.

EXTERNAL VS. NEA

The course combines one externally marked exam with two Non-Examined Assessment (NEA) units.

TERMINAL ASSESSMENT RULE

The R014 exam must be taken in the final assessment series of the course.

UNIT BREAKDOWN

R014

Principles of engineering manufacture

ASSESSMENT METHOD
Written paper, OCR set and marked

MARKS
70

DURATION
1 hour 15 mins

R015

Manufacturing a one-off product

ASSESSMENT METHOD
Centre-assessed tasks, OCR moderated

MARKS
60

DURATION
Approx. 10–12 hours

R016

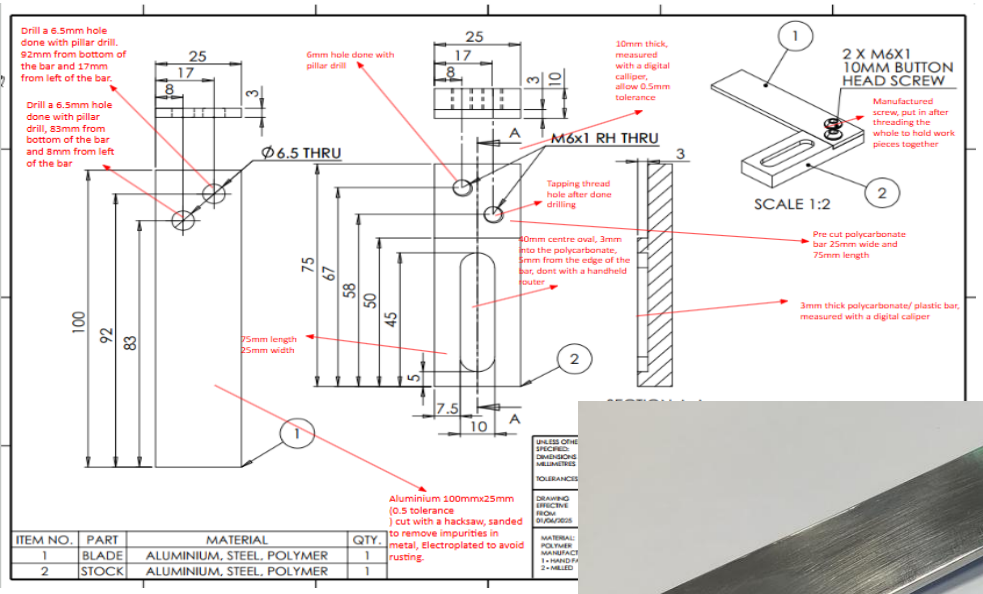
Manufacturing in quantity

ASSESSMENT METHOD
Centre-assessed tasks, OCR moderated

MARKS
60

DURATION
Approx. 10–12 hours

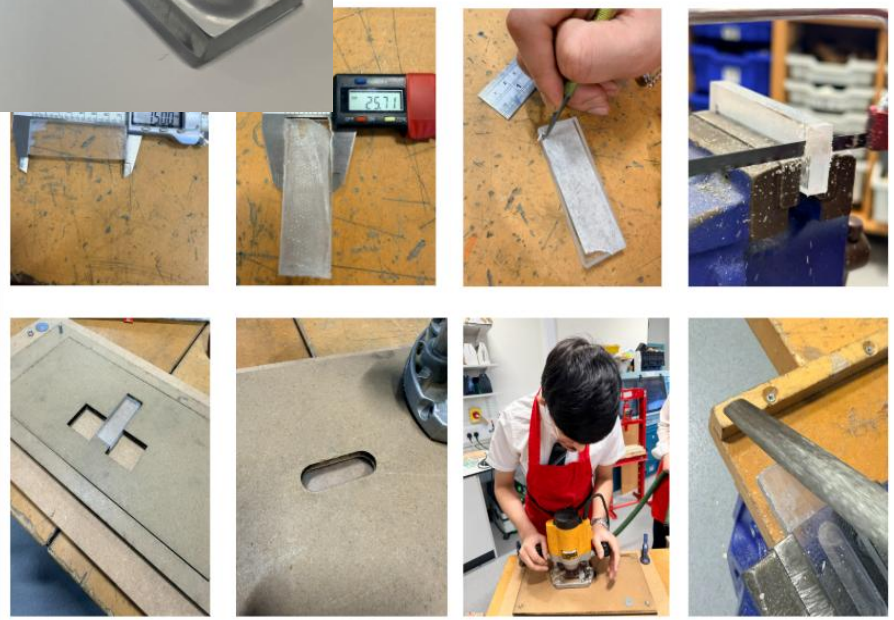
OCr Manufacturing - R015 - Manufacturing a one off.



