SUBJECT LEADER OVERVIEW

DESIGN TECHNOLOGY

SUBJECT LEADER

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WHAT THE NATIONAL CURRICULUM SAYS ABOUT DESIGN TECHNOLOGY

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. 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. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

The national curriculum for design and technology aims to ensure that all pupils:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- critique, evaluate and test their ideas and products and the work of others
- understand and apply the principles of nutrition and learn how to cook.

DESIGN TECHNOLOGY AT ALL SAINTS

INTENT

At All Saints, by nurturing hearts and inspiring minds, we encourage all pupils to shine in everything they do in Design and Technology.

The Design and technology scheme of work aims to inspire pupils to be innovative and creative thinkers who have an appreciation for the 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.

Our Design and technology scheme of work enables pupils to meet the end of key stage attainment targets in the National curriculum and the aims also align with those in the National curriculum. EYFS (Reception) units provide opportunities for pupils' to work towards the Development matters statements and the Early Learning Goals.

Our intent is to inspire children and young people to create, experience, and participate in great arts and culture.

IMPLEMENTATION

The Design and technology National curriculum outlines the three main stages of the design process: design, make and evaluate. Each stage of the design process is underpinned by technical knowledge which encompasses the contextual, historical, and technical understanding required for each strand. Cooking and nutrition* has a separate section, with a focus on specific principles, skills and techniques in food, including where food comes from, diet and seasonality.

The National curriculum organises the Design and technology attainment targets under four subheadings: Design, Make, Evaluate, and Technical knowledge. We have taken these subheadings to be our Primary strands:

- Design
- Make
- Evaluate
- Technical knowledge

All Saints' Design and technology scheme has a clear progression of skills and knowledge within these strands and key areas across each year group.

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:

- Cooking and nutrition
- Mechanisms/ Mechanical systems
- Structures
- Textiles
- Electrical systems (KS2 only)

- Digital world (KS2 only)

Our National curriculum overview shows which of our units cover each of the National curriculum attainment targets as well as each of the four strands.

Our Progression of skills shows the skills and knowledge that are taught within each year group and how these skills develop to ensure that attainment targets are securely met by the end of each key stage.

Through All Saints' 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.

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 All Saints 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.

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.

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. The All Saints Design and technology scheme has been created with 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.

Design and Technology is taught half termly in descreat lessons. Class teachers are usually responsible for teaching design technology, although there will be times when professional artists/helpers will be involved in the teaching of the topic. We take every opportunity to develop links with outside agencies and experts, including the local high school, in order to enrich our Design and Technology provision.

IMPACT

Our children enjoy the self-expression that they experience in Design and Technology. They are always keen to learn new skills and work hard to perfect those shown to them. The children's Design and Technology is very often cross-curricular, and helps them to express feelings and emotions in Design and Technology, as well as show

their knowledge and understanding in history, geography and science. Through their Design and Technology, the children are able to reach out into the wider community, with our pupil's work proudly displayed around the school.

The impact of Kapow Primary's scheme can be constantly monitored through both formative and summative assessment opportunities. Each lesson includes guidance to support teachers in assessing pupils against the learning objectives. Furthermore, each unit has a unit quiz and knowledge catcher which can be used at the start and/ or end of the unit.

After the implementation of Kapow Primary Design and technology, pupils should leave school equipped with a range of skills to enable them to succeed in their secondary education and be innovative and resourceful members of society.

The expected impact of following the Kapow Primary Design and technology scheme of work is that children will:

- 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, CAD, 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.
- Recognise where our decisions can impact the wider world in terms of community, social and environmental issues.
- Self-evaluate and reflect on learning at different stages and identify areas to improve.
- Meet the end of key stage expectations outlined in the National curriculum for Design and technology.
- Meet the end of key stage expectations outlined in the National curriculum for
- Computing.

CULTURAL CAPITAL

Cultural Capital is the essential knowledge that pupils need to be educated citizens, introducing them to the best that has been thought and said and helping to engender an appreciation of human creativity and achievement.

We want our pupils' 'lights to shine' both today in their future by not only giving them the knowledge and skills they need but by also installing a set of values and beliefs which enable them to be happy and successful citizens whilst having a positive impact on the lives of others.

