St Helen's Design and Technology Progression Map

Substantive Knowledge- The established facts that we want children to know and remember.

Pupils will develop practical knowledge in the following areas:

- Cooking and nutrition
- Mechanisms/ Mechanical systems
- Structures
- Textiles

In Key stage 2 they will also develop knowledge of
*Electrical systems
* Digital worlds

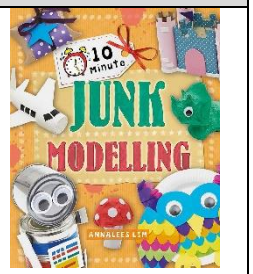
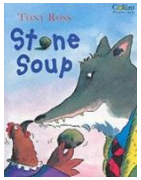
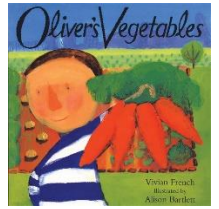
Disciplinary Knowledge- The methods that we want the children to use to find out the facts- thinking and acting like a designer.
4 skill strands run through each unit of work- Design, make, evaluate, technical knowledge

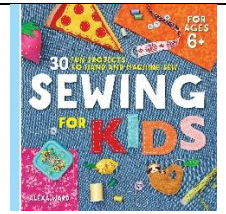
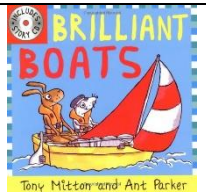
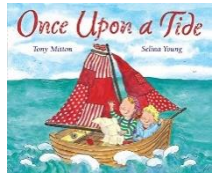
Key Stage 1

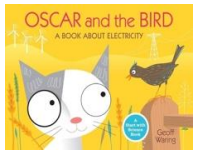
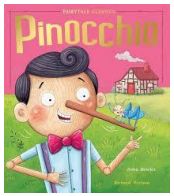
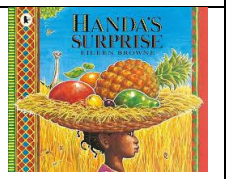
- Design purposeful, functional, appealing products for themselves and other users based on design criteria.
- Generate, develop, model and communicate their ideas through talking, drawing, templates, mock- ups and, where appropriate, information and communication technology.
- Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing].
- Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics.
- Explore and evaluate a range of existing products.
- Evaluate their ideas and products against design criteria.
- Build structures, exploring how they can be made stronger, stiffer and more stable.
- Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.
- Use basic principles of a healthy and varied diet to prepare dishes. Understand where food comes from.

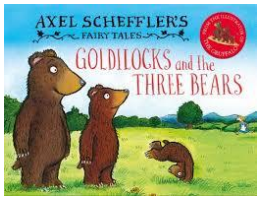
Key Stage 2

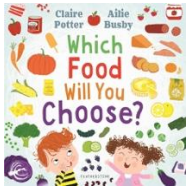
- Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.
- Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer- aided design.
- Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.
- Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics.
- Investigate and analyse a range of existing products.
- Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.
- Understand how key events and individuals in design and technology have helped shape the world.
- Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.
- Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages].
- Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors].
- Apply their understanding of computing to program, monitor and control their products.
- Understand and apply principles of a healthy and varied diet.
- Prepare and cook variety of predominantly savoury dishes using a range of cooking techniques

