Design and Technology: Yr 7 (Electronic Focus)

Unit	Key learning for this Unit linked to KS3 syllabus	Key Skills	Assessment opportunities	Links to GCSE/ BTEC specifications	Key Vocabulary
Electronic Focus: Torch Project	Initial electronic theory: Atoms and electrons: conductors and insulators.Flow of electricity - current and voltage.				**Electronic key vocabulary** • Inputs • Control Systems • Outputs; • Electron, Neutron, proton. • Atom • Current • Voltage • Resistance • Electricity • Insulator • Conductor • In series circuit • Parallel circuit • Light Emitting Diode • Capacitor • Resistor • Single pole single throw switch • Solder/ alloy • Printed circuit board **Computer Aided Design vocabulary** • Extrusion • Fillet • Radius • Diameter • Shell • Revolve • Section • Stereo lithographic file • Render • Dimensions **Plastic vocabulary** • Thermoplastic • PLA/ PVC • Bio plastic • Properties: • Plasticity, Brittle, Malleable:
	The role of basic electronic components - How they work:- switch, resistor and Led, batteries- extend to other outputs buzzers, bulbs			GCSE DT- Core knowledge: Control devices and components including: a/ The role of switches in electronic systems; transitors and resistors; Outputs including the roles of outputs in electronic systems;	
	Sustainability: How we can reduce our energy footprint. Advantages and disadvantages of using some components			GCSE DT- Core knowledge: Appreciation of Environmental, social and economic issues relating to the design and manufacture of products including fair trade, carbon offsetting, product disassemby and disposal.	
	Understanding resistance what it is and how to calculate it: Use of Ohms law	Manipulation of mathematical formula.	Math paper calculations for resitance values using units and ability to use formulae to find voltage/ resistance or current	DT - Core: calculation of quantities, and selection of components; mega, kilo,resitance, volts and amps> athematical formulae	
	Using Yenka to problem solve: students to develop an understanding for the basic electronic componenst through simulations of alterrnative circuits.	Using Yenka to simulate circuits	Electronic symbols and their function short test	DT core: systems and schematic diagrams- Applying suitable techniques to communicate design ideas.	
	Use specialsit processes like soldering to manufacture	Soldering components safely			
	Develop design idea using CAD; Use specialist techniques including CAD to design	Developing basic drawing and extruding skills using AutoDesk Fusion to create a torch: Some students to send drawing for 3d printing		DT- core: Use specialist techniques like computer aided design to communicate and record ideas.	
	Develop an uderstanding for Quality control systems to produce a high quality product safely	Select and use specialsit tools such as drills and files to assemble the product.	Assess final product using making descriptors.	DT core: Production of a prototype competentl using tools. Machinery abd components. Demonstrating high degree of safe working practices.	

Design and Technology: Yr 7 (Mechanism Focus)

Unit	Key learning for this Unit linked to KS3 syllabus	Key Skills	Assessment opportunities	Links to GCSE/ BTEC specifications	Key Vocabulary
Mechnism Focus:Mechanical Toy	Develop understaning of mechanical systems to enable changes of movement and force. Through the exploration of linkages, levers and cams	modelling prototypes using non resistant materials.		DT core: Types of movement: Linear, Reciprocating, Rotarty, Oscillating. Linkages: Bell crank, reverse motion linkages. Cams: Pear shaped. Eccentric, Snail cam	Mechanical Toy vocabulary **Mechanisms** • Linear Motion • Reciprocating Motion • Oscillating motion • Rotary motion • Cam: Pear cam • Eccentric wheel • Snail cam • Follower • Pivot. Fixed pivot, loci • Linkage • Input, output • Lever • Force • Mechanical advantage **Design** • Initial ideas • Development • Specification • Quality Assurance, Quality Control • Final Drawing • Annotation • Render • Evaluation **Manufacture**: • PPE • Risk, Hazard, • Medium Density Fibreboard • Plywood • High impact Polystyrene • Clearance hole
	Using formulae to transpose.		Mechanisms test to check key learning of vocab, understanding of movement. Lever type and calculations for MA	DT core: Classification of levers 1,2,3, Calculations of MA/ VR- load,effort and efficiency	
	Using research systems to develop understanding of user needs- questionnaires/ surveys/ high rated products			DT Core-Use research to inform and develop designs	
	Develop a specification to inform the design and function of innovative and appealing products that respond to needs			DT core: Develop specification points that are realisitc, mostly measurable, relevant in relation to the conte3xt.	
	Developing communication skills through drawing using 2d drawing, 3d modelling and annotation based on teacher modelling	skeching and annotation of ideas to communicate effectively	Using KS3 steps to mark design work	DT core: Selection of appropriate graphical techniques and notes to communicate design ideas	
	Understanding the safety and correct function of the Pillar drill, power drill, belt sander, scroll saw, files, abrasives and coping	Using equipment safely Pillar drill, scroll saw and belt sander; hand saws, files, power drill to cut and shape			
	Understand the application of quality systems like templates to create a high quality product. Continual checks and use of drawing equipment for accuracy		Using KS3 steps to mark practical work	DT core: Produce a high quality prototype that demonstrates a sustained high degree of safe worrking pratices with competent tool use	

Design and Technology: Yr 7 (Mechanism Focus)

