CANN BRIDGE SCHOOL

Design and Technology Curriculum Policy



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Statement of Intent

"*Using creativity and imagination, learners design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Learners learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens*." (National Curriculum 2013)

At Cann Bridge School, we are committed to providing all learners with learning opportunities to engage in Design and Technology. Our curriculum will support our learners to learn about the world we live in and to develop a wide range of knowledge and skills through designing and making. The Design and Technology curriculum will provide opportunities for learners to be inspired, engaged and excited. The curriculum encourages learners to learn, to think and intervene creatively to solve problems.

Our aims are:

- To support learners to develop the creative, technical and practical skills needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- For learners to develop knowledge, understanding and skills in order to design and make prototypes and products for a wide range of users
- To support learners to evaluate and test their ideas and products and the work of others
- For learners to understand and apply the principles of nutrition and learn how to cook.

Implementation

Design Technology is delivered in focused sessions across all key stages of the school. Learners follow a framework of planning which has been carefully mapped to ensure that all learners develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world. Each Design Technology project will follow a design, make and evaluate process. Learners will have the opportunity to build a wide range of skills and knowledge in understanding mechanisms, using tools and building structures. Learners will also be taught Food Technology, which will support them to develop a knowledge of the principles of nutrition and provide them with skills to prepare and cook dishes. All learners will follow a progression of steps to ensure that they build on previously learnt knowledge and skills.

Impact

Design Technology gives learners the opportunity to develop skills, knowledge and understanding of designing and making functional products. At Cann Bridge we feel that it is vital to nurture creativity and innovation through design, and by exploring the designed and made world in which we all live and work.

At Cann Bridge, Learners will build upon their early childhood investigations to explore progressively how things work. They will learn how to use hand tools and how computers are used to support designing and making. As they do so, they will learn about processes and the working characteristics of materials. Learners also learn about structures and the practical application of mechanisms and pneumatics, to make moving toys and models

Learners at Cann Bridge will also be taught food and nutrition within the Design Technology Curriculum, so that they are equipped with the necessary skills to cook and feed themselves well and keep healthy. Practical work, like cooking, develops fine, gross and sensory skills and it can also provide social experiences and opportunities for learners to develop skills for independent living and the world of work, especially within catering and hospitality

Accreditation

NOCN Entry Level Award in Independent Living

Monitoring, Evaluation and Review of Design Technology

The impact of the Design & Technology curriculum will be monitored and evaluated through;

- Photographs of made products
- Documentation of learning via Evisense
- Termly summative assessments
- Pupil progress reviews
- EHCP reviews

Design & Technology in EYFS
The learners in EYFS will have one Design and Technology topic each term. These are; Exploring How Things Work, Develop Small Motor Skills and Explore a Range of Tools. Design and Technology is taught across the day within the continuous provision, through interactions with adults.

Design & Technology in KS1
At Key Stage 1, Learners will begin to build on their explorative skills developed in EYFS. They will cover a range of knowledge and skills such as; building structures, food and nutrition, exploring materials, using mechanical systems and selecting from a range of materials.

Design & Technology in KS2
Learners in Key Stage 2 will continue to build on previously learnt skills and knowledge by following design briefs in the following areas; food and nutrition: understanding seasonality, exploring and using mechanical systems, building complex structures, understanding algorithms and exploring a wide range of materials.

Design & Technology in KS3
At Key Stage 3, learners will further develop their knowledge and skills by looking at specific areas in more depth as well as being introduced to new areas of learning, such as; identifying and solving design problems, learning where food comes from, understanding electrical systems and applying computer knowledge to design a programme.

Design & Technology in KS4 & KS5
Key Stage 4 and 5 focus on preparation for adulthood and developing skills for life. From Key Stage 4, learners will solely focus on Cooking and Nutrition in order to support their transition to life beyond Cann Bridge.

Learners will have the opportunity to use well-equipped purpose-built Food Technology rooms on the community campus as well as their taking their learning out into the local community.

Key Stage 4 will work towards the NOCN accreditations in the following units;

- Make a Simple Meal
- Food Safety and Storage
- Eating Out
- Eating a balanced diet
- Everyday Food and Drink Preparation
- Basic Cooking Techniques

Key Stage 5 will have weekly Food Technology lessons, focusing on the following topics; Food Hygiene, Basic Meals, Planning an Event, Nutrition Awareness and Substantial Snacks. The learners will be assessed against the Steps for Life progression steps.