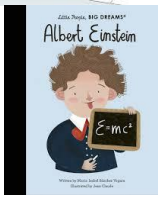
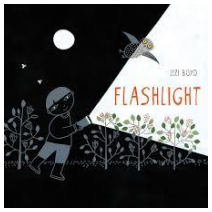
Reception				
Units taught	**Core Knowledge- what do we want the children to know and remember?**	**Core Skills- What do we want the children to be able to do?**	**Core Vocabulary- Words we want the children to be able to use**	**Key linked texts/ hook book**
Structures- junk modelling And autumn hibernation box project	To know different ways of joining materials- glues, tape, split pins, string, paper clips, elastic bands and suggest the best to use in a situation. To name some materials that are easy to cut with scissors and some that are harder or too hard to cut with scissors. To explain what a temporary and permanent join are and give some examples eg Lego bricks, blue tac, gluing	• Experiment with own junk modelling, choosing materials for different jobs • Explore how easy it is to cut different materials • Explore different ways of joining materials • Measure using non standard measures and by comparing • To be able to hold and use scissors effectively • To talk about their model and the processes they used to make it. • To problem solve and talk about improvements they have made. • To design and make a hibernation box for a hedgehog	join, stick, cut, bend, slot, smooth, bendy, bumpy scissors, blades, handle, snip, cut, squeeze, thumb, fingers, elbow, bubble wrap, cooked pasta, tin foil, playdough, straws, join, stick, cut, bend, slot, lift, open, measure, bigger, shorter, longer, taller, thicker, thinner, rough, smooth bendy, bumpy, paper clip, rubber band, bottle top	 
Cooking and nutrition- Soup and seasonal summer salad project	To know that fruits are the part of the plant that contains seeds. Vegetables are all other parts of the plant. They can be the roots, buds, stem or leaves. To know how to use a knife safely. To know that fruit, vegetables and salad are healthy foods and should be eaten as part of a balanced diet which help you to have a healthy body, mind and brain.	• Name some fruit and vegetables • To taste some fruit and vegetables • To use their senses to describe them- taste, smell, look, feel • To design a vegetable soup • To practise safe knife skills using playdough and chopping boards before vegetables • To understand that a knife is a tool not a toy • To taste and evaluate their soup • To design soup packaging • To design and make a seasonal rainbow salad	fruit, vegetable, texture, appearance, taste, seeds, roots, leaves, stem, plant, flower, bud, juicy, sweet, sour, dry, wet, bitter, chewy, watery saucepan, blender, knife, chopping board, hob, boil, blend, mix, soup, creamy, sweet, sour, dry, wet, watery, delicious packaging, tin, carton, pouch, lidded cup, barcode, ingredients, cardboard, metal, plastic, recyclable, reusable healthy, balanced diet, healthy eating, healthy lifestyle, mind, body brain	 

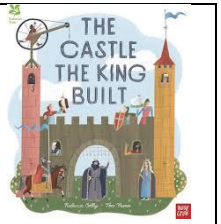
Textiles- Bookmarks and seasonal project- flower threading	To know that embroider means to decorate cloth by sewing on patterns.	• Practise threading and weaving skills using a variety of structures and materials • Create a repeating colour pattern • Sew with hessian and a needle and thread • Learn about the history of bookmarks in Victorian times • Design and create their own bookmark • Evaluate their bookmarks	thread, weave, pinch, push, pull, through, under, over, up, down, pattern, string, wool, ribbon, sew, sewing needle, hessian, thread bookmark, embroider, sew, Victorian design evaluate, reflect, think	
Structures- Boats and Christmas sliding mechanism project	To know that a waterproof material keeps water out. To know that floating means staying on surface of the water and sinking means to go to the bottom. To name different types of boats and what they are used for- cruise ship, fishing boat, kayak, ocean liner, pirate ship, sail boat To name the main parts of boats and why they are needed- sail, anchor, mast, deck, hull	• To test materials to see if they are waterproof • To make predictions before testing • To talk about fair testing • To test materials and objects to see if they float or sink • To design and create a boat • To test and evaluate their boat • To create a Christmas sliding santa chimney mechanism	waterproof, material, absorb, leak, wet, dry, prediction, variable, fair test, experiment, investigation, float, sink boat, sail boat, cruise ship, fishing boat, kayak, ocean liner, pirate ship, ship sail, anchor, hull, mast, rudder, helm, poop deck, deck, crow's nest	 

