

		Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Y7	Topic title	BLOCKBOTS 7.5	BOOKMARKS 7	LEMON SQUEEZER 7	BUG HOTEL 6	BUG HOTEL 5	COAT OF ARMS 7
	Building on KS2 (Skills and content)	SKILLS	SKILLS	INVESTIGATION	DESIGN/MAKING	MAKING	DESIGN/MAKING
	INTENT	Students need to know how to operate safely in a workshop, How to handle material, use basic woodworking hand tools and basic powered equipment safely. Clamping woods and using jigs How to effectively measure and mark out.	Building on basic safety skills the students need to work in metal which introduces a new range of measuring and marking out skills. Handling material safely. Clamping metals, drilling using jigs, filing, stamping, flattening, cleaning, polishing	Students will investigate how a product is designed to function through primary research into the structure, materials, functionality and aesthetics. With this evidence gathered students will then prototype through the use of soft materials, paper, white card, grey card and masking tape to develop an improved design. Students will also be taught how to handle/use/move knives in the workshop so that they can operate safely.	Using the skills from the Blockbots and Bookmarks projects students will design in 2D and isometric a bug hotel. Site visit, Students will be taken to see the site for the bug hotels out the back of technology in order to better understand how to design for a given environment. This will be the first opportunity for students to be creative within their designs. This project will scaffold those skills already covered and introduce simple wood joints, Half lap, finger and dovetail. Students will draw these out and practice these before committing to their final materials.	The students will scaffold the making skills from the first two projects and be able to combine these skills in order to manufacture the bug hotel. They will have a range of alternate materials and be given the pro's and cons of each by staff and allowing them to choose which is most appropriate for their projects. This will introduce environmental and sustainable design manufacturing and will introduce the 6r's.	Plastics, This is the first project introducing the use and manipulation of plastics, specifically the vacuum former to produce a coat of arms mould which can be filled with plaster, concrete etc. The coat of arms will be designed as a relief pattern in order to show the detail once formed. This will teach the process of pattern making, mould manufacture and cold casting.
	Learning journey	Lesson 1- Project Introduction and Marking Out Lesson 2- Using a Tenon Saw Lesson 3- Using a Pillar Drill Lesson 4- Sanding Lesson 5- Applying finishes to wood. Lesson 6- Assembly Lesson 7- Finishing off and Evaluation	Lesson 1- Project Introduction and Marking Out Lesson 2- Marking Out, Letter Stamping and using the centre punch Lesson 3- Marking Out, Letter Stamping and using the centre punch Lesson 4- Using the Pillar Drill and Centre Punch Lesson 5- Filing and Flattening Lesson 6- Cleaning and Polishing Lesson 7- Finishing off and Evaluation	Lesson 1- Project Introduction and ACCESS FM analysis of existing products Lesson 2- SCAMPER task to develop ideas Lesson 3- Design through modelling - creating a Lemon Squeezer prototype Lesson 4- Complete lemon squeezer prototypes Lesson 5- Test and evaluate Lemon Squeezer prototypes Lesson 6- Top Trumps Lemon Squeezers vs Lemon Squeezers	Lesson 1- Project introduction, The environment, Why do we need bugs. Lesson 2- Access fm/scamper to develop ideas. Lesson 3/4 introduction to materials available and choices students can make. Design of the bug hotel. Lesson 5- How's it hanging, Finalise design with dimensions and materials.	Lesson 7- Marking out Lesson 8/9- Cutting wood joints Lesson 10- Finishing and assemble of the frame Lesson 11- Roof and colour	Lesson 1- Introduction to the project Lesson 2- Design Lesson 3- Building the design from the base up Lesson 4 Vacuum forming Lesson 5- Concrete Lesson 6 - Remove and finish up the tile.
