Year 7- Design and Technology

Topic	Rationale	Knowledge acquisition	Key vocabulary	Skills and enrichment
Architecture My Dream Home	***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.***	What is architecture? Learning about famous historical and modern buildings and the building materials used.	Modern, historical, architecture, material, concrete, brick, wood, glass, roof tiles	• ***Problem solving-*** students will be set a design brief which will demand that they apply their subject knowledge to solve. This will be demonstrated through the presentation of suitable design ideas and a final prototype. • ***Evaluation-*** Students will evaluate, their design ideas and the project as a whole against the design brief and specification. • ***Analysis-*** Students will be asked to analyse the work of designers and inspirational sources to justify their design decisions. They will also be asked to analyse the suitability of materials and manufacturing techniques. • ***Creativity-*** Students will be asked to produce a creative response to a design brief and will be using external sources to inspire their creativity. • **Literacy-** Students will be taught how to annotate design ideas in order to communicate their intentions to clients clearly. They will also be writing a design brief and producing an evaluative piece of writing which will be marked for literacy. • ***Numeracy-*** The manufacture of prototypes and production of floor and site plans with demand that students use numeracy skills to accurately measure and mark out their intended design. Students may have to calculate areas and perimeters as well as quantities of materials needed. **<u>Subject Specific Skills:</u>** • Creating and presenting initial designs. • Annotating design work. • Drawing in isometric. • Drawing in orthographic. • Rendering drawings. • Manufacturing prototypes from paper and card.
		What is a design brief? Writing a client profile.	Design brief, client, profile,	
		Where do Creative ideas come from? Researching designers and sourcing inspiration. How to analyse the work of others and draw upon this to create solutions to the problem.	Gothic, modernist, Antoni Gaudi, Zaha Hadid, Biomimicry, inspiration, design features, form and function.	
		What is a specification and how do I write one?	Aesthetics, customer, client, materials, manufacture, justification, safety, dimensions.	
		Learning how to draw floor plans, site plans and create scale drawings.	Scale, 2D, internal, external, dimensions.	
		Learning how to draw and present different elevations. Rendering and annotating design ideas.	Elevation, scale, orthographic, isometric, render, tone, texture, annotation.	
		How to construct an architectural model.	Prototype, foam core board, corrugated card.	

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Electronic Systems Steady Hand Game	***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 introduces basic electrical principles, circuits and components taught through theory and the practical manufacture of a steady hand game.***	Sources, origins and properties of polymers.	Thermoplastic, thermoset, sustainable, finite, categories, polymer.	• ***Problem solving-*** use a schematic diagram to put electronic components in the correct place. Use circuit wizard to construct a working circuit using learned theory of components. • ***Evaluation-*** Evaluate a completed prototype by carrying out tests, assessing the product against a criteria and gathering third party feedback. • ***Literacy-***Students will be given a number of low stakes quizzes to test spelling and understanding of subject specific vocabulary. These quizzes will be set as homework tasks via the VLE. The project will culminate in a written evaluation which will be marked for literacy. • ***Numeracy-*** work out the value of resistors using a formula. Measure and mark out timber to manufacture a frame. **Subject Specific Skills:** • Using CAD software to design and test circuits. • Prepare and populate a PCB board. • Soldering.
		Manufacturing processes for polymers	Injection mould, vacuum form, die, former, taper, draft angle.	
		Electronic components	Schematic, system, input, process, output, component, Symbol, resistance, current, voltage, conductor.	
		Using Circuit Wizard	CAD, simulation, software, modelling, prototyping, testing, troubleshooting.	
		Manufacturing a wooden housing	Tri-square, metal rule, bench hook, tennon saw, sander, PVA.	
		Soldering and populating a PCB board.	Drill, Solder, Soldering iron, PCB drill, copper track, bond, Schematic, polarised, fly lead, component, PCB.	
		How to write a project evaluation.	Evaluate, summarise, reflect, third party, feedback, modifications.	

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Mechanical Systems Making things Move	***The National Curriculum requires that students learn about more advances mechanical systems which are used in products to enable changes in movements and force. This project has been developed to develop knowledge acquired at KS2 in relation to mechanisms and movement.***	Types of movement	Oscillation, reciprocating, linear, rotary.	• ***Problem solving-*** what is the impact of changing the shape of a cam? What is the effect of moving a fulcrum in a lever? What is mechanical advantage? • ***Analysis-*** what are the benefits and applications of different types of levers and cams? • ***Numeracy-*** calculations of mechanical advantage. **Subject Specific Skills:** • Manufacture of a number of small demonstration models to explain a concept.
		Cams and complex cam systems	Rotary systems: camshaft, follower, dwell, eccentric cam, pear cam, snail cam, heart shaped ca, flat follower, knife edged follower, flat follower, roller follower.	
		Levers and linkages	Levers: Mechanical advantage, fulcrum, effort, load, equilibrium. Linkages: Reverse motion linkage, parallel motion linkage or push/ pull linkage, crank and slider, treadle linkage.	
		Pulleys	Fixed, movable, compound, block and tackle.	
		Gears and gear trains	Gear ratio, idler, compound gears, rack and pinion, gear construction, torque, gear train.	