Unit	Key learning for this Unit linked to KS3 syllabus	Key Skills	Assessment opportunities	Links to GCSE/ BTEC specifications	Key Vocabulary
Textile Focus: Toy Monster	Identification of markets and user needs	Use of graphical techniques to communicate design ideas: Drawing to a suitable size; Using extra drawings to explore close up details, rendering and annotating.	Teacher Assessment: Designing grade for Product	DT: NEA: Investigation of needs and Research	Key Vocabulary: Monster Toy • Mass Production • One off Production • Brie • Analyse • Specification • Measurable Criteria • Target Market • Template • Embellishments • Applique • Risk Assessment • Hazard • Function • Aesthetics • Environmental Impact • Inspiration • Mood Board • Evaluation
	Writing a specification to match user wants and needs		Interactive whole class grading to establish what designs meet each step grade and how to improve	DT: NEA :Appropriate selection of design ideas which meets user needs and specification	
	Scales of Production: The differences in mass and one off Production	Use of templates to transfer designs		DT Core: Production Techniques and systems linked to scales of production	
	Identification of hazards and how to minimise risk.	Accurate use of scissors and pinking sheers to cut out work		DT NEA: Working and planning to high levels of safety	
	Safety marks and what they mean				
	Sequential planning using block diagrams	Using a sewing machine: Able to follow a line		DT: Engineering: DT Food: Sequential Planning of production pre manufacture:	
	Area calculations: To establish amount of fabric used	Select and use specialist sewing equipment including pins, needles, quick unpicks and sewing machines		DT: NEA Refinement of ideas considering cost.	
	Costing: Calculating the cost of the fabric used	Ablity to create a simple running stitch, cross stitch, back stitch and a blanket stitch.		DT: Core Applied Mathematics- calculating surface area: Numerical computation	
		Applique:Layering of multiple materials stitched into place	Interactive whole class grading to establish what designs meet each step grade and how to improve	DT: NEA: Fully considers a selection of fixtures components and fittings which are entirely appropriate to the chosen prototpe	
		Embelishment: Sewing on buttons, ribbons	Self Assessment: Stages of manufacture	DT NEA: Produce a Prototype that demonstrates fully competent making skills:	
	Evaluating success and failure against measurable criteria		Teacher Assessment: Making grade for Product		

Design and Technology: Yr 8 (Windmill/Generator)

Unit	Key learning for this Unit linked to KS3 syllabus	Key Skills	Assessment opportunities	Links to GCSE/ BTEC specifications	Key Vocabulary
	Bio-mimicry- natures use of aerodynamic shapes	Use a variety of approaches to generate creative idea and avoid stereotypical responses			• Biomimicry; • Kinetic Energy • Transfer of energy • Mechanical Advantage • Aerodynamic • Friction • Thermoplastics • Ferrous/ Non Ferrous Metals • Ecological Footprint • Sustainability • Proprietary components • Working properties • Characteristics • Iterative • Stereotypical • Analysis
	Understanding user needs and applying a windmill brief and specification to suit them:	Ability to analse existing products and break it down into key areas regarding user needs; form; function; performace requirements; sustainability; aesthetics.		DT Core: Analysing a product and followig specifcation criteria; BTEC Engineering: Analysing final design against a brief	
	Environmental issues linked to plastics- Life cycle analysis.			DT core: An appreciation of the environmental, social and economic issues relating to the design and manufacture of products including fair trade, carbon offsetting, product disassemby and disposa	
	Sustainability: designing a product with minimal impact.Reduce, Reuse, Rethink, Recyle				
	Understaning the effects of friction in a device and how to minimise. Use of Bearings	Iterative modelling 1st generation models to create a free running winmill- experimenting with different components to minimise friction and analyse effect.	Self analysis to identify improvements to the function of their work		
	Understaning thermoplastic properties: HIP, Acrylic, Biopol	Heat modelling thermoplastic to create aerodynamic shapes	self analysis to identify improvements to the function of their work: Advantages and Disadvantages of using plastics considering properties and sustainability	BTEC Engineering 2a Evaluate engineering materials and properties; DT core- Apply knowledge and understanding of working properties and characteristics.Hardness, toughness, durability	
	Understanding Properties of aluminium and mild steel	surface decorating, bending, forming and cutting mild steel and aluminum	Self analysis looking at the properties of aluminium in regards to its suitability for the wind generator	BTEC Engineering 2a Evaluate engineering materials and propietary components; DT core- Apply knowledge and understanding of working properties and characteristics.Hardness, toughness, durability	
	Understanding what is meant by pilot holes, clearance holes, tables of thread sizes; propietary components	Application of mechanical fixtures: Pop rivoting, nuts and bolts, cutting screw threads.		BTEC Engineering 2a;Understanding of mechanical fixixngs: IMI Automotive Engineering	

Design and Technology: Yr 8 (Windmill/Generator)

