St Denys Captivating Curriculum

Design and Technology

Intent

Curriculum Drivers	Well Being	Creativity	Communication	Choice	Challenge
Our curriculum drivers shape, personalise and underpin our curriculum, bring about the aims and values of our school, and respond to the particular needs of our learners.	Our curriculum has physical, mental and emotional well-being at its heart. Children only learn if they are safe, well and happy.	Our curriculum harnesses the power of possibility and fosters creative thought, enabling children to solve problems and express themselves in different ways	Our curriculum ensures that children develop the skills necessary to communicate their thoughts, ideas and feelings successfully in a wide range of different forms.	Our curriculum provides children with the knowledge, skills and understanding to make informed choices	Our curriculum provides challenge for all learners, teaches learners to seek challenge and develops the resilience they need to embrace it

Everything we use in our daily life has been designed by someone and has a function – design is everywhere and St Denys pupils appreciate and value the products we use whilst understanding how and why they have been made. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. Drawing on a wide range of disciplines including science, art, computing and mathematics, St Denys pupils apply practical construction skills grounded in a solid foundation of technical and practical knowledge.

By engaging with design as an iterative process, children will:

- develop a deep understanding of how to design products;
- know how to manage and control risks;
- know how to work safely with a variety of tools and materials;
- using creativity and imagination, design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values;
- continually refine products and designs through critique, evaluation, testing and review.

The knowledge and skills developed in each year group, including relating to food, nutrition and cooking, are returned to and built on in future years, securing long term retention for our children and equipping them for the next stage of their education and beyond, into later life.

These are the characteristics of learning that children will develop in Design and Technology :-

Characteristics of a Design Technologist

At St Denys we are Design Technologists. Children at St Denys have: -

The ability to use time efficiently and work constructively and productively with others.

An excellent attitude to learning and independent working.

Significant levels of originality and the willingness to take creative risks to produce innovative ideas and prototypes.

A deep understanding of the design process and the value and importance of design as an iterative process.

The ability to act as responsible designers and makers, working ethically, using finite materials carefully and working safely.

The ability to carry out thorough research, show initiative and ask questions to develop an exceptionally detailed knowledge of users' needs.

A thorough knowledge of which tools, equipment and materials to use to make their products.

A passion for the subject and knowledge of historical and up-to-date technological innovations in materials, products and systems.

An understanding of the principles of nutrition and a balanced and varied diet, including seasonality and where our food comes from.

The ability to think independently and to persevere when faced with challenges, showing a confidence of success

The ability to draw on and apply linked skills and knowledge from a wide range of other disciplines e.g. mathematics, art, geography, computing

The ability to manage risks exceptionally well to manufacture products safely and hygienically.

Creativity, Communication, Choice, Challenge: Achievement for All

This is what St Denys children achieve in Design and Technology by the end of each Milestone :-

Pebbles Milestone Early Years Foundation Stage	**Milestone 1** Years 1 & 2	**Milestone 2** Years 3 & 4	**Milestone 3** Years 5 & 6

Subject - End of Milestone Outcomes

<table>
<tr><td>By the end of <u>the Pebbles Milestone</u>, children will be able to…</td><td colspan="6">

Demonstrate secure fine motor skills when using a wide range of tools:

Thread a large needle and stitch real stitches.
Use brushes, crayons and pencils with control.
Use a knife and fork competently.
Use tools to make things.

Make judgements about properties of different materials and their suitability for construction.
Test out the properties of materials.
Draw what they are going to make and explain designs.
Experiment with designs and materials.
Use tools safely.
Describe how a product is made up of many different parts.
Talk about a time they cooked and how they stayed safe

</td></tr>
<tr><td></td><td colspan="3">Master practical skills – developing the skills needed to make high quality products</td><td colspan="2">Technical knowledge - developing the knowledge needed to make high quality products</td><td>Design, make, evaluate and improve – developing the process of design thinking and understanding design as an iterative process</td><td>Take inspiration from design throughout history – appreciating the design process that has influenced the products we use in everyday life</td></tr>
<tr><td></td><td>Food</td><td>Materials</td><td>Textiles</td><td>Food</td><td>Structures and mechanisms</td><td></td><td></td></tr>
<tr><td>By the end of <u>Milestone 1</u>, children will be able to…</td><td>

