Design Technology: Progression of skills and knowledge

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Nursery	Children in Nursery will draw with increasing complexity and detail, such as representing a face with a circle and including details. When drawing or painting, children will begin to use a comfortable grip and start to show control when holding equipment. (PD)		They will build independence and ownership over their work by selecting appropriate tools and resources to use to create their pictures. (PSED) Children will continue to develop their ability to control equipment such as pencils, pens, and paintbrushes. (PD)		Children will continue to build on the skills they have learnt over the year. They will select appropriate tools and resources to use in order to create collages, such as materials, glue and scissors. Children will show a preference for a dominant hand, whilst using one handed tools and equipment independently.	
Reception **SKILLS**	**Food:** Soup	**Structures:** Junk modelling	**Textiles:** Bookmarks		**Structures:** Junk modelling (Boats)	
	Design: • Designing a soup recipe as a class. • Designing soup packaging.	**Design:** • Making verbal plans and material choices. • Developing a junk model.	**Design:** • Discussing what a good design needs. • Designing a simple pattern with paper. • Designing a bookmark. • Choosing from available materials.		**Design:** • Designing a junk model boat. • Using knowledge from exploration to inform design.	
	Make: • Chopping plasticine safely. • Chopping vegetables with support.	**Make:** • Improving fine motor/scissor skills with a variety of materials. • Joining materials in a variety of ways (temporary and permanent). • Joining different materials together. • Describing their junk model, and how they intend to put it together	**Make:** • Developing fine motor/cutting skills with scissors. • Exploring fine motor/threading and weaving (under, over technique) with a variety of materials. • Using a prepared needle and wool to practice threading.		**Make:** • Making a boat that floats and is waterproof, considering material choices.	
	Evaluate: • Tasting the soup and giving opinions. • Describing some of the following when tasting food: look, feel, smell and taste. • Choosing their favourite packaging design and explaining why	**Evaluate:** • Giving a verbal evaluation of their own and others' junk models with adult support. • Checking to see if their model matches their plan. • Considering what they would do differently if they were to do it again. • Describing their favourite and least favourite part of their model.	**Evaluate:** • Reflecting on a finished product and comparing to their design.		**Evaluate:** • Making predictions about, and evaluating different materials to see if they are waterproof. • Making predictions about and evaluating existing boats to see which floats best. • Testing their design and reflecting on what could have been done differently. • Investigating the how the shapes and structure of a boat affect the way it moves.	
Reception **KNOWLEDGE**	• To know that soup is ingredients (usually vegetables and liquid) blended together.	• To know there are a range to different materials that can be used to make a model and that they are all slightly different.	• To know that a design is a way of planning our idea before we start. • To know that threading is putting one material through an object.		• To know that 'waterproof' materials are those which do not absorb water.	

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	• To know that vegetables are grown. • To recognise and name some common vegetables. • To know that different vegetables taste different. • To know that eating vegetables is good for us. • To discuss why different packages might be used for different foods.	• Making simple suggestions to fix their junk model.		

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1 **SKILLS**	**Mechanisms** Moving story book		**Food** Smoothies		**Structures** Windmills	
	Design: • Explaining how to adapt mechanisms, using bridges or guides to control the movement. • Designing a moving story book for a given audience.		**Design:** • Designing smoothie carton packaging by-hand or on ICT software.		**Design:** • Learning the importance of a clear design criteria. • Including individual preferences and requirements in a design.	
	Make: • Following a design to create moving models that use levers and sliders.		**Make:** • Chopping fruit and vegetables safely to make a smoothie.		Make: • Making stable structures from card, tape and glue . • Learning how to turn 2D nets into 3D structures. • 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.	
	Evaluate: • 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.		**Evaluate:** • Tasting and evaluating different food combinations. • Describing appearance, smell and taste. • Suggesting information to be included on packaging.		**Evaluate:** • 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.	
Year 1 **KNOLWEDGE**	• To know that a mechanism is the parts of an object that move together. •To know that a slider mechanism moves an object from side to side. • To know that a slider mechanism has a slider, slots , guides and an object. • To know that bridges and guides are bits of card that purposefully restrict the movement of the slider.		• Understanding the difference between fruits and vegetables. • To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber). • To know that a blender is a machine which mixes ingredients together into a smooth liquid. • To know that a fruit has seeds and a vegetable does not. • To know that fruits grow on trees or vines. • To know that vegetables can grow either above or below ground. • To know that vegetables can come from different parts of the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber).		• To understand that the shape of materials can be changed to improve the strength and stiffness of structures. • To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses). • To understand that axles are used in structures and mechanisms to make parts turn in a circle. • To begin to understand that different structures are used for different purposes. • To know that a structure is something that has been made and put together.	

