Progression in Design Technology

Intent:

We aim for children to have acquired the essential characteristics of designers/engineers:

- Significant levels of originality and the willingness to take creative risks to produce innovative ideas and prototypes.
- An excellent attitude to learning and independent working.
- The ability to use time efficiently and work constructively and productively with others.
- The ability to carry out thorough research, show initiative and ask questions to develop an exceptionally detailed knowledge of users' needs.
- The ability to act as responsible designers and makers, working ethically, using finite materials carefully and working safely.
- A thorough knowledge of which tools, equipment and materials to use to make their products.
- The ability to apply mathematical knowledge.
- The ability to manage risks exceptionally well to manufacture products safely and hygienically.
- A passion for the subject and knowledge of, up-to-date technological innovations in materials, products and systems.

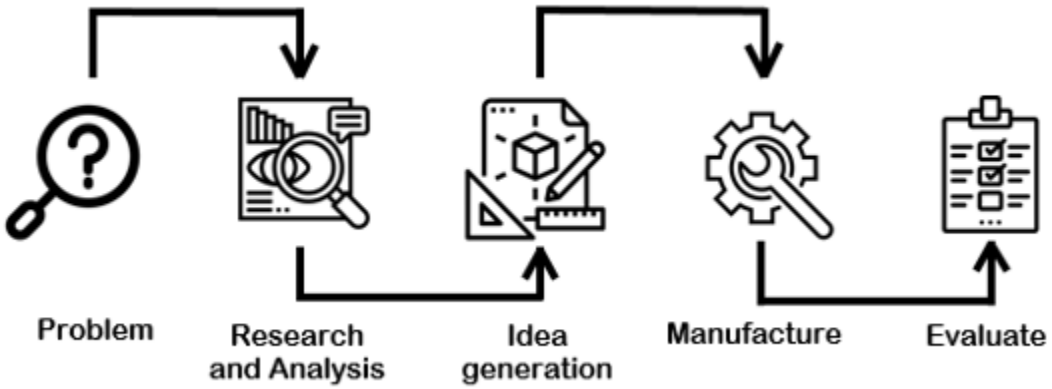
Implementation:

1. Curriculum drivers shape our curriculum breadth in design technology. They are derived from an exploration of the backgrounds of our students, our beliefs about high quality education and our values. They are used to ensure we give our students appropriate and ambitious curriculum opportunities. **Our curriculum drivers are community, spirituality, culture, democracy and possibilities.**
2. Cultural capital gives our students the vital background knowledge required to be informed and thoughtful members of our community who understand and believe in British values.
3. Curriculum breadth is shaped by our curriculum drivers, cultural capital, subject topics and our ambition for students to study the best of what has been thought and said by many generations of academics and scholars.
4. Our curriculum distinguishes between subject topics and 'threshold concepts'. Subject topics are the specific aspects of subjects that are studied.
5. **Threshold concepts** tie together the subject topics into meaningful schema. The same concepts are explored in a wide breadth of topics. Through this 'forwards-and-backwards engineering' of the curriculum, students return to the same concepts over and over and gradually build understanding of them. In design and technology, these threshold concepts are; ***Master practical skills*** (Developing the skills needed to make high quality products); **Design, make, evaluate and improve** (thinking and seeing design as a process); **Take inspiration from design throughout history** (Appreciating the design process that has influenced the products we use in everyday life).
6. **Knowledge categories:** These categories help students to relate each topic to previously studied topics and to form strong, meaningful schema. In design and technology these knowledge categories include: ***Technical Knowledge, Practical Knowledge, Design Inspiration, Design Process***
7. Cognitive science tell us that working memory is limited and that cognitive load is too high if students are rushed through content. This limits the acquisition of long-term memory. Cognitive science also tells us that in order for students to become creative thinkers, or have a greater depth of understanding they must first master the basics, which taken time.
8. **Milestones:** For each of the threshold concepts three Milestones, each of which includes the procedural and Knowledge categories in each subject give students a way of expressing their understanding of the threshold concepts. Milestone 1 is to taught across Years 1 and 2, milestone 2 is taught across Year 3 and 4 and milestone 3 is taught across Year 5 and Year 6

9. **Cognitive Domains:** Within each Milestone, students gradually progress in their procedural fluency and semantic strength through three cognitive domains: basic, advancing and deep. The goal for students is to display sustained mastery at the 'advancing' stage of understanding by the end of each milestone and for the most able to have a greater depth of understanding at the 'deep' stage.

Progression through the Cognitive Domains		
Basic	**Advancing**	**Deep**
Acquiring knowledge.	Applying knowledge.	Reasoning with knowledge.
Knowledge is explicit and unconnected.	Knowledge is explicit and connected.	Knowledge is connected and tacit.
Relying on working memory.	Drawing on long-term memory, freeing working memory to consider application.	Relies on long-term memory, freeing working memory to be inventive.
Procedures processed one at a time with conscious effort.	Procedures being automatic.	Automatic recall of procedures.
Understands only in the context in which the materials are presented.	Sees underlying concepts between familiar contexts.	Uses conceptual understanding in unfamiliar situations.
New information does not readily stick. Schemes are limited.	New information is linked to prior knowledge. Schemas are strong.	Readily assimilates new information into rapidly expanding schemas.
Struggles to search for problem solutions. Relies on means-end analysis.	Combines searching for problem solutions with means-end analysis.	Draws on a vast store of problem solutions.
Requires explicit instructions and models.	Uses models effectively.	Prefers discovery approaches to learning.

10. **Pedagogical Content Knowledge and Strategies:** As part of our progression model we use a different pedagogical style in each of the cognitive domains of basic, advancing and deep. This is based on the research of Sweller, Kirschner and Rosenshine who argue to direct instruction in the early stages of learning and discovery based approaches later. We use direct instruction in the basic domain and problem based discovery in the deep domain. This is called the reversal effect.
11. Also as part of our progression model we use POP tasks (Proof of Progress) which shows our curriculum expectations in each cognitive domain.
12. Our curriculum design is based on evidence from cognitive science; three main principles underpin it:
    - Learning is most effective with spaced repetition.
    - Interleaving helps pupils to discriminate between topics and aids long-term retention.
    - Retrieval of previously learned content is frequent and regular, which increases both storage and retrieval strength.
13. In addition to the three principles we also understand that learning is invisible in the short-term and that sustained mastery takes time.
14. Our content is subject specific. We make intra-curricular links to strengthen schema.
15. Continuous provision, in the form of daily routines, replaces the teaching of some aspects of the curriculum and, in other cases, provides retrieval practice for previously learned content.



St George's and St Benedict's Design Process - Designed with Progression into KS3/4 in mind

Breadth Of Study

Breadth of Study – Key Stage 1 (Milestone 1)

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts, such as the home and school, gardens and playgrounds, the local community, industry and the wider environment. When designing and making, pupils should be taught to:

Design

• 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.

Make

• select from and use a range of tools and equipment to perform practical tasks such as 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.

Evaluate

• explore and evaluate a range of existing products.

• evaluate their ideas and products against design criteria.

Technical knowledge

• build structures, exploring how they can be made stronger, stiffer and more stable.

• explore and use mechanisms, such as levers, sliders, wheels and axles, in their products.

Cooking and nutrition • use the basic principles of a healthy and varied diet to prepare dishes. • understand where food comes from.

Breadth of Study – Key Stage 2 (Milestones 2 and 3)

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making. They should work in a range of relevant contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment.

When designing and making, pupils should be taught to:

Design

• 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.

Make

• select from and use a wider range of tools and equipment to perform practical tasks, such as cutting, shaping, joining and finishing, accurately.

• select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.

Evaluate

• 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.

Technical knowledge

• apply their understanding of how to strengthen, stiffen and reinforce more complex structures.

• understand and use mechanical systems in their products, such as gears, pulleys, cams, levers and linkages.

• understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs, buzzers and motors.

