Castle View Primary School and Nursery
Design and Technology progression
'Exceeding expectations, raising aspirations'

QEGSMAT

Aims: •To develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world. • To 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. • To critique, evaluate and test their ideas and products and the work of others. • To understand and apply the principles of nutrition and learn how to cook.	
Nursery	**Personal Social and Emotions Development** • Select and use activities and resources, with help when needed. This helps them to achieve a goal they have chosen or one which is suggested to them. **Physical Development** • Use large-muscle movements to wave flags and streamers, paint and make marks. • Choose the right resources to carry out their own plan. • Use one-handed tools and equipment, for example, making snips in paper with scissors. **Understanding the World** • Explore how things work. **Expressive Arts and Design** • Make imaginative and complex 'small worlds' with blocks and construction kits, such as a city with different buildings and a park. • Explore different materials freely, in order to develop their ideas about how to use them and what to make. • Develop their own ideas and then decide which materials to use to express them. • Create closed shapes with continuous lines, and begin to use these shapes to represent objects
Reception	**Physical Development** • Progress towards a more fluent style of moving, with developing control and grace. • Develop their small motor skills so that they can use a range of tools competently, safely and confidently. • Use their core muscle strength to achieve a good posture when sitting at a table or sitting on the floor. **Expressive Arts and Design** • Explore, use and refine a variety of artistic effects to express their ideas and feelings. • Return to and build on their previous learning, refining ideas and developing their ability to represent them. Create collaboratively, sharing ideas, resources and skills
ELG – Physical Development	• Use a range of small tools, including scissors, paintbrushes and cutlery.
ELG - Expressive Arts and Design	• Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. • Share their creations, explaining the process they have used.

Digital Word CAD			
		Year 2 – Axles **See Mechanisms**	**Year 5** **Textiles - Logo**
Skills	Design	Design a purposeful, functional and appealing product for themselves and others based on a design criteria. Generate and communicate ideas through discussion using pictures and words, begin to annotate ideas. Propose more than one idea for their product, using templates and mock-ups.	Use CAD to develop and communicate ideas. Research (books, internet) for a particular need. Develop design criteria based on research. Communicate ideas through discussion, annotated sketches, cross-sectional and exploded diagrams. Understand what a virtual model is and the pros and cons of traditional and CAD modelling. Placing and manoeuvring 3D objects, using CAD. Change the properties of, or combine one or more 3D objects, using CAD.
	Make	Explore ideas by rearranging materials. Use nets to create structures. Explore fixed or moving axles. Use CAD to create models. Make vehicles with construction kits. Use a range of materials to create models with wheels and axles. Cut dowel using saws and bench hooks. Attach wheels to chassis using an axle.	Understanding the functional and aesthetic properties of different types of materials. Explain their choice of materials and components. Measure, mark, cut and assemble with increasing accuracy. Make a protype based on a chosen design. Plan the stages of the making process. Use appropriate finishing techniques.
	Evaluate	Explore existing products and investigate how they have been made. Note changes during the making process as annotations to plans and drawings. Use views of others to improve designs. Evaluate own designs by saying what they do / not like about it and why.	Describe changes they would make/do if they were to do the project again. Use the views of others to improve designs. Evaluating the work of others and receiving feedback on own work.

Knowledge	Technical	To know that CAD stands for 'Computer-aided design'	Understand the term CAD means computer aided design. Know that CAM means computer aided manufacture. Technical Vocabulary – augmented reality, faces, plane, extrude, view cube, dimension, radius, align. Scale, modify, flip design.
	Additional		To know that a design brief is a description of what I am going to design and make.
ELECTRICAL SYSTEMS			
		Year 4 **Wire Maze**	**Year 6** **Saving Sea Turtles - Microbit**
Skills	Design	Generate a design giving consideration to the target audience. Develop more than one design or adaptation of an initial design. Plan a sequence of actions to make a product. Generate ideas through sketching and discussion. Begin to use exploded diagrams with annotation. Use prototypes to develop and share ideas. Propose realistic suggestions in order to achieve design ideas. Use CAD where appropriate.	Create both design and success criteria focusing on features of individual design ideas. Generate initial ideas through sketching and discussion. Develop more than one design or adaptation of an initial design. Draw a design from three different perspectives. Use exploded diagrams and cross-sectional drawings. Identifying and name the components required. Model ideas through prototypes and use to develop and share ideas. Propose realistic suggestions in order to achieve design ideas. Use CAD where appropriate.

