

Design & Technology

Long Term Plan

Archbishop Runcie CE First School



Vision

The school first existed as a force for social change and we remember this within our historic original mission as we continue to inspire and transform the minds and hearts of everyone we serve today and, thus, the wider world. Everyone associated with our school will experience life in all its fullness, as promised by Jesus. We do so with Love and Determination.

Our original Mission

“A school for the education of children only of the labouring mining and manufacturing and other poorer classes in the Parish of Gosforth and for no other purpose.”

Mission Statement:

At ARFS, we promote educational excellence, for everyone. Our purpose in education is to enable the children, families, staff, Governors and the wider community we serve to flourish. The Christian values of Love and Determination are at the core of teaching and culture within the school. We believe this makes us distinctive in the learning experience on offer. This is firmly rooted in the following epistle:

Be on your guard; stand firm in the faith; be courageous; be strong.

Do everything in love.

1 Corinthians 16:13-14

Design and Technology

Intent	Implementation	Impact and Next Steps
<p>At Archbishop Runcie CE First School, we aim to inspire the next generation of engineers, architects, designers, chefs and technologists.</p> <p>We view Design and Technology as a rigorous and practical subject and that a deep understanding of DT is part of children's cultural capital entitlement. It enables children to use their God-given capabilities to shape the world that is to come for the better, in line with our school vision, values, ethos and mission.</p> <p>DT allows children to, using their 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. It is multi-disciplinary, thus deepening children's knowledge within other subjects e.g. Maths, Science, Art. However, we teach DT as a discrete subject explicitly as its application and utility goes beyond how it benefits other subjects and is worth study in its own right.</p> <p>The Kapow Design and technology scheme of work aims to inspire pupils to be innovative and creative thinkers who have an appreciation for the</p>	<p>The school uses Kapow for Design and Technology planning support – this supports teachers to put the ambitious intent statement into action. This scheme ensures that units are sequential, with the core areas being revisited, increasing in complexity through a spiral curriculum model, alongside National Curriculum coverage.</p> <p>Kapow's system scaffolds children to ensure that they can all access appropriate outcomes and content independently alongside the technical elements. It also supplements staff knowledge and expertise, ensuring that non-subject specialists can still lead lessons that have high degrees of challenge (e.g. using videos to demonstrate worked examples modelled by experts).</p> <p>In line with the National Curriculum, DT is grouped under four key areas:</p> <ul style="list-style-type: none"> ● Design ● Make ● Evaluate ● Technical knowledge <p>The scheme has a clear progression of skills and knowledge within these strands and key areas across each year group. The progression of skills is mapped out for each year group and how these skills develop to ensure that attainment targets are securely met by the end of each key stage.</p> <p>Cooking and nutrition is given a particular focus in the National Curriculum and we have made this one of our six key areas that pupils revisit throughout their time in primary school:</p> <ul style="list-style-type: none"> ● Cooking and nutrition 	<p>Children will be able to:</p> <ul style="list-style-type: none"> - Talk confidently about DT, including what the subject is and how it is used in real life - See DT as an essential subject, not an 'add on' - Succeed in the next stage of their education, taking DT beyond Key Stage 2 - Understand the functional and aesthetic properties of a range of materials and resources. - Understand how to use and combine tools to carry out different processes for shaping, decorating, and manufacturing products. - Build and apply a repertoire of skills, knowledge and understanding to produce high quality, innovative outcomes, including models, prototypes, computer aided design, and products to fulfil the needs of users, clients, and scenarios. - Understand and apply the principles of healthy eating, diets, and recipes, including key processes, food groups and cooking equipment. - Have an appreciation for key individuals, inventions, and events in history and of today that impact our world.