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 2 **SKILLS**	**Textiles** Christmas decorations		**Mechanisms** Wheels and Axles		**Food** A balanced diet: Healthy wraps	
	Design: • Designing a Christmas decoration.		**Design:** • Designing a vehicle that includes wheels, axles and axle holders, that when combined, will allow the wheels to move. • Creating clearly labelled drawings that illustrate movement.		**Design:** • Designing a healthy wrap based on a food combination which work well together.	
	Make: • Selecting and cutting fabrics for sewing. • Decorating a pouch using fabric glue or running stitch. • Threading a needle. • Sewing running stitch, with evenly spaced, neat, even stitches to join fabric. • Neatly pinning and cutting fabric using a template.		**Make:** • Adapting mechanisms, when: - they do not work as they should. - to fit their vehicle design. -to improve how they work after testing their vehicle.		**Make:** • Slicing food safely using the bridge or claw grip. • Constructing a wrap that meets a design brief.	
	Evaluate: • 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.		**Evaluate:** • Testing wheel and axle mechanisms, identifying what stops the wheels from turning, and recognising that a wheel needs an axle in order to move.		**Evaluate:** • 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.	
Year 2 **KNOLWEDGE**	• To know that sewing is a method of joining fabric. • To know that different stitches can be used when sewing. • To understand the importance of tying a knot after sewing the final stitch. • To know that a thimble can be used to protect my fingers when sewing**.**		• To know that wheels need to be round to rotate and move. • To understand that for a wheel to move it must be attached to a rotating axle. • To know that an axle moves within an axle holder which is fixed to the vehicle or toy. • To know that the frame of a vehicle (chassis) needs to be balanced.		• To know that 'diet' means the food and drink that a person or animal usually eats. • To understand what makes a balanced diet. • To know where to find the nutritional information on packaging. • To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar. • To understand that I should eat a range of different foods from each food group, and roughly how much of each food group. • To know that nutrients are substances in food that all living things need to make energy, grow and develop. • To know that 'ingredients' means the items in a mixture or recipe. • To know that I should only have a maximum of five teaspoons of sugar a day to stay healthy. • To know that many food and drinks we do not expect to contain sugar do; we call these 'hidden sugars'**.**	

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 3 SKILLS	**Textiles** Cross-stich and applique: Cushions		**Structures** Constructing a castle: Roman Forts		**Food** Eating seasonally: Fruit/Vegetable tart	
	Design: • Designing and making a template from an existing cushion and applying individual design criteria.		**Design:** • Designing a castle with key features to appeal to a specific person/purpose. • Drawing and labelling a castle design using 2D shapes, labelling: -the 3D shapes that will create the features - materials needed and colours. • Designing and/or decorating a castle tower on CAD software.		**Design:** • Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish.	
	Make: • Following design criteria to create a Christmas decoration. • Selecting and cutting fabrics with ease using fabric scissors. • Threading needles with greater independence. • Tying knots with greater independence. • Sewing cross stitch to join fabric. • Decorating fabric using appliqué. • Completing design ideas with stuffing and sewing the edges.		**Make:** • Constructing a range of 3D geometric shapes using nets. • Creating special features for individual designs. • Making facades from a range of recycled materials.		**Make:** • Knowing how to prepare themselves and a workspace to cook safely in, learning the basic rules to avoid food contamination. • Following the instructions within a recipe.	
	Evaluate: • Evaluating an end product and thinking of other ways in which to create similar items.		**Evaluate:** • Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison, to the original design. • Suggesting points for modification of the individual designs.		**Evaluate:** • Establishing and using design criteria to help test and review dishes. • Describing the benefits of seasonal fruits and vegetables and the impact on the environment. • Suggesting points for improvement when making a seasonal tart.	
Year 3 KNOWLEDGE			• To understand that wide and flat based objects are more stable. • To understand the importance of strength and stiffness in structures.		• To know that not all fruits and vegetables can be grown in the UK. • To know that climate affects food growth. • To know that vegetables and fruit grow in certain seasons. • To know that cooking instructions are known as a 'recipe'. • To know that imported food is food which has been brought into the country. • To know that exported food is food which has been sent to another country. • To understand that imported foods travel from far away and this can negatively impact the environment. • To know that each fruit and vegetable gives us nutritional benefits because	

