Progression in Design Technology

Intent:

At St. Elizabeth's Primary School, the intent of the design and technology curriculum is to prepare children to take part in the development of tomorrows rapidly changing world. For them to have a greater understanding of real-life applications; with emphasis on the roles that inventors, designers, engineers, manufacturers and chefs have in shaping our lives. By teaching design and technology, we are informing our children about social and environmental issues - they may well become potential innovators in the future.

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. **Curriculum themes** 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 curriculum themes are; **Take inspiration from design throughout history** (Appreciating the design process that has influenced the products we use in everyday life); **Design, make, evaluate and improve** (Thinking and seeing design as a process); **Master practical skills** (Developing the skills needed to make high quality products).
6. **Golden threads:** These categories help students to relate each topic to previously studied topics and to form strong, meaningful schema. In design and technology these golden threads include: **Mechanisms and Mechanical Systems, Electrical Systems, Materials and Techniques, Construction, Cooking and Nutrition, Textiles, Programming and Electronics.**
7. Cognitive science tells 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 curriculum themes, three Milestones, each of which includes the procedural and 'golden threads' in each subject give students a way of expressing their understanding of the curriculum themes. 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: 'remembering', 'knowing' and 'reasoning'. The goal for students is to display sustained mastery at the 'knowing' stage of understanding by the end of each milestone and for the most able to have a greater depth of understanding at the 'reasoning' stage.

Progression through the Cognitive Domains		
Remembering	**Knowing**	**Reasoning**
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.

In Design and Technology, the cognitive domain driver words are as follows:

Cognitive Domains in Design and Technology		
Remembering	**Knowing**	**Reasoning**
Name	Find out	Recommend
Who/What/Which/When	Compare and contrast	Discuss with a friend…
Label, List	Suggest reasons why	Investigate
Why	Experiment with	Always, sometimes, never?
How	Explain the method	Do you agree?
Copy	Define	Explore how
Describe	Select	True or false…?
Give examples of	Apply	Prove…
Create	Consider how	Justify… / Clarify…
Assemble	Summarise, Organise	Suggest ways
	Give examples of	Imagine…
	Examine	In which ways do….
	Demonstrate …	Explore…

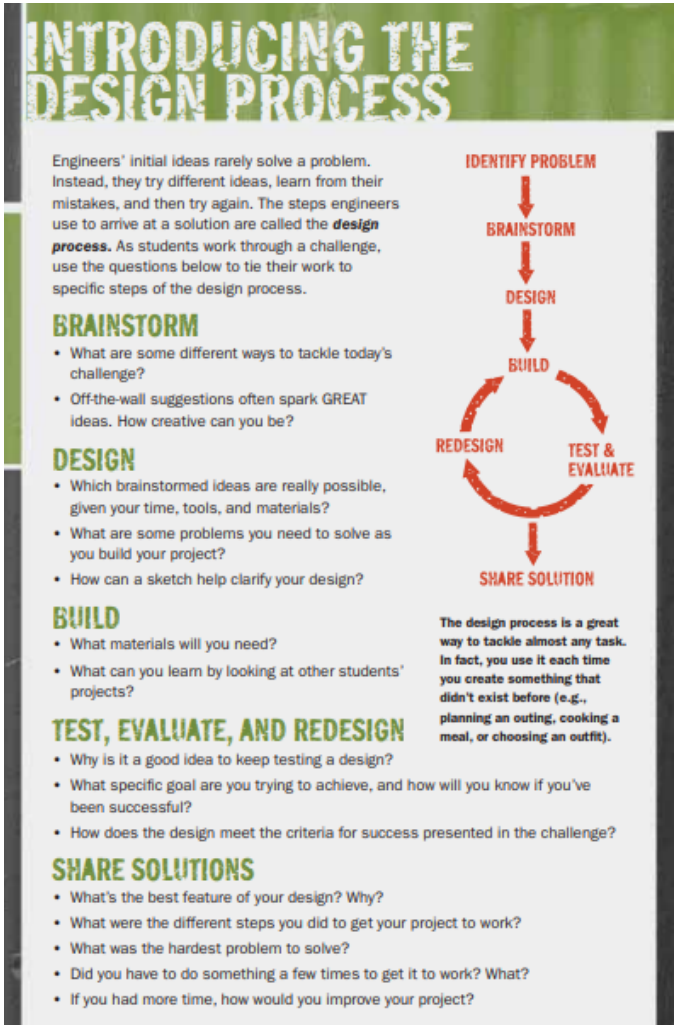
	Suggest some reasons What are the similarities and difference between… What observations can you make about? What techniques… Investigate other… Find other examples… Create a list of questions… Create a design model inspired by… Do you think that… Promote the benefits of…	Explain how/ the concept of… What connections can you make…? Discover whether… Compile a summary of how… Could it be true… Create 2 pieces of… and compare What impact did… Present information about… Persuade, Recommend, Apply, Adapt, Arrange…

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 'remembering', 'knowing' and 'reasoning'. 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 'remembering' domain and problem based discovery in the 'reasoning' 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.