Some students to gain key knowledge using CAD drawing packages	Develop and use a range of communication techniqes: annotated sketches, freehand sketching 2d,3d: modelling; Some students to extend to CAD drawing for 3d printing	Teacher assessment grading the Design work	DT core: Developing a range of communication skills: BTEC Engineering Component 1b Preparation of design proposals including CAD final soloution	
Use of gears and pulleys to transfer motion: Kinetic energy into electrical energy; Mechanical advantage: Function of a generator with a wind generator; How generartors work		Short written test to establish learning of the concept	DT core: Function of mechanical devices used to produce different movements and change the magnitude of force	
Susainable energy and ecological footprint related to energy production from both green and non renewable sources.			DT- core: Investigate social and environmental challenges when identifying opportunities and constraints that influence designeing	
	Using machinery and hand tools safely to drill, cut and shape resistant materials like thermomplastics, softwood, plywood, mild steel and aluminium	Safety passport signed off to establish students can use the tools and machinery safely	DT core: BTEC Engineering; BTEC Construction: Be able to use tools and machinery to produce high quality products safely	
	Cutting screw threads for assembly using dies		BTEC Engineering; IMI Automotive Engineering: Using propietarry components to assemble an engineered product	
Skills using Auto Desk Fusion and 2D design to communicate ideas and transfer to CAM and 3D printer	Some students will use 3D drawing technology to 3D print components			
Use of QC and QA procedures to produce a quality product	Produce a prototype that demonstates competent making skills and high levels of safe working practice for themselves and others	Manufacturing assessment marked by the teacher	DT NEA; BTEC Engineering Unit 2C: Manufacture a high quality prototype	

TCS KS3 Technology Curriculum

Food

Year 7

Year 7	Outline of Course/ SOW delivery	Key Assessments *(End point task)*	Skill Development *(How does this unit build on prior knowledge?)*	Key Vocabulary *(URL link to Tier 2&3 key words)*
	The focus of year 7 practical work is 'Healthy Eating'. We will be making food products that introduce students to a range of different practical skills, cooking methods and learn about what makes a balanced, healthy diet. Students will learn about; how to lead a healthy lifestyle, a range of food preparation and cooking techniques, how to adapt and follow recipes, measure and weigh ingredients, the principles of food hygiene and safety and the science behind food. The work has been developed to enable students to learn the basic cooking skills, appropriate health and safety in the kitchen and where food comes from.	At the end of the rotation students will make one of the dishes made during the rotation and make improvements or adapt the recipe, taking on board feedback from tasters and or teacher feedback. Students demonstrate what they have learned during their time in food technology and show off their skills in this final dish.	This unit builds on student's prior knowledge relating to 5 a day and developing a deeper understanding and apply the principles of nutrition and health. Students will cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet.	The Eatwell guide Claw and bridge method Hob Grill 4 C's

Year 9	Outline of Course/SOW delivery			
	The focus of year 9 practical work is 'Dietary Requirements'. We will be making a range of products that require a number of skills and learn about the dietary requirements of groups of people. Students learn how to cook a range of dishes safely and hygienically and apply their knowledge of nutrition. In addition, they will consider consumer issues, food and its functions. Students will apply the principles of *The Eatwell guide* and relate this to diet through life. Students will learn about the relationship between physical activity and the food we eat. How to achieve energy balance and how our dietary requirements change through life.			

Year 9 Timber Focus					
	Lesson Tasks	**Resources**	**Learning knowledge**	**Skills**	**Links to KS4**
Week 1	Introduction to marking out using Marking gauges, try squares, jigs and templates:	Test materials and marking out equipment			
		You tube clips can be used for marking out if required to show a larger audience view	Subject specific knowledge of tool names and functions for marking out	Use of marking out tools	
	Teacher demonstration to focus on marking out:How to use tools accurately and safely		What Quality Assurance and Quality Control are and how to apply them in marking out	Working to the waste side of materials	
	Introduction to quality control and Quality assurance: Tolerances, cutting to waste side of line; Use of jigs and templates				
Lesson Objective:	Students to develop and understanding for the accurate use of marking out tools				
	Students to develelop an understanding for quality assurance and quality control and how to apply them to marking out.				
Differentiation	Less able students will use jigs and templates manufactured by the teacher to aid marking out				
Homework	Complete worksheet on marking out tools: Picture of tool; what it does; how its used safely				

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 2	Introduction to using cutting and waste removal tools	Bench hook,Tenon, Coping and Mitre saws, Bevel edged chisel and mallet. Test wood for students	Use of Tenon, Coping and Mitre saws; When and how to use them safely; Bevel edge and Mortise chisel.When and how to use them safely	Using a Tenon and Coping saw safely and correctly including changing the coping saw blade.	
	Practical focused lesson: Teacher to demonstrate cutting and using the chisel to create a lap joint to all students and a comb joint to the more able students.	jig/ template to assist marking out		Using the bevel edge chisel and mallet safely to remove waste material	
	Students to manufacture 2 rebate or lap joints in test materials. Some students to move onto comb joints				
Lesson Objective:	Students to develop an understanding for the safe use of a Bevel edged chisel in removing waste from wood;				
	Students to develop an understanding fo using and holding a tenon saw correctly to cut a straight line in wood				
	Students to develop and understanding for using a coping saw safely including angling and changing the blade				
Differentiation	Some students will only be able to cope with a lap or rebate joint. These students may need to use files to assist them. In some cases it may be a neccessity for the teacher to assist with some machine cuts.				
Homework	Worksheet completion: Identify the Tenon Saw,Coping saw, mitre saw, Bevel edge and mortice chisel; Router; Explain when they are used and how they are used safely				