Progression Steps Framework

Step 1

Creative, Technical & Practical Expertise

- Selects an electrical object that will give light
- Selects an electrical object that will move
- Selects an electrical object that will make a sound
- Notices the difference without a battery/cell
- Makes objects move faster or slower
- Finds an item in their immediate environment that can be pulled
- Finds an item in their immediate environment that can be pushed
- Uses electricity to move an object, e.g. blows an object with an electric fan, manoeuvres a remote-controlled car, etc.
- Presses a switch at a specific point to achieve a desired result
- Moves an object in a variety of different ways, e.g. forwards and backwards, in circles, etc.
- Snips with scissors
- Rolls, flattens, tears, joins and moulds pliable material
- Chooses the correct familiar tool for a task from a group of three, e.g. paintbrush, scissors, glue
- Links or joins construction toys generally independently
- Uses an access/control device to make an object appear
- Grasps tools generally independently
- Moves tools generally independently
- Chooses the correct familiar material for a task from a group of three, e.g. cardboard, paper, string
- Communicates about textures they feel on different materials
- Puts an object together with assistance
- Turns a screw toy anticlockwise
- Turns a screw toy clockwise
- Recognises that when the equipment is turned off, it won't work, e.g. no light from a torch
- Demonstrates awareness they need a tool to help, e.g. asks for scissors to help cut a material

Designing & Making for Users

- Requests a tool or object for a purpose
- States simply how they will make a product, e.g. "Stick box"
- Suggests ways to decorate or colour their model
- Makes a product for a familiar purpose, e.g. a container to hold pencils
- Builds a tower of seven bricks
- Builds a tower of five bricks
- Stacks, organises and re-organises blocks and boxes
- Selects an object for a purpose
- Handles a range of containers of different sizes, materials and openings
- Chooses an item from a selection to decorate their product
- Places bricks on top of others successfully
- Builds a tower of blocks with a member of staff
- Changes a shape made with pliable material
- Explores the use of building bricks

Evaluating & Testing Ideas & Products

- Demonstrates an awareness that specific actions cause an expected result
- States what they noticed, e.g. 'not working', or 'bigger'

Investigating and Analysing Products

- Identifies one property of a material being handled, e.g. cold, hard, shiny, etc.
- Identifies textures they feel on materials after verbal prompt, e.g. hard/soft, rough/smooth, shiny/dull
- Tests new/unfamiliar objects, e.g. through manipulation/squeezing
- Examines parts of familiar objects up close
- Demonstrates an understanding of how electronic objects work
- Demonstrates an understanding of how mechanical objects work, e.g. winds up a car to make it move
- Identifies if they can pull, bend, or squash a material after manipulating it
- Identifies simple differences between materials, e.g. states if a material is dry or wet

Progression Steps Framework

Step 2

Creative, Technical & Practical Expertise

- Describes, in simple terms, what a cell or battery may do, e.g. "Make it work"
- Names familiar materials or tools, e.g. glue, pencil, scissors
- Demonstrates understanding that each switch in a two-switch activity will trigger a separate action
- Understands that they need to push the switch at a particular point (in time or space) to achieve a desired result
- Uses a variety of simple tools to make a model with assistance
- Imitates a member of staff using a range of equipment, e.g. scissors
- Indicates that batteries are needed to provide power
- Relates the size of battery to an object, e.g. a watch has a small battery and a car has a bigger battery, etc.
- Controls horizontal movement using a switch
- Controls vertical movement using a switch
- Inputs simple operations with some support, e.g. enters directions into a floor turtle
- Describes the action of a magnet using simple language, e.g. it sticks to things
- Adds wheels to object to make it move
- Indicates that different things move at different speeds, e.g. car/bike
- Finds inclined planes in their environment, e.g. a ramp, the slide, the stairs, etc.
- Cuts with scissors when paper held for them
- Responds appropriately to shape-based terminology, e.g. where's the round shape, pass me the box, etc.
- Uses tools effectively on pliable material
- Rolls pliable materials into different shapes
- Finds shapes from description, e.g. with a straight edge
- Selects a specific shape from a collection, e.g. circles
- Communicates about the properties of geometric shape in hand
- Collects pictures from a range of sources that relate to a specific subject
- Responds appropriately to texture-based terminology, e.g. how many items are rough, which fabrics are smooth, etc.
- Selects material which is appropriate for the task
- Selects tools appropriate for the purpose
- Uses tools with their preferred hand