SPIRITUAL, MORAL, SOCIAL AND CULTURAL (SMSC – DEVELOPED IN ALL LESSONS)

Spiritual: Explore beliefs and experience; respect faiths, feelings and values; enjoy learning about oneself, others and the surrounding world; use imagination and creativity; reflect. **Emphasise our school's close links to our local churches and our wider community.**

Moral: Recognise right and wrong; respect the law; understand consequences; investigate moral and ethical issues; offer reasoned views.

Social: Use a range of social skills; participate in the local community; appreciate diverse viewpoints; participate, volunteer and cooperate; resolve conflict; engage with the **'British values'** of democracy, the rule of law, liberty, respect and tolerance.

Cultural: Appreciate cultural influences; appreciate the role of Britain's parliamentary system; participate in culture opportunities; understand, accept, respect and celebrate diversity.

BRITISH VALUES (TO BE DEVELOPED IN ALL LESSONS)

The core British Values are:

- Democracy
- Rule of Law
- Mutual Respect
- Individual Liberty
- Tolerance

Our Design Technology curriculum casts a light on global citizenship and the rule of law, including the role of democratic advocacy for change. Pupils also look at how different cultures live and work throughout the world.

DESIGN TECHNOLOGY CURRICULUM

DESIGN OF CURRICULUM

Our foundation subjects use Kapow planning. This carefully tracks the progression of skills and knowledge throughout the school.

Due to our dual year groups, we look at coverage over 2 years rather than one.

Subject leaders have not taken for granted that Kapow covers all aspects / objectives required of the subject and have cross referenced the schemes with or tracking of skills and knowledge and then with the National Curriculum objectives.

The curriculum enables pupils to be supported, when necessary, but at the same time challenges pupils with deep questioning.

Our ambitious curriculum is designed taking into account the following:

- The curriculum is for all pupils regardless of their starting points
- The curriculum values **Design Technology**
- Big ideas / big questions are used to provoke deeper learning
- The curriculum teaches knowledge and skills
- The curriculum is well sequenced
- Expectations are high
- Where teachers are not confident about their knowledge for a specific lesson / scheme, they consult with colleagues, the subject leader or use the Kapow teacher videos before each lesson.
- Resources are available and of a high quality
- Subject leaders know their subject
- Vocabulary is rich and diverse

DELIVERY OF CURRICULUM

Design Technology lessons are held every other half term and happen one afternoon per week. If additional time is required to fit in the whole scheme of work, this will happen.

WHY BASE OUR CURRICULUM ON KAPOW SCHEMES OF WORK

We involved all our teaching staff in choosing schemes of work which would be suited to our school.

Subject Leaders spent half a term looking at different options for their subject and all were extremely positive about KAPOW, the progression and the resources available.

There is no requirement on staff to use the KAPOW resources. They are to follow the 'Big Question' and the objectives for each lesson, however, how they get there is up to them. This means we have flexibility but, at the same time, ready made quality resources and activities to use if they require.

TRACKING PROGRESSION OF SKILLS AND KNOWLEDGE

The overview of skills and knowledge covered in each phase and strand and how these skills are developed in order to enable pupils to reach the end of key stage outcomes - outlined in the National curriculum - are listed in our **Design Technology** Progression Document.

Within each key stage, knowledge is often introduced at the start of the key stage so that there is time for that knowledge to be revisited and applied in later years which is why knowledge accumulation may look heavier in some year groups than others. As we have joint classes, progression statements in Key stage 2 are shown for lower key stage 2 and upper key stage 2 only and not for individual year groups. Key concepts and knowledge are revisited in different contexts to ensure that pupils have a secure understanding by the end of each phase.