At St. Elizabeth's we will use the following model of 'The Design Process' throughout the school.

This specific model is from:

INTRODUCING THE DESIGN PROCESS - PBS KIDS
https://pbskids.org/.../pdf/parentseducators/DS_TG_DesignProcess.pdf



INTRODUCING THE DESIGN PROCESS

Engineers' initial ideas rarely solve a problem. Instead, they try different ideas, learn from their mistakes, and then try again. The steps engineers use to arrive at a solution are called the ***design process.*** As students work through a challenge, use the questions below to tie their work to specific steps of the design process.

IDENTIFY PROBLEM
BRAINSTORM
DESIGN
BUILD
REDESIGN
TEST & EVALUATE
SHARE SOLUTION

BRAINSTORM

- What are some different ways to tackle today's challenge?
- Off-the-wall suggestions often spark GREAT ideas. How creative can you be?

DESIGN

- Which brainstormed ideas are really possible, given your time, tools, and materials?
- What are some problems you need to solve as you build your project?
- How can a sketch help clarify your design?

BUILD

- What materials will you need?
- What can you learn by looking at other students' projects?

The design process is a great way to tackle almost any task. In fact, you use it each time you create something that didn't exist before (e.g., planning an outing, cooking a meal, or choosing an outfit).

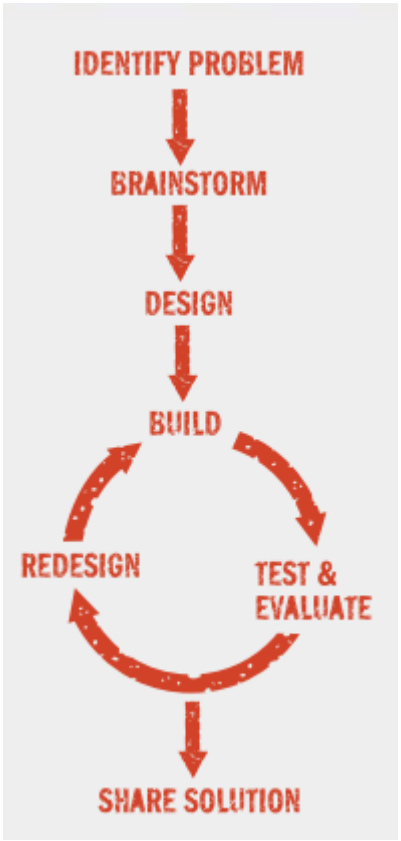
TEST, EVALUATE, AND REDESIGN

- Why is it a good idea to keep testing a design?
- What specific goal are you trying to achieve, and how will you know if you've been successful?
- How does the design meet the criteria for success presented in the challenge?

SHARE SOLUTIONS

- What's the best feature of your design? Why?
- What were the different steps you did to get your project to work?
- What was the hardest problem to solve?
- Did you have to do something a few times to get it to work? What?
- If you had more time, how would you improve your project?

DESIGN SQUAD . The Design Process | PBS KIDS GO!



Early Years			
Three and Four-Year-Olds	Personal, Social and Emotional 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	Fine Motor Skills	• Use a range of small tools, including scissors, paintbrushes and cutlery.
	Expressive Arts and Design	Creating with Materials	• 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.

	Milestone 1 Key Stage 1	Milestone 2 Lower Key Stage 2	Milestone 3 Upper Key Stage 2
Master Practical Skills			
Cooking and Nutrition	• 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 and Techniques:	• 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).

Electrical Systems	• 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).
Programming and Electronics	• 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 and Mechanical Systems	• Create products using levers, 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 Design Throughout History			
	• 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.

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.

Cooking and nutrition

• 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.