Cut, peel, grate and mix ingredients safely and hygienically
Measure or weigh using measuring

</td><td>

Cut materials safely using tools provided
Measure and mark out to the nearest cm

</td><td>

Shape textiles using templates
Join textiles using running stitch
Decorate textiles by adding details

</td><td>

Apply the basic principles of a healthy diet when preparing dishes
Understand that there are

</td><td>

Build structures (frame and solid), exploring how they can be made

</td><td>

Design products that have a clear purpose and an intended user
Make products, refining the

</td><td>

Explore objects and designs to identify likes and dislikes of the designs

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	cups or electronic scales • Assemble or prepare ingredients		• Demonstrate a range of cutting and shaping techniques (tearing, cutting, folding) • Demonstrate a range of joining techniques (gluing, hinges, combining materials to strengthen)		dangers to food preparation • Give some examples of food from different seasons • Explain that food comes from 2 main sources: animals and plants	stronger, stiffer and more stable • Explore and use mechanisms (sliders, wheels and axles) in their products	design as work progresses • Generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, design and technology • Evaluate their ideas and products against design criteria	• Suggest improvement to existing designs • Explore how products have been created
By the end of	Food	Materials	Textiles	Electricals, electronics and computing	• Understand and apply the	• apply their understandin	• Design with purpose by	• Understand how key events

Milestone 2, children will be able to…	• Prepare ingredients hygienically using appropriate utensils • Measure ingredients to the nearest gram accurately • Follow a recipe • Assemble or cook ingredients, including controlling the temperature of the hob.	• Cut materials accurately and safely by selecting appropriate tools • Measure and mark out to the nearest mm • Apply appropriate cutting and shaping techniques • Select appropriate joining techniques	• Understand the need for a seam allowance • Join textiles with appropriate stitching	• Select the most appropriate techniques to decorate textiles • Create series and parallel circuits	principles of a healthy and varied diet • The importance of refrigeration and how to safely store food in the fridge. • Understand seasonality and give examples of different seasonal food including fish and meat	g of how to strengthen, stiffen and reinforce more complex structures (frame, shell) • understand and use mechanical systems in their products (levers) • understand and use electrical systems in their products (series circuits incorporating switches and bulbs)	identifying opportunities to design • Make products by working efficiently e.g. by carefully selecting materials • Refine work and techniques as work progresses, continually evaluating the product design • generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams • evaluate their ideas and products against their own design criteria and consider the views of others to improve their work	and individuals in design and technology have helped shape the world • Investigate and analyse a range of existing products
By the end of	• Understand the importanc	• Cut materials with precision and refine the	• Create objects that employ a	• Create circuits that employ a	• Understand and apply the principles of a	• apply their understandin g of how to	• Design with the user in mind, motivated by	• investigate and analyse a range

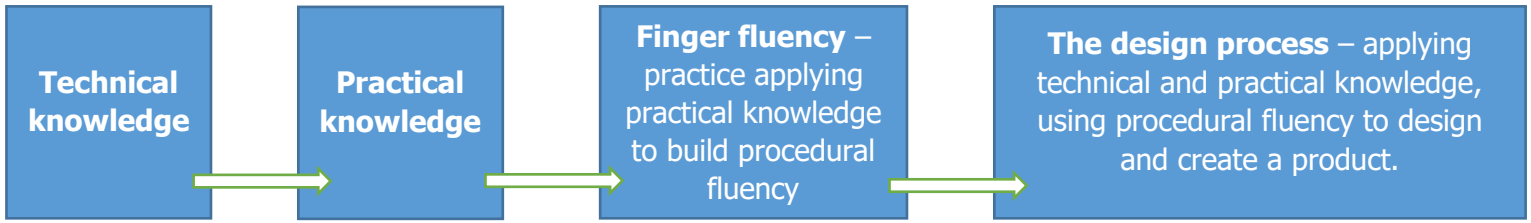
Milestone 3, children will be able to…	e of correct storage and handling of ingredients • Measure accurately and calculate ratios of ingredients to scale up or down from a recipe • Demonstrate a range of cooking techniques • Create and refine recipes, including ingredients, methods, cooking times and temperatures	finish with appropriate tools • Show an understanding of the qualities of materials to choose appropriate tools to cut and shape	seam allowance • Join textiles with more than one stitch • Use the qualities of materials to create suitable visual and tactile effects in the decoration of textiles	number of components • Control and monitor models using software designed for this purpose	healthy and varied diet and apply these to preparing dishes • Know the dangers to cooking & how to mitigate them incl: food safety, hygiene rules & safe cooking • Understand seasonality and know where and how a variety of ingredients are grown, reared, caught and processed	strengthen, stiffen and reinforce more complex structures (frame, arch) • understand and use mechanical systems in their products (cams, wheels and axles, pulleys) • understand and use electrical systems in their products (series circuits incorporating switches, bulbs, buzzers and motors) • apply their understanding of computing to program, monitor and control their products	the service a product will offer • Make products through stages of prototypes, making continual refinements • Ensure products have a high quality finish, using art skills where appropriate • generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design • evaluate their ideas and products against their own design criteria and consider the views of others, including their target	of existing products • understand how key events and individuals in design and technology have helped shape the world and link to other products, events and individuals they have learnt about •