	Make	Make a functioning wire maze game with a working electrical circuit and switch. Use appropriate equipment to cut and attach materials. Use tools with accuracy. Assemble according to the design and success criteria. Select techniques for different parts of the process. Use appropriate finishing techniques.	Use appropriate equipment to cut and attach materials. Use tools with accuracy. Assemble according to the design and success criteria. Select techniques for different parts of the process. Use appropriate finishing techniques. Use more complex circuits and components to create functional products. Program a computer to monitor changes in environment and control their products. Formulate step by step plans as guide to making.
	Evaluate	Evaluate electrical products: Investigate similar produces as starting points for design. Test and evaluate the success of a final product: -strengths and weaknesses -how well it meets the design criteria -how it could be improved.	Research and explore similar products as starting points for design. Test and evaluate the success of a final product: -strengths and weaknesses -how well it meets the design criteria -how it could be improved.
Knowledge	Technical	To know that an electrical circuit must be complete for electricity to flow. 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. To know that a switch can be used to complete and break an electrical circuit. Explore a range of switches. Understand a simple series circuit using bulbs, buzzers, switches.	Understand how to build more complex series circuits using bulbs, buzzers and switches. Understand how to incorporate programming, monitoring & control into a product. Know that systems have an input and output process. Develop experience of writing and modifying a program for control – Micro-bit. To understand that, in programming, a 'loop' is code that repeats something again and again until stopped.

		Know that electrical systems have an input and output process.	To know that a Micro:bit is a pocket-sized, codeable computer.
	Additional	Explore key individuals and key events in Design Technology. To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan & Thomas Edison. To know the features of a light bulb.	Explore key individuals and key events in Design Technology. To understand the diagram perspectives 'top view', 'side view' and 'back' 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'.

MECHANISMS					
		Year 2 **Car Design (axles)**	**Year 4** **Pneumatic Moving Toy**	**Year 5** **Levers and pulleys (Shaduf)**	**Year 6** **Pulleys and gears**

Skills	Design	Design a purposeful, functional and appealing product for themselves and others based on a design criteria. Generate and communicate ideas through discussion using pictures and words, begin to annotate ideas. Propose more than one idea for their product, using templates and mock-ups.	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 ideas using thumbnail sketches and exploded diagrams. Begin to use cross-sectional drawings. Use prototypes to develop and share ideas. Learn that different types of drawings are used in design to explain ideas clearly. Use CAD where appropriate.	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 ideas using thumbnail sketches and exploded diagrams. Begin to use cross-sectional drawings. Learn that different types of drawings are used in design to explain ideas clearly Use CAD where appropriate.	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 ideas using thumbnail sketches and exploded diagrams. Learn that different types of drawings are used in design to explain ideas clearly Name each mechanism, input and output accurately. Understand and draw cross-sectional diagrams to show the inner-workings of the design. Understand how linkages change the direction of a force. Make things move at the same time.
	Make	Explore ideas by rearranging materials. Use nets to create structures. Explore fixed or moving axles. Use CAD to create models. Make vehicles with construction kits.	Create a system to create a desired motion. Select materials due to their functional and aesthetic characteristics. Manipulate materials to create different effects by cutting, creasing, folding and weaving.	Create a system to create a desired motion. Measure, mark, cut and assemble with increasing accuracy. Select materials due to their functional and aesthetic characteristics.	Make mechanisms and/or structures. Measure, mark and cut components accurately using a ruler and appropriate tools. Select appropriate materials based on the materials being joined

		Use a range of materials to create models with wheels and axles. Cut dowel using saws and bench hooks. Attach wheels to chassis using an axle.	Plan the stages of the making process. Use appropriate finishing techniques.	Make a model based on a chosen design. Plan the stages of the making process. Use appropriate finishing techniques.	and the speed at which the glue needs to dry/set. Use layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result
	Evaluate	Explore existing products and investigate how they have been made. Note changes during the making process as annotations to plans and drawings. Use views of others to improve designs. Evaluate own designs by saying what they do / not like about it and why.	Investigate similar products. Research needs of users. Using the views of others to improve designs. Test and modify the outcome, suggesting improvements.	Use the views of others to improve designs. Evaluate the work of others and receive feedback on own work. Test and modify the outcome, suggesting improvements. Understand the purpose of exploded-diagrams through the eyes of a designer and their client. Explain how particular parts work.	Use the views of others to improve designs. Evaluating the work of others and receiving feedback on own work. Test and modify the outcome, suggesting improvements. Understand the purpose of exploded-diagrams through the eyes of a designer and their client. Describe changes they would make/do if they were to do the project again.
Knowledge	Technical	To know that CAD stands for 'Computer-aided design'.	To understand how different systems work – pneumatics / lever / linkages. To understand that these 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 mechanisms control movement. To understand that mechanisms can be used to change one kind of motion into another.	To know that mechanisms control movement. To understand that mechanisms can be used to change one kind of motion into another. To know that designers often want to hide mechanisms to make a