Topics Across The School					
Milestone 1 (Remembering and Knowing) Year 1	**Milestone 1 (Knowing and Reasoning) Year 2**	**Milestone 2 (Remembering and Knowing) Year 3**	**Milestone 2 (Knowing and Reasoning) Year 4**	**Milestone 3 (Remembering and Knowing) Year 5**	**Milestone 3 (Knowing and Reasoning) Year 6**
ADVENT TERM					
'Flying Kites' Children will test different materials, design, construct and fly kites and evaluate their own creations. **Materials and Techniques, Construction**	**'Puppets'** Children will develop and refine their sewing skills before designing, creating and evaluating their own glove puppets. **Textiles, Materials and Techniques, Construction**	**'Bridges'** Studying different types of bridge structure and how these are made strong and stable. Then constructing our own model bridges. **Materials and Techniques, Construction**	**'Levers and Linkages'** Children study different forms of motion. They will design a device containing a functional linked lever system. **Mechanics and Mechanical Systems, Materials and Techniques, Construction**	**'Moving Toys'** Investigate cam mechanisms and toys that contain them - Design, make and evaluate their own moving toy with a cam mechanism. **Construction, Mechanics and Mechanical Systems, Materials and Techniques**	**'All the fun of the fair'** Designing and building own fairground rides using electric motors, mechanical systems and structures **Mechanics and Mechanical Systems, Electrical systems, Construction, Materials and Techniques,**

LENT TERM					
'Wacky Windmills' Exploring structures with moving parts, designing and constructing own models **Mechanics and Mechanical Systems, Materials and Techniques, Construction**	**'Making fire engines'** Children will explore modern fire engines and their features, before exploring, designing, creating and evaluating their own model fire engine using wheels, axles and chassis. **Mechanics and Mechanical Systems, Materials and Techniques, Construction**	**'Can you make a Moving Monster?'** Investigating simple pneumatic systems. Using pneumatics and other materials to make our own moving monsters **Mechanics and Mechanical Systems, Materials and Techniques, Construction**	**'Money, Money, Money'** Children will explore different types of money containers and their features, and practise their sewing skills, before designing making and evaluating their own money containers for a particular purpose. **Textiles, Materials and Techniques, Construction**	**'BBC micro:bit - Programming'** Children will explore these mini computing devices and learn to program them for different purposes. **Electrical systems, Programming and Electronics**	
PENTECOST TERM					
'Seaside Snacks' Children will experience the flavours, textures and colours of different foods. Then have the opportunity to design their own seaside picnic. **Cooking and Nutrition**	**'Perfect Pizzas'** Children will explore pizzas, discovering what a variety of toppings and bases look like, taste like and feel like. They will then have the challenge of designing and making their pizza to meet a design brief and evaluate it based on the criteria. **Cooking and Nutrition**	**'What is seasonal food?'** Why are certain foods in season at different times of year? Why is it good to eat seasonal food? How can we include seasonal food in a healthy, varied diet? . **Cooking and Nutrition**	**'I say courgette, you say zucchini'** Exploring the history of American Food - hamburgers / hotdogs etc. Children will follow a recipe to make traditional 'corn bread'. **Cooking and Nutrition**	**'Perfect Pita's' (Bread)** Learning the difference between leavened and unleavened breads. Making flatbreads and filling them with savoury fillings and healthy salad. **Cooking and Nutrition**	**'Funky Furnishings'** Children will research, analyse, existing cushions. Then design, make and evaluate a 'funky' cushion cover, using their developing knowledge of and skills in a variety of sewing techniques for joining and decorating fabric. **Textiles, Materials and Techniques, Construction**