• apply their understanding of computing to programme, monitor and control their products.

• understand and apply the principles of a healthy and varied diet.

• prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.

• understand seasonality and know where and how a variety of ingredients are grown, reared, caught and processed.

	Milestone 1 **Key Stage 1**	**Milestone 2** **Lower Key Stage 2**	**Milestone 3** **Upper Key Stage 2**
		Master Practical Skills	
Food	• Cut, peel or grate ingredients safely and hygienically. • Measure or weigh using measuring cups or electronic scales. • Assemble or cook ingredients.	• Prepare ingredients hygienically using appropriate utensils. • Measure ingredients to the nearest gram accurately. • Follow a recipe. • Assemble or cook ingredients (controlling the temperature of the oven or hob, if cooking).	• Understand the importance of correct storage and handling of ingredients (using knowledge of micro-organisms). • Measure accurately and calculate ratios of ingredients to scale up or down from a recipe. • Demonstrate a range of baking and cooking techniques. • Create and refine recipes, including ingredients, methods, cooking times and temperatures.

Materials:	• Cut materials safely using tools provided. • Measure and mark out to the nearest centimetre. • Demonstrate a range of cutting and shaping techniques (such as tearing, cutting, folding and curling). • Demonstrate a range of joining techniques (such as gluing, hinges or combining materials to strengthen).	• Cut materials accurately and safely by selecting appropriate tools. • Measure and mark out to the nearest millimetre. • Apply appropriate cutting and shaping techniques that include cuts within the perimeter of the material (such as slots or cut outs). • Select appropriate joining techniques.	• Cut materials with precision and refine the finish with appropriate tools (such as sanding wood after cutting or a more precise scissor cut after roughly cutting out a shape). • Show an understanding of the qualities of materials to choose appropriate tools to cut and shape (such as the nature of fabric may require sharper scissors than would be used to cut paper).
Textiles	• Shape textiles using templates. • Join textiles using running stitch. • Colour and decorate textiles using a number of techniques (such as dyeing, adding sequins or printing).	• Understand the need for a seam allowance. • Join textiles with appropriate stitching. • Select the most appropriate techniques to decorate textiles.	• Create objects (such as a cushion) that employ a seam allowance. • Join textiles with a combination of stitching techniques (such as back stitch for seams and running stitch to attach decoration). • Use the qualities of materials to create suitable visual and tactile effects in the decoration of textiles (such as a soft decoration for comfort on a cushion).
Electricals and Electronics	• Diagnose faults in battery operated devices (such as low battery, water damage or battery terminal damage).	• Create series and parallel circuits	• Create circuits using electronics kits that employ a number of components (such as LEDs, resistors, transistors and chips).
Computing	• Model designs using software.	• Control and monitor models using software designed for this purpose.	• Write code to control and monitor models or products.
Construction	• Use materials to practise drilling, screwing, gluing and nailing materials to make and strengthen products.	• Choose suitable techniques to construct products or to repair items. • Strengthen materials using suitable techniques.	• Develop a range of practical skills to create products (such as cutting, drilling and screwing, nailing, gluing, filing and sanding).
Mechanics	• Create products using levers, sliders, wheels and winding mechanisms.	• Use scientific knowledge of the transference of forces to choose appropriate mechanisms for a product (such as levers, winding mechanisms, pulleys and gears).	• Convert rotary motion to linear using cams. • Use innovative combinations of electronics (or computing) and mechanics in product designs.

Design, make, evaluate and improve			
	• Design products that have a clear purpose and an intended user. • Make products, refining the design as work progresses. • Use software to design.	• Design with purpose by identifying opportunities to design. • Make products by working efficiently (such as by carefully selecting materials). • Refine work and techniques as work progresses, continually evaluating the product design. • Use software to design and represent product designs.	• Design with the user in mind, motivated by the service a product will offer (rather than simply for profit). • Make products through stages of prototypes, making continual refinements. • Ensure products have a high quality finish, using art skills where appropriate. • Use prototypes, cross-sectional diagrams and computer aided designs to represent designs.
Take Inspiration from the Greats			
	• Explore objects and designs to identify likes and dislikes of the designs. • Suggest improvements to existing designs. • Explore how products have been created.	• Identify some of the great designers in all of the areas of study (including pioneers in horticultural techniques) to generate ideas for designs. • Improve upon existing designs, giving reasons for choices. • Disassemble products to understand how they work.	• Combine elements of design from a range of inspirational designers throughout history, giving reasons for choices. • Create innovative designs that improve upon existing products. • Evaluate the design of products so as to suggest improvements to the user experience.

Progression of Knowledge in Design and Technology							
Knowledge Categories: Design Inspiration, Design Process, Technical Knowledge and Practical Knowledge							
National Curriculum Requirements	**Area of Design**	**EY**	**Milestone 1**		**Milestone 2**	**Milestone 3**	**KS3**
			Y1	**Y2**	**Y3/4**	**Y5/6**	
KS1 **<u>Cooking and Nutrition</u>** Use the basic principles of a healthy and varied diet to prepare dishes. Understand where food comes from. **<u>Make</u>** 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. **<u>Evaluate</u>** Explore and evaluate a range of existing products Evaluate their ideas and products against design criteria **KS2** **<u>Cooking and Nutrition</u>** Understand and apply the principles of a healthy and varied diet.	**Food**	**<u>Expressive Arts and Design</u>** Make imaginative and complex 'small worlds' with blocks and construction kits, such as a city with different buildings. 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 Create collaboratively, sharing ideas resources and skills.	**Portable Snacks** *Practical Knowledge* *Design Process*	**Cous Cous** *Design Inspiration* *Technical Knowledge,* *Design Process*	**Cycle A Vegetables Soup** **Cycle B Dips** *Practical Knowledge* *Design Inspiration* *Technical Knowledge* *Design Process*	**Cycle A Bolognese** **Cycle B Bread** *Practical Knowledge* *Technical Knowledge* *Design Process* *Design Inspiration*	**<u>Cooking and Nutrition</u>** Understand and apply the principles of nutrition and health. Cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet. Become competent in a range of cooking techniques [for example, selecting and preparing ingredients; using utensils and electrical equipment; applying heat in different ways; using awareness of

Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques. Understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed. **<u>Design</u>** 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. **<u>Make</u>** 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 wider range of materials and components, including construction materials, textiles and ingredients, according to their functional		ELG Safely use a variety of materials, tools and techniques, experimenting with colour, design texture form and function.					taste, texture and smell to decide how to season dishes and combine ingredients; adapting and using their own recipes] Understand the source, seasonality and characteristics of a broad range of ingredients.

properties and aesthetic qualities.							
KS1 **Technical Knowledge** Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products. **Design** 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. **Evaluate** Explore and evaluate a range of existing products Evaluate their ideas and products against design criteria **Make** 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,	**Mechanisms**	**Understanding the world** Explore how things work. **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 cutting snips in paper with scissors. Develop their small motor skills so that they can use a range of tools competently, safely and confidently. **ELG** Use a range of small tools including scissors, paintbrushes and cutlery.	**Sliders** **Easter Card** *Practical Knowledge* *Design Inspiration* *Technical Knowledge* *Design Process*	**Wheels and Axles** *Practical Knowledge* *Design Inspiration* *Technical Knowledge* *Design Process*	**Cycle A Links and Levers** **Cycle B Pneumatics** *Practical Knowledge* *Design Inspiration* *Technical Knowledge* *Design Process*	**Cycle A Electronic motors** **Car** **Cycle B Pulleys, Levers and Cams** **Educational toy** *Practical Knowledge* *Design Inspiration* *Technical Knowledge* *Design Process*	**Technical Knowledge** Understand how more advanced mechanical systems used in their products enable changes in movement and force. Understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs]. **Make** elect from and use specialist tools, techniques, processes,

according to their characteristics. **KS2** **Technical Knowledge** 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] **Design** 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. **Make** Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting,		**Personal, Social and 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. Share their creations, explaining the process they have used.					equipment and machinery precisely, including computer-aided manufacture. Select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties.

shaping, joining and finishing], accurately Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.							
KS1 **<u>Technical knowledge</u>** Build structures, exploring how they can be made stronger, stiffer and more stable **<u>Design</u>** 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. **<u>Make</u>** Select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]	**Structures**	**<u>Physical Development</u>** 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 cutting snips in paper with scissors. Develop their small motor skills so that they can use a range of tools competently, safely and confidently. **<u>ELG</u>**	**Solid structures House for Grandma** *Practical Knowledge Design Inspiration Technical Knowledge Design Process*	**Frame Chair for a toy** *Practical Knowledge Design Inspiration Technical Knowledge Design Process*	**Cycle A Frame Bridges** **Cycle B Shell Packaging** *Practical Knowledge Design Inspiration Technical Knowledge Design Process*	**Cycle A Frame Kites** **Cycle B Arch School building** *Practical Knowledge Design Inspiration Technical Knowledge Design Process*	**<u>Design</u>** Use research and exploration, such as the study of different cultures, to identify and understand user needs. Identify and solve their own design problems and understand how to reformulate problems given to them. Develop specifications to inform the design of innovative, functional,

Select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics. **KS2** **<u>Technical knowledge</u>** Apply their understanding of how to strengthen, stiffen and reinforce more complex structures. **<u>Design</u>** 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. **<u>Evaluate</u>** 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		Use a range of small tools including scissors, paintbrushes and cutlery. **<u>Expressive Arts and Design</u>** Make imaginative and complex 'small worlds' with blocks and construction kits, such as a city with different buildings. 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 Create collaboratively, sharing ideas resources and skills.					appealing products that respond to needs in a variety of situations. Use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses Develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools. **<u>Technical knowledge</u>** Understand and use the properties of

improve their work Understand how key events and individuals in design and technology have helped shape the world.		ELG Safely use a variety of materials, tools and techniques, experimenting with colour, design texture form and function.					materials and the performance of structural elements to achieve functioning solutions.
KS1 **<u>Make</u>** 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. **KS2** **<u>Make</u>** 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 wider range of materials and components, including	**Textiles**		Introduction to sewing *Practical Knowledge Technical Knowledge*	Hand Puppets *Practical Knowledge Design Inspiration Technical Knowledge Design Process*	Money Container *Practical Knowledge Design Inspiration Technical Knowledge Design Process*	Cushion *Practical Knowledge Design Inspiration Technical Knowledge Design Process*	

construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities. **<u>Evaluate</u>** 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.							
KS2 **Technical Knowledge** Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]	**Electronics**				Paper Circuits Celebration cards *Practical Knowledge* *Technical Knowledge* *Design Process*	Electronic Motors Car *Practical Knowledge* *Design Inspiration* *Technical Knowledge* *Design Process*	**<u>Technical Knowledge</u>** Understand how more advanced mechanical systems used in their products enable changes in movement and force. Understand how more advanced electrical and electronic systems can

							be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs].

Vocabulary Progression Chart for Design and Technology – Key Stage 1					
Milestone 1 - Year 1			Milestone 1 – Year 2		
Topic	**Tier 2**	**Tier 3**	**Topic**	**Tier 2**	**Tier 3**
<u>What is design and technology? (1.1)</u>	Purpose: A product's purpose is what it will be used for Product: A product is something that is made (manufactured), e.g. a table, a chair. Intended user(s): The intended user of a product is who you make it for. Inspiration: If something is the inspiration for your work it is where you got your ideas from. Features: The features of a product are the things that make it recognisable, e.g. a feature of a cup is that it has a handle. Materials: The materials of a product		**<u>Frame Structures 1.3</u>**	List: Names, numbers or things one after the other but written down. Draw: To make a picture with a writing tool. Automatically: An automatic action is one that you do without thinking about it. Fluency: If you are fluent in something you do it effortlessly. Accurate: Without making mistakes. Inspiration: Something that inspires you is where you get your ideas from. Purpose: The reason for which something is made.	Beam: A bar of wood, metal or concrete to support a structure. Column: A tall cylinder that forms part of a structure. Slab: A broad, flat thick piece of wood or stone or other material.