							consumer, to improve their work	

Implementation

Our whole curriculum is shaped by our school vision which aims to enable all children, regardless of background, ability, additional needs, to flourish, be creative and make choices in order to be the best version of themselves. The St Denys Captivating Curriculum in Design and Technology has been designed to meet the needs of our learners in our context, meeting the requirements of the National Curriculum, informed by research and the principles of the Chris Quigley Essentials Curriculum. It is supported by clear skills and knowledge progression with a clear vocabulary advancement. This ensures that skills and knowledge are built on year by year, sequenced appropriately and reinforced regularly to maximise learning for all children. It is important that the children develop the progressive skills of a Design Technologist throughout their time at St Denys and do not just learn a series of facts/procedures related to the subject. In lessons, children are encouraged to use the skills of a Design Technologist, building on what they have learnt and practised before to be fully prepared to use these skills in the next stages of their education and into their adult lives. Strong links between units and across milestones support children in making connections and deepening their skills.

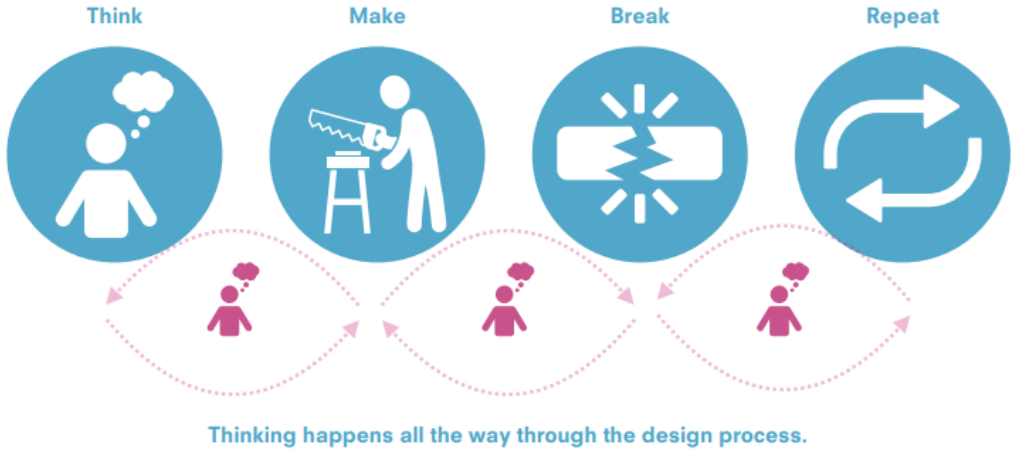
Each unit follows the same general structure, to enable children to develop deep understanding, building and applying practical skills on a foundation of technical and practical knowledge. Units progress as follows:



The design process

Whenever creating a product in D.T., children follow this design process.