END OF KEY STAGE EXPECTED KNOWLEDGE AND SKILLS: **STRUCTURES**					
AREA		**EYFS**	**KS1**	**LKS2**	**UKS2**
Skills	**Design**	Making verbal plans and material choices. Developing a junk model. Designing a junk model boat. Using knowledge from exploration to inform design.	Learning the importance of a clear design criteria. Including individual preferences and requirements in a design. Generating and communicating ideas using sketching and modelling.	Designing a castle with key features to appeal to a specific person/purpose. Drawing and labelling a castle design using 2D shapes, labelling: -the 3D	Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs

			Learning about different types of structures, found in the natural world and in everyday objects.	shapes that will create the features - materials needed and colours. Designing and/or decorating a castle tower on CAD software. Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. Building frame structures designed to support weight.	
	Make	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. Making a boat that floats and is waterproof, considering material choices.	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. Making a structure according to design criteria. Creating joints and structures from paper/card and tape. Building a strong and stiff structure by folding paper.	Constructing a range of 3D geometric shapes using nets. Creating special features for individual designs. Making facades from a range of recycled materials. 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.	Building a range of play apparatus structures drawing upon new and prior knowledge of structures. Measuring, marking and cutting wood to create a range of structures. Using a range of materials to reinforce and add decoration to structures.

	Evaluate	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. 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.	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. Exploring the features of structures. Comparing the stability of different shapes. Testing the strength of own structures. Identifying the weakest part of a structure. Evaluating the strength, stiffness and stability of own structure.	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. Evaluating structures made by the class. Describing what characteristics of a design and construction made it the most effective. Considering effective and ineffective designs.	Improving a design plan based on peer evaluation. Testing and adapting a design to improve it as it is developed. Identifying what makes a successful structure.
Knowledge	**Technical**	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. To know that 'waterproof' materials are those which do not absorb water.	To understand that the shape of materials can be changed to improve the strength and stiffness of structures. To understand that cylinders are a strong type of structure (e.g. the main shape used for windmills and lighthouses). To understand that axles are used in structures and mechanisms to make parts turn in a circle.	To understand that wide and flat based objects are more stable. To understand the importance of strength and stiffness in structures. 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 structures can be strengthened by manipulating materials and shapes.

			To begin to understand that different structures are used for different purposes. To know that a structure is something that has been made and put together. To know that shapes and structures with wide, flat bases or legs are the most stable. To understand that the shape of a structure affects its strength. To know that materials can be manipulated to improve strength and stiffness. To know that a structure is something which has been formed or made from parts. To know that a 'stable' structure is one which is firmly fixed and unlikely to change or move. To know that a 'strong' structure is one which does not break easily. To know that a 'stiff' structure or material is one which does not bend easily.		
	Additional	To know that some objects float and others sink. To know the different parts of a boat.	To know that a client is the person I am designing for. To know that design criteria is a list of points to ensure the product meets the clients needs and wants.	To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse - and their purpose. To know that a façade is the front of a structure.	To understand what a 'footprint plan' is. To understand that in the real world, design, can impact users in positive and negative ways.

			To know that a windmill harnesses the power of wind for a purpose like grinding grain, pumping water or generating electricity. To know that windmill turbines use wind to turn and make the machines inside work. To know that a windmill is a structure with sails that are moved by the wind. To know the three main parts of a windmill are the turbine, axle and structure. To know that natural structures are those found in nature. To know that man-made structures are those made by people.	To understand that a castle needed to be strong and stable to withstand enemy attack. To know that a paper net is a flat 2D shape that can become a 3D shape once assembled. To know that a design specification is a list of success criteria for a product. 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.	To know that a prototype is a cheap model to test a design idea.

END OF KEY STAGE EXPECTED KNOWLEDGE AND SKILLS: **MECHANISMS / MECHANICAL SYSTEMS**					
AREA		**EYFS**	**KS1**	**LKS2**	**UKS2**
Skills	**Design**	n/a	Selecting a suitable linkage system to produce the desired motion. Designing a wheel.	Designing a shape that reduces air resistance.	Designing a pop-up book which uses a mixture of structures and mechanisms.