Designing & Making for Users

- Communicates what they want to make with a member of staff
- Works in 2D
- Works in 3D
- Undertakes a task using some simple tools under supervision
- Includes a range of materials in their work in a variety of ways, e.g. buttons, wool, beads, feathers, etc.
- Builds with a range of construction materials
- Turns objects to align them
- Selects colour with purpose
- Looks for appropriate shapes, materials or sizes to fit or match their product
- Shows an appreciation of a subject's elements through modelling
- Suggests what shape they would like to make an object, e.g. "Star biscuits"

Evaluating & Testing Ideas & Products

- Communicates about an aspect of their model or product
- Explains in simple terms what their product does
- States who they have made their product for
- Gives their model/product a topic-related name

Investigating and Analysing Products

- Explores similar products made from two different materials, e.g. a wooden box and a cardboard box
- Gives a simple reason why an object is made from a specific material

Progression Steps Framework

Step 3

Creative, Technical & Practical Expertise

- Sorts objects into groups showing how electricity is used, e.g. lights, heats, moves
- Finds the negative and positive ends of a cells using the '-' and '+' symbol
- Lists different items that use electricity from a range of environments
- Stops activating a switch when the action is complete
- Presses a switch to complete an image on a screen
- Repeats switch pressing at appropriate time
- Explores the results of pressing a button on a robot
- Operates a switch to turn on a tool
- Describes how objects move using simple terms correctly, e.g. backwards, slowly, etc.
- Folds, tears and cuts paper and card
- Hammers gently with support
- Compares tools, e.g. a Phillips and flathead screwdriver
- Joins different materials
- Joins components using a variety of methods
- Marks the material where a join/cut needs to be made
- Explores how different tools work, e.g. clamp
- Draws lines with a ruler
- Cuts thicker materials with scissors, e.g. tape, string, etc.
- Shows an awareness of safety when using tools
- Attempts to cut different materials to a specific shape
- Draws round shape templates
- Describes shapes, listing some properties, e.g. sides, round
- Explains why inclined planes make our lives easier in simple terms
- Adds to a construction kit model to make it stronger or to make it move better
- Attempts to change their tall structure to help it become more stable

Designing & Making for Users

- Discusses what they are going to do, including how and why in simple terms
- Makes a simple drawing to illustrate their idea
- Picks out simple tools when named, e.g. metal ruler
- Makes a model containing several parts
- Builds towers, bridges and tunnels using wooden bricks
- Builds using geometric construction material
- Builds using interlocking cogs
- Builds models with clay or pliable materials using a variety of techniques
- Labels a simple diagram, e.g. puts pictures of body parts on a silhouette
- Describes with familiar, simple key words what actions they took or tools and materials they used to create a finished product
- Follows a simple pictorial plan to recreate a model, e.g. using pictures of different size/shape boxes

Evaluating & Testing Ideas & Products

- Communicates about what they think of their own work
- Describes the purpose of their product, including what or who their product is for
- Discusses their work using appropriate vocabulary
- Identifies simple processes they need to develop to improve their design or make work

Investigating and Analysing Products

- Identifies some reasons why a specific material is used for a task, e.g. paper for a parcel
- Describes the effect of turning an object on or off
- Looks closely at a large compound object and states what materials they see

Progression Steps Framework

Step 4

Creative, Technical & Practical Expertise

- Makes a simple lever with assistance
- Cuts simple shapes using scissors
- Lists examples of software which can be activated by switches
- Creates a simple electrical circuit using cells, bulbs, buzzers and wires with support
- Constructs things that turn or move with support, e.g. windmills
- Creates simple programs using symbols, e.g. robot
- Tests the load a structure can carry
- Investigates how to make a structure stiffer
- Investigates how to make a structure more stable
- Investigates how to make a structure stronger
- Measures using a ruler with support
- Identifies simple steps that can be taken to improve safety when using tools
- Inserts paper fasteners for card linkages
- Joins materials by overlapping
- Demonstrates care using tools, when supervised
- Hammers using the correct side
- Makes holes in soft wood using a hand drill with one-to-one support
- Demonstrates how to turn a screwdriver
- Demonstrates how to hold a nail
- Demonstrates how to hold a hammer
- Cuts straight line with scissors

Designing & Making for Users

- Makes a product, structure or object using simple tools successfully, e.g. a hole punch
- Makes products, structures or objects using construction materials, e.g. straws to build 3D frameworks
- Describes with key words what actions they took or tools they used to create a finished product
- Selects tools generally appropriate to the task when making a product
- Selects materials generally appropriate to the task when making a product
- Follows simple plans to make an object, e.g. stacking 3D objects to recreate a structure on a plan
- Makes a basic model to help communicate their ideas
- Writes a caption or labels on their drawings
- Records ideas using drawing or information and communication technology
- Designs products for different contexts, e.g. themselves at home, a member of staff in the setting
- Discusses and explains their design ideas

Evaluating & Testing Ideas & Products

- Compares their completed work simply against the original design criteria when evaluating their designed product
- Suggests a way they can improve their product, e.g. in initial design, technical ability
- Identifies simple processes they need to develop to improve their completed product

Investigating and Analysing Products

- Explains how each material in an object has a role and what that role is, e.g. leather and rubber in a shoe
- Describes two simple properties of common materials
- Lists the materials an object is made from
- Suggests what a product is for and who might use it
- Explains simply how a product they are evaluating works

Progression Steps Framework

Step 5

Creative, Technical & Practical Expertise

- Scores card before folding
- Identifies some techniques for using common tools
- Identifies different ways of joining materials
- Suggests why they need to saw in a straight line
- Saws with one-to-one support
- Puts tools away safely
- Identifies tools which could be dangerous
- Holds a saw correctly
- Curls paper
- Cares for tools and materials
- Writes a simple sequence of computer instructions to create an outcome
- Creates a simple electrical circuit using cells, bulbs, buzzers and wires
- Follows instructions to make a simple mechanism
- Describes what a simple mechanism does, e.g. lifts
- Explains how they think a lever works
- Identifies simple levers
- Makes objects move using wheels, axels and/or construction kits
- Makes a structure more stable, stiff or strong after simple testing
- Joins simply with given tools and materials successfully
- Cuts along lines, straight and curved with some accuracy

Designing & Making for Users

- Employs simple finishing techniques when working with a range of materials
- Names some of the tools and materials they selected to make their product
- Demonstrates safe use of tools when making their product
- Communicates about their art and design work as it develops
- Combines construction kits with other material
- Considers the final appearance of the product
- Makes a simple template of their product with support
- States where the product they have designed will be used, e.g. home, in the setting, industry
- States who will use the product they have designed, e.g. themselves or others
- Creates simple plans of their designs
- Investigates actual items or products as starting point

Evaluating & Testing Ideas & Products

- Compares their end product with their design criteria
- Demonstrates some appreciation of the user's needs, noting if and how they are met
- Justifies their choice of design from a selection of ideas
- Suggests some ways they could improve a specific area of their own design work

Investigating and Analysing Products

- Explains why an object is made from a specific material/s, based on their understanding of their properties
- Describes what they like or dislike about an object or product
- Evaluates a product against simple, given criteria
- Gives reasons why materials are used for specific purpose

Progression Steps Framework

Step 6

Creative, Technical & Practical Expertise

- Chooses different joins which are generally appropriate to task
- Investigates temporary, fixed and moving joins
- Draws lines along a straight edge
- Plans and enters a sequence of instructions forming an algorithm, e.g. specifying distance and turns
- Creates simple electrical circuits using given equipment
- Looks at and discusses examples of levers, e.g. how a pedal bin works and the name of the mechanism used
- Employs a simple mechanism in their product
- Explains how they think a mechanism works
- Suggests how to make their structure stronger, more stable or stiffer using simple techniques or equipment they have previously tried
- Joins textiles using glue, staples or simple stitches
- Cuts out more precisely using scissors
- Measures in centimetres using a ruler
- Generally selects the correct equipment or tools for the task
- Cuts and shapes a range of materials with some support
- Removes rough edges using sandpaper
- Clasps an object in a vice with support
- Saws using a junior hacksaw with some support
- Grips an object with pliers

Designing & Making for Users

- Employs simple finishing techniques to enhance their product
- Suggests some ways they could improve their making technique, e.g. cut more slowly, taking time to be precise
- Follows instructions when using tools
- Explains why they have chosen tools, techniques or materials
- Measures components in their design product with some care
- Manipulates materials to create new or different shapes
- Creates a model or mock-up of part or all of the product
- Labels diagrams or pictures using given information
- Selects material using simple characteristics as a basis
- Explains how their product will work
- Designs or makes a product using knowledge from previous work
- Takes into account some of the design criteria

Evaluating & Testing Ideas & Products

- Explains how and why they would change or improve a specific area of their product
- Explains simply why the properties of a material make is suitable or unsuitable for a purpose

↳ Investigating and Analysing Products

- States how a product works when evaluating, using some technical language, e.g. with gears
- Suggests the possible range of users when evaluating a product
- Suggests alternative materials for an object to be made from
- Gives simple examples of how the uses for a material have changed over time, e.g. bags to carry shopping
- Evaluates their product against the design criteria, using key words

Progression Steps Framework

Step 7

Creative, Technical & Practical Expertise

- Writes programs that accomplish specific goals
- Includes a control box to operate switch
- Includes simple circuits in their product, e.g. to create light or motion
- Devises a simple switch on their model
- Recognises simple mechanical systems, e.g. pneumatics
- Includes a simple mechanism in their product
- Suggests a mechanism to use in their product to fulfil a specific requirement
- Discusses the method, equipment and materials they can use to make an item stable or stronger
- Identifies what makes items stable or stronger
- Explains why they chose specific processes
- Selects tools relating to their functionality
- Marks the position for screws or nails using a tool, e.g. bradawl
- Includes the use of simple construction materials where appropriate
- Aids the finish or construction of their product using sandpaper
- Joins using a low temperature glue gun
- Joins or combines resistant materials, e.g. strip wood at right angles
- Joins materials using temporary fastenings
- Joins materials using permanent fastenings
- Makes holes accurately, e.g. using a drill
- Shapes resistant materials, e.g. makes rectangle or square from strip wood
- Cuts strip wood or dowel to length with some accuracy
- Cuts resistant materials, e.g. strip wood using saw
- Follows safety rules when using a range of tools

Designing & Making for Users

- Attempts to improve the finish of their product
- Chooses materials to fit the aesthetic quality of their design
- Measures, marks out and cuts with some accuracy
- Refers to their design or plans whilst making
- Assembles or joins parts of their product successfully
- Works out the order of the process when making their product
- Selects materials relating to their functionality
- Develops their own ideas as they design, e.g. when creating a prototype
- Uses a graphics program, e.g. to design elements such as a pattern
- Decides on the criteria for a product
- Communicates realistic ideas, e.g. how different parts of the product will work, use of available resources
- Gathers information about the needs or wants of a particular group or individual to aid their design, e.g. by undertaking a simple consumer survey
- Designs products to be used in different contexts

Evaluating & Testing Ideas & Products

- Evaluates own ideas and products, e.g. noting similarities and differences between the original plan and finished product
- Tests their product
- Considers the visual impact of the finished product
- Describes how improvements suggested by others would improve their final product
- Explains the reasons behind why modifications were made

Investigating and Analysing Products

- Suggests how a design or product affected or changed people's lives around the world
- Investigates and analyses a range of products using key words to describe their findings
- Researches some of the great designers in different areas of study

Progression Steps Framework

Step 8

Creative, Technical & Practical Expertise

- Controls and models using software designed for purpose
- Writes code to control and monitor models or products
- Draws conventional symbols correctly when designing circuits
- Changes speed using mechanisms
- Changes direction using mechanisms
- Describes the function of mechanical systems in a product
- Identifies how to strengthen, stiffen or reinforce a range of materials and applies this to different situations
- Demonstrates how to use a vice correctly
- Measures and cuts in millimetres
- Measures accurately in millimetres
- Describes linear motion
- Chooses finishing techniques appropriate to creating a quality product
- Marks out using a variety of equipment e.g. steel rule, set square
- Files metal to size
- Explains the suitability of using different joins, e.g. nuts and bolts for joins that need to be undone later
- Joins a range of materials, e.g. using slotting movements
- Drills two pieces of material together
- Cuts to a line using a saw
- Makes different cuts mostly accurately, e.g. with scissors or saws
- Shapes a range of resistant materials
- Uses machine tools safely and accurately under supervision
- Independently uses simple hand tools safely and accurately

Designing & Making for Users

- Makes sure that the finish of product is suitable for users
- Identifies an appropriate method of finishing product, taking note of aesthetics
- Demonstrates techniques which are multi-step
- Suggests ways to proceed when problems occur
- Makes modifications as work is in progress
- Assembles materials in accordance with plans
- Assembles components to make a working product using a range of materials
- Decides on the correct tools and processes to match the chosen material
- Measures and marks out the required length on a range of materials with accuracy
- Tests basic requirements using a prototype
- Produces detailed plans using a range of techniques, e.g. cross-sectional, exploded diagrams
- Creates realistic designs which are suitable for the task
- Creates a design criteria which demonstrates attention to atheistic and function of a product
- Produces simple, accurate product drawings or models using CAD software
- Designs products to be used within a range of contexts