Engineers' square (blade)

step	task	tools	RA	PPE	Quality control
1	Select a material (100x25mm aluminium) according to the drawing. Make sure the metal bar has a thickness of 3mm with no obvious scratches or imperfections.	Digital caliper	Don't drop the metal. Be aware of sharp edges/corners.	Goggles- protects eyes Gloves- protects hands Apron- protects clothes	Ensure the metal has not be damaged and has no impurities. Ensure correct grade of steel.
2	Paint the required metal sheet with a thin coat of blue dye and allow time to fully dry. (usually around 3-7 minutes)	Paint brush Blue dye	Do not inject dye Do no allow dye in eyes	Gloves-protects hands from staining Apron- avoid staining clothes	Ensure a thin coat of blue dye is painted on the material with little-to-no streaks to avoid mistakes during the measuring and cutting steps.
3	Lightly mark out lines with a scribe of the required length you want for the blade. Also by holding the engineers square to the flat edge of the metal, draw a line parallel to the end of the bar. using the drawing as a guide, leave 0.5mm of tolerance either side of the bar to ensure it does not go below 100mm.	Scribe Pencil Steel rule Engineer square	Be aware of sharp points. Avoid being scratched by scribe. Don't drop metal	Goggles-protects eyes from being pierced. Gloves- avoids scratches and being stabbed Apron- protects clothes	Ensure measurements are done precisely and with accuracy. Ensure marking is done with precise and accurately. Avoid damaging metal
3	Find a Hack saw. (with a secure and sharp blade). Then tighten the blade in the vice, make sure the blade is as far in to reduce it from wobbling causing uneven cuts.	Hack saw vice	Dont trap hand in vice Be aware of sharp edges Be aware of heavy objects	Apron- protects clothes	Ensure work is secure in vice Ensure work is flat in vice Ensure blade is sharp and is not defective
			e aware of sharp points andle saw with care to avoid utting/scratching yourself. on't trap hand in vice on't drop engineer square	Goggles-protect eyes from debris Anti-cut gloves- protects hands from being cut. Apron- protects clothes	Ensure metal is cut accurately along the marked out line Ensure metal is cut straight with minimal waste material. Ensure metal is cut within the tolerance lines
			e aware of sharp edges on't drop metal on't drop file on't trap hand in vice e aware of material temperature to resistance of file	Gloves- protect hands Goggles- avoid debris in eyes Steel toe-cap boots- protects feet Apron- protects clothes	Ensure metal does not decrease in size past the 100 mmn measurement line. Ensure metal inn no bigger than the 0.5mm tolerance line.

Actions	Health and Safety Precautions	Quality a
Here i was checking to see if my work was the correct size and depth using a steel rule	Tie back long hair. Apron- avoid staining clothes	Ensure rule measuring
Once i had finished routering, i moved on the the next task which was drilling. First i measured where the holes would go, using a scribe to mark it out.	Tie back long hair. Apron- avoid staining clothes	Ensure marking lines are clearly visible Ensure marked lines are correct according to drawing
Once done i tightened my work in the hand vice on the pillar drill	Tie back long hair. Apron- avoid staining clothes	Ensure work is securely tightened
I adjusted the settings on the drill to suit the work i was doing. E.g. hight, speed, drill bit size	Tie back long hair. Apron- avoid staining clothes	Ensure pillar drill is quality checked Ensure pillar drill has correct setting for mr workpiece
I then began the drilling process making sure to keep my work secure and stable while drilling.	Tie back long hair. Apron- avoid staining clothes Protection guard- flying debris Protective glasses- flying debris Caution tape- flying debris	Ensure holes are drilled the complete way through.