Knowledge and skills revisited	Knowledge: Learning to identify and use a range of drawing media, identify and use a range of shading techniques, identify tools, equipment, understand and follow health and safety rules	Knowledge: identify tools, equipment, understand and follow health and safety rules, understand and be able to describe manufacturing plans, learn what quality control is, learn what prototyping means	Knowledge: Identify and discuss a range of different materials and their applications, know why surface treatments are applied,	Knowledge: Identify and discuss a range of different materials and their applications, understand different manufacturing processes, know and describe the difference between natural and synthetic materials	Knowledge: identify tools, equipment, understand and follow health and safety rules, understand and be able to describe manufacturing plans, what quality control is, prototyping, metals and their properties	Knowledge: identify tools, equipment, understand and follow health and safety rules, understand and be able to describe manufacturing plans, what quality control is, prototyping,	
	Skills: Research, design and making skills, drawing skills	Skills: Making skills, planning, problem solving skills	Skills: Knowledge recall, listening skills	Skills: Knowledge recall, listening skills	Skills: Making and planning skills, problem solving skills	Skills: Making and planning skills, problem solving skills, analysing, discussion and evaluation skills	

		Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Y8	Topic title	CARD-ASHIANS 7	CARD-ASHIANS 7	CARS 7	CLOCK 6	CLOCK 5	PENCIL TOPPER 7
	Building on Year 7 (Skills and content)	DESIGN/MAKING	DESIGN/MAKING	DESIGN/INVESTIGATION MAKING	DESIGN	MAKING	CAD/CAM/3D PRINT
	Intent	Students will design an isometric version of themselves in Nunthorpe uniform and a casual outfit in isometric this design will then be transferred to a template for the Card-ashians ready to be cut out. The students will be using knives to cut out, score and then construct a 3d version of the isometric work.	Students will design an isometric version of themselves in Nunthorpe uniform and a casual outfit in isometric this design will then be transferred to a template for the Card-ashians ready to be cut out. The students will be using knives to cut out, score and then construct a 3d version of the isometric work.	The students will research with their teacher, types of cars, trucks etc. and the effect of aerodynamics on transport design and efficiency. They will develop a design for their own car within a standard size of block which they will transfer to timber.	Students will be building on woodworking and design skills from yr7 projects refining the materials used working with thinner sections and sheet materials to develop their use of tools and equipment. They will design the clock in isometric and create templates of each of their sides to be transferred to ply.	Students will be marking out, measuring with a greater degree of accuracy scaffolding those skills from yr7. They will be using a jig to drill the sides and the central 18mm MDF block. They will have to be able to set up and clamp the jigs for sides and block.	Students will be taught how to use tinkercad software to be able to produce a simple revolved or extruded shape which can be used as a pencil topper. They will be shown how to convert the files to DXF ready to 3d print and the process that designers go through, sending designs off to a manufacturer.
	Learning journey	Health & Safety in the workshop. Isometric drawing, idea generation, rendering, nets, folding, assembly, craft knife, scalpel, steel rule, cutting mat, quality assurance, quality control. Lesson 1 and 2- Health and safety in the workshop Lesson 3-Introduce Card-Ashians final completed version, show variations to get range of marks. H&S sheet using knives, rules and cutting mats, Lesson 4,5- Isometric drawing – start with copying shapes and shading /colouring on Isometric sheets. Lesson 6- .Isometric drawing design for their final Card-Ashian Lesson 7 - Nets – Cereal boxes, sweet boxes deconstruct /disassemble task – Card-Ashian card sheets given, surface designs started.	Lesson 8/9-Surface designs completed and begin to cut out/assemble Lesson 10/11,12- Complete, cutting out, assembly, Lesson 13-Final assembly Lesson14- Photograph and assessment.	Lesson 1- Project Introduction Lesson 2- Assemble Mousetrap Car Lesson 3- Assemble Mousetrap Car Lesson 4- Testing and Evaluation of Mousetrap Cars Lesson 5- Modifications and Testing of Modifications Lesson 6- Modifications and Testing of Modifications Lesson 7- Evaluation of Final Design	Lesson 1.What is the clock project? Writing a specification Lesson 2.Wood classification and properties Speed Sketching Crating Thin/Thick line Lesson 3.Development of ideas through modelling Lesson 4.How the clock is made Final Design Exploded View Plan of manufacture Lesson 5/6.Marking out length of Pine Margin for error Cutting into four Sanding off	Lesson 7/8.Mark out centres of Pine Mark out Acrylic for Dowel Drill Step drill Forstner Bit Lesson 9/10.Mark out individual design onto each piece of material and cut Sand smooth Lesson 11/12. Assemble Polish Stain Photograph Lesson 13.Evaluate	Lesson 1-Introduction to Tinkercad Lesson 2/3/4 Tinkercad tutorials Lesson 5/6 Design of pencil topper Lesson 7 Screen shots of tinkercad work printed and into books, assessment.