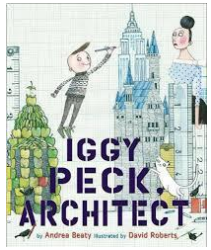
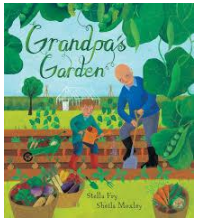
Key stage 1 Cycle A				
Units taught	**Core Knowledge- what do we want the children to know and remember?**	**Core Skills- What do we want the children to be able to do?**	**Core Vocabulary- Words we want the children to be able to use**	**Key linked texts**
Structures- Constructing a windmill	To know that a structure is something built for a reason. To know that stable structures do not topple. To know that adding weight to the base of a structure can make it more stable.	Finding the middle of an object. Puncturing holes. Adding weight to a structure. Creating supporting structures . Cutting evenly and carefully. Evaluating and improving a product.	axle, base, centre, equal, evaluate, middle, rotate, rotor, rotor blades, sails, same, stable, strong, structure, test, weak, wind, windmill	
Textiles- puppets	To know that 'joining technique' means connecting two pieces of material together. To know that there are various temporary methods of joining fabric by using staples, glue or pins. To know that a template (or fabric pattern) is used to cut out the same shape multiple times.	Using a template to create a design for a puppet. Cutting fabric neatly with scissors. Using joining methods to decorate a puppet. Sequencing steps for construction. Reflecting on a finished product, explaining likes and dislikes.	decorate, design, fabric, glue, model, hand puppet, safety pin, staple, stencil, template	
Cooking and nutrition- smoothies	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 and that vegetables can grow either above or below ground.	Designing smoothie carton packaging by hand. Chopping fruit and vegetables safely to make a smoothie. Juicing fruits to make a smoothie. Identifying if a food is a fruit. Learning where and how fruits and vegetables grow. Tasting and evaluating different foods. Describing appearance, smell and taste. Suggesting information to be included on packaging.	blend, blender, chopping board, compare, cut, design, evaluate, flavour, fork, fruit, healthy, ingredients, juice, juicer, leaf, plant, recipe, root, seed, select, smoothie, stem, table knife, taste, tree, vegetable, vine	

Key stage 1 Cycle B				
Units taught	**Core Knowledge- what do we want the children to know and remember?**	**Core Skills- What do we want the children to be able to do?**	**Core Vocabulary- Words we want the children to be able to use**	**Key linked texts**
Structures- Baby Bear's chair	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.	Generating and communicating ideas using sketching and modelling. 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. Exploring the features of structures. Comparing the stability of different shapes. Testing the strength of their own structures. Identifying the weakest part of a structure. Evaluating the strength, stiffness and stability of their own structure.	design criteria, man-made, natural, properties, structure, stable, shape, model, test	
Mechanisms- Making a moving monster	To know that mechanisms are a collection of moving parts that work together as a machine to produce movement. To know that an input is the energy that is used to start something working and an output is the movement that happens as a result of the input. To know that a lever is something that turns on a pivot.	Creating a design criteria for a moving monster as a class. Designing a moving monster for a specific audience in accordance with a design criteria. Making linkages using card for levers and split pins for pivots. Experimenting with linkages adjusting the widths, lengths and thicknesses of card used.	axle, design criteria, input, linkage, mechanical, output, pivot, wheel	

	To know that a linkage mechanism is made up of a series of levers.	Cutting and assembling components neatly. Evaluating own designs against design criteria. Using peer feedback to modify a final design.		
Cooking and nutrition- Balanced diet	To know that 'diet' means the food and drink that a person or animal usually eats. To know that the five main food groups are: carbohydrates, fruits and vegetables, protein, dairy and oils and spreads. To know that 'ingredients' means the items in a mixture or recipe.	Chopping foods safely to make a wrap. Grating foods to make a wrap. Snipping smaller foods instead of cutting. Spreading soft foods to make a wrap. Identifying the five food groups. Learning about a balanced diet. Tasting and evaluating different food combinations. Describing appearance, smell and taste. Designing three wrap ideas.	appearance, balanced, carbohydrates, chopping board, combination, cut, dairy, design, design brief, diet, evaluate, feel, fruit, grate, grater, ingredients, menu, oils, proteins, review, scissors, smell, snip, spread, spreads, table knife, taste	

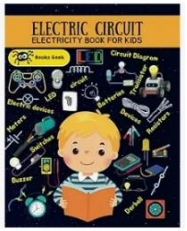
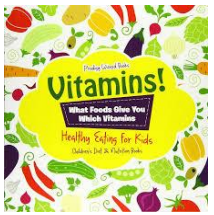
Lower Key Stage 2 Cycle A				
Units taught	**Core Knowledge- what do we want the children to know and remember?**	**Core Skills- What do we want the children to be able to do?**	**Core Vocabulary- Words we want the children to be able to use**	**Key linked texts**
Mechanical systems- Making a slingshot car	To know that all moving things have kinetic energy and that kinetic energy is the energy that something (object/person) has by being in motion. To know that air resistance is the level of drag on an object as it is forced through the air. To know that the shape of a moving object will affect how it moves due to air resistance.	Designing a shape that reduces air resistance. Drawing a net to create a structure from. Choosing shapes that increase or decrease speed as a result of air resistance. Personalising a design. Measuring, marking, cutting and assembling with increasing accuracy. Making a model based on a chosen design. Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.	chassis, energy, kinetic, mechanism, air resistance, design, structure, graphics, research, model, template	 
Electrical systems- Torches	To know 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 an electrical circuit must be complete for electricity to flow and that a switch can be used to complete and break an electrical circuit.	Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas. 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. Evaluating electrical products. Testing and evaluating the success of a final product.	battery, bulb, buzzer, conductor, circuit, circuit diagram, electricity, insulator, series circuit, switch, component, design, design criteria, diagram, evaluation, LED, model, shape, target audience, input, recyclable, theme, aesthetics, assemble, equipment, ingredients, packaging, properties, sketch, test	
Structures- Constructing a Castle	To know that wide and flat based objects are more stable.	Designing a castle with key features to appeal to a specific person/purpose. Drawing and labelling a castle design using 2D shapes.		

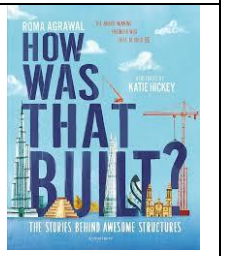
	To know that a façade is the front of a structure. To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse – and their purpose.	Designing and/or decorating a castle tower on CAD software. Constructing a range of 3D geometric shapes using nets. Creating special features for individual designs. Making facades from a range of recycled materials. 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.	2D, 3D, castle, design, key features, net, scoring, shape, stable, stiff, strong, structure, tab	

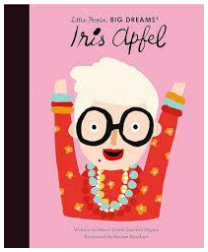
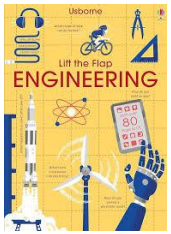
Lower Key stage 2 Cycle B				
Units taught	**Core Knowledge- what do we want the children to know and remember?**	**Core Skills- What do we want the children to be able to do?**	**Core Vocabulary- Words we want the children to be able to use**	**Key linked texts**
Structures- Pavilions	To know that a 'free-standing' structure is one that can stand on its own. To know that a pavilion is a decorative building or structure for leisure activities. To know that aesthetics are how a product looks.	Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. Building frame structures designed to support weight. 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.	3D shapes, cladding, design criteria, innovative, natural, reinforce, structure	
Cooking and nutrition- Eating seasonally	To know that seasonal means foods that grow in a given season in a given country. To know that similar coloured fruits and vegetables often have similar nutritional benefits. To know that buying seasonal foods has numerous benefits: it supports local farmers, reduces energy consumption associated with out-of-season farming that contributes to climate change, and minimises costs and pollution from food transportation.	Describing how climate affects where foods grow. Identifying seasonal ingredients from the UK. Tasting seasonal ingredients. Describing the texture and flavour of ingredients. Peeling foods by hand or with a peeler. Cutting ingredients safely. Choosing ingredients based on a design brief. Following the instructions within a recipe.	appearance, arid, climate, complementary, country, cut, design, evaluate, export, fruit, grate, import, ingredients, Mediterranean, mock-up, mountain, peel, polar, seasonal, seasons, snip, taste, temperate, texture, tropical, vegetable, weather	

		Describing the benefits of seasonal fruits and vegetables and their impact on the environment.		
Textile- Cross stitch and appliqué	To know that appliqué is a way of mending or decorating a textile by applying smaller pieces of fabric. To know that when two edges of fabric have been joined together it is called a seam. To know that some products are turned inside out after sewing so the stitching is hidden.	Designing and making a template from an existing cushion and applying individual design criteria. Following design criteria to create a cushion. 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. Evaluating an end product and thinking of other ways in which to create similar items.	appliqué, cross-stitch, design, equipment, fabric, patch, running stitch, thread, seam, texture, knot	