OCr Manufacturing - R016 - Manufacturing in quantity.

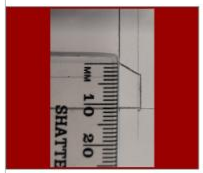
Task 1 – Manufacture templates

I then measured the longest length of component (B) to 55mm, using the fist drawing as a size guide.

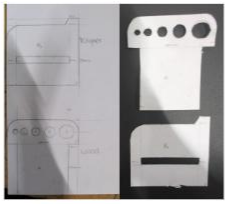
I then measured the longest width of component (B) to 80mm.

Next, i measured 8 mm on weather side of the component so i could mark where the cutout would go.

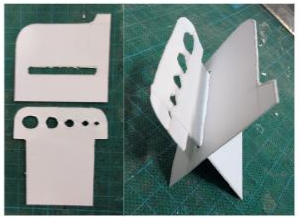
After i marked out where it would stars, i measured the length of the groove (44) and the width which was 6.1mm.



T finish off component B, i measured the length of the upper cut out, amd drew a diagonal line at 118 degrees.



This was the final paper drawing/ model

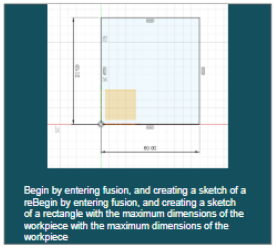


Finally, i used the paper model as a template and marked and cut out the final template out of a thicker card as it would be sturdier.

Task 2 – Produce a Standard Operating Procedure (SOP)

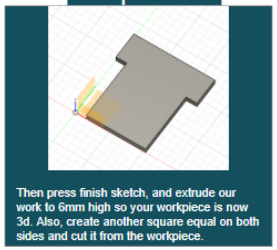
Task	tools/ equipment	Risks; health and safety	Quality control
Clean down the machine and ensure the bed is clear	Laser cutter	Be aware of possible sharp clippings	Ensure bed is completely clear Ensure there is no debris
Select desired material and place it flat on the bed	Laser cutter	Watch for sharp edges Possible burn injuries	Ensure workpiece is flat Ensure workpiece is in correct area
Move (x, y) and align head of the beam with top, right hand side of your work using keys, press origin	Laser cutter	Do not leave machine unattended	Ensure head is correctly aligned with the work so component is correctly cut out
Quality check			
Close the lid and ensure the magnets connect so lid is shut	Laser cutter	Ensure lid is completely closed Don't trap hand	Ensure lid is completely closed
Turn Workshop power on and laser cutter on	Laser cutter	Electrical shocks Do not leave machine unattended	Ensure power is completely on
Check emergency stop is off and accessible to user	Laser cutter	Electrical shock Trap hand	Ensure emergency stop is not on so machine is useable
Check extractor fan is on and connected to laser cutter	Laser cutter Extractor fan	Hand entrapment Hair entanglement Burn possibility	Ensure fan is in good quality Ensure fan is useable
Press start	Laser cutter	N/A	Ensure you check work is positioned correctly Ensure all correct settings are on
Wait for laser cutter stop	Laser cutter	Machine failure	Do not leave laser cutter unattended
Quality check			

Task 3 – Use CAD software

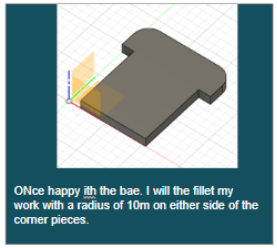


Begin by entering fusion, and creating a sketch of a reBegin by entering fusion, and creating a sketch of a rectangle with the maximum dimensions of the workpiece with the maximum dimensions of the workpiece

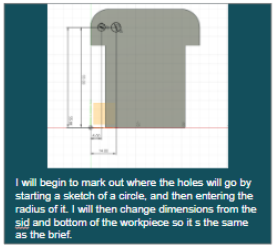
Component A



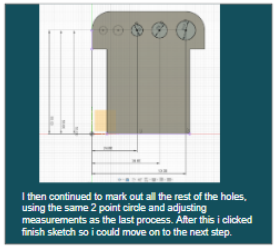
Then press finish sketch, and extrude our work to 6mm high so your workpiece is now 3d. Also, create another square equal on both sides and cut it from the workpiece.



