Curriculum Progression (Intent)

Long Term Intent Technologies: Design and Technology (Workshop)

- Exercise and develop their creativity through designing and making.
- The children are taught to combine their designing and making skills with knowledge and understanding in order to design and make a product.
- Skills are taught progressively to ensure that all children are able to learn and practice in order to develop as they move through the school.
- Evaluation is an integral part of the design process and allows children to adapt and improve their product; this is a key skill which they will implement throughout their life.
- Evaluate and analyse creative works using the language of rehearsing and performing.
- Design and Technology allows children to apply the knowledge and skills learned in other subjects across the curriculum, particularly Maths, Science and Art.
- Children's interests are captured through project design briefs, giving them purpose, motivation and meaning for their learning.

	Knowledge and Understanding	Skills
Year 11	Students should investigate, analyse and evaluate the work of past and present designers and companies to inform their own designing How different strategies can be applied, including: • collaboration • user cantered design • a systems approach • iterative design • avoiding design fixation Explore and develop their own ideas, including: • sketching • modelling • testing • evaluation of their work to improve outcomes. • freehand sketching, isometric and perspective • 2D and 3D drawings • system and schematic diagrams • annotated drawings that explain detailed development or the conceptual stages of designing • exploded diagrams to show constructional detail or assembly • working drawings: 3rd angle orthographic, using conventions, dimensions and drawn to scale • audio and visual recordings in support of aspects of designing: eg interviews with client or users Design and develop prototypes in response to client wants and needs. Note the term	In Year 11, learners continue to use range of tools, equipment and processes that can be used to shape, fabricate, construct and assemble high quality products for the NEA (coursework) project This will include: Use of vacuum former Use of laser cutter and 2D CAD Use of strip heaters to bend plastics. Use of a full range of hand tools Use of a wide range of woodworking machinery Learners will develop their visual presentation skills including 2D and 3D sketching techniques and 3D CAD. This will form the basis of their NEA product development work and portfolio

	prototype can be used to describe either a product or system Students should know and understand how to evaluate prototypes and be able to: • reflect critically, responding to feedback when evaluating their own prototypes • suggest modifications to improve them through inception and manufacture • assess if prototypes are fit for purpose. How to select and use specialist tools and equipment, including hand tools, machinery, digital design & manufacture, appropriate for the material and/or task to complete quality outcomes. Students should know and understand that surface treatments and finishes are applied for functional and aesthetic purposes.	
Year 10	The impact of new and emerging technologies. Enterprise based on the development of an effective business innovation. The impact of resource consumption on the planet, taking into consideration the ecological and social footprint of materials. How products are designed and made to avoid having a negative impact on others. The contemporary and potential future use of automation, CAD/CAM and Lean Manufacturing Planned Obsolescence, design for maintenance, ethics and the environment. How power is generated from coal, gas and oil, and how nuclear power is generated. How power is generated from wind, solar, tidal, hydro-electrical and biomass	In Year 10, a range of tools, equipment and processes that can be used to shape, fabricate, construct and assemble high quality products. This will include: Use of vacuum former Use of laser cutter and 2D CAD Use of strip heaters to bend plastics. Use of a full range of hand tools Use of a wide range of woodworking machinery Learners will develop their visual presentation skills including 2D and 3D sketching techniques and 3D CAD.

	Developments made through the invention of new or improved processes eg Graphene, Metal foams and Titanium. Alterations to perform a particular function eg Coated metals, Liquid Crystal Displays (LCDs) and Nanomaterials That materials can have one or more properties that can be significantly changed in a controlled fashion by external stimuli, such as stress, temperature, moisture, or PH eg shape memory alloys, thermochromic pigments and photochromic pigments. That composite materials are produced by combining two or more different materials to create an enhanced material. The use of light sensors, temperature sensors, pressure sensors and switches The use of buzzers, speakers and lamps, to provide functionality to products and processes. The functions of mechanical devices to produce linear, rotary, reciprocating and oscillating movements. Levers, Linkages and Rotary systems Students will have an overview of the main categories and types of natural and manufactured timbers and the main categories and types of polymers Tension, compression, bending, torsion and shear. How materials can be reinforced, stiffened or made more flexible Reduce, refuse, re-use, repair, recycle and rethink. Primary sources of materials and the main processes involved in converting into workable forms. Commercially available types and sizes of materials and components Timber based materials: • planks, boards and standard mouldings	

	- sold by length, width, thickness and diameter. - standard components eg woodscrews, hinges, KD fittings. Polymers: - sheet, rod, powder, granules, foam and films. - sold by length, width, gauge and diameter. - standard components eg screws, nuts and bolts, hinges. How products are produced in different volumes How to use measurement/reference points, templates, jigs and patterns where suitable.	
Year 9	This 30-hour project, completed over 10 weeks, will form part of the Key Stage 3 programme of study for Year 9 learners. It will introduce the learners to Computer Aided Design (CAD) and how to create and realised a **shipping container home** digitally within a 3D model space. The learns will be introduced to the benefits of CAD within industry/construction and the impact of 3D modelling the virtual world and build environment. The project focuses on developing skills to digitally draw in 3D with progression to develop their own ideas to design an eco-house that enables them to think about 3D design, costs and environmental issues.	Research and analyses different types of Architecture, whilst looking into several famous architects. Using their research, design a house in Google SketchUp. Continue to develop their SketchUp skills to design a 3D shipping container home that includes: - Mood board - Applying Scale & Prototyping - Produce an CAD model that contains a maximum of six shipping containers, with dimensions. - Add Eco credentials to your home. - Using and making components and groups within the model space. Produce a marketing brochure for your project that showcases your creative and graphical presentation skills.
Year 8	This 30-hour project, completed over 10 weeks, will form part of the Key Stage 3 programme of study for Year 8 learners. Learners will design and make a **'bug hotel'.** They will learn how to follow a manufacturing specification and plans to build the outer frame to a set tolerance, utilising accurate wood joints to ensure a strong construction. Learners will then use a wide range of advanced techniques/tools, including wood planes and the	Continued good practice of health and safety in the workshop. Using research to effectively produce conceptual design work including: - Moodboard - Concept designs - Visual communication Using design and product specifications to design and make an ecofriendly big hotel with finger joints and a minimum of four habitats.

	wood lathe (wood turning) to construct a finished product to their own designs.	Confident and correct use of key workshop tools and machinery including: • Scroll saw • Hand plane • Wood lathe • Wire cutters • Stapler • Panel pins and hammers Continued Analysis & Evaluation; design is not a linear process.
Year 7	This 30-hour project, completed over 10 weeks, will form part of the Key Stage 3 programme of study for Year 7 learners. Learners will complete two practical pieces of work in this rotation – **LED lamp and Phone Stand/Desk tidy.** Through the completion of these challenging and contemporary products learners will be taught how to use a wide variety of hand tools and machinery safely and competently. Learners will be taught how to use a soldering iron to complete a functioning electronic circuit, and they will use a variety of adhesives to fix plastics and wood. The desk tidy project will introduce the use of wood joints. Learners will use accurate measuring and marking in the successful completion of both products. Learners will be introduced to CAD/CAM so that they have an understanding of how components are batch produced and how to ensure accuracy in that process.	Solid foundation of health and safety in the workshop. Confident and correct use of key workshop tools and machinery including: • Try square • Steel rule • Bench hook and vice • Tenon Saw • Coping Saw • Belt sander • Pillar Drill • Soldering Iron • Hot glue gun Ability to solve problems independently in D&T projects and think creatively. Learners will develop their design and drawing skills to produce: • Concept Designs • Technical Drawings • Rendering Skills • One & Two Point Perspectives