Upper Key Stage 2 Cycle A

Units taught	Core Knowledge- what do we want the children to know and remember?	Core Skills- What do we want the children to be able to do?	Core Vocabulary- Words we want the children to be able to use	Key linked texts
Electrical systems- Doodlers	To know that, in a series circuit, electricity only flows in one direction. To know when there is a break in a series circuit, all components turn off. To know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin.	Identifying factors that could be changed on existing products and explaining how these would alter the form and function of the product. Developing design criteria based on findings from investigating existing products. Developing design criteria that clarifies the target user. Altering a product's form and function by tinkering with its configuration. Making a functional series circuit, incorporating a motor. Constructing a product with consideration for the design criteria. Breaking down the construction process into steps so that others can make the product. Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses. Determining which parts of a product affect its function and which parts affect its form. Analysing whether changes in configuration positively or negatively affect an existing product. Peer evaluating a set of instructions to build a product.	circuit component, configuration, current, develop, DIY, investigate, motor, motorised, problem solve, product analysis, series circuit, stable, target user	 
Cooking and nutrition- Developing a recipe	To know that nutritional value helps us understand how healthy a food is. Nutrition information on food labels can help us make better choices for our bodies by showing us the amounts of nutrients like fibre, protein and sugar. To know that cross contamination happens when foods mix with raw foods or unclean objects.	Explaining the farm-to-fork process. Researching existing recipes. Suggesting alternative ingredients. Analysing nutritional content. Writing an alternative recipe.	abattoir, adaptation, balanced, beef, brand, cook, cross-contamination, cut, design, enhance, equipment, evaluate, farm, grate, hygiene, ingredients, label, measure, nutrient, nutrition, nutritional value, preference, press, process, recipe, safety, theme	

	To know that coloured chopping boards can prevent cross-contamination.	Understanding cross-contamination. Using preparation skills. Designing a jar label. Making a developed recipe.		
Structures- Playgrounds	To know that a 'footprint plan' is a design plan or layout that shows how a product or structure will be positioned or placed within a given space or environment To know that jelutong is a type of softwood which is lightweight and easy to cut and shape. To know that a prototype is a cheap model to test a design idea.	Designing a playground featuring a variety of different structures, giving consideration to how the structures will be used. Considering effective and ineffective designs. 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. 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.	apparatus, design criteria, equipment, playground, landscape features, cladding	

Upper Key stage 2 Cycle B				
Units taught	**Core Knowledge- what do we want the children to know and remember?**	**Core Skills- What do we want the children to be able to do?**	**Core Vocabulary- Words we want the children to be able to use**	**Key linked texts**
Textiles- Stuffed Toy	To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric. 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.	Designing a stuffed toy considering the main component shapes required and creating an appropriate template. Considering the proportions of individual components. 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. Testing and evaluating an end product and giving points for further improvements.	accurate, annotate, appendage, blanket-stitch, design criteria, detail, evaluation, fabric, sew, shape, stuffed toy, stuffing, template	
Mechanical systems- Pop up books	To know that mechanisms control movement and that mechanisms can be used to change one kind of motion into another. To know that a design brief is a description of what I am going to design and make. To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.	Designing a pop-up book which uses a mixture of structures and mechanisms. Naming each mechanism, input and output accurately. Storyboarding ideas for a book. 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.	design, input, motion, mechanism, criteria, research, reinforce, model	

		Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result. Evaluating the work of others and receiving feedback on own work. Suggesting points for improvement.		
Digital world- Navigating the world	To know that accelerometers can detect movement. To understand that sensors can be useful in products as they mean the product can function without human input. To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.	Writing a design brief from information submitted by a client. Developing design criteria to fulfil the client's request. Developing a product idea through annotated sketches. Placing and manoeuvring 3D objects, using CAD. Changing the properties of, or combine one or more 3D objects, using CAD. Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo). Explaining material choices and why they were chosen as part of a product concept. Programming an N,E, S,W cardinal compass. Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool. Developing an awareness of sustainable design.	smart, smartphone, equipment, navigation, cardinal compass, application (apps), pedometer, GPS tracker, design brief, design criteria, client, function, program, duplicate, replica, loop, variable, value, if statement, boolean, corrode, moldable, lightweight, sustainable design, environmentally friendly, biodegradable, recyclable, product lifecycle, product lifespan	

		Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch. Demonstrating a functional program as part of a product concept.		