<p>product design cycle through ideation, creation, and evaluation. We want pupils to develop the confidence to take risks, through drafting design concepts, modelling, and testing and to be reflective learners who evaluate their work and the work of others. Through our scheme of work, we aim to build an awareness of the impact of design and technology on our lives and encourage pupils to become resourceful, enterprising citizens who will have the skills to contribute to future design advancements.</p>	<ul style="list-style-type: none"> ● Mechanisms/ Mechanical systems ● Structures ● Textiles ● Electrical systems (KS2 only) ● Digital world (KS2 only) <p>Through Kapow Primary’s Design and technology scheme, pupils respond to design briefs and scenarios that require consideration of the needs of others, developing their skills in the six key areas.</p> <p>Each of our key areas follows the design process (design, make and evaluate) and has a particular theme and focus from the technical knowledge or cooking and nutrition section of the curriculum. The Kapow Primary scheme is a spiral curriculum, with key areas revisited again and again with increasing complexity, allowing pupils to revisit and build on their previous learning.</p> <p>Lessons incorporate a range of teaching strategies from independent tasks, paired and group work including practical hands-on, computer-based and inventive tasks. This variety means that lessons are engaging and appeal to those with a variety of learning styles. Differentiated guidance is available for every lesson to ensure that lessons can be accessed by all pupils and opportunities to stretch pupils’ learning are available when required. Knowledge organisers for each unit support pupils in building a foundation of factual knowledge by encouraging recall of key facts and vocabulary.</p> <p>Strong subject knowledge is vital for staff to be able to deliver a highly effective and robust Design and technology curriculum. Each unit of lessons includes multiple teacher videos to develop subject knowledge and support ongoing CPD. Kapow Primary has been created with</p>	<ul style="list-style-type: none"> - Recognise where our decisions can impact the wider world in terms of community, social and environmental issues.
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	<p>the understanding that many teachers do not feel confident delivering the full Design and technology curriculum and every effort has been made to ensure that they feel supported to deliver lessons of a high standard that ensure pupil progression.</p>	
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EYFS

Nursery	Autumn Term		Spring Term		Summer Term	
Topic Title	Once upon a time	Sparkling Celebrations	Awe & Wonder	Nature's Miracles	Our Wonderful World	We're going on a journey
Texts – Cycle 1	Goldilocks Baby Bear's Birthday	Pinecone & Penguin Dear Santa	The Gingerbread Man Dinosaur Roar	Dear Zoo Driving my tractor	The Very Hungry Caterpillar Jack and the Beanstalk	The Train Ride Penguin on Holiday
Texts – Cycle 2	No Rising 3s		Peace at Last How to Catch a Star	Noisy Farm Farmer Duck	Chick to Hen Titch	Commotion in the Ocean Pirate Pete
Design and Technology within topic	Baking cakes	Christmas Crafts	Fruit kebab wands Fossils biscuits Dinosaur World	Easter baskets Easter craft	Space rocket building Baking rock cakes	Junk Modelling

Reception	Autumn Term	Spring Term	Summer Term
Unit title	Structures: Junk modelling	Textiles: Bookmarks	Structures: Boats
Vocabulary	Join Stick Cut Bend Slot Scissors Measure Materials Fix	Thread Weave Pattern Sew Sewing needle Embroider Design Evaluate	Waterproof Absorb Prediction Variable Experiment Investigation Float Sink Junk
Why this, why now	Builds on Nursery work and is appropriate point to baseline knowledge.	Celebrates reading and is progressively more challenging than prior unit	Links to Science learning and is progressively more challenging than first Reception unit.
Disciplinary Knowledge	<p>Design:</p> <ul style="list-style-type: none"> • Making verbal plans and material choices. • Developing a junk model. <p>Make:</p> <ul style="list-style-type: none"> • Improving fine motor/scissor skills with a variety of materials. • Joining materials in a variety of ways (temporary and permanent). • Joining different materials together. • Describing their junk model, and how they intend to put it together. <p>Evaluate:</p> <p>Giving a verbal evaluation of their own and others' junk models with adult support. Checking to see if their model matches their plan. Considering what they would do differently if they were to do it again. Describing their favourite and least favourite part of their model.</p>	<p>Design:</p> <p>Discussing what a good design needs. Designing a simple pattern with paper. Designing a bookmark. Choosing from available materials.</p> <p>Make:</p> <p>Developing fine motor/cutting skills with scissors. Exploring fine motor/threading and weaving (under, over technique) with a variety of materials. Using a prepared needle and wool to practise threading.</p> <p>Evaluate:</p> <p>Reflecting on a finished product and comparing to their design.</p>	<p>Design:</p> <p>Designing a junk model boat. Using knowledge from exploration to inform design.</p> <p>Make:</p> <p>Making a boat that floats and is waterproof, considering material choices.</p> <p>Evaluate:</p> <p>Making predictions about, and evaluating different materials to see if they are waterproof. Making predictions about, and evaluating existing boats to see which floats best. Testing their design and reflecting on what could have been done differently. Investigating the how the shapes and structure of a boat affect the way it moves.</p>
Substantive knowledge	<ul style="list-style-type: none"> • To know there are a range to different materials that can be used to make a model and that they are all slightly different. • Making simple suggestions to fix their junk model. 	<ul style="list-style-type: none"> • To know that a design is a way of planning our idea before we start. • To know that threading is putting one material through an object. 	<p>To know that 'waterproof' materials are those which do not absorb water.</p> <ul style="list-style-type: none"> • To know that some objects float and others sink. • To know the different parts of a boat.

Year 1	Autumn Term	Spring Term	Summer Term
Unit title	Structures: Constructing a windmill	Textiles: Puppets	Cooking and nutrition: Fruit and vegetables
Vocabulary	Client Design Evaluation Net Stable Strong Test Weak Windmill	Decorate Design Fabric Glue Model Hand puppet Safety pin Staple Stencil Template	Blender Carton Fruit Healthy Ingredients Peel Peeler Recipe Slice Smoothie Stencil Template Vegetable
Why this, why now	Builds on previous unit in Reception.	Progressively more challenging than Reception textiles including more difficult techniques.	Multimedia design and links to PSHE healthy choices.
Disciplinary knowledge	<p>Design: Learning the importance of a clear design criteria. Including individual preferences and requirements in a design.</p> <p>Make: Making stable structures from card, tape and glue. Learning how to turn 2D nets into 3D structures. Following instructions to cut and assemble the supporting structure of a windmill. Making functioning turbines and axles which are assembled into a main supporting structure.</p> <p>Evaluate: Evaluating a windmill according to the design criteria, testing whether the structure is strong and stable and altering it if it isn't. Suggest points for improvements.</p>	<p>Design: Using a template to create a design for a puppet.</p> <p>Make: Cutting fabric neatly with scissors. Using joining methods to decorate a puppet. Sequencing steps for construction.</p> <p>Evaluate: Reflecting on a finished product, explaining likes and dislikes.</p>	<p>Design: Designing smoothie carton packaging by-hand or on ICT software.</p> <p>Make: Chopping fruit and vegetables safely to make a smoothie.</p> <p>Evaluate: Tasting and evaluating different food combinations. Describing appearance, smell and taste. Suggesting information to be included on packaging.</p>
Substantive knowledge	<p>To understand that the shape of materials can be changed to improve the strength and stiffness of structures.</p> <p>To understand that cylinders are a strong type of structure (and, therefore, they are the main shape used for windmills and lighthouses).</p> <p>To understand that axles are used in structures and mechanisms to make parts turn in a circle.</p> <p>To begin to understand that different structures are used for different purposes.</p>	<p>To know that 'joining technique' means connecting two pieces of material together.</p> <p>To know that there are various temporary methods of joining fabric by using staples, glue or pins.</p> <p>To understand that different techniques for joining materials can be used for different purposes.</p> <p>To understand that a template (or fabric pattern) is used to cut out the same shape multiple times.</p>	<p>Understanding the difference between fruits and vegetables.</p> <p>To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber).</p> <p>To know that a blender is a machine which mixes ingredients together into a smooth liquid.</p> <p>To know that a fruit has seeds and a vegetable does not.</p> <p>To know that fruits grow on trees or vines.</p> <p>To know that vegetables can grow either above</p>

	To know that a structure is something that has been made and put together.	To know that drawing a design idea is useful to see how an idea will look.	or below ground. To know that vegetables can come from different parts of the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber).
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Year 2	Autumn Term	Spring Term	Summer Term
Unit title	Structures: Baby bear's chair	Mechanisms: Fairground wheel	Mechanisms: Making a moving monster
Vocabulary	Function Man-made Mould Natural Stable Stiff Strong Structure Test Weak	Axle Decorate Evaluation Ferris wheel Mechanism Stable Strong Test Waterproof Weak	Evaluation Input Lever Linear motion Linkage Mechanical Mechanism Motion Oscillating motion Output Pivot Reciprocating motion Rotary motion Survey
Why this, why now	More challenging design elements and also linked to Science learning.	Introduction to mechanisms building on prior structures.	Consolidating mechanisms from prior unit and progressively more challenging.
Disciplinary knowledge	<p>Design: Selecting a suitable linkage system to produce the desired motion. Designing a wheel.</p> <p>Make: Selecting materials according to their characteristics. Following a design brief.</p> <p>Evaluate: Evaluating different designs. Testing and adapting a design.</p>	<p>Design: Selecting a suitable linkage system to produce the desired motions. Designing a wheel.</p> <p>Make: Selecting appropriate materials based on their properties. Selecting materials according to their characteristics. Following a design brief.</p> <p>Evaluate: Evaluating different designs. Testing and adapting a design.</p>	<p>Design: Creating a design criteria for a moving monster as a class. Designing a moving monster for a specific audience in accordance with a design criteria.</p> <p>Make: Making linkages using card for levers and split pins for pivots. Experimenting with linkages adjusting the widths, lengths and thicknesses of card used. Cutting and assembling components neatly.</p> <p>Evaluate: Evaluating own designs against design criteria. Using peer feedback to modify a final design.</p>
Substantive knowledge	<p>To know that shapes and structures with wide, flat bases or legs are the most stable.</p> <p>To understand that the shape of a structure affects its strength.</p> <p>To know that materials can be manipulated to improve strength and stiffness.</p> <p>To know that a structure is something which has been formed or made from parts.</p> <p>To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move.</p> <p>To know that a 'strong' structure is one which does not break easily.</p>	<p>To know that different materials have different properties and are therefore suitable for different uses.</p> <p>To know the features of a Ferris wheel include the wheel, frame, pods, a base, an axle and an axle holder.</p> <p>To know that it is important to test my design as I go along so that I can solve any problems that may occur.</p>	<p>To know that mechanisms are a collection of moving parts that work together as a machine to produce movement. To know that there is always an input and an output in a mechanism. To know that an input is the energy that is used to start something working. To know that an output is the movement that happens as a result of the input. To know that a lever is something that turns on a pivot. To know that a linkage mechanism is made up of a series of levers.</p> <p>Developing understanding of sculpture to construct and model simple forms.</p>

	<p>To know that a 'stiff' structure or material is one which does not bend easily.</p>		<p>Using hands and tools with confidence when cutting, shaping and joining paper, card and malleable materials. Developing basic skills for shaping and joining clay, including exploring surface texture. Following a plan for a making process, modifying and correcting things and knowing when to seek advice. Talking about art they have seen using some appropriate subject vocabulary. Explaining their ideas and opinions about their own and other's art work, giving reasons.</p>
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Year 3	Autumn Term	Spring Term	Summer Term
Art/DT	Digital world: Electronic charm	Cooking and nutrition: Eating seasonally	Structures: Constructing a castle
Vocabulary	Analogue Badge CAD Control Design requirements Develop Digital Display Electronic products Fasten Feature Function Initiate Key features Layers Loops Microbit	Climate Dry climate Exported Imported Mediterranean climate Nationality Nutrients Polar climate Recipe Seasonal food Seasons Temperate climate Tropical climate	2D shapes 3D shapes Castle Design criteria Evaluate Façade Feature Flag Net Recyclable Scoring Stable Strong Structure Tab Weak
Why this, why now	Links to Computing curriculum and more complex use of multiple media.	Links to Geography unit and PSHE.	More challenging structure and repeating link from KS1 History.
Disciplinary knowledge	<p>Design: Designing a castle with key features to appeal to a specific person/purpose. Drawing and labelling a castle design using 2D shapes Designing and/or decorating a castle tower on CAD software.</p> <p>Make: Constructing a range of 3D geometric shapes using nets. Creating special features for individual designs. Making facades from a range of recycled materials.</p> <p>Evaluate: Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison to the original design. Suggesting points for modification of the individual designs.</p>	<p>Design: Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish.</p> <p>Make: Knowing how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination. Following the instructions within a recipe.</p> <p>Design: Establishing and using design criteria to help test and review dishes. Describing the benefits of seasonal fruits and vegetables and the impact on the environment. Suggesting points for improvement when making a seasonal tart.</p>	<p>Design: Designing a castle with key features to appeal to a specific person/purpose. Drawing and labelling a castle design using 2D shapes Designing and/or decorating a castle tower on CAD software.</p> <p>Make: Constructing a range of 3D geometric shapes using nets. Creating special features for individual designs. Making facades from a range of recycled materials.</p> <p>Evaluate: Evaluating own work and the work of others based on the aesthetic of the finished product and in comparison to the original design. Suggesting points for modification of the individual designs.</p>
Substantive knowledge	To know that in Design and technology the term 'smart' means a programmed product.	To know that not all fruits and vegetables can be grown in the UK. To know that climate affects food growth.	To understand that wide and flat-based objects are more stable.