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 3	Consilidation of skills from week 1 and 2				
	Teacher to demonstrate how to mark out and cut out both the comb and rebate joints in order to consolidate learning and pick up mistakes: Focus again on QA and QC measures to ensure quality products	Homework sheet on scales of production	Scales of production: Focusing on one off, batch and mass production. Constraints and opportunities: Build from use of jigs and templates to CAD CAM and CNC	Students to develop wood working specific skills using marking out tools, hand saws and chisels to manufacture joints	
	Students to finalise their practice joints and apply techniques safely	jigs, templates for joints			
	Introduce batch production methods like using the CNC router though a demonstration or a You tube clip. Discuss the positives and negatives of machine production technniques opposed to hand crafted measures: See Learning Knowledge			Some differentiated students may gain CAD CAM skills using 2D design and the Boxford Router	
Lesson Objective:	Students to develop an understanding for different scales of Production.				
	Students to continue to develop their skills in both marking our a woodwork joint accurately and using hand tools to cut out a rebate and comb joint.				
Differentiation	Students who are more able could move on to assembling the joints using PVA and cramps to create a structure				
	Less able students will use jigs and templates manufactured by the teacher to aid marking out. Teachers may also need to clean up some of their joints on the bandsaw. Some students may prefer to use files rather than chisels for greater contro;				
	Where a student is physically disabled or extremely able intoduce the use of the cad cam router for automated production techniques				
Homework	Scales of Production worksheet: Students to describe: One off, Batch, Mass and Continous Production. More ables students to explain the advantages and disadvantages of these methods of production				

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 4	Teacher: Intoduction to the Project: What students will be making:	PowerPoint imagery; Working drawing; existing product	Wood types: Soft wood, Hardwood, Manufactured Boards: Properties and working characteristics.	Continued development of marking out , curtting out and chiselling in wood skills.	
	Teacher: Introduce a selection of the wood available focusing on material properties and working characteritics: Discuss sutainability and environmental footprint of the different woods considering manufacture and origin. Focus on FSC wood. Soft wood- Red Deal; Manufactured boards- MDF, Plywood, Hardwoods- Oak, Teak.	Material selection pre cut for students in alternative materials. Some further test pieces available where students want to explore working characteristics of alternative materials	Sustainability and environmental footprints of manufactured boards, hardwoods and softwoods. Role of the FSC.		
	Teacher to give out final drawing with measurements for the students to work to:	Templates and guides for students: Rod for each table	Use of a Rod in the assistance of sizing	Using a Rod to assist the sizing of their product	
	Teacher to give out templates and guides for students that need assistance		Reading an orthographic drawing		
	Students to select the wood they need and label it as their own. This could be signed off to ensure they work with care as they will discard it when the make mistakes.		Safe working practices when working with softwoods and hardwoods: Hazards, risks and actions needed		
	Students to focus on marking an cutting out their wood: Aim to mark out 2 ends at a time: Get them to QC their own work and possible assign another person on the table to qc for them.				
Lesson Objective:	Students to develop an understanding for marking out and cutting out a joint with accuracy using the supports and understand the				
	Students to develop an understanding for the sort of choices they need to make when selecting materials that will involve properties and should involve ethical ans sustainable factors.				

Differentiation	Students will be supported with templates, rods and jigs to assist marking out where needed: Student with physical disabilities will mark out on 2D design	
Homework	Students to complete a worksheet on wood properties, characteristics and typical uses. Differentiation can include risks from using those materials and how to limit exposure when working with them/ Why we should use local and FSC wood	

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 5	Teacher and students anlyse the joints what is going wrong and how can we improve our working practices using the QA and QC measures available. Student and teacher to demonstrate the correct practices to reinforce the key knowledge and skills: Recap how to use tools and equipment correctly and safely.	Routing table pre set with router bit: Extra wood cut for base of box.Jigs, templates, rods available to assist; You tube video or screen shots to assist instruction: 5 min starter or video linked to hazards and control measures related to wood dust-equipment	Identification of hazards, levels of risk and control measures needed when working with differnet types of wood and relevant tools and equipment	Continue to develop cutting and shaping skills using wood saws and chisels in the consruction of wood joints.	
	Teacher to discuss hazards of working with the different types of wood dust. What control measures need to be taken to minimise the risk of inhalation and skin irritation.		Application of quality management systems to ensure a high quality product		
	Students to continue to focus on their joint construction.	Homework sheet on risk assessment			
Lesson Objective:	Apply QA and QC measures to their marking out and cutting out to improve joint accuracy				
	understand what is meant by a risk assessment including awareness of what is a hazard and how it may be controlled				
Extension	Some students may need to be shown routing a groove using the table router.From this they can then look at cutting and fitting the base				
Differentiation	Student joints may need to be cut with the bandsaw by the teacher; Use jigs and templates to assist marking out. LA students to be guided to lap joints only: HA to move onto routing and can also use CAD CAM to make joints				
Homework	Students to complete a worksheet on risk assessment linked to the project both materials and tools and equipment				

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 6	Introducing the table router to cut grooves in the side panels:	Video starter of a high speed router. What it can do- extend to CNC Router	What a router is: When and where they are used. Advantages of using them	Continue to develop cutting and shaping skills using wood saws and chisels in the consruction of wood joints.	
	Teacher to demonstrate how to use the table router and the H and S involved; Direct supervision is needed:	Extra panels for top and base			
	Teacher to demonstrate how the top and bottom panels will fit into the slots; Give tips on marking out and cutting accurately: Use of the plane to smooth edges.	Router and push sticks set up and ready for demonstration		Develop some understanding of how to to cut slots in wood by using a table router safely.	
	Students to continue jointing their boxes and working towards assembly.				
Objective	Students to understand the function of a high speed router: What is does and how to use it safely				
Differentiation	CNC Router can be used for some students: Technician can pre groove students work				
Homework	Students to research imagery that can be used for their pencil box				

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 7	Teacher to show sample products to explain the effects that can be created by using a laser	Computer room booked	Vectorising bit map imagery into vector imagery using cut studio.	Vectorising bit map imagery into vector imagery	
	Teacher to demonstrate vectorising images through cut studio.	students set up with default CAD page sized to fit Pencil box	Understanding the basic tools in 2D design to create CAD drawing.	Using 2D design to create CAD drawing.	
	Teacher to demonstrate the use of 2D design in creating imagery for the pencil box lid.	Sample products and imagery of laser cutting and engraving			
	Students to create their own pencil box lid using the pre set sized document saved in R drive.				
Learning Objective	Students to develop an understanding for 2D design: Key functions				
	Students to develop an understanding for using Cut Studio in order to vectorise an image				
Differentiation	Some students can move onto drawing the Pencil box in Isometric and rendering in tone using 2D				
Homework					

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 8	Teacher to demonstrate the laser cutter producing a piece of the students own work	CAD CAM room with demonstration set up	How a laser works to cut and engrave an image + H& S issues		
	Split lesson with some students continuing to work on their CAD drawings for the laser	Computer room booked	Vectorising bit map imagery into vector imagery using cut studio.	Vectorising bit map imagery into vector imagery	
	Teacher to display exemplar student work to reiterrate best practice for students who need extra time to create their laser pencil case top.	students set up with default CAD page sized to fit Pencil box	Understanding the basic tools in 2D design to create CAD drawing.	Using 2D design to create CAD drawing.	
	Teacher to demonstrate setting up page for isometric and demonstrating how to colour fill in tone to create a drawing of their pencil box. This will set up the homework and the extension rask	Sample products and imagery of laser cutting and engraving	Isometric grid paper for homework		
	All students to complete the laser image.				
Extension	Students can complete their pictorial views in CAD using the isometric grid. Print out for folios	Sample examplar isometric drawings	Understanding of an isometric view and how to create one for a simple cuboid.	Development of 3D drawing skills.	
Learning Objective	Students to develop an understanding for 2D design: Key functions				
	Students to develop an understanding for using Cut Studio in order to vectorise an image				
Differentiation	Some students can move onto drawing the Pencil box in Isometric and rendering in tone using 2D				
Homework	Drawing an object at home in isometric either using 2D design through the desk top or using grid paper. Set up help tutorial on class charts page.				

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 9	Teacher to demonstrate the application of different glues on a range of materials: Discussing advantages and disadvantages.	Glues and materials to glue; PPE for glues; cramps; try squares	Adhesives: What they glue, how they are applied; how to use them safely.	Clamping work squarely under pressure	
	Teacher to demonstrate clamping work squarely whilst glue is setting	CAD CAM room available			
	Some students will need time to complete CAD work in the CAD CAM room	Table router set up with push sticks and PPE			
	Some students will be assembling their products	Homework worksheet			
	Some students will be using the table router				
	Some students will need teacher assistance to ensure all the joints are completed				
Learning Objective	Developing an understanding for using adhesives. Which one to use and which materials: Advantages and Disadvantages				
Differentiation	Teacher will need to assist many students during the lesson both in cutting and correcting joints in order to speed them up. Some default				
Homework	Complete worksheet on glue types. Extend to advantages and disadvantages; Risks and Conrol measures when using				

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 10	Teacher to demonstrate how to apply stain, varnish, wax, thin paint onto wood to create a quality finish: - masking, rollers, sponges ; thinning	Technician available to laser cut lids	Wood finishes and their controlled application	Using stains and varnish to create a quality finish.	
	Recap of assembly, QC measures to ensure box is straight.	Technician has pre cut lids ready for lesson		Asembling a product using a Rod to assist	
	Some students to CAD lid	Stains, varnish, wax, thin paint (pre made in jars with water) brushes, meths, white spirit, gloves, rags, sponges,			
	Students to be focused on manufacture and assembly of their Pencil case box	Some pre routed student work completed by the technician outside of lesson to catch up slow students			
		Rods			
Lesson Objective	Developing an understanding for using finishing techniques for wood				
Differentiation	Slower students will have technician assistance to speed them up- probably outside of the lesson.				
	Stronger students will work independently: Rods used to help with assembling squarely.				
	Pre lasered lids can be given to students who are very behind or need further assistance				
Homework	Students tp complete a wood finishing worksheet				

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 11	Teacher led self evaluation of work. What grade have they achieved and why> How do they improve performance	Technician available to laser cut lids	Mark scheme requirements: The criteria needed to achieve the 5-7 steps	Using stains and varnish to create a quality finish.	
	Continue to recap QA and QC measures to attain a high quality product>	Technician has pre cut lids ready for lesson		Asembling a product using a Rod to assist with sizing	
	Students to be focused on manufacture and assembly of their Pencil case box	Stains, varnish, wax, thin paint (pre made in jars with water) brushes, meths, white spirit, gloves, rags, sponges - set up on tables		self evaluation against others and a marks scheme in order to improve	
		Some pre routed student work completed by the technician outside of lesson to catch up slow students		Applying quality management skills to produce high quality work	
		Rods			
Learning Objective	Developing self evaluation skills:				
Differentiation	Slower and LA students will have direct assistance in manufacturing component parts either in the lesson or outside of the lesson.				
Extension	HA students to devlop thier CAD drawing once completed: This could be in the form of orthographic drawing of their pencil box or they				
Homework	Revision of key knowledge covered during the project: wood types and properties, glues and finishes; tools and				

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 12	Final Lesson				
	Teacher to recap mark scheme and quality of work needed to achieve the high marks: Teacher to recap the dos and don'ts of assembly and final staining.	Evaluation templates and camera	Developing reflecitve thinking skills in order to peer and self assess their own and others work.	Applying quality management skills to produce high quality work	
	Teacher to explain peer assessement and style of positive and constructive feedback necessary.	Access to CAD CAM room		Using stains and varnish to create a quality finish.	
	Students to evaluate their work with the assistance of Peer based assessment	Samples of plywood for laser engraving of signs		Assembling a product using a Rod to assist with sizing	
	Teacher to assess work at this period giving feedback to students	Technician to have caught some students up by routing their work and cutting the base in readiness for assembly and staining			
	Students to complete the final assembly and finish of their work if still incomplete	Painting and staining area set up			
Extension	Some students can complete any outstanding isometic drawings of their finished product using 2D design				
	Some students could use 2D design to produce a sign for laser engraving by the technician.				
Learning Objective	Developing skills of self and peer assessment through guided reflection				
Differentiation	Students who were behind will have had the technician rout their work and cut the base ready for staining and gluing. More able students can continue to develop their skills using 2D design to complete and render outstanding drawings or complete a sign to be laser engraved.				

Year 9 Engineering Focus

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 1	Introduction to course and expectations	Course PPT and Booklets			
	Starter: What is engineering and engineering sectors.	YouTube clip for introduction to engineering	Understanding of engineering diversity	Listening	Component 1A - Engineering sectors
	Teacher demonstration: Screwdriver blade - Marking out silver steel, cutting and filing. H&S in workshop and using hacksaw. Reading the orthographic drawing.	4mm Silver Steel, workshop tools. Screwdriver drawing	Reading a drawing for dimensions. Marking and cutting accurately. Names and function of tools.	Accurate practical skills - marking, cutting and filing	Component 2C - produce a component - skills. Component 3
	Centre Lathe - pair up - waiting list. Students to start one on one centre lathe tasks	Centre Lathe	Centre Lathe keywords	Centre lathe processes	
Lesson Objective:	Students to develop an understanding of 'the world of engineering' Students to develop measuring, metal cutting/filing skills and reading an engineering drawing				
Differentiation	Practical task - differentiate by outcome - use examples and images of final product				
Homework	Produce a leaflet/poster/PPt about 'What is Engineering' Focus on one engineering sector				

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 2	Starter - Health and safety in the workshop	PPt and booklet			
	Introduction to Centre Lathe - H&S - Video demonstration of facing off, tapering and drilling.	Lathe processes - video clips (booklet)	Lathe processes - facing off, tapering and drilling (shaping processes)	Lathe skill processes	Component 2A Component 3
	Screwdriver blade cutting and filing. (Ext. project)	4mm Silver Steel, 16mm Aluminium bar, workshop tools. Screwdriver drawing	Develop making skills		
	Production Planning - Introduce diary of making	Booklet plan of making	Plan use of tools and resources	Planning how to manufacture a product	Component 2C - Planning
Lesson Objective:	Students to develop an understanding for Centre Lathe skills - Facing off, tapering and drilling Learn how to cut and file silver steel bar safely				

Differentiation	Students will be closely supervised using the centre lathes and assistance given as required. Describe>Explain>Evaluate BTEC model used for writing up lathe process task in booklets.
Homework	Complete worksheet activities on centre lathe processes

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 3	Starter - Centre lathe processes	Booklet			
			Heat treatment processes - high carbon steels		
	Heat treatment - Hardening and Tempering - Video clip - Filmed in class - Class exercise in book Centre Lathe Processes - Knurling, turning and chamfering	4mm Silver Steel, 16mm Aluminium bar, workshop tools. Screwdriver drawing Booklet	Centre Lathe processes - Knurling, turning and chamfering - keywords and technique	Heat treatment processes and H&S Centre Lathe processes - Knurling	Component 2A - Processes - Heat treatment and centre Lathe

Lesson Objective:	Learn how to harden and temper high carbon steel. Learn knurling and turning techniques on the centre lathe
Differentiation	Students will have the option to add decorative features using turning techniques for the screwdriver handle.
Homework	Hardening and Tempering worksheet: Students to consolidate knowledge of heat treatment process

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 4	Starter - Hardening & Tempering / Knurling	Booklet			
		4mm Silver Steel, 16mm Aluminium bar, workshop tools. Screwdriver drawing Booklet	Writing specification points. Isometric and oblique drawing techniques.	Interpreting a design brief and specification	Component 1B - Specification and drawing techniques
	Introduction of memo holder mini - project. Given specification. Isometric and Oblique sketching.				
		Aluminium flat bar for milling machine. Cut to size on power saw.			Component 2C - manufacturing a component
	Students can start to file the aluminium blocks and polish			Isometric and oblique drawing techniques	

Lesson Objective:	Learn how to interpret a given specification Develop understanding of drawing techniques

Differentiation Students will have opportunity to be creative with the memo holder project or support given for standard project.

Homework Research the memo holder mini project ideas - decorative features - final idea in isometric.

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 5	Starter - Hardening & Tempering / Knurling	Booklet			
	Milling machine demonstration for aluminium block. Cutting Process. Centre punch block and file/mill faces - polishing	Aluminium flat bar for milling machine. Cut to size on power saw.	Writing specification points. Isometric and oblique drawing techniques.	Interpreting a design brief and specification	Component 1B - Specification and drawing techniques
	Students complete range of practical tasks for both screwdriver and memo holder. Teacher and TA to supervise heat treatment, centre lathes, drilling and milling machines. Demonstration: Using Tinsnips for sheet mild steel.	4mm Silver Steel, 16mm Aluminium bar, workshop tools. Screwdriver drawing. Tinsnips. Mild steel 100x100mm. Booklet	Produce screwdriver to a given specification and orthographic production drawing.	Reading a working production drawing to produce accurate components.	Component 2C - manufacturing a component

Lesson Objective: Learn how to use the milling machine to face off edges and produce a slot.

Differentiation Students will have the option of using the milling machine or files to finish edges

Homework Add to processes research file > Milling Machine > Describe/Explain/Evaluate this process

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 6	Starter - Isometric and oblique sketching	Booklet			
	Pillar Drill demonstration for screwdriver and memo holder block. Explain fluted drill bits as part of cutting process. Explain use of jigs to aid drilling. Use component 3 drilling jig example.	Booklet task - students to annotate booklet worksheet in their books.	Safe practice for drilling process. Keywords and components. How a jig can aid drilling.	Using Pillar drill safely to drill holes in metal, correct size for tapping.	Component 2A - Processes
	Students complete range of practical tasks for both screwdriver and memo holder. Teacher and TA to supervise heat treatment, centre lathes, drilling and milling machines. Demonstration: Using cutting/bending 4mm rod	4mm Silver Steel, 16mm Aluminium bar, workshop tools. Screwdriver drawing Booklet	Produce screwdriver to a given specification and orthographic production drawing.	Reading a working production drawing to produce accurate components.	Component 1B. 2C and 3 - related to making skills and knowledge

Lesson Objective: Develop understanding of using the pillar drill safely and accurately

Differentiation Pillar drill task will be differentiated according to BTEC model Describe > Explain > Evaluate

Homework Add to processes research file > Pillar Drill > Describe/Explain/Evaluate this process

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 7	Starter - Pillar Drill process	Booklet/PPt			
	Tap and die demonstration for screwdriver grub screw and memo holder stand (4mm, 5mm & 6mm) Show how to use tap & die charts for drill hole sizes	Tap and die booklet task	How to use tap and die equipment accurately	Using a tap and die set	Component 2A - Processes
	Students complete range of practical tasks for both screwdriver and memo holder. Teacher and TA to supervise heat treatment, centre lathes, drilling and milling machines. Demonstration: Using Spot Welder	4mm Silver Steel, 16mm Aluminium bar, workshop tools. Screwdriver drawing Booklet	Produce screwdriver to a given specification and orthographic production drawing.	Reading a working production drawing to produce accurate components.	Component 1B. 2C and 3 - related to making skills and knowledge

Lesson Objective: Develop understanding of using the tap and die set

Differentiation Students will start with tapping a 4mm hole but can try 5mm or 6mm if necessary.

Homework Add to processes research file > Centre lathe Knurling & Turning > Describe/Explain/Evaluate this process

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 8	Starter - Disassembly	Booklet / PPt			
	Disassembly demonstration. Students to pair up and perform a disassembly of a given product. Students will need to record details about the parts. Focus given to proprietary components.	Products to disassemble (Motor vehicle or scooter) Booklet task to record the parts and features	Tools required for disassembly and the features that can be recorded.	Disassembly and assembly of a given product.	Component 2B - disassembly
	Students complete range of practical tasks for both screwdriver and memo holder. Teacher and TA to supervise heat treatment, centre lathes, drilling and milling machines.	4mm Silver Steel, 16mm Aluminium bar, workshop tools & machines. Screwdriver drawing Booklet	Cutting & filing, Hardening & tempering, Lathe work, pillar drill, milling, tap&die, tinsnips, spot welding	Range of making skills related to screwdriver and memo holder projects	Component 1B. 2C and 3 - related to making skills and knowledge

Lesson Objective: Develop understanding of a disassembly process

Differentiation For disassembly task students will follow BTEC model of Describe parts > Explain Purpose > Evaluate (link parts together)

Homework Proprietary components task: Use IT to access worksheet on main components.

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 9	Starter - Material properties	Booklet/PPt			
	Material task - focus metal - Aluminium and mild steel key properties. Ferrous and non ferrous metals. Applications - Scooter example.	Booklet - task. Ppt - examples	Key properties of materials - ferrous and non ferrous	Applying knowledge to real life product applications	Component 2A - Processes
	Students complete range of practical tasks for both screwdriver and memo holder. Teacher and TA to supervise heat treatment, centre lathes, drilling and milling machines. Student disassembly tasks. Introduce Mv tour of workshop.	4mm Silver Steel, 16mm Aluminium bar, workshop tools & machines. Screwdriver drawing. Disassembly task. Booklet	Cutting & filing, Hardening & tempering, Lathe work, pillar drill, milling, tap&die, tinsnips, spot welding. Disassembly techniques. Principles of Mv course.	Range of making skills related to screwdriver and memo holder projects. Disassembly skills. Mv - changing a tyre	Component 1B. 2C and 3 - related to making skills and knowledge

Lesson Objective: Develop understanding of material properties and their applications - metal

Differentiation Materials task will be differentiated according to BTEC model Describe > Explain > Evaluate

Homework Materials: Aluminium and Mild Steel properties worksheet

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 10	Starter - Materials - Plastics	Booklet			
	Material task - focus plastic - Nylon and Polyurethane key properties. Thermoplastics and thermosetting. Applications - Scooter example.	Booklet - task. Ppt - examples	Key properties of materials - ferrous and non ferrous	Applying knowledge to real life product applications	Component 2A - Processes

	Students complete range of practical tasks for both screwdriver and memo holder. Teacher and TA to supervise heat treatment, centre lathes, drilling and milling machines. Student disassembly tasks. Mv tour of workshop. Small groups.	4mm Silver Steel, 16mm Aluminium bar, workshop tools & machines. Screwdriver drawing. Disassembly task. Booklet	Cutting & filing, Hardening & tempering, Lathe work, pillar drill, milling, tap&die, tinsnips, spot welding. Disassembly techniques. Principles of Mv course.	Range of making skills related to screwdriver and memo holder projects. Disassembly skills. Mv - changing a tyre	Component 1B. 2C and 3 - related to making skills and knowledge
Lesson Objective:	Develop understanding of material properties and their applications - plastics				
Differentiation	Materials task will be differentiated according to BTEC model Describe > Explain > Evaluate				
Homework	Materials: Nylon and Polyurethane properties worksheet				

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 11	Starter - What is CAD?	Booklet/PPt			
	Introduction / revision Autodesk - students to develop their understanding and skill of using Autodesk to model design concepts.	Help sheets/booklet	Basic and more advanced functions of Autodesk Fusion 360.	Producing 3D CAD models of design concepts	Component 1B - Design an engineered product
	Students complete range of practical tasks for both screwdriver and memo holder. Teacher and TA to supervise heat treatment, centre lathes, drilling and milling machines. Student disassembly tasks. Mv tour of workshop. Small groups. When students have completed the practical tasks they can choose: CAD/Materials/Processes/Proprietary tasks.	4mm Silver Steel, 16mm Aluminium bar, workshop tools & machines. Screwdriver drawing. Disassembly task. Booklet	Cutting & filing, Hardening & tempering, Lathe work, pillar drill, milling, tap&die, tinsnips, spot welding. Disassembly techniques. Principles of Mv course.	Range of making skills related to screwdriver and memo holder projects. Disassembly skills. Mv - changing a tyre	Component 1B. 2C and 3 - related to making skills and knowledge
Lesson Objective:	Develop understanding of 3D CAD modelling using Autodesk Fusion 360				
Differentiation	3D CAD tasks can vary from basic to more advanced tool functions.				

Homework Sketching task - Improving a given design - Example Screwdriver Holder - Component 3 Exam Question

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 12	Starter - Orthographic Projection	Booklet			
	Third Angle Orthographic Projection task. Hand drawn or using 2D-Design.	Booklet task.	Learn principles of orthographic projection	Produce orthographic projection of a given object.	Component 1B - CAD design of final idea. Interpreting data for Component 3.
	Students complete range of practical tasks for both screwdriver and memo holder. Teacher and TA to supervise heat treatment, centre lathes, drilling and milling machines. Student disassembly tasks. Mv tour of workshop. Small groups. When students have completed the practical tasks they can choose: CAD/Materials/Processes/Proprietary tasks.	4mm Silver Steel, 16mm Aluminium bar, workshop tools & machines. Screwdriver drawing. Disassembly task. Booklet	Cutting & filing, Hardening & tempering, Lathe work, pillar drill, milling, tap&die, tinsnips, spot welding. Disassembly techniques. Principles of Mv course.	Range of making skills related to screwdriver and memo holder projects. Disassembly skills. Mv - changing a tyre	Component 1B. 2C and 3 - related to making skills and knowledge

Lesson Objective: Develop understanding of producing a third angle orthographic projection

Differentiation Students can be given a range of different objects to be drawn in third angle projection.

Homework Plot a graph from given data and summarise/evaluate - Component 3 example

	Lesson Tasks	Resources	Learning knowledge	Skills	Links to KS4
Week 13	Starter - Interpretation of Data	Booklet			
	Interpreting data task - example from component 3 exam questions.	Booklet task. PPt	Comparing trends, identify anomalies, drawing conclusions, making recommendations	Interpreting any given set of data	Component 3 - Interpretation of data

	Students complete range of practical tasks for both screwdriver and memo holder. Teacher and TA to supervise heat treatment, centre lathes, drilling and milling machines. Student disassembly tasks. Mv tour of workshop. Small groups. When students have completed the practical tasks they can choose: CAD/Materials/Processes/Proprietary tasks. Assessment of final making products.	4mm Silver Steel, 16mm Aluminium bar, workshop tools & machines. Screwdriver drawing. Disassembly task. Booklet	Cutting & filing, Hardening & tempering, Lathe work, pillar drill, milling, tap&die, tinsnips, spot welding. Disassembly techniques. Principles of Mv course.	Range of making skills related to screwdriver and memo holder projects. Disassembly skills. Mv - changing a tyre	Component 1B. 2C and 3 - related to making skills and knowledge
Lesson Objective:	Learn how to interpret engineering data and draw conclusions				
Differentiation	Mark scheme from component 3 can be used to set level of questioning				
Homework					