Vocabulary Progression Chart for Design and Technology – Key Stage 1		
Year 1 and Year 2		
Topic	**Tier 2**	**Tier 3**
General Terms	planning, investigating, design, evaluate, make, purpose, ideas, product, function, automatically, fluency, accurate, inspiration, annotate, feature, improvements,	intended user, design criteria, front-view, rear-view, decorated-view, diagram, designer, prototype
Cooking and Nutrition	Master practical skills, Explore Suggest improvements, colourful, attractive, grown, reared, caught, hygiene, stored, permission, supervision, prepare,	Sources of food: plants, animals, animal products, processed foods, fruit and vegetable names; seasonal food, harvest, names of equipment and utensils; sensory vocabulary e.g.soft, juicy, crunchy, sweet, sticky, smooth, sharp, crisp, sour, hard flesh, skin, seed, pip, core, cut, spread, grate, peel, slice, squeeze, fold, snipping, stirring, toasted, dissolve, safely, measure, weigh, scales, cook, healthy diet, ingredients, 'fork hold', 'bridge hold', nutritious, vegetarian, meat-eater, seasoning, food-poisoning, apron
Materials and Techniques	Demonstrate, manufactured, solid, hollow, rigid, stronger, weak	Cut, tools, measure, mark out, cutting, shaping, tearing, folding, curling, hinges, wall, tower, base, top, underneath, side, edge, surface, thinner, thicker, corner, point, straight, curved, metal, wood, plastic, circle, triangle, square, rectangle, cuboid, cube, cylinder, transparent, opaque,
Textiles	Shape, join, mark out, colour	templates, pattern pieces, textiles, fabric, cotton, thread, needle, pins, join, running stitch, over stitch, colour, decorate, finish, dyeing, sequins, printing, googly eyes
Electrical Systems	N/A	N/A
Programming and Electronics	N/A	N/A
Construction	Use, practise, combine, connect, manufactured, stability, unstable, balanced, combined, protect, rigid, properties,	Architects, construct, drilling, screwing, gluing, joining, fix, nailing, hammer, spread, span, structure, free-standing, anchor, brace, base, foundations, framework, strengthen, finishing, names of tools, equipment and materials used, centre of gravity, flanges, beam, column, slab,
Mechanics and Mechanical Systems	Create join, pull, push, up, down, forwards, backwards, rotating, horizontal, vertical, diagonal, attach, input, output, transport, distance,	slider, lever, pivot, fulcrum, slot, bridge/guide, card, masking tape, paper fastener, straight, curve, vehicle, wheel, axle, axle holder, cogs, winding, chassis, body, cab assembling, fixed, free, moving, mechanism, products, force,

Vocabulary Progression Chart for Design and Technology – Key Stage 2					
Year 3 and Year 4			**Year 5 and Year 6**		
Topic	**Tier 2**	**Tier 3**	**Topic**	**Tier 2**	**Tier 3**
General Terms	investigate, model, user, purpose, design, evaluate, annotated sketch, function/ functional, label, drawing, planning, appealing, sensory evaluations, innovative, discovery, automatically, fluently, inspiration, experimental, modify, variety, render, aspects, coordinates, assemble, construction,	design brief, design criteria, cross-section	**General Terms**	functionality, authentic, research, evolution, perfected, aesthetically pleasing, representation, versatile	design decisions, design specification, mock-up,
Cooking and Nutrition	Master practical skills Identify Improve preference questionnaire method, assemble, innovate	measure accurately, recipe, temperature, hob/oven, name of products, names of equipment, utensils, techniques and ingredients, texture, taste, sweet, sour, hot, spicy, appearance, smell, greasy, moist, cook, fresh, savoury, hygienic, edible, grown, reared, caught, frozen, tinned, processed, seasonal, harvested healthy/varied diet, carbohydrate, protein, vitamins, nutrients, nutrition, healthy,	**Cooking and Nutrition**	Master practical skills Combine Evaluate Create innovative designs intolerance, refine, survey, market research, risk assessment, traditional /classic, temperature, cleanliness, disinfect,	Storage, micro-organisms, compostable, calculate ratios, to scale , yeast, dough, prove, bran, flour, pulses, wholemeal, leavened, unleavened, perishable, meat substitute, yeast, sourdough, sautéing, accompaniments, condiments, baking soda, spice, herbs, fat, fold, knead, stir, pour, mix, rubbing in, whisk, beat, roll out, shape, sprinkle, crumble,

		'Claw Grip', varied, gluten, dairy, allergy, garnish, bacteria, perishable, preserve, refrigeration.			
Materials and Techniques	Technique(s), shaping, joining, assemble, accuracy, decision, position, interlocking, extend, reduce, reuse, recycle,	Names of materials, perimeter, opaque, cube, cuboid, prism, vertex, edge, face, length, width, breadth, capacity, marking out, scoring, adhesives, stiff, strong, font, lettering, text, graphics	**Materials and Techniques**	Make high quality products malleable precision, temporary, permanent, roughly, brittle	mountain fold, fan fold, U-fold, V-fold, envelope fold, acetate, light-weight,
Textiles	Join, Select, secure, embellish/ embellishments, reinforce, strength, weakness, stiffening, templates	fabric, names of fabrics, fastening, press studs, velcro, compartment, zip, button, structure, finishing technique, stitch, seam, seam allowance, button hole, hook and eye, whip stitch, back stitch	**Textiles**	Evaluate and improve Use qualities of materials in design process, resealable, durable,	visual effects, tactile effects, aesthetics, applique, wadding, right side, wrong side, hem, facing, name of textiles and fastenings used, pinking shears,
Electrical Systems	Create, illuminate, exploded diagram, components	electrical system, series / parallel circuit, fault, connection, toggle switch, push-to-make switch, push-to-break switch, battery, battery holder, light emitting diode (LED), bulb, bulb holder, wire, insulator, conductor/ conductive, crocodile clip, control, program, system, input device, output device,	***Electrical Systems***	Create and employ (a number of components) dismantle, disassembly, mounted, vibration, propelled,	circuit diagram, transistors, resistors, chips, motor, motorised, sensor, propeller, reed switch, light dependent resistor (LDR), tilt switch,