			Creating a class design criteria for a moving monster. Designing a moving monster for a specific audience in accordance with a design criteria.	Drawing a net to create a structure from. Choosing shapes that increase or decrease speed as a result of air resistance. Personalising a design.	Naming each mechanism, input and output accurately. Storyboarding ideas for a book.
	Make	n/a	Selecting materials according to their characteristics. Following a design brief. 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.	Measuring, marking, cutting and assembling with increasing accuracy. Making a model based on a chosen design.	Following a design brief to make a pop up book, neatly and with focus on accuracy. Making mechanisms and/or structures using sliders, pivots and folds to produce movement. Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.
	Evaluate	n/a	Evaluating different designs. Testing and adapting a design. Evaluating own designs against design criteria. Using peer feedback to modify a final design.	Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.	Evaluating the work of others and receiving feedback on own work. Suggesting points for improvement.
Knowledge	**Technical**	n/a	To know that different materials have different properties and are therefore suitable for different uses. 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 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 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 know that mechanisms control movement. To understand that mechanisms can be used to change one kind of motion into another. To understand how to use sliders, pivots and folds to create paper-based mechanisms.

			To know that a linkage mechanism is made up of a series of levers.		
	Additional	n/a	To know the features of a ferris wheel include the wheel, frame, pods, a base an axle and an axle holder. To know that it is important to test my design as I go along so that I can solve any problems that may occur. To know some real-life objects that contain mechanisms.	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.	To know that a design brief is a description of what I am going to design and make. To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.

END OF KEY STAGE EXPECTED KNOWLEDGE AND SKILLS: **ELECTRICAL SYSTEMS**					
AREA		**EYFS**	**KS1**	**LKS2**	**UKS2**
Skills	**Design**	n/a	n/a	Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas.	Identifying factors that could be changed on existing products and explaining how these would alter the form and function of the product. Developing design criteria based on findings from investigating existing products. Developing design criteria that clarifies the target user.
	Make	n/a	n/a	Making a torch with a working electrical circuit and switch. Using appropriate equipment to cut and attach materials.	Altering a product's form and function by tinkering with its configuration. Making a functional series circuit, incorporating a motor. Constructing a product with consideration for the design criteria.

				Assembling a torch according to the design and success criteria.	Breaking down the construction process into steps so that others can make the product.
	Evaluate	n/a	n/a	Evaluating electrical products. Testing and evaluating the success of a final product.	Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses. Determining which parts of a product affect its function and which parts affect its form. Analysing whether changes in configuration positively or negatively affect an existing product. Peer evaluating a set of instructions to build a product.
Knowledge	**Technical**	n/a	n/a	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 that series circuits only have one direction for the electricity to flow. To know when there is a break in a series circuit, all components turn off. To know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin. To know a motorised product is one which uses a motor to function.
	Additional	n/a	n/a	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.	To know that product analysis is critiquing the strengths and weaknesses of a product. To know that 'configuration' means how the parts of a product are arranged.

END OF KEY STAGE EXPECTED KNOWLEDGE AND SKILLS: **COOKING AND NUTRITION**					
AREA		**EYFS**	**KS1**	**LKS2**	**UKS2**
Skills	**Design**	n/a	Designing smoothie carton packaging by-hand.	Designing a recipe for a savoury tart.	Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients.

					Writing an amended method for a recipe to incorporate the relevant changes to ingredients. Designing appealing packaging to reflect a recipe. Researching existing recipes to inform ingredient choices.
	Make	n/a	Chopping fruit and vegetables safely to make a smoothie. Juicing fruits safely to make a smoothie.	Following the instructions within a recipe. Tasting seasonal ingredients. Selecting seasonal ingredients. Peeling ingredients safely. Cutting safely with a vegetable knife.	Cutting and preparing vegetables safely. Using equipment safely, including knives, hot pans and hobs. Knowing how to avoid cross-contamination. Following a step by step method carefully to make a recipe.
	Evaluate	n/a	Tasting and evaluating different food combinations. Describing appearance, smell and taste. Suggesting information to be included on packaging. Comparing their own smoothie with someone else's.	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.	Identifying the nutritional differences between different products and recipes. Identifying and describing healthy benefits of food groups.
Knowledge		n/a	To know that a blender is a machine which mixes ingredients together into a smooth liquid. To know that a fruit has seeds. To know that fruits grow on trees or vines. To know that vegetables can grow either above or below ground. To know that vegetables is any edible part of a plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber).	To know that not all fruits and vegetables can be grown in the UK. To know that climate affects food growth. To know that vegetables and fruit grow in certain seasons. To know that cooking instructions are known as a 'recipe'. To know that imported food is food which has been brought into the country.	To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed. To know that recipes can be adapted to suit nutritional needs and dietary requirements. To know that I can use a nutritional calculator to see how healthy a food option is. To understand that 'cross-contamination' means bacteria and

