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EYFS				
		Autumn **Junk Modelling**	**Spring** **Wheels and Axles**	**Summer** **Boats**
Skills	**Design**	• Making verbal plans and material choices. • Developing a junk model.	• Designing a vehicle that includes wheels, axels, and axle holders, that when combined, will allow the wheels to move.	• Designing a junk model boat. • Using knowledge from exploration to inform design.
	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.	• Adapting mechanisms, when they do not work as they should.	• Making a boat that floats and is waterproof, considering material choices.
	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 part of their model.	• Testing wheel and axle mechanisms and identifying what stops the wheels from turning.	• 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 how the shapes and structures of a boat affect the way it moves.
Knowledge	**Technical**	• To know there are a range of different materials that can be used to make a model and that they are all slightly different. • Making simple suggestions to fix their junk model.	• 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 'waterproof' materials are those which do not absorb water.
	Additional		• To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles.	• To know that some objects float, and others sink. • To know different parts of boats.

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Year 1				
		Autumn **Fruit and Vegetables**	**Spring** **Wheels and Axles**	**Summer** **Constructing a Windmill**
Skills	**Design**	• Designing smoothie carton packaging by-hand or on ICT software.	• Designing a vehicle that includes wheels, axels, and axle holders, that when combined, will allow the wheels to move.	• Learning the importance of a clear design criteria. • Including individual preferences and requirement in a design.
	Make	• Chopping fruit and vegetables safely to make a smoothie.	• Adapting mechanisms, when: - They do not work as they should. - To fit their vehicle design. - To improve how they work after testing their vehicle.	• making stable structures from card, tape and glue. • Learning w to turn 2D nets into 3D structures. • Following instructions to cut and assembly the support structure of a windmill. • Making functioning turbines and axles which are assembled into a main supporting structure.
	Evaluate	• Tasting and evaluating different food combinations. • Describing appearance, smell and taste. • Suggesting information to be included on packaging.	• Testing wheel and axle mechanisms and identifying what stops the wheels from turning, and recognising that a wheel needs an axle in order to move.	• Evaluating a windmill according to the design criteria, testing whether the structure is strong and stable and altering if it isn't. • Suggest points for improvement.

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Knowledge	**Technical**	• 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 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 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 the vehicle needs to be balanced.	• To understand that the shape of materials can be changed to improve the strength and stiffness of structures. • To understand that cylinders are strong type of structure (e.g the main shape used fir 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.
	Additional		• To know some real-life items that use wheels such as wheelbarrows, hamster wheels and vehicles.	• To know that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity. • To know the three main parts of a windmill are the turbine, axle and structure.

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Year 2				
		Autumn **Pouches**	**Spring** **A Balanced Diet**	**Summer** **Wooden Houses**
Skills	**Design**	• Designing a pouch.	• Designing a healthy wrap based on a combination which work well together.	• Generating and communicating ideas using sketching and modelling. • Learning about different types of structures, found in the natural world and in everyday objects
	Make	• Selecting and cutting fabrics for sewing. • Decorating a pouch using fabric glue or running stitch. • Threading a needle. • Sewing running stitch, with evening spaced, neat, even stiches to join fabric. • Neatly pinning and cutting fabric using a template.	• Slicing food safetly using the bridge or claw grip. • Constructing a wrap that meets a design brief.	• Making a structure according to design criteria. • Creating joints and structures from paper/card and tape. • Building a strong and stiff structure by folding paper.
	Evaluate	• Troubleshooting scenarios posed by the teacher. • Evaluating the quality of the stitching on others' work.	• Describing the taste, texture and smell of fruit and vegetables. • Taste testing food combinations and final products.	• Exploring the features of structures. • Comparing the stability of different shapes.

		• Discussing as a class, the success of their stitching against the success criteria. • Identifying aspects of the peers' work that they particularly like and why.	• Describing the information that should be included on a label. • Evaluating which grip was most effective.	• Testing the strength of own structures. • Identifying the weakest part of a structure. • Evaluating the strength, stiffness and stability of own structure.
Knowledge	**Technical**	• 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 fingers when sewing.	• 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 know that shapes and structures with wide, flat bases or legs are the most stable. • To understand that the shape of a structure affects its strength. • To know that materials can be manipulated to improve strength and stiffness. • To know that a structure is something which has been formed or made from parts. • To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move. • To know that a 'strong' structure is one which does not break easily.

				• To know that a 'stiff' structure or material is one which does not bend easily
	Additional			• To know that natural structures are those found in nature. • To know that man-made structures are those made by people.

Year 3				
		Autumn **Pneumatic Toys**	**Spring** **Eating Seasonally**	**Summer** **Building a Castle**
Skills	**Design**	• 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.	• Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish.	• 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.

	Make	• 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 and weaving.	• Knowing how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination. • Following the instructions within a recipe.	• Constructing a range of 3D geometric shapes using nets. • Creating special features for individual designs. • Making facades from a range of recycled materials.
	Evaluate	• Using the views of others to improve designs. • Testing and modifying the outcome, suggesting improvements. • Understanding the purpose of exploded diagrams through the eyes of a designer and their client.	• 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.	• 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.

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Knowledge	**Technical**	• To understand how pneumatic systems work. • To understand that pneumatic systems can be used as part of a mechanism. • To know that pneumatic systems operate by drawing in, releasing and compressing air.	• 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 they contain vitamins, minerals and fibre. • To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health.	• To understand that wide and flat based objects are more stable. • To understand the importance of strength and stiffness in structures.

			• 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.	
	Additional	• To understand how sketches, drawings and diagrams can be used to communicate design ideas. • To know that exploded-diagrams are used to show how different parts of a product fit together. • To know that thumbnail sketches are small drawings to get ideas down on paper quickly.		• To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose. • To know that a façade is the front of a structure. • To understand that a castle needed to be strong and stable to withstand enemy attack. • To know that a paper net is a flat 2D shape that can become a 3D shape once assembled. • To know that a design specification is a list of success criteria for a product.

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Year 4				
		Autumn **Adapting a Recipe**	**Spring** **Torches**	**Summer** **Fastening**
Skills	**Design**	• Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish.	• Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.	• Writing design criteria for a product, articulating decisions made. • Designing a personalised book sleeve.
	Make	• Knowing how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination. • Following the instructions within a recipe.	• 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.	• 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 by sewing small, straight stitches. • Incorporating a fastening to a design.
	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.	• Evaluating electrical products. • Testing and evaluating the success of a final product	• 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. • Articulating the advantages and disadvantages of different fastening types
Knowledge	**Technical**	• 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 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 fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro. • To know that different fastening types are useful for different purposes. • To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions

		• 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 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.	• To know that a switch can be used to complete and break an electrical circuit.	
	Additional		• To know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens. • To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison.	

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Year 5				
		Autumn **Stuffed Toys**	**Spring** **What could be healthier?**	**Summer** **Bridges**
Skills	**Design**	• Designing a stuffed toy, considering the main component shapes required and creating an appropriate template. • Considering the proportions of individual components.	• 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.	• Designing a stable structure that is able to support weight. • Creating a frame structure with a focus on triangulation.

	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.	• 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.	• 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	• Testing and evaluating an end product and giving point for further improvements.	• Identifying the nutritional differences between different products and recipes.	• Adapting and improving own bridge structure by identifying points of

			• Identifying and describing healthy benefits of food groups.	weakness and reinforcing them as necessary. • Suggesting points for improvements for own bridges and those designed by others.
Knowledge	**Technical**	• 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 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	• 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 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.
	Additional			• To understand the difference between arch, beam, truss and suspension bridges.

				• To understand how to carry and use a saw safely.

Year 6				
		Autumn **Automata Toys**	**Spring**	**Summer** **Steady Hand Games**
Skills	**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.		• 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 and drawing cross-sectional diagrams to show the inner-workings of my design.		• 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.		• 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.		• Testing own and others finished games, identifying what went well and making suggestions for improvement. • Gathering images and information about existing children's toys. • Analysing a selection of existing children's toys.

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Knowledge	**Technical**	• 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 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.
	Additional	• To know that an automata is a hand powered mechanical toy. • To know that a cross-sectional diagram shows the inner workings of a product. • To understand how to use a bench hook and saw safely. T • o know that a set square can be used to help mark 90° angles.		• To know that ‘form’ means the shape and appearance of an object. • To know the difference between 'form' and 'function'. • To understand that 'fit for purpose' means that a product works how it should and is easy to use. • To know that form over purpose means that a product looks good but does not work very well. • To know the importance of ‘form follows function’ when designing: the product must be designed primarily with the function in mind. • To understand the diagram perspectives 'top view', 'side view' and 'back'.