Grayswood CE Primary School Knowledge Progression Map

Subject: Design and Technology

Intent

The National Curriculum for design and technology aims to ensure that all pupils:

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

Grayswood CE Primary School deliver a design and technology curriculum which aims to inspire our children to be innovative and creative thinkers who have an appreciation for the product design cycle: ideation, creation and evaluation in order to make purposeful products.

Children's interests are captured through project design briefs, giving them purpose, motivation and meaning for their learning. By providing a supportive and nurturing environment, we want our children to develop the confidence to take risks and achieve their personal best, through drafting design concepts, modelling, and testing and to be reflective learners who can evaluate their work and that of others respectfully. Furthermore, we aim to build an awareness of the impact of design and technology on our lives and encourage children to become resourceful, enterprising citizens who will have the skills to contribute to the design of the future.

The children of Grayswood will have the tools to meet the end of key stage attainment targets in the National curriculum and the aims align with those in the National curriculum.

	EYFS	Key Stage 1		Key Stage 2			
	Year R	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Structures							
Technical	**Junk modelling** To know there are a range to 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. **Boats** To know that 'waterproof' materials are those which do not absorb water.	**Stable structures** To recognising that different structures are used for different purposes. To explore the features of structures. To describe structures as buildings or freestanding structures. To make stable structures from card. To create supporting structures to aid stability. To use stable objects like cylinders to create structures.	**A chair for a bear** To recognise that different structures are used for different purposes. To explore the features of structures. To make stable structures from card. To create supporting structures to aid stability. To use stable objects like cylinders to create structures. To build a strong and stiff structure by folding paper. Folding to strengthen or stiffen. To compare the stability of different shapes. To identify the weakest part of a structure. To know that shapes and structures with wide, flat bases or legs are the most stable.	**Product Packaging** To begin to understand how different structures are built. To begin to understand how different structures are built. To begin to understand how different structures are built. To understand that wide and flat based objects are more stable. To understand the importance of strength and stiffness in structures.	**Helmets** Stiffening structures by layering. Strengthening structures by layering materials (lamination). Strengthening structures by ribbing. To know how some different structures are built. To know that structures can be strengthened by manipulating materials and shapes. To know a shell structure is a hollow shape with a thin outer layer.	**Bridges** 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.	**Playground pioneers** To know that structures can be strengthened by manipulating materials and shapes. To understand how to reinforce structures to make them more stable. To use triangulation to strengthen or stabilise a structure . To know that constraints are limits or conditions when making a product. To know that the environmental impact is how the product and making the product might affect the environment. To know that original and innovative ideas are different from what has been made before.

			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.				To know drawings and diagrams can be communicated in 3D. To know that annotations are detailed labels and comments on diagrams. To know that improving on prototypes can help to improve the final design. To know that materials and equipment lists help with planning. To know aesthetics are the way something looks. To know that risks are things that might go wrong. To know the shape of an object can affect both its aesthetics and function. To know aesthetics is how something looks. To know that the finish can make a

							product suitable to be used outside.
Additional	**Boats** To know that some objects float and others sink. To know the different parts of a boat.	To know that the 'user' is the person who will use the product. To know that different users may want different things from a design. To know that who they are designing for makes a difference to what they design. To know that the purpose is what something is for. To know that existing products can help when deciding what to design. To know that drawings are a way to explain ideas. To know that a plan is deciding what to do first and next. To know that different equipment does different things.	To know that a design brief helps to decide what to make. To know that design criteria are the steps for making a product successful. To know that design criteria help when thinking of ideas. To know that different products work in different ways and have parts that make them work. To know some properties of materials like hard, soft, flexible, waterproof, strong etc. To know the names of some geometric shapes, triangle, pyramid, square, cube, circle, sphere. To know that existing products can be evaluated against design criteria. To know that design criteria help to decide if their product is a success.	To know that creating accurate shapes improves how they look and sometimes their function. To know good suggestions help give better feedback. To know that they can choose to use feedback or not. To know that a shell structure is a hollow shape with a thin outer layer. To know that 3D shapes can form structures. To know structures can be strengthened by manipulating materials and shapes. To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose.	To know how design criteria help to plan for a product. To know form is the look and shape of something. To know function is what something does and how it works. To know that creating accurate shapes improves how they look and sometimes their function. To know choices of materials and equipment can affect the final product.	To understand the difference between arch, beam, truss and suspension bridges. To understand how to carry and use a saw safely.	To understand what a 'footprint plan' is. To understand that in the real world, design , can impact users in positive and negative ways. To know that a prototype is a cheap model to test a design idea. To know that sustainability means thinking about the materials that were used to make a product and how the product was made. To know that their final product can still be improved by using different materials or techniques. To know that evaluating their designs in detail will help them understand its successful and less successful parts. To know that a frame structure