			To know that exported food is food which has been sent to another country. To know that eating seasonal foods can have a positive impact on the environment. To know that similar coloured fruits and vegetables often have similar nutritional benefits. To know that the appearance of food is as important as taste.	germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects. To know that coloured chopping boards can prevent cross-contamination. To know that nutritional information is found on food packaging. To know that food packaging serves many purposes.

END OF KEY STAGE EXPECTED KNOWLEDGE AND SKILLS: TEXTILES					
AREA		**EYFS**	**KS1**	**LKS2**	**UKS2**
Skills	**Design**	Discussing what a good design needs. Designing a simple pattern with paper. Designing a bookmark. Choosing from available materials.	Using a template to create a design for a puppet.	n/a	Designing a waistcoat in accordance to a specification linked to set of design criteria. Annotating designs, to explain their decisions.
	Make	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.	Cutting fabric neatly with scissors. Using joining methods to decorate a puppet. Sequencing the steps taken during construction.	n/a	Using a template when cutting fabric to ensure they achieve the correct shape. Using pins effectively to secure a template to fabric without creases or bulges. Marking and cutting fabric accurately, in accordance with their design. Sewing a strong running stitch, making small, neat stitches and following the edge. Tying strong knots. Decorating a waistcoat, attaching features (such as appliqué) using thread.

					Finishing the waistcoat with a secure fastening (such as buttons). Learning different decorative stitches. Sewing accurately with evenly spaced, neat stitches
	Evaluate	Reflecting on a finished product and comparing to their design.	Reflecting on a finished product, explaining likes and dislikes.	n/a	Reflecting on their work continually throughout the design, make and evaluate process.
Knowledge		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.	To know that 'joining technique' means connecting two pieces of material together. To know that there are various temporary methods of joining fabric by using staples. glue or pins. To understand that different techniques for joining materials can be used for different purposes. To understand that a template (or fabric pattern) is used to cut out the same shape multiple times. To know that drawing a design idea is useful to see how an idea will look.	n/a	To understand that it is important to design clothing with the client/ target customer in mind. To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric. To understand the importance of consistently sized stitches.

END OF KEY STAGE EXPECTED KNOWLEDGE AND SKILLS: **DIGITAL WORLD**					
AREA		**EYFS**	**KS1**	**LKS2**	**UKS2**
Skills	**Design**	n/a	n/a	Problem solving by suggesting which features on a micro:bit might be useful and justifying my ideas. Drawing and manipulating 2D shapes, using computer-aided design, to produce a point of sale badge. Developing design ideas through annotated sketches to create a product concept. Developing design criteria to respond to a design brief.	Writing a design brief from information submitted by a client Developing design criteria to fulfil the client's request Considering and suggesting additional functions for my navigation tool Developing a product idea through annotated sketches Placing and manoeuvring 3D objects, using CAD Changing the properties of, or combine one or more 3D objects, using CAD

	Make	n/a	n/a	Following a list of design requirements. Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm.	Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo) Explaining material choices and why they were chosen as part of a product concept Programming an N,E, S,W cardinal compass
	Evaluate	n/a	n/a	Analysing and evaluating wearable technology. Using feedback from peers to improve design.	Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool Developing an awareness of sustainable design Identifying key industries that utilise 3D CAD modelling and explain why Describing how the product concept fits the client's request and how it will benefit the customers Explaining the key functions in my program, including any additions Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch Demonstrating a functional program as part of a product concept
Knowledge	**Technical**	n/a	n/a	To understand that, in programming, a 'loop' is code that repeats something again and again until stopped. To know that a micro:bit is a pocket-sized, codeable computer. To know that a simulator is able to replicate the functions of an existing piece of technology.	To know that accelerometers can detect movement To understand that sensors can be useful in products as they mean the product can function without human input
	Additional	n/a	n/a	To know what the 'Digital Revolution' is and features of some of the products that have evolved as a result. To understand what is meant by 'point of sale display.' To know that CAD stands for 'Computer-aided design'. To know what a focus group is by taking part in one.	To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request To know that 'multifunctional' means an object or product has more than one function

					To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing

ENRICHMENT

When possible, and after taking into consideration expense, time constraints and impact on learning, enrichment activities such as trips, after school clubs, outdoor work and visitors are encouraged in Design Technology.

LOCAL AWARENESS

In all aspects of the curriculum we take every opportunity to help pupils to connect with their immediate surroundings and develop a global perspective by making connections between their everyday lives and the world around them.

CROSS CURRICULAR LINKS

Links to other learning will be made wherever possible, providing they help the pupils with their understanding and are in no way tenuous. Guided reading texts are regularly selected to further underpin learning.

HOW WE ASSESS

Class teachers assess each pupil against each objective in every subject 5 times each year (at the end of Autumn Term 2, Spring Term 1, Spring Term 2, Summer Term 1 and Summer Term 2).

Assessment is putting a pupil at ARE, WT or Below (and in some cases GD) against each objective.

This has been agreed by all teachers and is not seen as too onerous of time consuming). This has been fully supported by the Staff Welfare Representative and the Welfare Governor who have both liaised with teachers.

HOW WE MODERATE

Subject leaders are given at least half a day per term to monitor and moderate their subject.

Moderation takes the form of:

- Drop in
- Book Scrutiny
- Pupil Voice
- Data analysis
- Link Governor visits
- Observation
- Teacher Chat

Every Staff Meeting also has an agenda item where Subject Leaders can pass on any issues / points / questions / requests / advice to teachers.

Subject leaders can also request moderation time in staff meetings.

Class Teachers assess every pupil against each objective in every subject at the end of every term.

Headteacher / Deputy Head and Subject Governor monitors subjects each year

SUBJECT LEADER CPD

Subject Leaders have taken part in curriculum sharing with other local schools.

In additions, Subject Leaders are to complete at least one subject specific CPD course with National College every year.

RESOURCES

With Kapow being new to the school, Class Teacher are asked to speak to Subject Leaders about any additional resources which may be required (any that may have been missed when Subject Leaders were balancing the curriculum).

Each weekly Staff Meeting has an agenda item where Class Teacher and Subject Leaders have an additional opportunity to request and additional resources,

RECORDING OF LEARNING

KS1 pupils use a floor book as a record of class learning in Design Technology. Each pupil has an individual folder in which to record and evaluate finished projects.

KS2 pupils have a folder in which they keep a record of their KS2 learning journey in Design Technology.

RECENT FEEDBACK GIVEN TO STAFF

SUBJECT ACTION PLAN 2024/25

At the end of each unit, teacher to notify lead so a folder inspection and pupil voice can be carried out.

Ensure all units have a knowledge organiser at beginning of unit, WALTs recorded weekly and an evaluation sheet at the end and that both teachers and pupils are using it correctly.

KS1 – Knowledge organiser and WALTs in class book. Record of finished work and pupil evaluation sheets in individual Art/DT folder.

KS2 – all in individual DT folder.

Ensure pupils and teachers use past knowledge organisers at the start of each lesson for fluency

Continue to use ICT by pupils for researching and recording ideas.

To support teaching staff in the implementation of our new scheme of work – encouraging them to use a variety of sources to keep Art fun and engaging.

“UK children shorter, fatter and sicker amid poor diet and poverty, report finds” Guardian, (accessed 20.06.24)
https://www.theguardian.com/society/article/2024/jun/19/uk-children-shorter-fatter-and-sicker-amid-poor-diet-and-poverty-report-finds

Set up an afterschool club focussing on cooking fresh food and what to do with left overs.