	are what it is made from, e.g. a desk may be made from wood and metal. Techniques: The techniques used to make a product are the methods used, e.g. making a frame uses the techniques of cutting and joining.			User: The person for whom the product is designed.	
Structures Introduction (1.2)	Collect: Gather, pick up Describe: To tell or write about something. List: Names, numbers or things places one after the other but written down. Define: To explain the meaning of something Combined: Put together Connected: Joined or linked together Protect: To keep something or someone safe.	Structure: Something made either in nature or by people. Nature: All things not made by people Manufactured: Made by people Span: To stretch across a space	**Lever Mechanisms 1.6**	Force: A pushing or pulling effect.	Rigid: Stiff and does not bend easily. Pivot: If something pivots it balances or turns around a point. Fulcrum: Another word for pivot. Input: Something that goes in. Output: Something that goes out. Lever: A handle used to control or set the position of part in a machine/device.
Slider Mechanisms - (1.5)	Rear: if something is at the rear, it is at the back. Rotating: if something is rotating, it is turning Horizontal: flat and level with the ground, rather than at an angle to it Vertical: standing or pointing straight up	Guide bridge: a piece of material that makes something go in the right direction	**Wheel and Axle Mechanisms 1.7**	Force: A pushing or pulling effect. Dowel: A peg or pin that is placed into corresponding holes to join two pieces of wood/materials together. Flange: A collar or rim that projects from a pipe or similar to	Mechanisms: Something that changes the direction or size of a push or a pull. Chassis: The frame on which a vehicle is built. Axle: A bar on which wheels turn.

	Diagonal: in a sloping direction. Decorate: to make more beautiful by adding decorations or designs. Attach: If you attach something to an object, you join it or fasten it to the object Automatically: an automatic action is one that you do without thinking about it Fluency: if you are fluent in something you do it effortlessly Practise: he doing of some activity many times to become skilled at it. Apply: to put on Decide: To choose Test: To try out. Modify: To change Explain: To say how something works or why something is that way.			provide strength and stability or attach different parts. Adapt: Make changes. Prototype: A first model of a design to test out your ideas. Rotating: If something is rotating it is turning. Attach: If you attach something you fasten or join it to another object.	
Portable Snacks – 1.8	inspiration: where you got your ideas from purpose: the reason for which something is made user: the person for whom the product is designed Annotate: To explain my drawing in writing.		**Couscous Dish 1.9**	Nutritious: Containing a large amount of vitamins and minerals. Experiment: Try different ways of doing something. Unappealing: Unattractive.	Couscous: Crushed grains originating from Africa. Snip: Cut at an angle Slice: To take form a larger portion by cutting. Chop: To cut by hitting many times.

	Organise: To decide how something should look or be done. Experiment: try different ways of doing something.			Colourful: Made up of different colours. Evaluate: To reflect on an item's effectiveness.	
Solid Structures – 1.4	solid: made of objects that have little or no space inside them Hollow: something that has space inside it arranged: how objects are placed remove: take something away balanced: if an object is balanced, it stays steady and does not fall	mortar: cement used to join bricks or stones together dam: a wall used to block a river bond: how bricks are arranged architects: people who design buildings foundations: the underground bases of structures	**Textiles Puppets**	Template: A pattern used as a guide for drawing or cutting. Attach: Join different parts together.	Needle: A thin instrument made of steel used for sewing. Running stitch: Needlework stitch consisting of a small line or series of lines. Textiles: Cloth made my weaving or knitting. Over stitch -

Vocabulary Progression Chart for LKS2		
Milestone 2		
Topic	**Tier 2**	**Tier 3**
Frame Structures	**Triangular** **Rigid** **Distribute** **Pioneer** **Interlocking** **Stability**	**Truss** **Strut** **Theory of Triangulation** **Joining Plate** **Chord – the top of bottom of a truss structure** **Pier – a solid structure supporting a bridge** **Girders** **Braces** **Cross beams**
Vegetable Soup	**Blended** **Smooth** **Diced** **Juicing**	**Claw grip** **Simmering** **Nutritious** **Season – add salt and pepper**

	Crushing	**Prototype.**
Money Containers	**Secure**	**Applique** **Poppers/press studs** **Velcro** **Back stitch** **Whip Stitch** **Button hole** **Embellishments**
Linked Levers (Mechanisms)	**Operate** **Paper fasteners/split pins** **Expand** **Contract** **Portable Barrier** **Uprights** **Base**	**Pivot – the point around which a lever turns** **Fulcrum: The point at which a lever balances or turns** **Linear - in a straight line** **Rotary – turning around a fixed point** **Reciprocating – moving back and forth in a straight line** **Oscillating: moving back and forth in an arc** **Arc**
Pneumatics (Mechanisms)	**Compressed – squashed** **Pressure – the force that you produce when you press hard on something.** **Input** **Output** **Transferred** **Platform**	**Pneumatic – filled with air** **Hydraulic – filled with water** **Piston – a disc that slides to and fro in a hollow cylinder** **Hollow cylinder – a cylinder that is not solid** **Lever arm**
Electronics	**Adhesive – able to stick to a surface** **Exploded diagram – a diagram that is enlarged to show more detail.** **Illuminate – to light up** **Circuit** **Components**	**LED – light emitting diode – a type of lightbulb** **Conductive – a material that is conductive allows electricity to pass through it.** **Cell** **Battery** **Insulators** **Push switch** **Close page switch** **Crocodile clips** **Copper tape**

Shell Structures	**Internal** **External** **Conjunction** **Contain** **Cross section** **Aspects** **Coordinates** **Component parts** **Assemble** **Net** **Interlocking** **Shell**	
Dips	**Intolerance** **Balanced diet** **Bacteria** **Preserve** **Refrigerated**	**Hummus** **Guacamole** **Salsa** **Garnish** **Consistency** **Pulses** **Wholegrain** **Nutrients**
Vocabulary Progression Upper KS2		
Milestone 3		
Food - Bolognese	**Traditional** **Classic** **Infectious**	**Sauteing** **Meat substitute** **Perishable – perishable foods go bad after a short length of time.**
Frame Structures	**Arches** **Lightweight**	**Tetrahedral (kite)**
Electronic motors	**Cable tie**	**Rotary – turning around a fixed point** **Propeller – A curved spinning blade that causes movement.** **Transistor** **Resistors** **Chips** **Motor** **LDR Light dependent resistor**

Pulleys and Gears	**Circumference – the distance around the edge of a circle** **Physicist – a person who studies forces such as heat, light, sound gravity and electricity** **Interlock** **Ratio**	**Mechanical Advantage – how much force is increased by using a tool or machine.** **Archimedes** **Gear train - a system of gears that transmits power** **Mitre gear – a gear train with equal sized driver and follower gears.** **Spindle**
Bread	**Bake**	**Yeast** **Sourdough** **Unlevened** **Kneading** **Gluten** **Prove** **Microorganisms**
Arch Structures	**Perfected**	**Keystone** **Voussoir** **Impost** **Ellipse** **Parabola – a curve like the path of something that is thrown up into the air.** **Abutments** **Foundations**
Textiles	**Affordable** **Aesthetic** **Functionality** **Resealable** **Durable** **Secure**	**Facing** **Tassells** **Envelope fold**
Cams	**Clockwise** **Anti-clockwise**	**Dwell- To stay in one position** **Eccentric circle – a circle that has an off-centre pivot point.** **Pear shaped (cam)** **Snail Shaped (cam)** **Fall/dwell/rising (relating to the movement)**

		Vice versa: A latin phrase that means the other way around **Automaton/automata** **Crank handle**