		To know the names of common pieces of equipment. To know that some products will be better than others. To know that their ideas or products can be made better. To know that their ideas can makes someone else's work better. To know that other people's ideas can help make their work better. To know that a structure is something that has been made and put together. To know that stable structures do not topple. To know that shapes and structures with wide, flat bases or legs are the most stable. To know that adding weight to the base of a structure can make it more stable.	To know that improve means to make something better. To know that a structure is something that has been made and put together. To know 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 'strong' structure is one which does not break easily. To know that a 'stiff' structure or material is one which does not bend easily. To know that natural structures are those found in nature. To know that man-made structures are those made by people.	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.			supports or holds a shape, and is made up of strong parts joined together, like a skeleton or a climbing frame. To know how to reinforce structures. To know triangles can be used to reinforce structures. To know triangles can create strong and stable structures. To know that bracing is a way of reinforcing a structure.

Mechanisms / mechanical systems							
Technical			**Fairground wheel** To know that different materials have different properties and are therefore suitable for different uses. **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 there is always an input and output in a mechanism. To know that an input is the energy that is used to start something working. To know that 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. To know that a linkage mechanism is made up of a series of levers.		**Making a slingshot car** To understand that all moving things have kinetic energy. To understand 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 understand that the shape of a moving object will affect how it moves due to air resistance	**Pop up book** To know that mechanisms control movement. To understand that mechanisms can be used to change one kind of motion into another. To understand how to use sliders, pivots and folds to create paper-based mechanisms.	

Additional			**Fairground wheel** To know the features of a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder. To know that it is important to test my design as I go along so that I can solve any problems that may occur. **Making a moving monster** To know some real-life objects that contain mechanisms.		To understand that products change and evolve over time. To know that aesthetics means how an object or product looks in design and technology. To know that a template is a stencil you can use to help you draw the same shape accurately. To know that a birds-eye view means a view from a high angle (as if a bird in flight). To know that graphics are images which are designed to explain or advertise something. To know that it is important to assess and evaluate design ideas and models against a list of design criteria.	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.	
Electrical systems (KS2 only)							
Technical					**Torches** To understand that electrical conductors are materials which electricity can pass through.	**Doodlers** To know that series circuits only have one direction for the electricity to flow.	

					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 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. To know a motorised product is one which uses a motor to function.	
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.	To know that product analysis is critiquing the strengths and weaknesses of a product. To know that 'configuration' means how the parts of a product are arranged	
Cooking and nutrition							
		Fruit and vegetables Understand the difference between fruits and vegetables.		**Eating Seasonally** To know that not all fruits and vegetables can be grown in the UK.		.	**Come dine with me** To know that 'flavour' is how a food or drink tastes. To know that many countries have

		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 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,			'national dishes' which are recipes associated with that country. To know that 'processed food' means food that has been put through multiple changes in a factory. To understand that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides. To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork).

				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.			
Textiles							
	Bookmarks 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.	**Simple stitches** To discuss fabric properties. Threading large needles. To rehearse sewing techniques with large needles and thick thread, like wool. To sew a running stitch in large-weave embroidery fabric or hessian. To create patterns and following them with stitching. To space stitches evenly. To know drawings are a way to explain ideas.					**Waistcoats** To understand that it is important to design clothing with the client/ target customer in mind. To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric. To understand the importance of consistently sized stitches.

		To know that choosing different materials or components will affect what the product does or looks like. To know the names of common pieces of equipment. To know that following instructions helps with safety. To know that spacing cuts or marks evenly can be useful. To know that exture is how something feels. To know their ideas or products can be made better. To know their final product might be different to their original idea. To know their ideas can make someone else's work better. To know other people's ideas can help make their work better.					

		To know evenly spaced stitches, help when following a pattern. 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 understand that different techniques for joining materials can be used for different purposes. To understand that a template (or fabric pattern) is used to cut out the same shape multiple times. To know that drawing a design idea is useful to see how an idea will look. www.kapow					
Digital world (KS2 only)							
Technical				**Electronic charm** To understand that in programming a 'loop' is code that repeats			

				something again and again until stopped To know that a Micro:bit is a pocket-sized, codeable computer Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm			
Additional				To know what the 'Digital Revolution' is and features of some of the products that have evolved as a result To know that in Design and technology the term 'smart' means a programmed Product To know the difference between analogue and digital technologies To understand what is meant by 'point of sale display' To know that CAD stands for Computer-aided design			