Topic	Rationale	Knowledge acquisition	Key vocabulary	Skills and enrichment
Architecture Civil Engineering	***National Curriculum requires students to be taught about the properties of materials and the performance of structural elements. This project allows for the acquisition of this knowledge but also provides the opportunity to learn about the iterative design cycle and the way that design projects are structured. Learning about the process of designing is a key theme of the national curriculum as it hinges upon three key stages- Design, Make and Evaluate.*** ***This project leads on from the architectural project in year seven which concentrates upon designing a dream home. Introducing the idea of civil engineering and designing for a community adds more challenge as students must learn about the structures of buildings and how to design for a much wider audience with varying needs.***	Types of structures	Natural, Manmade, Frame, Shell	• ***Problem solving-*** Producing a design outcome which adheres to a given design brief. • ***Evaluation-*** Evaluating the success of the project against the specification and design brief. • ***Analysis-*** Looking at existing buildings and communal areas and gathering inspiration for new design ideas. • ***Creativity-*** producing a design solution in line with a design brief. • **Literacy-** wring a justified analysis and evaluations. • ***Numeracy-*** Measuring and marking accurately to produce high quality scale models. • ***Oracy-*** Discussion and verbal presentation of design solutions. **<u>Subject Specific Skills:</u>** • Planning • Design skills • Practical skills • Marking out • Making scale models
		How forces act upon structures	Static load, dynamic load, tension, compression, shear, bending and torsion.	
		How to make structures stronger	Triangulation, equilibrium, key stone, bracing, struts and ties.	
		Ecological architecture	Grass roof, solar power, habitat, ecology	
		Landscape architecture	Formal gardens, parks, seafront, recreation.	
		Looking at the work of Zaha Hadid	Form, Organic, inspiration, futuristic.	
		Design a communal building and surrounding area to fit a design brief.	Specification, client, brief, scale, modelling.	

Topic	Rationale	Knowledge acquisition	Key vocabulary	Skills and enrichment
Electronic Systems **Night Light**	***The National Curriculum suggests that students should be taught how more advanced electrical and electronic systems can be powered and used in their products. This project builds upon basic electrical principles, circuits and components taught in year seven by introducing more complex components and their use in a more complex product.***	**Task analysis and designing to meet a specific brief**	Client, Client needs, Client preferences, Analysis.	• ***Problem solving-*** Producing a design outcome which adheres to a given design brief. • ***Evaluation-*** Evaluating the success of the project against the specification and design brief. • **Literacy-** wring a justified analysis • ***Numeracy-*** Measuring and marking out material. **<u>Subject Specific Skills:</u>** • CAD skills • Planning • Selection • Soldering • Marking out
		Key features of the Art Deco design movement.	Analysis, Research, Evaluation Design, Evaluate, Justify.	
		Using 2D design	Vector, Bitmap, Contour, Explode, Delete between intersecting lines.	
		PCB Assembly, Testing, Fault Finding and correction.	System block diagram, Input, Process, Output Potential divider. Solder, Soldering Iron, Soldering, PCB Drill, PCB, Resistor, LDR, Slide switch, Transistor, flying lead, LED.	
		Construct a wooden jointed box	Millimetre, Steel rule, Try square Tenon saw, Bench hook, Hand file, PVA, Disc sander.	
		Create a basic manufacturing specification	Cutting list. Working drawing, components, plan of work, flow chart, quality control and quality assurance.	

Topic	Rationale	Knowledge acquisition	Key vocabulary	Skills and enrichment
Mechanical Systems **Litter grabber**	***The National Curriculum requires that students be taught about more advanced mechanical systems which are used in products to enable changes in movements and force. This project has been developed to teach students about linkages and how they can alter force and movement. This project builds upon the knowledge gained in year seven in relation to levers and types of motion.***	Mechanical systems	*Ratchets, quick return mechanisms, springs.*	• ***Problem solving-*** make a linkage system which is comfortable to hold and can be operated easily with one hand to pick up small objects such as litter. • ***Evaluation-*** Evaluating the success of the project against the specification and design brief. • **Literacy-** wring a justified analysis • ***Numeracy-*** Measuring **<u>Subject Specific Skills:</u>** • Reading a working drawing. • Constructing a cutting list.
		Ergonomics	Ergonomics, anthropometrics, 5th, 50th and 95th percentile.	
		Properties of materials	*Physical properties:* Absorbency, density, fusibility, electrical conductivity, thermal conductivity. *Mechanical properties:* Strength, hardness, toughness, malleability, ductility, elasticity.	
		Manufacturing processes for timber	*Turning, lathe, wasting, drilling, cutting, tenon saw, coping saw, scroll saw, file, abrasive, grit, sanding, routing, planing, adhesive, nails, screws, finishing, stain, varnish.*	
		Documenting a manufacturing process with QA, QC and H&S	*Manufacturing diary, manufacturing specification, quality assurance, quality control, health and safety, risk, hazard, PPE.*	
		Testing and evaluating	Design criteria, Third party testing and feedback, Evaluating, Modifications.	