	Knowledge and skills revisited	Knowledge: The difference between primary and secondary data, understand what anthropometrics and ergonomics are Skills: Investigative skills, knowledge recall	Knowledge: Understand the work of companies, use of different design strategies effectively, understand economic and social issues, be able to use the work of others, know the 6 R's Skills: Investigative, analysis, discussion skills, communication skills	Knowledge: Identify and use a range of materials, tools and equipment accurately, understand CAD/CAM, understand functional and aesthetic properties of a product, understand basic circuits and components, know health and safety rules Skills: Manufacturing skills, identification skills	Knowledge: Identify and use a range of tools and equipment, understand basic circuits and components, understand different manufacturing techniques, understand what a manufacturing specification is, what a production plan is Skills: Manufacturing skills, identification skills, evaluation and discussion skills, recall of knowledge	Knowledge: Know about renewable and non-renewable energy sources, understand how energy is stored, know about modern materials, smart materials and their uses, know about technical textiles Skills: Identification skills, discussion skills, knowledge recall	Knowledge: Understanding of basic electronics and electronic systems, understand different types of mechanisms, be able to work out mechanical advantage Skills: Identification and discussion skills, knowledge recall

		Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Y9	Topic title	CHAIR PHONE HOLDER 7.5	BLOCKLIGHT 7	BLOCKLIGHT 7 ?	RECYCLING/REUSING	PASSIVE/MASSIVE SPEAKER or TV 5	PASSIVE/MASSIVE SPEAKER or TV 7
	Building on Year 8 (Skills and content)	DESIGN INFLUENCE/MAKING	PLANNING	MAKING ?	?	DESIGN/MAKING	DESIGN/MAKING
	Intent	This is a plastics manipulation project building on the coat of arms project from yr7. Students will use designs of famous chairs to influence their designs for a mobile phone holder. A strip of acrylic can be manipulated with Hegner saw, files, step drills, wet and dry boards and polish to shape and then a strip heater to shape the chair.	This project focuses on complex assembly and planning of the blocklight. Students are given the pre cut blocks/ acrylic which will need to be externally finished and polished. The internals will need to be drilled for dowel and then polished for the light itself to glow through. The students will need to produce a manufacturing plan giving a step by step guide of how they are going to successfully manufacture the light.	The students will need to refer to their manufacturing plan for making the light although the light looks quite simple from the exterior there are a series of complex holes to drill across a number of pieces in order to assemble the light correctly. The light will come from a battery operated tea light.	Recycling knowledge, focusing on single use plastics and recyclable bottle tops.	The students will draw together all their design and make knowledge to produce a well finished, creative and quirky design to enclose their mobile phone as a "Television" so they can stream into it.	