<table>
<tr><th colspan="5">RECEPTION</th></tr>
<tr><td colspan="5">Structures: Junk modelling
Exploring and learning about various types of permanent and temporary join. Pupils are encouraged to tinker using a combination of materials and joining techniques in the junk modelling area.</td></tr>
<tr><td>Learning objectives</td><td colspan="4">Explore and investigate the tools and materials in the junk modelling area.
Develop scissor skills.
Investigate cutting different materials.
Learn how to plan and select the correct resources needed to make a model.
Verbally plan and create a junk model.
Share a finished model and talk about the processes in its creation.
Explore different ways to temporarily join materials together.</td></tr>
<tr><td>EYFS outcomes</td><td colspan="4">Physical development
Develop small motor skills so that they can use a range of tools competently, safely and confidently.
ELG: Fine Motor Skills: Use a range of small tools, including scissors, paint brushes and cutlery.
Expressive arts and design
Explore, use and refine a variety of artistic effects to express ideas and feelings.
ELG: Creating with Materials: Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.
Create collaboratively, sharing ideas, resources and skills.
Return to and build on their previous learning, refining ideas and developing their ability to represent them.
ELG: Creating with Materials: Share their creations, explaining the process they have used.
Characteristics of effective learning
Playing and exploring.
Active learning.
Creating and thinking critically.</td></tr>
<tr><td>Key Vocabulary</td><td>join
stick
cut
bend
slot
smooth
bendy
bumpy
paper clip
rubber band</td><td>scissors
blades
handle
snip
squeeze
thumb
fingers
elbow
bubble wrap
cooked pasta</td><td>lift
open
measure
bigger
shorter
longer
taller
thicker
thinner
rough</td><td>temporary
permanent
materials
push
pull
break
fix
separate
playdough
straws</td></tr>
</table>

	bottle top	tin foil	cork	glue stick plastic
Key Skills	Making verbal plans and material choices. Developing a junk model. 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. 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.			
Key Knowledge	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.			

<table>
<tr><th colspan="5">RECEPTION</th></tr>
<tr><td colspan="5">Structures: Boats
Exploring what is meant by ‘waterproof’, ‘floating’ and ‘sinking’, pupils experiment and make predictions with various materials to carry out a series of tests. They learn about the different features of boats and ships before investigating their shape and structures to build their own.</td></tr>
<tr><td>Learning objectives</td><td colspan="4">Understand what waterproof means and to test whether materials are waterproof.
Test and make predictions for which materials float or sink.
Compare the uses of boats.
Investigate how the shape and structure of boats affects the way they move.
Design a boat.</td></tr>
<tr><td>EYFS outcomes</td><td colspan="4">Communication and language
Articulate their ideas and thoughts in well-formed sentences.
Connect one idea or action to another using a range of connectives.
Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.
ELG: Speaking: Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary
ELG: Speaking: Offer explanations for why things might happen.
Understanding the world
Explore the natural world around them.
ELG: The Natural World: Explore the natural world around them, making observations and drawing pictures of animals and plants
Characteristics of effective learning
Playing and exploring
Active learning
Creating and thinking critically
Expressive arts and design
Explore, use and refine a variety of artistic effects to express their ideas and feelings.
ELG: Creating with materials: Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.
ELG: Creating with materials: Share their creations, explaining the process they have used.</td></tr>
<tr><td>Key Vocabulary</td><td>waterproof
material</td><td>float
sink</td><td>sail
anchor</td><td>reeds
junk</td></tr>
</table>

	absorb leak wet dry prediction variable fair test	boat cruise ship fishing boat kayak ocean liner pirate ship ship	hull mast rudder helm poop deck deck crow's nest	watercraft waterproof experiment investigation
Key Skills	Designing a junk model boat. Using knowledge from exploration to inform design. Making a boat that floats and is waterproof, considering material choices. 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.			
Key Knowledge	To know that 'waterproof' materials are those which do not absorb water. To know that some objects float and others sink. To know the different parts of a boat.			