	<p>To know the difference between analogue and digital technologies.</p> <ul style="list-style-type: none"> • To understand what is meant by 'point of sale display.' <p>To know that CAD stands for 'Computer-aided design'.</p>	<p>To know that vegetables and fruit grow in certain seasons.</p> <p>To know that cooking instructions are known as a 'recipe'.</p> <p>To know that imported food is food which has been brought into the country.</p> <p>To know that exported food is food which has been sent to another country..</p> <p>To understand that imported foods travel from far away and this can negatively impact the environment.</p> <p>To know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre.</p> <p>To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health.</p> <p>To know safety rules for using, storing and cleaning a knife safely.</p> <p>To know that similar coloured fruits and vegetables often have similar nutritional benefits.</p>	<p>To understand the importance of strength and stiffness in structures.</p> <p>To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose.</p> <p>To know that a façade is the front of a structure.</p> <p>To understand that a castle needed to be strong and stable to withstand enemy attack.</p> <p>To know that a paper net is a flat 2D shape that can become a 3D shape once assembled.</p> <p>To know that a design specification is a list of success criteria for a product.</p> <p>To know that a façade is the front of a structure.</p> <p>To understand that a castle needed to be strong and stable to withstand enemy attack.</p> <p>To know that a paper net is a flat 2D shape that can become a 3D shape once assembled.</p> <p>To know that a design specification is a list of success criteria for a product.</p>
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Year 4	Autumn Term	Spring Term	Summer Term
Unit Title	Structure: Pavilions	Mechanical systems: Making a slingshot car	Electrical systems: Torches
Vocabulary	Aesthetic Cladding Design criteria Evaluation Frame structure Function Inspiration Pavilion Reinforce Stable Structure Target audience Target customer Texture Theme	Aesthetic Air resistance Chassis Design Design criteria Function Graphics Kinetic energy Mechanism Net Structure	Battery Bulb Buzzer Cell Component Conductor Copper Design criteria Electrical item Electricity Electronic item Function Insulator Series circuit Switch Test Torch Wire
Why this, why now	Complex unit combining structural integrity with design appropriate to older age group.	Challenging unit, linked to Science and helps prepare for Computing in summer term.	Links with Science unit.
Disciplinary knowledge	<p>Design:</p> <ul style="list-style-type: none"> Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. Building frame structures designed to support weight. <p>Make:</p> <ul style="list-style-type: none"> Creating a range of different shaped frame structures. Making a variety of free standing frame structures of different shapes and sizes. Selecting appropriate materials to build a strong structure and cladding. Reinforcing corners to strengthen a structure. Creating a design in accordance with a plan. Learning to create different textural effects with materials. <p>Evaluate:</p> <ul style="list-style-type: none"> Evaluating structures made by the class. Describing what characteristics of a design and 	<p>Design:</p> <ul style="list-style-type: none"> Designing a shape that reduces air resistance. Drawing a net to create a structure from. Choosing shapes that increase or decrease speed as a result of air resistance. Personalising a design. <p>Make:</p> <ul style="list-style-type: none"> Measuring, marking, cutting and assembling with increasing accuracy. Making a model based on a chosen design. <p>Evaluate:</p> <ul style="list-style-type: none"> Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance. 	<p>Design:</p> <ul style="list-style-type: none"> Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. Building frame structures designed to support weight. <p>Make:</p> <ul style="list-style-type: none"> Creating a range of different shaped frame structures. Making a variety of free standing frame structures of different shapes and sizes. Selecting appropriate materials to build a strong structure and cladding. Reinforcing corners to strengthen a structure. Creating a design in accordance with a plan. Learning to create different textural effects with materials. <p>Evaluate:</p> <ul style="list-style-type: none"> Evaluating structures made by the class. Describing what characteristics of a design and construction made it the most effective.

	<p>construction made it the most effective. Considering effective and ineffective designs.</p>		<p>Considering effective and ineffective designs.</p>
<p>Substantive knowledge</p>	<p>To understand what a frame structure is. To know that a 'free-standing' structure is one which can stand on its own To know that a pavilion is a decorative building or structure for leisure activities. To know that cladding can be applied to structures for different effects. To know that aesthetics are how a product looks. To know that a product's function means its purpose. To understand that the target audience means the person or group of people a product is designed for. To know that architects consider light, shadow and patterns when designing.</p>	<p>To understand that all moving things have kinetic energy. To understand that kinetic energy is the energy that something (object/person) has by being in motion. To know that air resistance is the level of drag on an object as it is forced through the air. To understand that the shape of a moving object will affect how it moves due to air resistance. To understand that products change and evolve over time. To know that aesthetics means how an object or product looks in design and technology. To know that a template is a stencil you can use to help you draw the same shape accurately. To know that a birds-eye view means a view from a high angle (as if a bird in flight). To know that graphics are images which are designed to explain or advertise something. To know that it is important to assess and evaluate design ideas and models against a list of design criteria.</p>	<p>To understand that electrical conductors are materials which electricity can pass through. To understand that electrical insulators are materials which electricity cannot pass through. To know that a battery contains stored electricity that can be used to power products. To know that an electrical circuit must be complete for electricity to flow. To know that a switch can be used to complete and break an electrical circuit. To know the features of a torch: case, contacts, batteries, switch, reflector, lamp, lens. To know facts from the history and invention of the electric light bulb(s) - by Sir Joseph Swan and Thomas Edison.</p>