Programming and Electronics	Model, control and monitor, respond, device, remotely,	control, programme, component, app - enabled, robotic, Bluetooth control hub, app coding, counter display, algorithms, de-bugging, operate	**Programming and Electronics**	flow diagram, instrument, detect, connection	Software, code, products, graphics, smart device, artificial intelligence, remote servers,
Construction	cross-section, interlocking, component parts, aspects, coordinates, rigid, stiffen, variety, conjunction, external, internal, repair, function, compressed, pressure, distribution	names of tools/equipment shell structure, three-dimensional (3-D) shape, net, tabs, corrugating, ribbing, laminating, frame structure, flange, slot, tab, triangulation, truss, girder, deck, chord, strut, pier, key stone, abutment,	**Construction**	specification	CAD – computer aided design, shape, filing, sanding, overhang,
Mechanics and Mechanical Systems	Use Scientific knowledge process	forces, mechanisms, pulleys, gears, linkage, bridge/ guide system, input, output linear, rotary, oscillating, reciprocating pneumatic, hydraulic, piston, hollow cylinder,	**Mechanics and Mechanical Systems**	Convert Innovate annotated drawings, exploded diagrams mechanical system, transmit, circumference, interlock, vice versa, dwell,	Rotary, motion, linear, Cam shapes: Pear shaped Snail shaped, Eccentric circle. Cam movement: falling, dwelling and rising. linear reciprocating. automaton, Linked lever mechanism, camshaft, crank and handle. engineering, drive belt, rotation, spindle, driver, follower, ratio, axle, carousel, friction, Pulley systems: Simple pulley, Moveable pulley, Block-and-tackle pulley, rope, cable, belt or chain, mechanical advantage, physicist-Archimedes, Gear trains: Gearing up, Mitre gear, Gearing down,

Learning in EYFS - The information below demonstrates which statements from the 2020 Development Matters are prerequisite skills for D&T within the national curriculum and outlines the most relevant statements taken from the Early Learning Goals in the EYFS statutory framework and the Development Matters age ranges for Three and Four-Year-Olds and Reception to match the programme of study for D&T.

The most relevant statements for D&T are taken from the following areas of learning:

- Physical Development * Expressive Arts and Design

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.

The ELG below indicates what children should have achieved by the end of their time in EYFS as they progress into Year 1.

ELG	Physical Development	Fine Motor Skills	• Use a range of small tools, including scissors, paintbrushes and cutlery.
	Expressive Arts and Design	Creating with Materials	• 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.

EYFS Breadth of Study		
Advent Term	**Lent Term**	**Pentecost Term**
LET'S EXPLORE SUPERHEROES	**LET'S EXPLORE DINOSAURS**	**LET'S EXPLORE PIRATES**
POSSIBLE ACTIVITIES: • Investigate, design and make own superhero mask. • Superhero Fruit skewers • Christmas cakes	**POSSIBLE ACTIVITIES:** • Investigate, design and make a cage /enclosure for a dinosaur (think - Jurassic world??) • Making porridge (linked to 'Bears' topic)	**POSSIBLE ACTIVITIES:** • Investigate existing devices for magnifying – initially telescopes that pirates would use. Then show binoculars, finally introduce 'periscope' and their use by submarines.... (loads of links to science) Support children in constructing own periscope using recycled materials or a kit. Locations to purchase pre – prepares periscope kits: B8R07378 - Periscope Kits | Philip Harris Periscope Kit (pk10) (selectschoolsupplies.co.uk) Videos found on constructing own periscopes (no particular order/ preference) How-to-Make-a-Periscope.pdf (parsonsgreenprimaryschool.co.uk) SMG-Learning-Activities-360-Periscope.pdf (sciencemuseumgroup.org.u Periscope : 6 Steps - Instructables