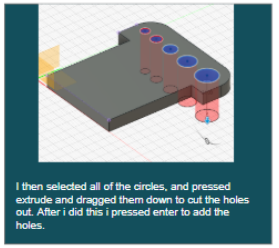
ONce happy ith the bae. I will the fillet my work with a radius of 10m on either side of the corner pieces.



I will begin to mark out where the holes will go by starting a sketch of a circle, and then entering the radius of it. I will then change dimensions from the sid and bottom of the workpiece so it s the same as the brief.



I then continued to mark out all the rest of the holes, using the same 2 point circle and adjusting measurements as the last process. After this i clicked finish sketch so i could move on to the next step.



I then selected all of the circles, and pressed extrude and dragged them down to cut the holes out. After i did this i pressed enter to add the holes.

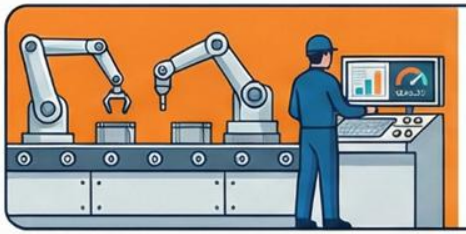
Technical knowledge / manufacturing / making

Technical knowledge / manufacturing / making

Your Future in Engineering Manufacture

The Cambridge National in Engineering Manufacture provides foundational skills in CNC programming, manual machining, and engineering drawings. This qualification acts as a direct bridge to high-demand technical roles and advanced vocational or academic study.

REAL-WORLD CAREER PATHWAYS



Manufacturing and Process Operative

Working in high-volume production environments using automated systems and quality control methods.

CNC Machine Programmer

Using CAD/CAM software to create complex parts with Computer Numerical Control equipment.

Fabrication and Welding Technician

Applying specialist knowledge of materials and joining processes to build industrial structures.

EDUCATIONAL PROGRESSION

T-Levels

Entering technical study programmes focused specifically on Manufacturing, Processing, and Control.

A-Level Design and Technology

Moving into academic pathways that focus on advanced design, theory, and material science.

Level 3 Vocational Qualifications

Progressing to Cambridge Technicals in Engineering or specialized industry apprenticeships.

Newhouse Academy

Hopwood Hall College

Rochdale Training
The Home of Apprenticeships

Apply Now!

About Us | Apprenticeships

Home

Eng
Ma

Our Engin
create, in
boxes, the

The cours
Technolog
delighted
constant i

In fact, this
by employ
Johnson f

Our Engin
industry w
aim to mal
opportunit

As a result
You'll quic
industry e
important

APPLY NOW! We are in the process of re

HNC in Manufacturing Engineering (F

The Pearson BTEC Level 4 HNC Manufac
key knowledge, understanding, and pra
technician, engineering technician, tech
manager. If you are interested in a care
progress onto an HND, this is the ideal

BURY COLLEGE

BOLTON COLLEGE

Search website ...

English

Course Finder | Find Your Career | Our Success Stories | Parents & Carers | Book a Tour | Courses | Quick Links | My Courses

ENGINEERING

STUDENT SUPPORT | WHY JOIN US | TERM DATES | CONTACT US

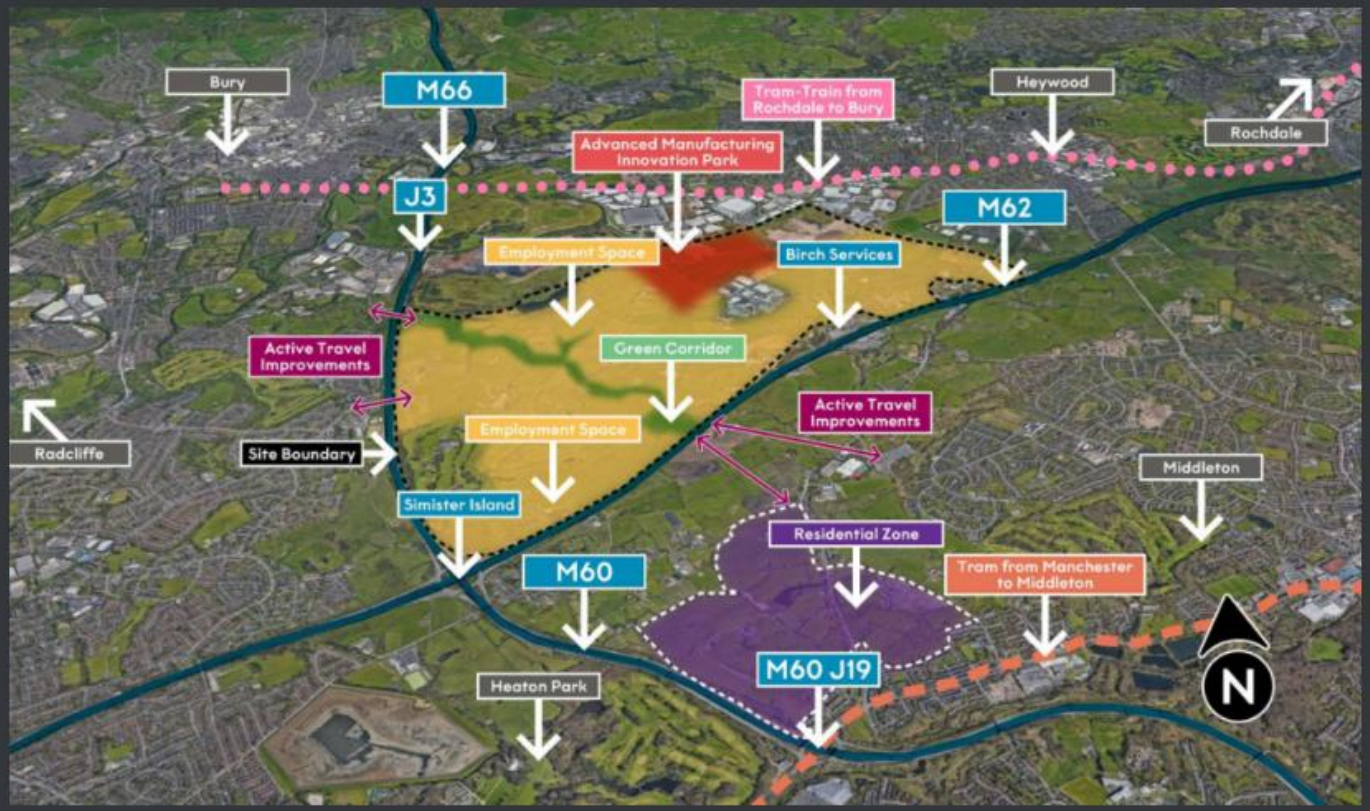
Design, build and innovate with engineering courses that take you from the basics to advanced industry skills. Learn in our £5 million Engineering & Digital Centre, equipped with the latest technology and inspiring spaces to help you succeed in this dynamic, future-focused field.

