

Year Group	Term	1	2	3 &4	4	5	6
	Topic Title	R109 Keyring	R109 Pewter	R109/r110 Lathe and milling skills development	R109 Exam Preparation	R110 Manual Lathework	R110 Manual Lathework
Why are you delivering this topic now? How does it fit with the learning journey?	Rationale	Basic engineering concepts, accuracy & precision. Use of hand tools.	Basic assembly techniques in 3D CAD. introduction to lathework	Advanced lathework, basic milling machine operations. Introduction to heat treatments	Enable pupils to attain 25% of overall examined grade.	Enable pupils to build a pre-production part, following BS8888 conventions with appropriate deployment of a variety of manufacturing method	Enable pupils to build a pre-production part, following BS8888 conventions with appropriate deployment of a variety of manufacturing method
What have pupils already covered that will support?	Prior knowledge	Hand tool usage within KS3	2D/3D CAD from KS3	Basic lathework Milling work	Application of Term 1, 2, 3 work.	Lathework, Milling machine, drilling & tapping	Lathework, Milling machine, drilling & tapping
	Key knowledge/skills development	Accuracy	Developing accuracy, introduction to precision	Selection of correct tools, multi-part assembly	Subject content	Measuring/marketing out/QC/BS8888	Measuring/marketing out/QC/BS8889
	National Curriculum/specification links	Linked to specification content	Linked to specification content	Linked to specification content	Linked to specification content	Linked to specification content	Linked to specification content
	Literacy	Researching an range of theory topics, through reading text from book sources, online sources. summarizing their findings through questions. Evaluating and analysing final practical outcome, making own judgements about final product. Range of new key terms directed at engineering terms.	Researching an range of theory topics, through reading text from book sources, online sources. summarizing their findings through questions. Range of new engineering key terms.	Researching an range of theory topics, through reading text from book sources, online sources. summarizing their findings through questions. Evaluating and analysing final practical outcome, making own judgements about final product. Range of new key terms directed at engineering terms.	Revision techniques and exam practice covered.	Controlled assessment: Range of different literacy tasks: Create tables of instructions, researching tools and equipment to use. Labelling of machines, and engineering drawings. Use of key terms. Reading a set text and answering questions about the text.	As term 5 and creating Health and safety charts. Describing tools and techniques used. Evaluating final product. Explanations of changes if product was MASS produced.
	Numeracy	Working to sizes from engineering drawing. Working to tolerances, using quality control testing equipment. Understanding working to scales. Measuring and marking out. Basic subtracting to work out their difference against an tolerance.(error intervals)	Working to scale and to an engineering drawing to draw up an item.	Working to scale and engineering drawings. Quality control, working to tolerance and working out difference between actual item and intended size. Basic add subtract.		Speeds and feeds maths worked out, using formulas: $RPM = \frac{CS \times 100}{\pi \times \text{diameter}}$ Working from data charts to find cutting speeds. Working to scale and tolerance from an engineering drawing. Measuring stock with rulers and vernier calipers. Micrometers	Quality control, working to tolerance and working out difference between actual item and intended size. Basic add subtract.
	STEM	Researching range of theory topics related to science, technology and engineering subjects. Working to engineering drawings. Practicing engineering skills to mark out projects. Working to tolerances.	Using 3d software fusion 360 to design an pendant. Working to an engineering drawings. Use laser cutter to make the mould. Continue to research range of theory topics related to science, technology and engineering subjects.	Developing engineering machine skills on metal lathe and milling machine. Learning correct names and techniques on machines. Labelling machines, setting up machines. Working to engineering drawings	Learning theory of engineering reas for exam. materials, finishes, techniques, machines etc	Creating a mounting post using a engineering drawing and skills and tools learnt in previous terms. Main skills lathe, milling, pillar drill tapping threads. Working to scale and tolerances	Creating a mounting post using a engineering drawing and skills and tools learnt in previous terms. Main skills lathe, milling, pillar drill tapping threads. Working to scale and tolerances
What other curriculum areas/skills does the topic link with? When are these taught?	Cross curricular links	Maths/Science	Maths/Science	Maths/Science	Maths/Science	Maths/Science	Maths/Science
	Key vocabulary	Engineering Tools	Manufacturing machines	Manufacturing methods	Manufacturing quantities	Lean Manufacturing	CNC Terms

Term	1	2	3	4	5	6
Topic Title	R111 CNC Lathework	R111 CNC Lathework	R112 Quality Control	R112 Quality Control		
Rationale	All pupils need to complete this work as part of their assessment (25%)	https://www.ocr.org.uk/images/582865-computer-aided-manufacturing.pdf	https://www.ocr.org.uk/images/583417-quality-control-of-engineered-products.pdf	https://www.ocr.org.uk/images/583417-quality-control-of-engineered-products.pdf		
Prior knowledge	R109/R110	R109/R110	R109/R110/R111	R109/R110/R112		
Key knowledge/skills development	Manual lathe operation, conversion to CNC control	Manual lathe operation, conversion to CNC control	Ability to differentiate appropriate manufacturing methods	Ability to differentiate appropriate manufacturing methods. Application of QC		
National Curriculum/specification links	Follow OCR Specification	Follow OCR Specification	Follow OCR Specification	Follow OCR Specification		
Literacy	Controlled assessment: Range of different literacy tasks: Create tables of instructions, researching tools and equipment to use. Annotating engineering drawings. Labelling of machines, and engineering drawings. Use of key terms. Reading a set text and answering questions about the text. Learning new languages NC-code and writing code to make a machine work.	As term 1 and creating Health and safety charts. Describing tools and techniques used. Evaluating final product. Comparing man made vs. computer controlled. Research tasks. Watch video complete research tables from information gathered from video.	Controlled assessment Research task: Writing reports on Quality control and procedures used. Research topics from range of sources. Create conclusions from research material. Comparison tasks different measuring tools. Pupils have to research a topic related to quality control and produce research and conclusions in a report style.	Controlled assessment Research task: Writing reports on Quality control and procedures used. Research topics from range of sources. Create conclusions from research material. Comparison tasks different measuring tools. Pupils have to research a topic related to quality control and produce research and conclusions in a report style		
Numeracy	Working to scale and tolerance from an engineering drawing. Measuring stock with rulers and vernier callipers. Micrometres Using measurements from engineering drawing to draw up a computer drawing. Learning computer code to plot coordinates x y z axis work	Quality control, working to tolerance and working out difference between actual item and intended size. Basic add subtract.	Look at quality control tools: Graphs, Check sheets, Pareto charts, Cause and effect, scatter diagrams, Histograms, Control charts. Working to tolerances, looking at different measuring tools, micrometres, vernier callipers gauges, comparators	Creating charts and graphs, tables of evidence to compare tolerances and accuracy to original dimensions. Basic adding and subtracting. Plotting data to create graphs to be analyses.		
STEM	Creating a mounting post using cnc machines. Working to engineering drawings. learning how to set up cnc machines. Learning NC code to program machines.	Drawing on CAD software, to scale and simulating results using software. Working to scale and tolerances. Learning about different cnc process.	Report writing about quality control and different areas involved in quality control. Working to tolerance, equipment used to measure quality control.	Report writing about quality control and different areas involved in quality control. Working to tolerance, equipment used to measure quality control.		
Cross curricular links	Math's/Science	Math's/Science	Math's/Science/Geography	Math's/Science/Geography		
Key vocabulary	CNC, G-Code, QC, Repeatability	CNC, G-Code, QC, Repeatability	Lean manufacturing, Globalization	Lean manufacturing, Globalization		