	Learning journey	Lesson 1- Inspiration for the project Chairs Lesson 2 Card strip designs and design analysis Lesson 3- Identifying folds in the design to create the final design. Lesson 4/5- File/Shape/Wet n dry/polish the acrylic Lesson 6/7- Strip heat and shape the acrylic. Lesson 8- Test, photograph and assessment.	Lesson 1.What is the BlockLight? Writing a specification Lesson 2.Wood classification and properties Speed Sketching Crating Thin/Thick line Lesson 3.Development of ideas through modelling Lesson 4.How the Blocklight is made Final Design Exploded View Plan of manufacture Lesson 5/6.Marking out length of Pine Margin for error Cutting into four Sanding off	Lesson 7/8.Mark out centres of Pine Mark out Acrylic for Dowel Drill Step drill Forstner Bit Lesson 9/10.Mark out individual design onto each piece of material and cut Sand smooth Lesson 11/12. Assemble Polish Stain Photograph Lesson 13.Evaluate	Lesson 1- Discussion on plastics and the effect that they have on the environment. Lesson 2- Reuse of plastics versus single use plastics Lesson 3- Demo of re using plastics, Design work, Jewellery/key ring etc. Lesson 4- Final design, rendering, colour, shade,fineline. Lesson 5/6- Cutting, shaping, filing finishing. Lesson 7- Final polish and finish.	Lesson 1- Introduction to the project, examples of the project and examples of old Televisions Lesson 2- Measuring and accurately recording their phone dimensions. Lesson 3- Design of the TV casing Lesson 4- rendering in isometric Lesson 5- Modelling	Lesson 6- Marking out Lesson 7- Cutting Lesson 8- Shaping and finishing Lesson 9- Applying finishes Lesson 10-Assembly Lesson 11-Assembly and photos Lesson 12-Assessment
Knowledge and skills revisited	Knowledge: One point and two point perspective	Knowledge: Identify static and dynamic forces, be able to discuss forces and stresses in different conditions and using different materials. Understand what is meant by ecological footprint	Knowledge: Understanding of the 6 R's and environmental impact, understand the use of jigs and fixtures, manufacturing processes and linking them to certain products	Knowledge: Carry out a process following planned procedures, using and testing a prototype/model. Measuring and recording data with accuracy and precision, using appropriate units	Knowledge: Knowledge of new and modern technologies, environmental effect, sustainability, market pull and push, automation, colour relating to cultures	Knowledge: Knowledge of automated production systems, CAD, lean manufacturing processes, Lean, just in time manufacturing processes, environmental concerns	

		Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Y10	Topic title	Mini NEA Assessment Project (50%)	Mini NEA Assessment Project (50%)	Theory (50%)	Theory (50%)	Theory (50%)	Theory (50%)
	Building on Key Stage 3 (Skills and content)	Key Stage 3 skills built upon include investigation, designing, making and evaluating, new and emerging technologies, materials including both modern and smart, new and emerging technologies					
	Intent	Investigating (10%) Designing (15%)	Making (15%) Analysing and Evaluating (10%)	Core Technical Principles (10%)	Core Technical Principles (10%) Specialist Technical Principle's (15%)	Specialist Technical Principles (15%) Designing and Making Principles (25%)	Designing and Making Principles (25%)
	Knowledge Skills Understanding	Investigating Choose and analyse a contextual challenge Identify and discuss design possibilities Investigate and discuss client needs, including economic and social issues Use the work of others to help me form ideas Use a range of research techniques to help write a design specification Designing Produce a range of possible ideas linked to the contextual challenge Demonstrate flair and originality in ideas Refine ideas using a range of strategies Use feedback to make improvements and modifications to my ideas Communicate my ideas using a range of media Develop model(s) of idea(s) Select suitable materials and components to manufacture the idea Develop and produce a manufacturing specification	Making Use a range of appropriate materials / components to manufacture a prototype Produce an accurate prototype that is within tolerance Use specialist tools and equipment to manufacture a prototype, including CAD/CAM Use a range of techniques which might involve shaping, fabrication, construction and assembly Produce a prototype that has a suitable finish, is functional and has aesthetic qualities Analysing and Evaluating Analyse and evaluate throughout the design brief Write a design brief and discuss in detail the specification points Test and evaluate design ideas Perform a range of tests on the prototype Demonstrate a good understanding of the iterative design process	New and Emerging Technologies Identify, understand and discuss the impact of new and emerging technologies in relation to