Evaluating & Testing Ideas & Products

- Outlines how modifications for improvements suggested by others could be implemented and how they would improve the final product
- Outlines the effects of modifications that were made during the making process
- Comments on the effectiveness of their product when evaluating their ideas and products

Investigating and Analysing Products

- Investigates and analyses a range of products against a wide ranging criteria, using key words to describe their findings appropriately
- Suggests reasons why or how a designer generated an original idea which improved an existing model, e.g. horticultural technologies
- Researches or discusses information about key individuals in design and technology who have created products which helped shape the world, e.g. a chef or engineer

Progression Steps Framework

Step 9

Creative, Technical & Practical Expertise

- Employs innovative combinations of electronics, computing and mechanisms in their products
- Includes programmable components in their products with support
- Ensures a desired effect is created using a range of electrical components confidently
- Recognises moving pivots and fixed pivots
- Recognises a range of mechanisms including bell cranks, sliders, ratchet and pawls, rack and pinions
- Explores how to change the appearance of a range of materials, e.g. colouring technique in fabric
- Combines appropriate materials within a product which provide a range of uses, e.g. fabric for comfort, card to stiffen
- Explores more complex finishing processes, e.g. wood staining, enamelling, dip coating
- Makes own decisions about how they will combine materials and techniques to create a specific effect
- Understands the working properties of materials and selects appropriate materials to be used in products to produce functional solutions to design ideas

Designing & Making for Users

- Organises practical work consistently so that processes are carried out accurately
- Employs specialist equipment to product a product/part of product
- Displays adaptation when making
- Shows a detailed understanding of the equipment, materials, tools, components and processes worked with to produce a very good quality product
- Works mostly to plan, correcting any mistakes with little help
- Annotates all designs with the materials and sizes, and refers to the processes that will be used
- Produces a detailed plan of making, including accurate timings and HACCP, suggesting alternative ways of making the product at certain stages
- Develops a detailed specification that will inform innovative and appealing design ideas that are suitable for a specific user
- Analyses existing products by justifying the different materials and processes used in their manufacture
- Explores the needs of others in depth and uses research to help create design ideas that are suitable for the user
- Takes into account the properties of materials, explaining why they are used
- Uses a range of tools, equipment, materials and components with precision, to consistently produce a well finished product

Evaluating & Testing Ideas & Products

- Justifies any modifications or improvements that were needed and modifies the product based on the evaluation which led to an improved final product
- Tests the product carefully against the design specification, using this to further improve ideas
- Evaluates their work regularly throughout the design and making process
- Thoroughly tests and evaluates the final product as it was being used, highlighting any weaknesses

Investigating and Analysing Products

- Understands the responsibilities of Designers, Engineers and Technologists
- Analyses the work of past and present professionals and explains how this has impacted on both original ideas and final product
- Suggests own criteria to investigate against when looking at existing products

Progression Steps Framework

Step 10

Creative, Technical & Practical Expertise

- ◯ Understands and uses the properties of materials and the performance of structural elements to achieve functioning solutions
- ◯ Understands how more advanced mechanical systems used in their products enable changes in movement and force
- ◯ Understands how more advanced electrical and electronic systems can be powered and used in their products
- ◯ Applies computing and uses electronics to embed intelligence in products that respond to inputs and control outputs using programmable components

Designing & Making for Users

- ◯ Uses research and exploration, such as the study of different cultures, to identify and understand user needs
- ◯ Identifies and solves their own design problems and understand how to reformulate problems given to them
- ◯ Develops specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations
- ◯ Uses a variety of approaches, to generate creative ideas and avoid stereotypical responses
- ◯ Develops and communicates design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools
- ◯ Selects from and uses specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture
- ◯ Selects from and use a wider, more complex range of materials, components and ingredients, taking into account their properties

Evaluating & Testing Ideas & Products

- ◯ Analyses the work of past and present professionals and others to develop and broaden their understanding
- ◯ Investigates new and emerging technologies
- ◯ Tests, evaluates and refines their ideas and products against a specification, taking into account the views of intended users and other interested groups
- ◯ Understands developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists