DT Progression

Vision: To teach children to love, learn and live as a global citizen in an ever-changing world.

Design and Technology: To determine practical solutions to real-world challenges, through deconstruction, design and discovery.

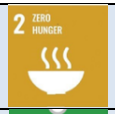
Throughout the Design and Technology curriculum the children will be tasked with a variety of projects that are rooted in real-world problems and challenges. With projects ranging from classroom dilemmas to community support, from national energy saving to international plastics crisis, the pupils will develop skills and fundamental design knowledge to help solve a range of problems. Using the repeated pattern of RESEARCH – PRACTISE - DESIGN - MAKE – EVALUATE the children will work through a spiral curriculum that builds on knowledge and skills across cooking and nutrition, mechanisms, textiles, structures and electrical systems.

Some of t*he most influential people of our times are rooted in Design and Technology (Steve Jobs, Boyan Slat, James Dyson) and allow our children to aspire to be future leaders.*

By the end of their journey in DT pupils will:

- Understand the fundamentals of a variety of food groups, dietary needs, cooking skills and the importance of a healthy lifestyle
- Comprehend consumer awareness and the impact food and its packaging has upon the environment
- Design, make and evaluate a variety of structures, mechanical systems, and electrical systems
- Design, make and evaluate a variety of products based upon set criteria and considering the views of others
- Apply their growing understanding to offer practical and creative solutions to a variety of real-world challenges
- Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- Have a comprehensive understanding of the importance of food safety and hygien.

	EYFS	Key Stage 1	Lower Key Stage 2	Upper Key Stage 2
	Early Learning Goal: Expressive Arts and Design • To 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	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 [for example, 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 [for example, cutting, shaping, joining and finishing]	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 [for example, 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 [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 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 [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 **Cooking and Nutrition** • Understand and apply the principles of a healthy and varied diet	

	they have used. Physical Development • Use a range of small tools, including scissors, paint brushes and cutlery.	• 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 [for example, 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.	• 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.
Sustainable development goals		Know the nutritional benefits of a variety of food (and their alternatives). How to support local farmers and producers.	
		Understand a variety of ways to improve their own and other people's well-being.	
		Good sanitation and hygiene. Every person has access to clean and safe water.	
		To understand the need to save energy.	
		Fairtrade	
		Engage all people in planning improvement in cities. We must ensure that cities and communities are inclusive, safe, resilient and sustainable. Make cities resilient to disasters and ensure less people die from global disasters.	

		Equal opportunities for all.
		Prevent food waste. Effective use of recycled materials in order to reduce waste. Understand the importance of reduce, reuse, recycle. Live in harmony with nature.
		Reduce and prevent pollution. Protect ecosystems. Take action to restore healthy and productive oceans.
		Combat crime and corruption

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Developing Ideas DT Workbook:	• **Observe** talk about what they have produced, describing simple techniques, tools and materials used.	Know how to use their DT workbook to: • Start to **observe**, record and **explore** simple ideas. • Begin to record criteria, design choices and simple evaluations.	Know how to use their DT workbook to: • **Plan** and **explore** simple ideas. • **Observe** and collect textures, patterns and prototypes that will be used in their work. • Begin to suggest improvements to own work.	Know how to use their DT workbook to: • **Observe, record and explore** material and experiment with these. • Use **design brief and criteria** to explore ideas for projects. • **Plan,** collect and **record** materials for prototypes. • Explore **decisions** made, giving reasons for these decisions. • Make notes about **techniques** used by designers/innovators . • Annotate ideas for improving their work. • Try ideas and start to refine them.	Know how to use their DT workbook to: • **Observe,** collect and **record** visual information from different sources. • **Plan**, trying out ideas. • Use **specific criteria** to inform **design choices** made and express functionality through **annotations** • Adapt and improve original ideas as they progress. • Keep notes to indicate their **intentions/innovations**. • Use cross sectional diagrams. • Evaluate suitability of their own product, suggesting improvements to make it more **appealing**.	Know how to use their DT workbook to: • **Explore** designers working within the medium studied, including their products and materials used. • Begin to **explore** possibilities, using and combining different styles and techniques of joining. • Use **annotated sketches** and **exploded diagrams** to convey their design choices to others. • Keep notes which consider how a piece of work or concept may be developed further. • Collect and record visual information	Know how to use their DT workbook to: • Collect and **record** visual information from different sources as well as planning and collating source material. • **Annotate** work/diagrams in sketchbook using appropriate diagrams (exploded/cross sectional etc) • **Explore** ideas. • Use the DT book to consider and plan functionality, appeal, cost and suitability based upon the design criteria. • Select own images and starting points for work. • Comment on and give an opinion on

						from different sources as well as planning, trying out ideas and changing **techniques.** • Evaluate own work and that of others against **design specification** and suggest improvements.	designs with a fluent grasp of **technical language.** • **Justify** design decisions based upon original **purpose and user**.
Language:	plan, make, construct, design, idea	design, make, evaluate, user, purpose, ideas, design criteria, product, function, label,	features, suitable, quality mock-up, design brief, design criteria, make, evaluate, user, purpose, function	decision, evaluating, design brief, design criteria, innovative, prototype, process, decision, user, annotate innovative, investigate, label, drawing, aesthetics, function, pattern pieces	user, purpose, function, design criteria, innovative, appealing, design brief model, evaluate, annotated sketch, functional, investigate, drawing, aesthetics, pattern pieces	design brief, design specification, prototype, annotated sketch, purpose, user, innovation, research, functional/functionality design criteria, annotate, design decisions, authentic, evaluate, mock-up, prototype	function, innovative, design specification, design brief, user, purpose design decisions, functionality, innovation, authentic, design specification, Improvements, user, purpose, design decisions
Cooking and Nutrition	Explore understanding of food – A world of food Festival foods Celebration foods  - Prevent food waste - Good sanitation and hygiene	Explore understanding of food - fruits Fruit Kebabs Smoothies Apple Crumble  - Prevent food waste - Good sanitation and hygiene - Know the nutritional benefits and sources of a variety of food.	Explore understanding of food – vegetables Vegetable Soup Hummus and fresh Vegetables Coleslaw  - Prevent food waste - Good sanitation and hygiene - Know the nutritional benefits and sources of a variety of food.	Explore understanding of food – carbohydrates An investigation into world flour Flat Bread, Scones and Pasta  - Prevent food waste - Good sanitation and hygiene - Know the nutritional benefits and	Explore understanding of food – dairy, fats and sugar Meringue Spanish Omelette Cheese scones  - Prevent food waste - Good sanitation and hygiene - Know the nutritional benefits and sources of a variety of food.	Explore understanding of food – herbs and spices Tomato Sauce Biscuits Spring Rolls (sweet and savoury)  - Prevent food waste. - Know the nutritional benefits and sources of a variety of food. - Fairtrade.	Explore understanding of food - meat and fish -Are they sustainable? -What are the alternatives? Lentil Curry/ Ragu Quorn Shepherd's Pie Mexican Bean Burgers  - Live in harmony with nature. - That communities should be

				sources of a variety of food.			resilient and sustainable. - Know the nutritional benefits and sources of a variety of food and their alternatives. - How to support local farmers and producers. -
Food Preparation and Cooking Outcomes	Explore and develop skills in - Mixing - Decorating	Explore and develop skills in - Cutting - Peeling - Mixing - Blending	Explore and develop skills in - Cutting/chopping - Peeling - Mashing - Grating - Mixing - Heating	Explore and develop skills in - Cutting/slicing - Peeling - Mixing - Blending - Grating - Kneading - Baking - Weighing and measuring	Explore and develop skills in - Slicing/dicing - Peeling - Mixing - Blending - Grating - Kneading - Baking - Weighing and measuring - Rolling - Whisking - Frying/grilling	Explore and develop skills in - Slicing/dicing/julienne - Peeling - Mixing/Blending - Grating - Baking - Weighing and measuring - Rolling/folding - Frying/boiling/reducing - Seasoning	Explore and develop skills in - Slicing/dicing/julienne - Peeling - Mixing/Blending/ Combining - Mashing - Grating - Baking/frying/grilling - Weighing and measuring - Frying/boiling/reducing - Seasoning - Piping - Sautéing/softening
Designing, Making and Evaluating Food Outcomes	Begin to think of interesting ways to decorate food. Describe differences between some food	Begin to design and create appealing products based on some simple design criteria. Begin to learn how to	Make products look attractive. Carefully select ingredients considering taste and texture.	Think about presenting product in interesting/ attractive ways. Explore how using different ingredients	Know that preparing foods in different ways produces a variety of outcomes, in terms of appearance and appeal.	Present product well - interesting, attractive, fit for purpose. Describe how recipes can be adapted to	Present product to a high standard to make the product interesting and aesthetically pleasing.

	groups (i.e. sweet, vegetable etc.).	evaluate their product. Design food that is visually appealing.	Evaluate products made based on their own likes/dislikes.	and methods can change the taste/texture of products. Evaluate products made by themselves and others.	Use a greater variety of preparation techniques. Design, make and evaluate products made by themselves. Evaluate products made by themselves and others, offering suggestions for improvement.	change appearance, taste, texture, aroma. Consider how cost of ingredients impacts choices. Evaluate products made by themselves and others, offering suggestions for improvement and alternatives.	Adapt recipes by substituting ingredients to make them more sustainable. Critically evaluate their own products and those of others. Consider how cost, nutritional value, source and sustainability of products impacts choices.
Nutrition Outcomes	Discuss how fruit and vegetables are healthy.	Begin to know the properties of ingredients and the importance of varied diet. Explain how food and drink are needed for active/healthy bodies.	Describe how healthy diet=variety/balance of food/drinks. Think about how to grow plants to use in cooking. Explore eat well plate; explain there are groups of food, describe “five a day”.	Describe eat well plate and how a healthy diet=variety / balance of food and drinks. Explain importance of food and drink for active, healthy bodies.	Know that different foods affect bodily and oral health. Know that some people have allergies or intolerances to specific foods or food groups. Explore how food contains different amounts of energy, knowing which foods are energy dense.	Explain how there are different substances in food / drink needed for nutrition and health. Consider the nutritional benefits of food products designed and made.	Describe some of the different substances in food and drink, and how they can affect health. Know the importance of a balanced, nutritious diet.
Consumer awareness Outcomes	Say where some foods come from, (i.e. plant or animal). Describe textures, tastes and preferences of a variety of foods.	Understand how a variety of food is grown and where their ingredients have come from. Know that a variety of factors makes food	Begin to understand food comes from UK and wider world, needing different environments/climate. Explore branding of food and drink products.	To explore the reason for consumer choices Begin to know that food is marketed specifically at consumers.	Understand ingredients can be fresh, pre-cooked or processed. Develop an understanding of consumer choices.	Explain seasonality of foods, and how this can affect cost and choices. Explore and understand the concept of ‘Fairtrade’.	Explain why some types of food are grown, reared or caught in the UK or wider world. Explore sustainability of foods and how our

		appealing.	Begin to explore the seasonality of food.		Explore understanding of portion size.	Know that the aesthetics of food (look, taste, aroma) can make it more or less appealing to a consumer. Explain importance of portion size in relation to health and a balanced diet.	choices affect the environment. Understand the concept of being an 'informed consumer' using food packaging to understand more about the food contained.
Food Safety and Hygiene Outcomes	Know the importance of washing hands & cleaning surfaces. Discuss the rules of food safety and hygiene.	Explain hygiene and keep a hygienic kitchen. Know when to ask for adult help to assist in cooking and preparing food.	Use a greater variety equipment safely including asking for help when heating or preparing food. Explain the basics of food hygiene including clean hands, surfaces, hair, jewellery, nail varnish.	Know the importance of how to be safe/hygienic. Understand how to use a greater variety of kitchen equipment safely. Understand that food allergies affect safe food preparation.	Explain how to be safe / hygienic and follow guidelines. Know that food packaging and labels provide a source of information Explore the importance of correct food storage	Consistently prepare and cook dishes safely and hygienically including where appropriate using a heat source.	Consistently prepare and cook dishes safely and hygienically considering the implications of reheating. Know that cooked, fresh, processed and packaged food has a shelf life. Understand the dangers of poor kitchen practices and resulting effects including food poisoning.
Sticky Knowledge:	• Know key vocabulary to describe a variety of tastes and textures. • Know to wash hands before eating. • Know what makes a food attractive.	• Know the basic rules of kitchen safety. • Recognise 10 fruits. • Know what makes an item a 'fruit'.	• Recognise at least 20 vegetables. • Know what makes an item a 'vegetable'. • Know what the 'Eat-well' plate is and recommended proportions of food consumed. • Know that different fruit and vegetables	• To know what a carbohydrate is. • To know what a consumer is. • To know different foods hav e a different cost and come from different places. • To know the importance of how to be safe and hygienic	• To know how to cook a variety of dishes that are made from dairy products. • To know different sources of fat, and determine whether it comes from an animal or a plant. • To know the correct terminology for a	• Know the name for different cookin g methods – grinding, seasoning, boiling, reducing, julienne • Know the correlation between seasonality, location and cost of foods. • Know food can	• To know that food is caught, reared and farmed for human consumption. • To know where to gain information from food packaging and what it means. • To know the names of 5 alternatives to meat and fish.

			grow in different seasons.	• To know key ingredients can be exchanged. • To know an increased variety of cooking techniques.	large variety of cookery processes. • To know the dangers associated with storage and re-heating food. • To know what processed food is. • To know the effects of sugar.	travel far and this impacts the cost/climate. • Know what Fairtrade is. • Know the names of 15 herbs and spices and their effect upon a dish.	• To know • that recipes can be adapted to be more sustainable.

Structures				
Structures	**EY**	**Year 1**	**Year 4**	**Year 5**
	Junk Modelling/ Construction Design, make and evaluate a model house from a story for role play or storytelling.  Effective use of recycled materials in order to reduce waste.	**Free Standing Structures** Design, make and evaluate a new desirable playground for your local community to promote incusion and physical wellbeing in young people.  That cities and communities should be safe and inclusive.  Understand a variety of ways to improve their own and other people's well-being.	**Shell Structures** Design, make and evaluate a recycling station for your classroom to ensure appropriate recycling of all different items.  Understand the importance of reduce, reuse, recycle.	**Frame Structures** Design, make and evaluate a system of flood defense for a rural islander to keep themselves safe from flood dangers.  Make cities resilient to disasters and ensure fewer people die from global disasters.
Outcomes:	**EY**	**Year 1**	**Year 4**	**Year 5**
	Designing • Generate ideas to create a model. **Making** • Select items for their model considering shape, size and material. • Use various methods and tools/joining items.	**Research** • TBC, linked to project and SDG. **Designing** • Generate ideas based on simple design criteria and their own experiences, explaining what they could make. • Develop, model and communicate	**Research** • Understand the impact of waste and the importance of recycling. • Investigate a variety of structures used for collecting waste. • Investigate net structures. **Designing** • Generate realistic ideas and design criteria collaboratively through	**Research** • TBC, linked to project and SDG. **Designing** • Carry out research into user needs and existing products, using surveys, interviews, questionnaires and web-based resources. • Develop a simple design

	Evaluating • Orally suggest what went well and any improvements they would make to their creation.	their ideas through talking, mock-ups and drawings. **Making** • Plan by suggesting what to do next. • Select and use tools, skills and techniques suitable for the task, explaining their choices. • Select new and reclaimed materials and construction kits to build their structures. • Use simple finishing techniques suitable for the structure they are creating. **Evaluating** • Explore a range of existing freestanding structures in the school and local environment e.g. everyday products and buildings. • Evaluate their product by discussing how well it works in relation to the purpose, the user and whether it meets the original design criteria. • Technical knowledge and understanding • Know how to make freestanding structures stronger, stiffer and more stable. • Know and use technical vocabulary relevant to the project.	discussion, focusing on the needs of the user and purpose of the product. • Develop ideas through the analysis of existing products and use annotated sketches and deconstructed models to communicate ideas. **Making** • Order the main stages of making. • Use appropriate tools to measure, mark out, cut, score, shape and assemble with some accuracy. • Explain their choice of materials according to functional properties and aesthetic qualities. • Use finishing techniques suitable for the product they are creating. **Evaluating** • Investigate and evaluate a range of existing shell structures including the materials, components and techniques that have been used. • Test and evaluate their own products against design criteria and the intended user and purpose. • Technical knowledge and understanding • Develop and use knowledge of how to construct strong, stiff shell structures. • Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes. • Know and use technical vocabulary relevant to the project.	specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost. • Generate, develop and model innovative ideas, through discussion, prototypes and annotated sketches. **Making** • Formulate a clear plan, including a step-by-step list of what needs to be done and lists of resources to be used. • Competently select from and use appropriate tools to measure accurately, mark out, cut, shape and join construction materials to make frameworks. • Use finishing and decorative techniques suitable for the product they are designing and making. **Evaluating** • Investigate and evaluate a range of existing frame structures. • Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests. • Research key events and individuals relevant to frame structures. • Technical knowledge and understanding • Understand how to strengthen, stiffen and reinforce3-D frameworks. • Know and use technical vocabulary relevant to the project.
Sticky Knowledge:	• Know what a design is. • Know that different methods of joining are	• To know what a free-standing structure is.	• To know what items can be recycled.	• Know that using triangular shapes can re-inforce a structure.

	better for different materials (glue, tape, staples). • Know what 'evaluate' means and begin to share their creations with others.	• To know how to make a structure stable • To know that an accurate drawing is important when designing a product.	• To know how to design a functional product that is fit for purpose. To know how to accurately construct a net. • To know different ways of attaching materials.	• Know that internal and external frame structures are used frequently in society. • Know what tension and compression are. • Know that using different materials will produce a different effect/product. • Know how to strengthen, stiffen and re-inforce.

Mechanisms:	**EY**	**Year 1**	**Year 2**	**Year 3**	**Year 6**
	<u>Mechanisms in our environment</u> Explore a variety of mechanisms in the school environment, using them in traditional and non-traditional ways. Assess and explore mechanisms through discussion, developing a curiosity for how things work. Engineer some fun! You'll need blocks, recycled materials like paper tubes or cardboard, and toy trains or cars.  Recycled materials. Engage all people in planning improvement in cities.	<u>Sliders, Levers and Flaps</u> Design, make and evaluate a class information book to help explain to Reception class how to save energy, recycle and look after the planet.  To understand the need to save energy.	<u>Wheels and Axles</u> Design, make and evaluate a stable vehicle for a rural family to transport water over large distances  Every person has access to clean, safe water	<u>Levers, Linkages and Pneumatics</u> Design, make and evaluate a transport mechanism for you to move plastics and rubbish from the ocean to the recycling depot.  Reduce and prevent pollution. Protect ecosystems. Take action to restore healthy and productive oceans.	<u>Pulleys, Gears and Cams</u> Design, make and evaluate a boxcar for your team to complete in The RIVERS Boxcar Rally.
Outcomes:	**Designing** Generate ideas to create a model. **Making** Select items for their model considering shape, size and material. Use various methods and tools/joining items.	**Research (Link to SDG)** • Explore the reasons why it is important to save energy in our homes and at school. • Explore the variety of ways we can save energy at home and at school. **Designing** • Generate ideas based on	**<u>Research (Link to SDG)</u>** • Understand the differing needs around the world to transport water for personal consumption. • Explore the efficiency of using a vehicle rather than carrying. **<u>Designing</u>**	**Research (Link to SDG)** • Explore the need to protect our oceans' ecosystems and reduce/prevent pollution. • Know that designers (like Boyan Slat) are currently designing mechanisms to remove plastics from the world's oceans and	**Research** • TBC, linked to project and SDG. **Designing** • Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources. • Develop a simple design

	Evaluating Orally suggest what went well and any improvements they would make to their creation.	simple design criteria. • Communicate and develop their ideas through drawings. **Making** • Plan by suggesting what to do next. • Explore using sliders and levers. • Select and use tools suitable for the task. • Use simple finishing techniques. **Evaluating** • Explore a range of existing books and everyday products that use simple sliders and levers. • Evaluate their product by discussing how well it works in relation to the purpose and whether it meets design criteria.	• Generate initial ideas using simple design criteria. • Develop and communicate ideas through annotated drawings. **Making** • Select from and use a range of tools and equipment to perform practical tasks such as cutting and joining to allow movement. • Select from and use a range of materials and components such as paper, card, plastic and wood according to their characteristics. **Evaluating** • Explore and evaluate a range of products with wheels and axles. • Evaluate their ideas and their products against design criteria. • Suggest improvements to their product **Technical knowledge and understanding** • Explore and use wheels, axles and axle holders. • Distinguish between fixed and freely moving axles. • Know and use technical vocabulary relevant to the project. SG 6: Every person has access to clean, safe water.	waterways. **Designing** • Generate realistic ideas and their own design criteria through discussion, focusing on the needs of the user. • Use annotated sketches and prototypes to develop, model and communicate ideas. **Making** • Order the main stages of making. • Select from and use appropriate tools with some accuracy to cut, shape and join materials and components such as card, paper, tubing, syringes and balloons. • Select from and use finishing techniques suitable for the product they are creating. **Evaluating** • Investigate and analyse prototypes and, where available, other products with lever and linkage mechanisms and pneumatic mechanisms. • Evaluate their own products and ideas against criteria and user needs. • Technical knowledge and understanding • Understand and use lever and linkage mechanisms. • Distinguish between fixed and loose pivots. • Understand and use pneumatic mechanisms. • Know and use technical vocabulary relevant to the project.	specification to guide their thinking. • Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views. **Making** • Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team. • Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. Work within the constraints of time, resources and cost. **Evaluating** • Compare the final product to the original design specification. • Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. • Consider the views of others to improve their work. • Investigate famous manufacturing and engineering companies relevant to the project. • Technical knowledge and understanding • Understand that mechanical and electrical systems have an input, process and an output. • Understand how gear sand pulleys can be used to speed up, slow down or change the direction of movement.

					• Understand how cams can be used to produce different types of movement and change the direction of movement. • Know and use technical vocabulary relevant to the project.
Sticky Knowledge:	• Know parts of a vehicle. • Know how to add parts that represent a mechanism (door, window etc.) to their modelling.	• Know what a lever/slider is. • To know what a mechanism is. • To know the importance of recycling and saving energy. • To know that different mechanisms produce different types of movement.	• Know what an axle is and its function. • To know that wheels and axles can be assembled in different ways. • To know what a chassis is and its function.	• To know what a pivot, pneumatic and hydraulic mechanism is, and how they are used • To know what a lever and linkage is. • To know what a prototype is. • To know who Boyan Slat is and what he invented? • To know the design process.	• • To know a machine is a device that does a physical task • To know and use a variety of advanced tools for construction. • Know how a prototype affects design. • Know the importance of design criteria in the design process.

Textiles	**EY**	**Year 2**	**Year 3**	**Year 5**
	<u>Exploring Materials</u> Design, make and evaluate a festival decoration for your family to display.	<u>Templates and Joining</u> Design, make and evaluate a glove puppet for themselves to promote mental health through role play.  Understand a variety of ways to improve their own and other people's well-being.	<u>2D shape to 3D project</u> Design, make and evaluate a new repurposed product from a second-hand pillowcase to promote a sustainable culture.  Understand the importance of reduce, reuse, recycle.	<u>Combining different fabrics and shapes</u> Design, make and evaluate a fidget blanket for someone with Alzheimer's/autism to help relieve anxiety or agitation and to aid a feeling of calmness.  Understand a variety of ways to improve their own and other people's well-being.
Outcomes:	**Designing** • Design a product for your family that is attractive and conveys some of the themes stated in the design criteria. **Making** • Use a range of tools safely. • Select fabric based on its colour and	**Research (link to SDG)** • Children explore the importance of mental health. • Children know that good mental health is beneficial to their well-being. **Designing** • Design a functional and appealing	**Research (Link to SDG)** • To know the impact of the fabric industry on the planet. • To know the difference between recycling, repurposing and upcycling. **Designing** • Generate realistic ideas through	**Research (Link to SDG)** • To know, as a society, that we are responsible for each other. • Explore purpose and functions of a 'fidget' blanket and identify its intended users. **Designing**

	pattern. **Evaluating** • Consider their final product and suggest how it could have been improved. • Offer suggestions to others on how they could have improved their products.	product for a chosen user and purpose based on simple design criteria. • Generate, develop, model and communicate their ideas as appropriate through talking, drawing, templates. **Making** • Select from and use a range of tools and equipment to perform practical tasks such as marking out, cutting, joining and finishing. • Select from and use textiles according to their characteristics. **Evaluating** • Explore and evaluate a range of existing textile products relevant to the project being undertaken. • Evaluate their ideas throughout and their final products against original design criteria. **Technical knowledge and understanding** • Understand how simple 3-D textile products are made using a template to create two identical shapes. • Understand how to join fabrics using different techniques e.g. running stitch, glue, over stitch, stapling. • Explore different finishing techniques e.g. painting, fabric crayons, stitching, sequins, buttons and ribbons. • Know and use technical vocabulary relevant to the project.	discussion and design criteria for an appealing, functional product fit for purpose and specific user/s. • Produce annotated sketches, prototypes, final product sketches and pattern pieces. **Making** • Plan the main stages of making. • Select and use a range of appropriate tools with some accuracy e.g. cutting, joining and finishing. • Select fabrics, stitches and fastenings according to their functional characteristics e.g. strength, and aesthetic qualities **Evaluating** • Investigate a range of 3-D textile products relevant to the project • Test their product against the original design criteria and with the intended user. • Take into account others' views. • Understand how key individuals who have influenced the development of the chosen product. **Technical knowledge and understanding** • Understand how to securely join two pieces of fabric together. • Understand the need for patterns and seam allowances. • Know and use technical vocabulary relevant to the project. • Know how to strengthen, stiffen and reinforce existing fabrics.	• Generate innovative ideas by carrying out research including interviews. • Develop, model and communicate ideas through talking, drawing, and annotating designs. • Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design criteria. **Making** • Produce detailed lists of equipment and fabrics relevant to their tasks. • Formulate step-by-step plans and, if appropriate, allocate tasks within a team. • Select from and use a range of tools and equipment to make products that are accurately assembled and well finished. • Select appropriate stitches, joining techniques and fastenings appropriate to their design. • Work within the constraints of time, resources and cost. • Adjust their ongoing work and make changes to overcome problems. **Evaluating** • Investigate and analyse textile products linked to their final product. • Compare the final product to the original design criteria. • Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. • Consider the views of others to improve their work. **Technical knowledge and understanding** • A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics. • Fabrics can be strengthened, stiffened and reinforced where appropriate.

Sticky Knowledge:	Know the names of basic sewing materials. Know that we make decorations for a purpose or to celebrate a festival.	• To know appropriate ways to join fabric. • To know what a template it. • To know ways to embroider/decorate their product.	• To know that materials can be recycled into new products. • To know a range of different fastenings and how to join them. • To know a variety of stitches. • To know the design process. • To know what a template is and how to use it.	• Know what Alzheimer's/Autism is. • Know what a fidget blanket is and how it can be used. • Know how to thread a needle, use pins and other sewing tools. • Know a range of stitches (over sew, blanket and tacking). • Know how to use annotated sketches to convey their design choice to others. • Know that fabric can be stiffened and strengthened (e.g. inlacing, boning, gluing, starch, card, wadding). • Know that design proposals and criteria are used to guide the making process. • Know the importance of evaluating evolving work.

Electrical Systems		**Year 4**	**Year 6 (within Computing planning)**
		Circuits and Switches Design, make and evaluate a product that incorporates an electrical circuit to aid everyday living Affordable and Clean Energy	**Monitoring and Control** Design, make and evaluate a car of the future (using spheros) to complete a pre-determined course.
Outcomes:		**Research** • What is clean energy? Where does it come from? **Designing** • Gather information about users' needs and wants, and develop design criteria to inform the design of products that are fit for purpose, aimed at particular individuals or groups. • Generate, develop, model and communicate realistic ideas through discussion, annotated sketches and cross-sectional **Making** • Order the main stages of making. • Select from and use tools and equipment to cut, shape, join and finish with some accuracy. • Connect simple electrical components and a battery in a series circuit to achieve a functional outcome. • Select from and use materials and components, including construction materials and electrical components according to their functional properties and aesthetic qualities. **Evaluating**	**Research** • Develop a comprehensive understanding of the impact of vehicles on the environment and health. • Know that through design and innovation, changes can come about that have a positive effect on the world. **Designing** • Generate, develop and communicate ideas through discussion, annotated sketches and pictorial representations of proposed design **Making** • Competently select and accurately assemble materials and securely connect electrical components to produce a reliable, functional product. • Create and modify a computer control program to enable their electrical product to respond to changes **Evaluating** • Continually evaluate and modify the working features of the product to match the initial design specification. • Test the system to demonstrate its effectiveness for the intended user and purpose. **Technical knowledge and understanding**

		• Investigate and analyse a range of existing battery-powered products. • Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work. **<u>Technical knowledge and understanding</u>** • Understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs and buzzers. • Know and use technical vocabulary relevant to the project.	• Understand the use of computer control systems in products. • Apply their understanding of computing to program, monitor and control their products. • Know and use technical vocabulary relevant to the project.
Sticky Knowledge:		• Know what a circuit is. • Know what a prototype is and how it is integral to the design process. • Know that there are a variety of switch styles available (push to make, push to break, toggle) and know how each works. • Know the dangers of mains electricity. • Know what a cross sectional drawing is. • Know we can be innovative in solving everyday problems	• To know that a program is used to sequence instructions to control electrical components. • To know how to include electrical systems in their planning. • To know what a variable is and that it can hold numbers (integers) or letters (strings). • To know computer algorithms can be triggered by sensor inputs (when it is dark / when robot hits). • To know how to code a robot around a specific path using a block coding language.
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