a variety of areas Evaluate new and emerging technologies in order to inform design decisions Energy Storage and Generation Understand and describe how power sources are selected to make and power systems Understand and discuss fossil fuels and renewable energy Modern and Smart Materials Understand and identify developments in modern and smart materials Describe the difference between modern and smart materials Name and discuss in some detail different modern and smart materials Systems approach to designing Are aware of electronic systems that include programmable components that allow products and processes to function Identify and describe different inputs, processes and outputs Mechanical Devices Demonstrate a good understanding of different mechanical devices Identify and describe different types of movement Describe changing magnitudes and direction of force	Core Technical Principles Materials and their working properties Identify and describe the different material categories Identify and describe different materials and their uses within the different material categories Material properties Identify and describe the physical and mechanical properties of different materials within the different material categories Specialist Technical Principles Selection of materials and components Select materials and components after considering a range of different factors Demonstrate an understanding of the impact of forces and stresses Discuss in some detail the ways in which materials can be reinforced and stiffened Ecological and social footprint Discuss ecological and social issues in the design and manufacture of products Identify and discuss the 6 R's Scales of production Consider scales of production when selecting materials and components Sources and origins Understand and discuss sources and origins of different materials Stock forms, types and sizes Understand and discuss commercially available types and sizes of a variety of materials and components	Using and working with materials Describe how properties of materials and components influence a variety of commercial issues Provide detail on how materials are shaped and formed using cutting, abrasion and addition Demonstrate an understanding of why materials are modified for specific purposes Specialist techniques Understand and can describe the use of different production aids Discuss a variety of tools, equipment and processes used in particular material areas Understand tolerancing Describe different commercial processes Understand the application and use of quality control Surface treatments and finishes Demonstrate knowledge and understanding of surface treatments and finishes Designing and Making Principles Investigation, primary and secondary data Demonstrate an understanding of how data is used to understand clients' needs Carry out relevant investigations Environmental, social and economic challenge Discuss in some detail the influences that the environment, social and economic issues have on designing and making The work of others Identify and use the work of past and present designers to inform my own thinking	Design strategies Use a range of different design strategies to generate imaginative and creative design ideas Develop ideas using the iterative process Communication of design ideas Use a wide variety of techniques to develop and communicate design ideas Prototype development Design and develop prototypes in response to client needs Successfully evaluate prototypes and suggest improvements Selection of materials and components Select appropriate materials and components suitable to make a prototype Tolerances Demonstrate understanding of how and why tolerances are applied in a range of making activities Material management Discuss the importance of planning cutting and shaping materials to minimise waste Demonstrate the importance of using appropriate marking out methods, to create an accurate high quality prototype Tools and equipment Know how to use specialist tools and equipment to safely complete a high quality outcome Techniques and processes Discuss how to select and use specialist techniques safely to produce high quality outcomes Demonstrate how and why surface treatments and finishes are applied to different products
	Knowledge and skills revisited	Knowledge: Investigation techniques, client needs, economic and social issues, design specifications, materials and components	Knowledge: Understanding of materials and components, identify tools and equipment, understand a specification, understand the iterative design process	Knowledge: New and emerging technologies, energy storage and generation, fossil fuels and renewable energy, modern and smart materials, electronic systems, mechanical devices	Knowledge: Materials and their physical and mechanical working properties, correct selection of materials and components, impact of forces and stresses, ways in which materials are reinforced and stiffened,	Knowledge: What influences commercial ideas, how materials are shaped and formed, understand different manufacturing methods, understand tolerancing, quality	Knowledge: Design strategies, communication of design ideas, prototype development, selection of materials and components, understand tolerances, material management, tools and

					ecological and social footprints, scales of production, sourcing of stock forms and sizes	control, surface finishing, how to carry out relevant investigations	equipment, techniques and processes
	Skills: Creating ideas using a variety of drawing media, demonstrating flair and originality, model ideas effectively	Skills: Creating accurate prototypes of ideas, using correct tools, materials and processes	Skills: Be able to identify, discuss and evaluate different elements of theory	Skills: Be able to identify, discuss and evaluate different elements of theory Decision making,	Skills: Be able to identify, discuss and evaluate different elements of theory Investigation techniques	Skills: Be able to identify, discuss and evaluate different elements of theory Create ideas, investigate and evaluate, make informed decisions	

		Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
	Topic title	NEA (50%)	NEA (50%)	NEA (50%) Exam Theory	Exam Theory	Exam Theory	
	Building on Key Stage 3 and Year 10 (Skills and content)	Building upon all theory and practical skills gained at Key Stage 3, and the mini NEA completed in Y10					
	Intent	Investigating (10%) Designing (15%) Core Technical Principles (10%)	Making (15%) Core Technical Principles (10%)	Analysing and Evaluating (10%) Core Technical Principles (10%) Specialist Technical Principles (15%)	Specialist Technical Principles (15%) Designing and Making Principles (25%)	Designing and Making Principles (25%) Revision	
Y11	Knowledge Skills Understanding	<p>Investigating</p> <p>Choose and analyse a contextual challenge</p> <p>Identify and discuss design possibilities</p> <p>Investigate and discuss client needs, including economic and social issues</p> <p>Use the work of others to help form ideas</p> <p>Use a range of research techniques to help write a design specification</p> <p>Designing</p> <p>Produce a range of possible ideas linked to the contextual challenge</p> <p>Demonstrate flair and originality in ideas</p> <p>Refine ideas using a range of strategies</p> <p>Use feedback to make improvements and modifications to ideas</p> <p>Communicate ideas using a range of media</p> <p>Develop model(s) of idea(s)</p> <p>Select suitable materials and components to manufacture the idea</p> <p>Develop and produce a manufacturing specification</p> <p>Core Technical Principles</p> <p>New and Emerging Technologies</p> <p>Identify, understand and discuss the impact of new and emerging technologies in relation to a variety of areas</p> <p>Evaluate new and emerging technologies in order to inform</p>	<p>Making</p> <p>Use a range of appropriate materials / components to manufacture a prototype</p> <p>Produce an accurate prototype that is within tolerance</p> <p>Use specialist tools and equipment to manufacture the prototype, including CAD/CAM</p> <p>Use a range of techniques which might involve shaping, fabrication, construction and assembly</p> <p>Produce a prototype that has a suitable finish, is functional and has aesthetic qualities</p> <p>Modern and Smart Materials</p> <p>Understand and can identify developments in modern and smart materials</p> <p>Describe the difference between modern and smart materials</p> <p>Name and discuss in some detail different modern and smart materials</p> <p>Systems approach to designing</p> <p>Are aware of electronic systems that include programmable components that allow products and processes to function</p> <p>Identify and describe different inputs, processes and outputs</p> <p>Mechanical Devices</p> <p>Demonstrate a good understanding of different mechanical devices</p> <p>Identify and describe different types of movement</p> <p>Describe changing magnitudes and direction of force</p>	<p>Analysing and Evaluating</p> <p>Analyse and evaluate throughout the design brief</p> <p>Write a design brief and discuss in detail the specification points</p> <p>Test and evaluate design ideas</p> <p>Perform a range of tests on the prototype</p> <p>Demonstrate a good understanding of the iterative design process</p> <p>Material properties</p> <p>Identify and describe the physical and mechanical properties of different materials within the different material categories</p> <p>Specialist Technical Principles</p> <p>Selection of materials and components</p> <p>Select materials and components after considering a range of different factors</p> <p>Demonstrate an understanding of the impact of forces and stresses</p> <p>Discuss in some detail the ways in which materials can be reinforced and stiffened</p> <p>Ecological and social footprint</p> <p>Discuss ecological and social issues in the design and manufacture of products</p> <p>Identify and discuss the 6 R's</p> <p>Scales of production</p> <p>Consider scales of production when selecting materials and components</p> <p>Sources and origins</p> <p>Understand and discuss sources</p>	<p>Using and working with materials</p> <p>Describe how properties of materials and components influence a variety of commercial issues</p> <p>Provide detail on how materials are shaped and formed using cutting, abrasion and addition</p> <p>Demonstrate an understanding of why materials are modified for specific purposes</p> <p>Specialist techniques</p> <p>Understand and describe the use of different production aids</p> <p>Discuss a variety of tools, equipment's and processes used in particular material areas</p> <p>Understand tolerancing</p> <p>Describe different commercial processes</p> <p>Understand the application and use of quality control</p> <p>Surface treatments and finishes</p> <p>Demonstrate knowledge and understanding of surface treatments and finishes</p> <p>Designing and Making Principles</p> <p>Investigation, primary and secondary data</p> <p>Demonstrate an understanding of how data is used to understand clients' needs</p> <p>Carry out relevant investigations</p> <p>Environmental, social and economic challenge</p> <p>Discuss in some detail the influences that the environment, social and economic issues have</p>	<p>Design strategies</p> <p>Use a range of different design strategies to generate imaginative and creative design ideas</p> <p>Develop ideas using the iterative process</p> <p>Communication of design ideas</p> <p>Use a wide variety of techniques to develop and communicate design ideas</p> <p>Prototype development</p> <p>Design and develop prototypes in response to client needs</p> <p>Successfully evaluate prototypes and suggest improvements</p> <p>Selection of materials and components</p> <p>Select appropriate materials and components suitable to make a prototype</p> <p>Tolerances</p> <p>Demonstrate understanding of how and why tolerances are applied in a range of making activities</p> <p>Material management</p> <p>Discuss the importance of planning cutting and shaping materials to minimise waste</p> <p>Demonstrate the importance of using appropriate marking out methods, to create an accurate high quality prototype</p> <p>Tools and equipment</p> <p>Know how to use specialist tools and equipment to safely complete a high quality</p>	

	design decisions Energy Storage and Generation Understand and describe how power sources are selected to make and power systems Understand and discuss fossil fuels and renewable energy	Materials and their working properties Identify and describe the different material categories Identify and describe different materials and their uses within the different material categories	and origins of different materials Stock forms, types and sizes Understand and discuss commercially available types and sizes of a variety of materials and components	on designing and making The work of others Identify and use the work of past and present designers to inform own thinking	outcome Techniques and processes Discuss how to select and use specialist technique's safely to produce high quality outcomes Demonstrate how and why surface treatments and finishes are applied to different products	
Knowledge and skills revisited	Knowledge: Investigation techniques, client needs, economic and social issues, design specifications, materials and components, new and emerging technologies, fossil fuels, renewable energy	Knowledge: Modern and smart materials, electronic systems, inputs, processes and outputs, mechanical devices, types of movement	Knowledge: Physical and working properties of materials, forces and stresses, how materials can be reinforced and stiffened, ecological and social footprints, sources and types of materials, scales of production	Knowledge: Understanding of different specialist techniques, surface treatments and finishes, understand designing and making principles, environmental, social and economic issues,	Knowledge: Selection of materials and components, understanding of tolerances, understand techniques and processes, surface treatments and processes	Knowledge:
	Skills: Creating ideas using a variety of drawing media, demonstrating flair and originality, model ideas effectively	Skills: Creating accurate prototypes of ideas, using correct tools, materials and processes	Skills: Analyse and evaluate throughout a given process, write a detailed design specification using a given brief, identify a range of ways of testing a prototype	Skills: Using and working with materials, using the work of others	Skills: Creating ideas using a variety of drawing media, demonstrating flair and originality, model ideas effectively	Skills: