St. Mewan C.P. School Knowledge and Skills Progression for Design and Technology

For DT knowledge and skills are combined, rather than being identified separately as skills, through designing, making, evaluating and technical knowledge.

Year Group	Design	Make	Evaluation	Technical knowledge	Tier 3 Vocabulary	Tier 2 Vocabulary
N	Explore different materials freely, in order to develop their ideas about how to use them and what to make. Develop their own ideas and then decide which materials to use to express them.	Join different materials and explore different textures. Make imaginative and complex 'small world' with blocks and construction kits, such as a city with different buildings and a park. Provide lots of flexible and open-ended resources for children's imaginative play.	Listen and understand what children want to create before offering suggestions. Invite artists, musicians and crafts people in to the setting to widen the range of ideas which the children can draw on.	Join different materials and explore different textures. Listen and understand what children want to create before offering suggestions.	Fasteners Join	Glue Masking tape Materials Cardboard boxes Hammers and nails Glue guns
R	Provide a range of materials and tools and teach children to use them with care. Promote independence taking care not to introduce too many things at once.	Provide a range of materials and tools and teach children to use them with care. Promote independence taking care not to introduce too many things at once.	Provide children with a range of materials for children to construct with. Encourage them to think about and discuss what they want to make. Discuss problems and how they might be solved as they arise. Reflect with the children on how they achieved their aims.	Teach children to develop their colour mixing techniques to enable them to match the colours they see and to represent with step-by-step guidance when appropriate. Teach children different techniques for joining materials such as how to use adhesive tape and different sorts of glue.	Shapes Colours Galleries Museums Independent Creative	Adhesive tape Colour mixing
1	Structures • Learning the importance of a clear design criteria • Including individual preferences and requirements in a design Mechanisms • Explaining how to adapt mechanisms, using bridges or guides to control the movement • Designing a moving story book for a given audience • Designing a vehicle that includes wheels, axles and axle holders, which will allow the wheels to move • Creating clearly labelled drawings which illustrate movement Textiles • Using a template to create a design for a puppet	Structures • Making stable structures from card, tape and glue • Following instructions to cut and assemble the supporting structure of a windmill • Making functioning turbines and axles which are assembled into a main supporting structure Mechanisms • Following a design to create moving models that use levers and sliders • Adapting mechanisms Food • Chopping fruit and vegetables safely to make a smoothie • Identifying if a food is a fruit or a vegetable • Learning where and how fruits and vegetables grow Textiles • Cutting fabric neatly with scissors • Using joining methods to decorate a puppet • Sequencing steps for construction	Structures • Evaluating a windmill according to the design criteria, testing whether the structure is strong and stable and altering it if it isn't • Suggest points for improvements Food • Tasting and evaluating different food combinations • Describing appearance, smell and taste • Suggesting information to be included on packaging Mechanisms • Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed • Reviewing the success of a product by testing it with its intended audience • Testing mechanisms, identifying what stops wheels from turning, knowing • that a wheel needs an axle in order to move Textiles • Reflecting on a finished product, explaining likes and dislikes	Structures • Describing the purpose of structures, including windmills • Learning how to turn 2D nets into 3D structures • Learning that the shape of materials can be changed to improve the strength and stiffness of structures • Understanding that cylinders are a strong type of structure that are often used for windmills and lighthouses • Understanding that windmill turbines use wind to turn and make the machines inside work • Understanding that axles are used in structures and mechanisms to make parts turn in a circle • Developing awareness of different structures for different purposes Food • Understanding the difference between fruits and vegetables • Describing and grouping fruits by texture and taste Mechanisms • Learning that levers and sliders are mechanisms and can make things move • Identifying whether a mechanism • is a lever or slider and determining what movement the mechanism will make	Stencil Assemble Design Evaluation Mechanism Model Sliders Test Design Net Axle Axle holder Fix Client Stable Chassis Mechanic	Blender Carton Fruit Healthy Ingredients Peel Peeler Recipe Slice Smoothie Template Vegetable Target Template Audience Evaluation Strong Weak Windmill Decorate Fabric Glue Hand puppet Safety pin Staple Wheel

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				• Using the vocabulary: up, down, left, right, vertical and horizontal to describe movement • Identifying what mechanism makes a toy or vehicle roll forwards • Learning that for a wheel to move it must be attached to an axle Textiles • Learning different ways in which to join fabrics together: pinning, stapling, gluing		
2	Structures • Generating and communicating ideas using sketching and modelling • Learning about different types of structures, found in the natural world and in everyday objects Mechanisms • Creating a class design criteria for a moving monster • Designing a moving monster for a specific audience in accordance with a design criteria • Selecting a suitable linkage system to produce the desired motions • Designing a wheel • Selecting appropriate materials based on their properties Cooking and nutrition • Designing a healthy wrap based on a food combination which work well together Textiles • Designing a pouch	Structures • Making a structure according to design criteria • Creating joints and structures from paper/card and tape Mechanisms • Making linkages using card for levers and split pins for pivots • Experimenting with linkages adjusting the widths, lengths and thicknesses of card used • Cutting and assembling components neatly • Selecting materials according to their characteristics • Following a design brief Cooking and nutrition • Slicing food safely using the bridge or claw grip • Constructing a wrap that meets a design brief Textiles • Selecting and cutting fabrics for sewing • Decorating a pouch using fabric glue or running stitch	Structures • Exploring the features of structures • Comparing the stability of different shapes • Testing the strength of own structures • Identifying the weakest part of a structure • Evaluating the strength, stiffness and stability of own structure Food • Describing the taste, texture and smell of fruit and vegetables • Taste testing food combinations and final products • Describing the information that should be included on a label • Evaluating which grip was most effective Mechanisms • Evaluating own designs against design criteria • Using peer feedback to modify a final design • Evaluating different designs • Testing and adapting a design Textiles • Troubleshooting scenarios posed by teacher • Evaluating the quality of the stitching on others' work • Discussing as a class, the success of their stitching against the success criteria • Identifying aspects of their peers' work that they particularly like and why	Structures • Identifying natural and man-made structures • Identifying when a structure is more or less stable than another • Knowing that shapes and structures with wide, flat bases or legs are the most stable • Understanding that the shape of a structure affects its strength • Using the vocabulary: strength, stiffness and stability • Knowing that materials can be manipulated to improve strength and stiffness • Building a strong and stiff structure by folding paper Food • Understanding what makes a balanced diet • Knowing where to find the nutritional information on packaging • Knowing the five food groups Mechanisms • Learning that mechanisms are a collection of moving parts that work together in a machine • Learning that there is an input and output in a mechanism • Identifying mechanisms in everyday objects • Learning that a lever is something that turns on a pivot • Learning that a linkage is a system of levers that are connected by pivots • Exploring wheel mechanisms • Learning how axels help wheels to move a vehicle Textiles • Joining items using fabric glue or stitching • Identifying benefits of these techniques • Threading a needle	Input Lever Linear motion Linkage Mechanical Mechanism Motion Oscillating motion Output Pivot Reciprocating motion Rotary motion Mould Stable Stiff Structure Axle	Alternative Diet Balanced diet Expensive Healthy Ingredients Nutrients Packaging Refrigerator Sugar Natural Weak Accurate Fabric Knot Pouch Running stitch Shape Stencil Template Thimble Decorate Ferris wheel Waterproof Survey Test Function Man made Strong

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				• Sewing running stitch, with evenly spaced, neat, even stitches to join fabric • Neatly pinning and cutting fabric using a template		
3	Mechanisms • Designing a toy which uses a pneumatic system • Developing design criteria from a design brief • Generating ideas using thumbnail sketches and exploded diagrams • Learning that different types of drawings are used in design to explain ideas clearly Electrical systems • Designing a game that works using static electricity, including the instructions for playing the game • Identifying a design criteria and a target audience Textiles • Designing and making a template from an existing cushion and applying individual design criteria	Mechanisms • Creating a pneumatic system to create a desired motion • Building secure housing for a pneumatic system • Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy • Selecting materials due to their functional and aesthetic characteristics • Manipulating materials to create different effects by cutting, creasing, folding, weaving Electrical systems Making an electrostatic game, referring to the design criteria • Using a wider range of materials and equipment safely • Using electrostatic energy to move objects in isolation as well as in part of a system Textiles • Following design criteria to create a cushion • Selecting and cutting fabrics with ease using fabric scissors • Sewing cross stitch to join fabric • Decorating fabric using appliqué • Completing design ideas with stuffing and sewing the edges	Mechanisms • Using the views of others to improve designs • Testing and modifying the outcome, suggesting improvement Electrical systems • Learning to give constructive criticism on own work and the work of others • Testing the success of a product against the original design criteria and justifying opinions Textiles • Evaluating an end product and thinking of other ways in which to create similar items	Mechanisms • Understanding how pneumatic systems work • Learning that mechanisms are a system of parts that work together to create motion • Understanding that pneumatic systems can be used as part of a mechanism • Learning that pneumatic systems force air over a distance to create movement Electrical systems • Understanding what static electricity is and how it moves objects through attraction or repulsion • Generating static electricity independently • Using static electricity to make objects move in a desired way Textiles • Threading needles with greater independence • Tying knots with greater independence • Sewing cross stitch and appliqué • Understanding the need to count the thread on a piece of even weave fabric in each direction to create uniform size and appearance • Understanding that fabrics can be layered for affect	Target audience Target customer Attract Component Constructive criticism Design criteria Electrostatic Motion Repel Exploded-diagram Function Input Lever Linkage Mechanism Net Output Pivot Pneumatic system Thumb nail sketch	Climate Dry climate Exported Imported Mediterranean climate Nationality Nutrients Polar climate Temperate climate Tropical climate Recyclable Scoring Weak Strong Accurate Cross stitch Cushion Decorate Detail Fabric Patch Running stitch Seam Stencil Stuffing Template
4	Structures • Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect • Building frame structures designed to support weight Cooking and nutrition • Designing a biscuit within a given budget, drawing upon previous taste testing Textiles • Writing design criteria for a product, articulating decisions made	Structures • Creating a range of different shaped frame structures • Making a variety of free standing frame structures of different shapes and sizes • Selecting appropriate materials to build a strong structure and for the cladding • Reinforcing corners to strengthen a structure • Creating a design in accordance with a plan • Learning to create different textural effects with materials Cooking and nutrition • Following a baking recipe	Structures • Evaluating structures made by the class • Describing what characteristics of a design and construction made it the most effective • Considering effective and ineffective designs Cooking and nutrition • Evaluating a recipe, considering: taste, smell, texture and appearance • Describing the impact of the budget on the selection of ingredients • Evaluating and comparing a range of products • Suggesting modifications	Structures • Learning what pavilions are and their purpose • Building on prior knowledge of net structures and broadening knowledge of frame structures • Learning that architects consider light, shadow and patterns when designing • Implementing frame and shell structure knowledge • Considering effective and ineffective designs Cooking and nutrition	Cladding Design criteria Evaluation Function Reinforce Target audience Target customer Adapt Budget Equipment Flavour Ingredients Method Packaging Prototype Mock up	Budget Equipment Flavour Ingredients Method Packaging Quantity Recipe Utilities Aesthetic Book sleeve Fabric Fastening Running stitch Inspiration Pavilion

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	• Designing a personalised Book sleeve	• Cooking safely, following basic hygiene rules • Adapting a recipe Textiles • Making and testing a paper template with accuracy and in keeping with the design criteria • Measuring, marking and cutting fabric using a paper template • Selecting a stitch style to join fabric, working neatly sewing small neat stitches • Incorporating fastening to a design	Textiles • Testing and evaluating an end product against the original design criteria • Deciding how many of the criteria should be met for the product to be considered successful • Suggesting modifications for improvement	• Understanding the impact of the cost and importance of budgeting while planning ingredients for biscuits • Understanding the environmental impact on future product and cost of production Textiles • Understanding that there are different types of fastenings and what they are • Articulating the benefits and disadvantages of different fastening types	Net	Texture Theme
5	Mechanisms • Designing a popup book which uses a mixture of structures and mechanisms • Naming each mechanism, input and output accurately • Storyboarding ideas for a book Electrical systems • Designing an electronic greetings card with a simple electrical control circuit • Creating a labelled design showing positive and negative parts in relation to the LED and the battery Textiles • Designing a stuffed toy considering the main component shapes required and creating an appropriate template • Considering proportions of individual components Digital World • Researching (books, internet) for a particular (user's) animal's needs • Developing design criteria based on research • Generating multiple housing ideas using building bricks • Understanding what a virtual model is and the pros and cons of traditional and CAD modelling • Placing and manoeuvring 3D objects, using CAD • Changing the properties of, or combine one or more 3D objects, using CAD	Mechanisms • Following a design brief to make a pop up book, neatly and with focus on accuracy • Making mechanisms and/ or structures using sliders, pivots and folds to produce movement • Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result Electrical systems • Making a working circuit • Creating an electronics greeting card, referring to a design criteria • Mapping out where different components of the circuit will go Textiles • Creating a 3D stuffed toy from a 2D design • Measuring, marking and cutting fabric accurately and independently • Creating strong and secure blanket stitches when joining fabric • Using applique to attach pieces of fabric decoration Digital World • Understanding the functional and aesthetic properties of plastics • Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range	Mechanisms • Evaluating the work of others and receiving feedback on own work • Suggesting points for improvement Electrical systems • Evaluating a completed product against the original design sheet and looking at modifications that could be made to improve the reliability or aesthetics of it or to incorporate another type of electronic device, eg: buzzer Textiles • Testing and evaluating an end product and giving point for further improvements Digital World • Stating an event or fact from the last 100 years of plastic history • Explaining how plastic is affecting planet Earth and suggesting ways to make more sustainable choices • Explaining key functions in my program (audible alert, visuals) • Explaining how my product would be useful for an animal carer including programmed features	Mechanisms • Knowing that an input is the motion used to start a mechanism • Knowing that output is the motion that happens as a result of starting the input • Knowing that mechanisms control movement • Describing mechanisms that can be used to change one kind of motion into another Electrical systems • Learning the key components used to create a functioning circuit • Learning that graphite is a conductor and can be used as part of a circuit • Learning the difference between series and parallel circuits • Understanding that breaks in a circuit will stop it from working Textiles • Learning to sew blanket stitch to join fabric • Applying blanket stitch so the space between the stitches are even and regular • Threading needles independently Digital World • To know that a 'device' means equipment created for a certain purpose or job and that monitoring devices observe and record • To know that a sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose • To understand that conditional statements (and, or, if booleans) in programming are a set of rules which are followed if certain conditions are met	Computer aided design Design brief Design criteria Exploded diagram Input Linkage Mechanism Motion Output Pivot Prototype Slider Structure Appendage Monitoring device Monitor Device Electronic Sensor Thermoscope Thermometer Research	Aesthetic Caption Function Template Accurate Annotate Detail Evaluation Fabric Sew Shape Stuffed toy Stuffing Battery Buzzer Circuit Component Conductor Copper Graphite Innovative Insulator LED Modify Parallel circuit Series circuit Switch Test Wire Compression Forces Mark out Measure Predict Reinforce Research Development Inventor Historical Vivarium

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6	Structures • Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs Mechanisms • After experimenting with a range of cams, creating a design for an automata toy based on a choice of cam to create a desired movement • Understanding how linkages change the direction of a force • Making things move at the same time Electrical systems • Designing a steady hand game - identifying and naming the components required • Drawing a design from three different perspectives • Generating ideas through sketching and discussion • Modelling ideas through prototypes Cooking and nutrition • Writing a recipe, explaining the key steps, method and ingredients • Including facts and drawings from research undertaken Textiles • Designing a waistcoat in accordance to specification linked to set of design criteria to fit a specific theme • Annotating designs	Structures • Building a range of play apparatus structures drawing upon new and prior knowledge of structures • Measuring, marking and cutting wood to create a range of structures • Using a range of materials to reinforce and add decoration to structures Mechanisms • Measuring, marking and checking the accuracy of the jelutong and dowel pieces required • Measuring, marking and cutting components accurately using a ruler and scissors • Assembling components accurately to make a stable frame • Understanding that for the frame to function effectively the components must be cut accurately and the joints of the frame secured at right angles • Selecting appropriate materials based on the materials being joined and the speed at which the glue needs to dry/set Electrical systems • Making a working circuit • Creating an electronics greeting card, referring to a design criteria • Mapping out where different components of the circuit will go Cooking and nutrition • Following a recipe, including using the correct quantities of each ingredient • Adapting a recipe based on research • Working to a given timescale • Working safely and hygienically with independence Textiles • Using template pinning panels onto fabric • Marking and cutting fabric accurately, in accordance with a design • Sewing a strong running stitch, making small, neat stitches and following the edge • Tying strong knots • Decorating a waistcoat - attaching objects using thread and adding a secure fastening	Structures • Improving a design plan based on peer evaluation • Testing and adapting a design to improve it as it is developed • Identifying what makes a successful structure Mechanisms • Evaluating the work of others and receiving feedback on own work • Applying points of improvements • Describing changes they would make/ do if they were to do the project again Electrical systems • Testing own and others finished games, identifying what went well and making suggestions for improvement Cooking and nutrition • Evaluating a recipe, considering: taste, smell, texture and origin of the food group • Taste testing and scoring final products • Suggesting and writing up points of improvements in productions • Evaluating health and safety in production to minimise cross contamination Textiles • Evaluating work continually as it is created	Structures • Knowing that structures can be strengthened by manipulating materials and shapes • Identifying the shell structure in everyday life (cars, aeroplanes, tins, cans) • Understanding man made and natural structures Mechanisms • Using a bench hook to saw safely and effectively • Exploring cams, learning that different shaped cams produce different follower movements • Exploring types of motions and direction of a motion Electrical systems • Understanding how electromagnetic motors work • Learning that batteries contain acid, which can be dangerous if they leak • Learning that when electricity enters a magnetic field it can make a motor Cooking and nutrition • Learning how to research a recipe by ingredient • Recording the relevant ingredients and equipment needed for a recipe • Understanding the combinations of food that will complement one another • Understanding where food comes from, describing the process of 'Farm to Fork' for a given ingredient Textiles • Learning different decorative stitches • Application and outcome of the individual technique • Sewing accurately with even regularity of stiches	Target audience Assembly diagram Automata Axle Bench hook Cam Clamp Component Cutting list Dowel Drill bits Exploded diagram Hand drill Follower Frame Jelutong Linkage Tenon saw Adapt Annotate Design Design criteria Detail Fabric fastening Knot Running stitch Seam Sew Target customer Thread Design Design criteria Perspective drawing Prototype Side view Top view Bench hook Cladding Coping saw Dowel Jelutong Modify Plan view Sketch Tenon saw Vice	Accompaniment Adjective Caption Collaboration Cookbook Cross contamination Equipment Farm Flavour Illustration Imperative verb Ingredients Method Nationality Preparation Processed Reared Recipe Research Story board Top tips Unit of measurement Accurate Diagram Mark out Measure Model Right angle Set square Accurate Properties Shape Template Unique Waistcoat Waterproof Assemble Battery Battery pack Bulb Bulb holder Buzzer Circuit Circuit symbol Component Conductor Copper Evaluation Function Insulator LED Magnetic field

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						Net Steady hand game Plan Pliers Series circuit Circuit Switch Symmetrical Test Wire cutters Apparatus Feedback Idea Landscape Natural materials Playground Reinforce Strong Structure Texture User Weak