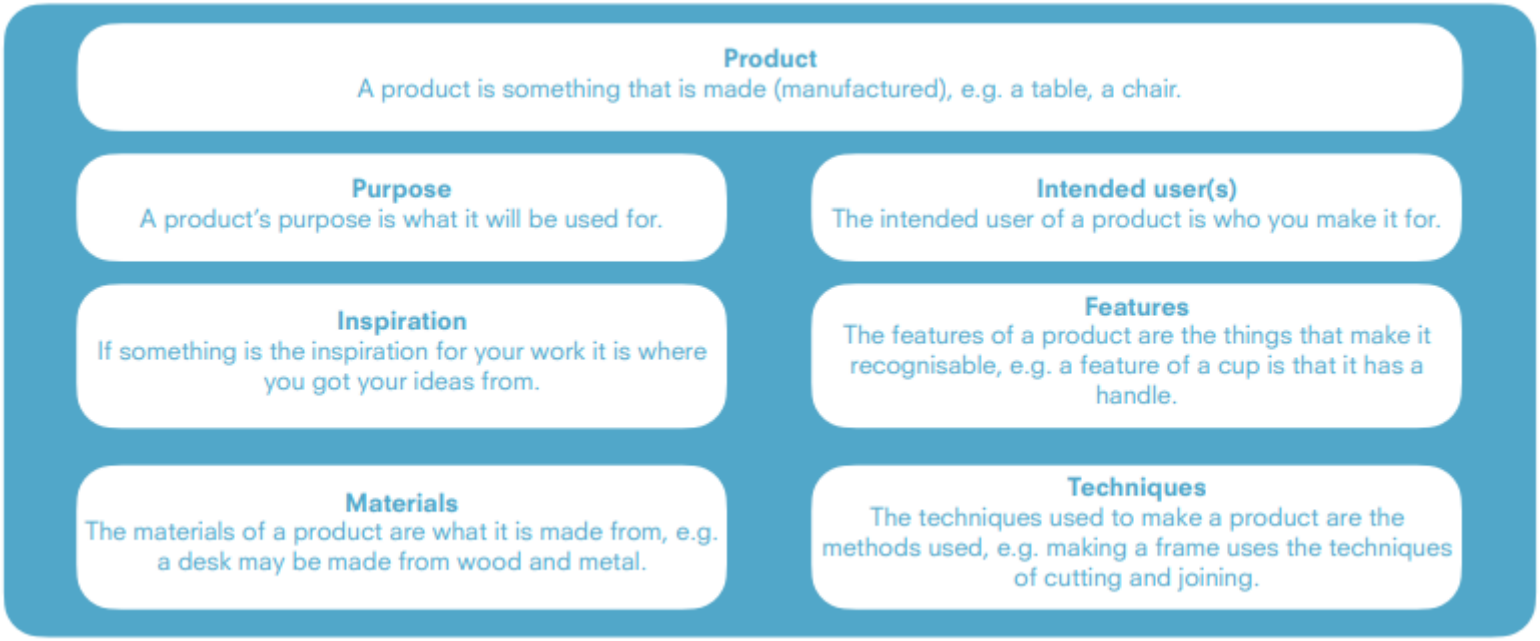
Think = coming up with ideas for products and what	Make = where the product is made in real life	Break = seeing where the product can be improved	Repeat = returning to earlier stages to make identified improvements.



By engaging with this process throughout their time at the school, while creating a variety of products, children develop a deep understanding of the process, showing greater independence at each stage as they develop.

Product design

There are key things which must be considered during the 'Think' stage of designing a product. D.T. is different from Art because, in D.T., products are always designed for someone to use. This table outlines the key things which children will be taught to consider whenever they design a product.



The whole school overview for Design and Technology is as follows:

	Key events / individuals	Structures & Materials	Mechanisms	Cooking
EYFS	Continuous provision: Through a wide range of activities and learning opportunities, children will learn: • to develop their fine motor skills when using a wide range of tools, especially pens, pencils, brushes, crayons, cutlery, scissors • to test out the properties of materials and make judgements about their suitability for construction • to draw what they are going to make and explain their designs • to experiment with designs and materials • to use tools safely • to work independently and with others • to think about what is effective about their design and construction and to revise their ideas and models Some of the contexts through which children develop these skills include: den building, sewing, block play, junk modelling, small world construction, pre-made construction toys, paper construction, playdoh and modelling clay.			Biscuits Children will learn: Basic hand & food hygiene when cooking Basic safety rules for cooking Mixing, combining, rolling
Year 1	What is DT? / the design process Invention of the television and its design evolution	Joining fabric together End product: animal hand puppet (felt) Children will learn: •how to use a template to shape fabric • threading a needle • running stitch • problem solving when sewing • adding felt embellishments with glue • How to follow the design process to create an animal hand puppet Vocabulary: needle, thread, sew, running stitch	Sliders End product: 'Magic slider' greetings card Children will learn: • A slider is a rod that moves when pulled or pushed. If something is attached to one end of the rod, the push or pull will move that too. • A guide bridge can stop the rod from rotating. • Slider mechanisms can guide an object in a variety of directions: the shape of the slot can change the path of the slider rod. • An object can be attached to a slider rod in a variety of ways, including to make the object stand out from the background, and how to do this. • How to follow the design process to create a magic slider card.	Portable snacks where food comes from safety & hygiene Children will learn: • Features of portable snacks • Spreading • Grating • Peeling • Fork secure hold to cut food with flat surface • Bridge hold to cut items which might roll • Folding (a wrap) • How to follow the design process to create a portable snack (sandwich / wrap) • That food comes from 2 main sources: animals and plants and how we get food from these sources. • That there are dangers to food preparation and some of the things to be aware of

			Vocabulary: mechanism, slider, rod, guide bridge, pull, push, slot	Vocabulary: grown, reared, caught, processed food, inspiration, purpose, user, food poisoning, prepare, store
Year 2	What is DT? / the design process Chairs & how they have developed over time	Solid structure – End product: Sugar cube wall Children will learn: • Structures are things made either in nature or by people • There are 4 main types of structure: shell, frame, solid, combined • People make and design structures for a variety of reasons • For a structure to be strong, it needs to be stable. A structure is stable when its centre of gravity is over its base. • There are ways to make a free standing structure more stable: anchoring, braces, bases, buttresses. A wider base is more stable than a narrow one. • A solid structure is made from one solid object or lots of solid objects joined together. • Examples of natural and manufactured solid structures. • Solid structures made of many solid objects are strong because of the **bond** of the objects (the way they are arranged). A running bond is stronger than a stacked bond. • How to place and arrange objects so they are stable • How to follow the design process to create a brick wall (using sugar cubes for bricks) Vocabulary: structure, manufactured, natural, strong, stable, balanced, anchoring, braces, bases, mortar, stacked bond, running bond	Wheels and axles End product: Wind powered car Children will learn: • A wheel and axle is a mechanism for moving things. They work together: turning the wheel turns the axle in the same direction. • It is easy to move a big wheel as it doesn't take much force. When it is connected to a • smaller axle the axle turns more slowly but with more force. • An axle is attached to a chassis – this can be done in a number of different ways. • How to make wheel and axle mechanisms in a variety of ways. • How to follow the design process to create a wind powered car. Vocabulary: mechanism, wheel, axle, rotating, force, chassis, attach,	couscous dish seasonality safety & hygiene Children will learn: • Features of a couscous dish • Grating • Peeling • Fork secure hold to cut food with flat surface • Bridge hold to cut items which might roll • Snipping • Weighing • How to follow the design process to create a couscous dish • That seasonal food is food that is ready to be harvested during a particular season, and examples of foods from different seasons • That there are dangers to food preparation and some of the things to be aware of Vocabulary: seasonal food, harvest, food poisoning, prepare, store

Year 3	What is DT? / the design process Bridges over time incl. Gateshead Millennium Bridge (first tilting bridge). – Isambard Kingdom Brunel	Frame structure – end product: Truss bridge Children will learn: • Some shapes are more rigid than others – triangles are the most rigid shapes for frames • Truss bridges have interconnecting triangular structures which give them strength and distribute weight evenly along the length of the bridge • Frames can be made stronger by adding a strut or joining plate. • A variety of ways to join square section wood including Jinks' corners. • How to follow the design process to create a model truss bridge. Vocabulary: rigid, truss, distribute, strut, joining plate, frame, Jinks' corners	Levers End product: Litter grabber Children will learn: • A lever is a mechanism that has a rigid rod which has a pivot point somewhere along its length. • This pivot point is called a fulcrum, and a lever can either balance or turn about the fulcrum. • A force at one end of the lever leads to movement at the other. The movement will be in the opposite direction to that of the force. T • he force is called the input and the resulting movement is called the output. • How the inputs and outputs change when the position of the fulcrum is changed • How to follow the design process to create a litter grabber Vocabulary: lever, rigid, rod, pivot, fulcrum, force, input, output	Vegetable soup seasonality Food storage/ safety Children will learn: • Features of a vegetable soup • Claw grip for chopping vegetables (and revisit bridge hold & fork secure) • Blending • Heating/cooking on hob • How to follow the design process to create a vegetable soup • Some foods need to be kept in the fridge to help stop bacteria growing. These include foods with a use by date, cooked foods and ready-to-eat foods such as desserts and cooked meats. • Refrigeration helps to preserve the food. • It is important that cooked and uncooked foods are stored on separate shelves: cooked food must be above uncooked meat or poultry so that no juices containing bacteria drip on to it. • Seasonal food is food that is ready to be harvested during a particular season. • Fish and some types of meat also have seasons. • Examples of different seasonal food including fish and meat • There are benefits to eating seasonal food and what they are The way we cook/prepare our food can also change with the seasons.
Year 4	What is DT? / the design process	Joining fabric together with a seam allowance	Paper circuits Switches End product: Light up card	Dips Balanced diet Children will learn:

	The invention & development of Lego – Ole Kirk Christiansen	End product: hanging decoration Children will learn: • Why a seam allowance is necessary • Back stitch • How to join 2 pieces of fabric (cotton) right-sides together • How to follow the design process to create a hanging decoration Vocabulary: seam allowance, right / wrong side (together), embellishment	Children will learn: • Electrical connections between LEDs, switches and batteries may be made with copper tape, and some of the advantages of using copper tape • How to correctly connect up a circuit including a cell and LED • Switches may be made by laying out circuits of copper tape (or other conductive materials) in different ways. • Folded paper or other components can be used to break or complete a circuit. • How to make a copper tape circuit with and without a switch • How to follow the design process to create a paper circuit greetings card Vocabulary: LED, conductive, adhesive, exploded diagram, switch, illuminate,	• Features of dips • Claw grip for chopping vegetables (and revisit bridge hold & fork secure) • Juicing • Crushing • Blending • How to follow the design process to create a dip • Different kinds of foods give your body different kinds of nutrients. • Having the right amount of each food is called having a 'balanced diet'. We need a balanced diet to stay healthy. • Food can be divided into these five food groups: starchy foods (bread, rice, potatoes, pasta, cereals); vegetables and fruits; dairy (milk, cheese, etc.); protein (meat, fish, eggs, beans and nuts) and high fat/sugary foods (biscuits, chocolate, cake, crisps). • All food contains nutrients. • Different foods contain different types of them. Different nutrients help our bodies in different ways.
Year 5	What is DT? / the design process Invention of the telephone and its design evolution – Martin Cooper (inventor of first mobile phone)	Joining fabric together in a variety of ways End product: cushion Children will learn: • to create objects that employ a seam allowance • to join textiles with more than one stitch, selecting the appropriate stitch for the intended purpose • to select appropriate materials for decoration by using the qualities of different fabrics	Cams End product: Moving Toy Children will learn: • A cam and follower mechanism turns rotary motion into linear reciprocating motion (or vice versa). • As the cam rotates, the follower rises and falls in a process known as reciprocating motion. Cams • are similar to a wheel but, instead of having a circular	Bread seasonality Children will learn: • Seasonal food is food that is ready to be harvested during a particular season. • Fish and some types of meat also have seasons. • Examples of different seasonal food including fish and meat • There are benefits to eating seasonal food and what they are