Newhouse Academy

Atom Valley

Greater Manchester Mayoral Development Zone

Northern Gateway

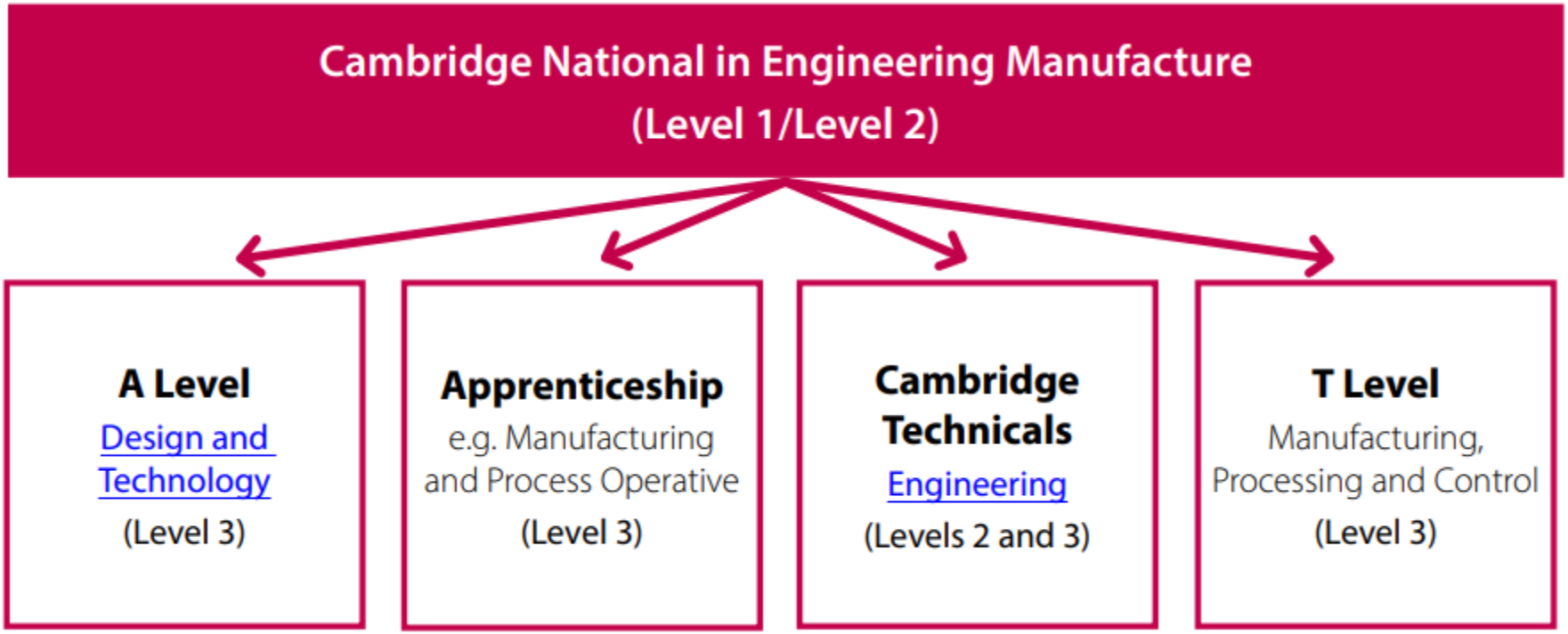


Stretching across 13 million sq ft, the Northern Gateway is Atom Valley's largest single site, occupying a location adjacent to the M60, M62 and M66.

£650m has already been invested with an expected creation of 20,000 new jobs, alongside 3,000 new homes. Primed for development, the site offers a vast amount of flexible space that's ready for design and build. Complemented by active travel routes that link communities and employment areas, a green corridor will run through the site, allowing nature and sustainability to sit at its very heart.

A section of land at the north of the development will be home to AMPI – an initiative that's set to drive innovation for the UK's advanced machinery manufacturers and meet the challenges of developing new technology and emerging markets.

Career opportunities:



- **Manufacturing Engineer:** Designing and improving manufacturing processes. **£30-£60k**
- **Production Manager:** Overseeing the entire production line and ensuring efficiency. **£30-£60k**
- **Quality Control Engineer:** Ensuring products meet strict quality standards. **£30-£50k**
- **Robotics Engineer:** Designing, building, and maintaining automated manufacturing systems. **£30-£60k**
- **CAD/CAM Programmer:** Creating digital designs and programming machines for manufacturing. **£30-60k**
- **Supply Chain Manager:** Managing the flow of materials and products throughout the manufacturing process. **£40-£70k**
- **Additive Manufacturing Engineer (3D Printing):** Developing and implementing 3D printing technologies in manufacturing. **£30-£55K** (Growing market sector)


Future careers ...
Engineer
FURNITURE
ENTREPRENEUR
ROBOTICS
Set Design
Architect
Gaming
ECO DESIGN
Industrial Design
Electronics
Fashion
Programming
GRAPHICS
Product Designer
MANAGEMENT

Design & Technology Department

Design & Technology

Engineering Manufacture

Construction

Food & Nutrition

Any questions?

Please talk to any of us.

Hopwood Hall
Wed 25th March 4.30 - 6.30

Bury College
Thur 26th March 2026 5pm - 7.15pm