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			they contain vitamins, minerals and fibre. • To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health. • To know safety rules for using, storing and cleaning a knife safely. • To know that similar coloured fruits and vegetables often have similar nutritional benefits.

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 4 **SKILLS**	**Electrical systems** Torches		**Digital World** **Mindful Moments Timer**		**Food** Adapting a recipe: Biscuits	
	Design: • Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.		**Design:** Writing design criteria for a programmed timer (Micro:bit). • Exploring different mindfulness strategies. • Applying the results of my research to further inform my design criteria. • Developing a prototype case for my mindful moment timer. • Using and manipulating shapes and clipart by using computer-aided design (CAD), to produce a logo. • Following a list of design requirements.		**Design:** • Designing a biscuit within a given budget, drawing upon previous taste testing judgements.	
	Make: • Making a torch with a working electrical circuit and switch. • Using appropriate equipment to cut and attach materials. • Assembling a torch according to the design and success criteria.		**Make:** Developing a prototype case for my mindful moment timer. • Creating 3D structures using modelling materials. • Programming a micro:bit in the Microsoft micro:bit editor, to time a set number of seconds/minutes upon button press.		**Make:** • Following a baking recipe, from start to finish, including the preparation of ingredients. • Cooking safely, following basic hygiene rules. • Adapting a recipe to improve it or change it to meet new criteria (e.g. from savoury to sweet).	
	Evaluate: • Evaluating electrical products. • Testing and evaluating the success of a final product**.**		**Evaluate:** Investigating and analysing a range of timers by identifying and comparing their advantages and disadvantages. • Evaluating my Micro:bit program against points on my design criteria and amending them to include any changes I made. • Documenting and evaluating my project. • Understanding what a logo is and why they are important in the world of design and business. • Testing my program for bugs (errors in the code). • Finding and fixing the bugs (debug) in my code. • Using an exhibition to gather feedback. • Gathering feedback from the user to make suggested improvements to a product		**Evaluate:** • 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 food products. • Suggesting modifications to a recipe (e.g. This biscuit has too many raisins, and it is falling apart, so next time I will use less raisins).	
Year 4 **KNOWLEDGE**	• To understand that electrical conductors are materials which electricity can pass through. • To understand that electrical insulators are materials which electricity cannot pass through. • To know that a battery contains stored electricity that can be used to power products. • To know that an electrical circuit must be complete for electricity to flow. • To know that a switch can be used to complete and break an electrical circuit.		• To understand what variables are in programming. • To know some of the features of a Micro:bit. • To know that an algorithm is a set of instructions to be followed by the computer. • To know that it is important to check my code for errors (bugs). • To know that a simulator can be used as a way of checking your code works before installing it onto an electronic device.		• To know that the amount of an ingredient in a recipe is known as the 'quantity.' • To know that it is important to use oven gloves when removing hot food from an oven. • To know the following cooking techniques: sieving, creaming, rubbing method, cooling. •To understand the importance of budgeting while planning ingredients for biscuits.	

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 5 **SKILLS**	**Food** What could be healthier? Making spaghetti Bolognese		**Digital World** Monitoring devices		**Structures** Bridges	
	Design: • Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients. • Writing an amended method for a recipe to incorporate the relevant changes to ingredients. • Designing appealing packaging to reflect a recipe.		**Design:** • 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 combining one or more 3D objects, using CAD.		**Design:** • Designing a stable structure that is able to support weight. • Creating a frame structure with a focus on triangulation.	
	Make: • Cutting and preparing vegetables safely. • Using equipment safely, including knives, hot pans and hobs. • Knowing how to avoid cross-contamination. • Following a step by step method carefully to make a recipe		**Make:** • 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.		**Make:** • Making a range of different shaped beam bridges. • Using triangles to create truss bridges that span a given distance and support a load. • Building a wooden bridge structure. • Independently measuring and marking wood accurately. • Selecting appropriate tools and equipment for particular tasks. • Using the correct techniques to saws safely. • Identifying where a structure needs reinforcement and using card corners for support. • Explaining why selecting appropriating materials is an important part of the design process. • Understanding basic wood functional properties.	
	Evaluate: • Identifying the nutritional differences between different products and recipes. • Identifying and describing healthy benefits of food groups.		**Evaluate:** • 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		**Evaluate:** • Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary. • Suggesting points for improvements for own bridges and those designed by others.	

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		programmed features.	
Year 5 **KNOWLEDGE**	• To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues. • To know that I can adapt a recipe to make it healthier by substituting ingredients. • To know that I can use a nutritional calculator to see how healthy a food option is. • To understand that 'cross-contamination' means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects.	• 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.	• To understand some different ways to reinforce structures. • To understand how triangles can be used to reinforce bridges. • To know that properties are words that describe the form and function of materials. • To understand why material selection is important based on properties. • To understand the material (functional and aesthetic) properties of wood.

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	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 6 **SKILLS**	**Mechanical systems** Automata toys		**Textiles** Stuffed Toys *adapted from Y5 unit		**Electrical systems** Steady Hand Game	
	Design: •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. • Understanding and drawing cross-sectional diagrams to show the inner-workings of my design.		**Design:** • Designing a stuffed toy, considering the main component shapes required and creating an appropriate template. • Considering the proportions of individual components.		**Design:** • 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. • Understanding the purpose of products (toys), including what is meant by 'fit for purpose' and 'form over function'	
	Make: • 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.		**Make:** • 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. • Threading needles independently. • Using appliqué to attach pieces of fabric decoration. • Sewing blanket stitch to join fabric. • Applying blanket stitch so the spaces between the stitches are even and regular.		**Make:** • Constructing a stable base for a game. • Accurately cutting, folding and assembling a net. • Decorating the base of the game to a high quality finish. • Making and testing a circuit. • Incorporating a circuit into a base	
	Evaluate: • Evaluating the work of others and receiving feedback on own work. • Applying points of improvement to their toys. • Describing changes they would make/do if they were to do the project again.		**Evaluate:** • Testing and evaluating an end product and giving point for further improvements.		**Evaluate:** • Constructing a stable base for a game. • Accurately cutting, folding and assembling a net. • Decorating the base of the game to a high quality finish. • Making and testing a circuit. • Incorporating a circuit into a base.	
Year 6 **KNOWLEDGE**	• To understand that the mechanism in an automata uses a system of cams, axles and followers. • To understand that different shaped cams produce different outputs.		• To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric. • To understand that it is easier to finish simpler designs to a high standard. • To know that soft toys are often made by creating appendages separately		• To know that batteries contain acid, which can be dangerous if they leak. • To know the names of the components in a basic series circuit, including a buzzer.	

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		and then attaching them to the main body. • To know that small, neat stitches which are pulled taut are important to ensure that the soft toy is strong and holds the stuffing securely.	

Structures	
Food	
Textiles	
Electrical systems	
Mechanisms	
Digital World	
Mechanical systems	