			To know that mechanical and electrical systems have an input and output process.		product more aesthetically pleasing.
	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 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 a cross-sectional diagram shows the inner workings of a product. To understand how to use a bench hook and saw safely. To know that a set square can be used to help mark 90° angles.
TEXTILES					
		Year 1 Textiles – simple printing techniques	**Year 3** Textiles - 2D to 3D project	**Year 4** Textiles – running stitch and over sewing	**Year 6** Textiles – pin, tack, join, stitches, cross stitch (stitches, textures, colours)

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Skills	Design	Generate and communicate ideas using sketching and modelling. Design with key features to appeal to a specific person/purpose.	Generate and communicate ideas using sketching and modelling. Design with key features to appeal to a specific person/purpose. Begin to use templates and where appropriate, information technology. Draw and label a design using 2D shapes, labelling: the 3D shapes that will create the features - materials needed and colours. Begin to use exploded diagrams.	Generate and communicate ideas using sketching and modelling. Design with key features to appeal to a specific person/purpose. Begin to use templates and mock-ups, and where appropriate, information technology. Draw and label a design using 2D shapes, labelling: the 3D shapes that will create the features - materials needed and colours. Develop exploded diagrams with annotations.	Design and make a template and apply individual design criteria. Design with key features to appeal to a specific person/purpose. Use templates and mock-ups, and where appropriate, information technology. Draw and label a design using 2D shapes, labelling: the 3D shapes that will create the features - materials needed and colours. Detailed exploded diagrams – fully annotated.
	Make	Select and cut fabrics for printing Select and explain colour and pattern choices.	Select and cut fabrics for sewing. Decorate using fabric glue or running stitch. Thread a needle. Sew running stitch to join fabric.	Select and cut fabrics for sewing. Decorate using fabric glue or running stitch. Thread needles with greater independence. Select materials for their functional properties Use appropriate finishing techniques. Sew running stitch and over sewing with evenly spaced, neat, even stitches to join fabric.	Follow design criteria to create a new functioning item Neatly pin and cut fabric using a template. Select and cut fabrics with ease using fabric scissors. Thread needles with greater independence. Tie knots with greater independence. Sew cross stitch to join fabric.

				Neatly pin and cut fabric using a template.	Decorate fabric using appliqué. Complete design ideas through: stuffing, sewing the edges or embellishing.
	Evaluate	Evaluate their ideas and products against a design criteria. Troubleshooting scenarios posed by teacher.	Evaluate their ideas and products against a design criteria. Consider the views of others to improve their work. Investigate and analyse a range of existing products. Troubleshooting scenarios posed by teacher.	Evaluate their ideas and products against a design criteria. Consider the views of others to improve their work. Investigate and analyse a range of existing products. Evaluate an end product and thinking of other ways in which to create similar items.	Evaluate own work and the work of others based on the aesthetic of the finished product and in comparison, to the original design. Suggest points for modification of the individual designs. Evaluate their ideas and products against a design criteria. Evaluate an end product and thinking of other ways in which to create similar items
Knowledge	Technical	To know that drawing a design idea is useful to see how an idea will look. To know that 'joining technique' means connecting two pieces of material together.	To understand that different techniques for joining materials can be used for different purposes.	To know that there are various temporary methods of joining fabric by using staples. glue or pins. To understand that a template (or fabric pattern) is used to cut out the same shape multiple times.	To know that applique is a way of mending or decorating a textile by applying smaller pieces of fabric to larger pieces. To know that when two edges of fabric have been joined together it is called a seam. To know that it is important to leave space on the fabric for the seam.

					To understand that some products are turned inside out after sewing so the stitching is hidden.
	Additional	Understand how key events and individuals in design and technology have helped shape the world			

STRUCTURES				
		Year 1 **Joining & Stability**	**Year 3** **Recycled Iron Man**	**Year 5** **Frames**
Skills	Design	Generate, develop and communicate their ideas through talking and drawing. Explore and evaluate a range of products.	Generate and communicate ideas through discussion using sketching and modelling. Design to a specific criteria. Begin to use templates and mock-ups, and where appropriate, information technology. Draw and label a design using 2D shapes, labelling: the 3D shapes that will create the features - materials needed. Begin to develop exploded diagrams.	Design a structure that is aesthetically pleasing and select materials to create a desired effect. Designs should be fit for purpose, aimed at particular individuals or groups. Use exploded diagrams and annotations to communicate ideas. Use templates and mock-ups, and where appropriate, information technology. Draw and label a design using 2D shapes, labelling: the 3D shapes that will create the features - materials needed and colours.

	Make	Make a structure according to design criteria. Create joints and structures from paper/card and tape.	Strengthen frames with diagonal struts. Measure and mark square section, strip and dowel accurately to 1cm. Create special features for individual designs. Use a range of recycled materials	Create a range of different shaped frame structures. Build frame structures designed to support weight. Create a frame structure with a focus on triangulation. Independently measure and mark wood accurately. Make a variety of free-standing frame structures of different shapes and sizes. Reinforce corners to strengthen a structure. Learn to create different textural effects with materials Using the correct techniques to saw safely. Identify where a structure needs reinforcement and using card corners for support. Explain why selecting appropriating materials is an important part of the design process. Understand basic wood functional properties.
	Evaluate	Evaluate their ideas and products against a design criteria. Evaluate the strength, stiffness and stability of own structure.	Evaluate own work and the work of others based on the aesthetic of the finished product and in comparison, to the original design. Suggest points for modification of the individual designs.	Adapt and improve own structure by identifying points of weakness and reinforcing them as necessary. Suggest points for improvements and those designed by others. Describe what characteristics of a design and construction made it the most effective or ineffective.

Knowledge	Technical	To know that materials can be manipulated to improve strength and stiffness. To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move.	To understand that wide and flat based objects are more stable. To understand the importance of strength and stiffness in structures. Gain a greater understanding of 3D shapes and the physical properties and everyday uses of a range of materials. Use of different techniques for joining, cutting and finishing.	To understand what a frame structure is. To know that a 'free-standing' structure is one which can stand on its own 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 know that aesthetics are how a product looks. To know that a product's function means its purpose. To understand that the target audience means the person or group of people a product is designed for. Wider knowledge of amount of rubbish that can be reused or recycled.	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 understand how to carry and use a saw safely.
COOKING AND NUTRITION				
		Year 1 **Bread Making**	**Year 2** (sources, vocab, preparing, safety and hygiene, measure/weigh)	**Year 3** **The Perfect Packed Lunch**

Skills	Design	Generate, develop and communicate their ideas through talking and drawing. Use basic principles of a healthy and varied diet to prepare dishes.	Generate, develop and communicate their ideas through talking and drawing. Use basic principles of a healthy and varied diet to prepare dishes.	Generate and communicate ideas using sketching and exploded diagrams. Use basic principles of a healthy and varied diet to design and prepare dishes. Deconstruct a range of packed lunches – Eatwell Plate. Use market research and analyse results – id. target audience.
	Make	Know how to prepare themselves and a workspace to cook safely in. Follow the instructions within a recipe. Measure and weigh using non-statutory measures – spoon, cup etc.	Know how to prepare themselves and a workspace to cook safely in, learning the basic rules to avoid food contamination. Follow the instructions within a recipe. Measure and weigh using non-statutory measures – spoon, cup etc.	Know how to prepare themselves and a workspace to cook safely in including the hygiene – hair tied back, handwashing, aprons etc. Understand the basic rules to avoid food contamination. Follow the instructions within a recipe. Use grams, litres etc. to measure accurately.
	Evaluate	Establish and use design criteria to help test and review dishes.	Establish and use design criteria to help test and review dishes. Describe the benefits of seasonal fruits and vegetables and the impact on the environment. Suggest points for improvement.	Evaluate a recipe, considering taste, smell, texture and appearance. Describe the impact of the budget on the selection of ingredients. Evaluate and compare a range of food products. Suggest modifications to a recipe (e.g. has too many raisins, it's falling apart, next time use less raisins).

Knowledge	Technical	To know safety rules for using, storing and cleaning a knife safely. To know that cooking instructions are known as a 'recipe'. Know what a fruit and vegetable is. To know that vegetables and fruit grow in certain seasons.	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 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 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 safety rules for using, storing and cleaning a knife safely. To know a variety of cooking techniques. 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.
	Additional	Food diary		Develop pupils knowledge of healthy food choices and that food comes from plants and animals.