		to follow the design process to create a decorated (applique) cushion. Vocabulary: seam, applique, running stitch, back stitch, blanket stitch	profile they have different shaped profiles • How different shaped cams create different movements: rise, dwell, fall • How to follow the design process to create an automaton toy. Vocabulary: linear reciprocating, cam, follower, dwell, eccentric circle, automaton	• The way we cook/prepare our food can also change with the seasons. • Features of different types of bread • Kneading • Mixing & folding • Oven use • How to follow the design process to create a bread rolls
Year 6	What is DT? / the design process Invention of the motor car and its design evolution	Shell structure – End product: Building design (architecture link – Zaha Hadid) Children will learn: • Shell structures are usually curved, hollow, light-weight structures. They are used for a variety of purposes, such as containing, protecting, covering and presenting • Examples of natural and manufactured shell structures • Manufactured shell structures often gain their strength from their shell used in conjunction with a frame structure. • A variety of ways sheet materials (cardboard) can be shaped and joined. • How to follow the design process to create a model shelter / playhouse Vocabulary: variety, purpose, contain, conjunction, shell, hollow, external, score, bend, flange, slots, tab, foot fold	Electronic motors (Wheels & axles, pulleys) End product: Motorised Car Children will learn: • Electric motors produce rotary movement. The movement can be used to turn something, such as a pulley, a propeller, a fan or an axle. • When motors are combined with gears their speed can be altered. • Electric motors can be used alone or they can be combined to give extra power. • Examples of products using electric motors • How to connect motors to different circuits and products • How to follow the design process to create a motorised car Vocabulary: rotary, propeller, combined, motor, gears, power, circuit,	Veggie Bolognese Food & kitchen safety Children will learn: • Features of Bolognese • Meat alternatives for Bolognese • How to follow the design process to create veggie bolognese • Sauteing / frying • Hob use Dangers to cooking & how to mitigate them incl: food safety, hygiene rules & safe cooking

Our planning overviews set out the learning journey for each term. Our weekly/unit planning identifies the specific learning intentions and relevant vocabulary and learning activities through which children achieve the learning objectives. Our success criteria show the context of the lesson/series of lessons, the specific learning intentions (using 'I can' format) and the associated key vocabulary.

Example of subject success criteria:-

30.11.22 	***As a design technologist**, I am learning to identify the features of a product.* *Context: portable snacks*	
I can identify the features of a specific portable snack		
I can describe similarities between portable snacks		
I can think about why a user might want a product with these features		
feature product purpose user filling transport hold inside bread pastry cutlery		

Our learning resources and activities are carefully chosen and build and sustain engagement. The purpose of the learning is driven by subject specific intent. By engaging in 'finger fluency' activities St Denys pupils develop strong practical skills which they showcase and use to real purpose in designing, developing, creating and refining end products within each unit of learning. Carefully planned skills progressions within and across units of learning, and across milestones, promote long term retention and keep skills and knowledge current for our pupils as each unit builds on the learning and practical experiences that have come before.

Impact

By the time the children at St Denys leave our school they should have developed the ability to apply practical construction skills grounded in a solid foundation of technical and practical knowledge. They will understand design as an iterative process and demonstrate:

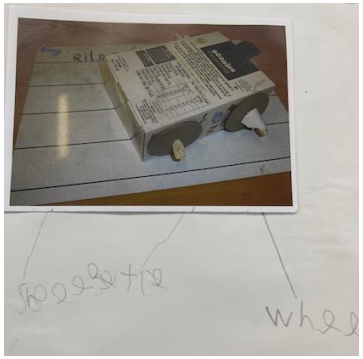
- a deep understanding of how to design products;
- that they know how to manage and control risks;
- that they know how to work safely with a variety of tools and materials;
- creativity and imagination as they design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values;
- an understanding of the importance of, and the ability to, continually refine products and designs through critique, evaluation, testing and review

- an understanding and knowledge of past and present design and the evolution of key product design over time

Within class, teachers continually assess pupils' knowledge and understanding of concepts and skills taught, using a wide range of AfL strategies including questioning, observation and peer and self assessment. This is used to adapt teaching in the moment, build in further practice opportunities, impact future planning and to support children in knowing their strengths and next steps in learning.

The children's learning in each unit is captured through the end products they create, the technical knowledge and practical skills they use to inform their designs and creations and the refinements they make as they engage with evaluating their designs and products.

We capture a summary of the learning in Design and Technology in the products pupils create and the ways they evaluate and refine these products.



Example of a child refining and developing their product throughout a unit

Our main aim is for children to leave St Denys having used and developed the characteristics of a Design Technologist: skills, knowledge and characteristics they will continue to use throughout their lives.