<table>
<tr><th colspan="4">RECEPTION</th></tr>
<tr><td colspan="4">Textiles: Bookmarks
Developing and practising threading and weaving techniques using various materials and objects. Pupils look at the history of the bookmark from Victorian times versus modern-day styles. The pupils apply their knowledge and skills to design and sew their own bookmarks.</td></tr>
<tr><td>Learning objectives</td><td colspan="3">Develop threading and weaving skills.
Practise and apply weaving skills to a specific material e.g. paper.
Practise and apply threading skills with specific materials e.g. hessian and wool.
Use threading or sewing to design a product (bookmark).
Create a textiles product (bookmark) following their own design.
Reflect with children on how they have achieved their aims.</td></tr>
<tr><td>EYFS outcomes</td><td colspan="3">Physical development
Develop their small motor skills so that they can use a range of tools competently, safely and confidently.
ELG: Fine Motor Skills: Use a range of small tools, including scissors, paint brushes and cutlery.
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.
ELG: Creating with materials: Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.
ELG: Creating with materials: Share their creations, explaining the process they have used.
Characteristics of effective learning
Playing and exploring
Active learning</td></tr>
<tr><td>Key Vocabulary</td><td>thread
weave
pinch
push
pull
through
under
over</td><td>back
front
sew
sewing needle
wool
thread
hessian
bookmark
embroider</td><td>Design
reflect
evaluate
think
sew
Victorian
up
down
pattern</td></tr>
<tr><td>Key Skills</td><td colspan="3">Discussing what a good design needs.
Designing a simple pattern with paper.</td></tr>
</table>

	Designing a bookmark. Choosing from available materials. 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. Reflecting on a finished product and comparing to their design.
Key Knowledge	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.

TOPAZ CLASS

CYCLE A

AUTUMN TERM

Structures: Baby bear's chair

Using the tale of Goldilocks and the Three Bears as inspiration, children help Baby Bear by making him a brand new chair. When designing the chair, they consider his needs and what he likes and explore ways of building it so that it is strong.

Key Vocabulary	design criteria man-made natural	properties structure stable	shape model test
Outcome: most pupils will be able to	• Identify man-made and natural structures. • Identify stable and unstable structural shapes. • Contribute to discussions. • Identify features that make a chair stable. • Work independently to make a stable structure, following a demonstration. • Explain how their ideas would be suitable for Baby Bear. • Produce a model that supports a teddy, using the appropriate materials and construction techniques. • Explain how they made their model strong, stiff and stable.		
Key Skills	• Generating and communicating ideas using sketching and modelling. • Learning about different types of structures, found in the natural world and in everyday objects. • Making a structure according to design criteria. • Creating joints and structures from paper/card and tape. • Building a strong and stiff structure by folding paper. • Exploring the features of structures. • Comparing the stability of different shapes. • Testing the strength of their own structures. • Identifying the weakest part of a structure. • Evaluating the strength, stiffness and stability of their own structure.		
Key Knowledge	• Generating and communicating ideas using sketching and modelling. • Learning about different types of structures, found in the natural world and in everyday objects.		

	• Making a structure according to design criteria. • Creating joints and structures from paper/card and tape. • Building a strong and stiff structure by folding paper. • Exploring the features of structures. • Comparing the stability of different shapes. • Testing the strength of their own structures. • Identifying the weakest part of a structure. • Evaluating the strength, stiffness and stability of their own structure.
Cross Curricular Links	**Mathematics** • identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces • identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] • compare and sort common 2-D and 3-D shapes and everyday objects. • compare and order lengths'

TOPAZ CLASS

CYCLE A

SPRING TERM

Textiles: Puppets

Exploring different ways of joining fabrics before creating their own hand puppets based upon characters from a well-known fairytale. Children work to develop their technical skills of cutting, glueing, stapling and pinning.

Key Vocabulary	decorate design fabric glue model hand puppet safety pin staple stencil template
Outcome: most pupils will be able to	• Join fabrics together using pins, staples or glue. • Design a puppet and use a template. • Join their two puppets' faces together as one. • Decorate a puppet to match their design.
Key Skills	• Using a template to create a design for a puppet. • Cutting fabric neatly with scissors. • Using joining methods to decorate a puppet. • Sequencing steps for construction. • Reflecting on a finished product, explaining likes and dislikes.
Key Knowledge	• To know that 'joining technique' means connecting two pieces of material together. • To know that there are various temporary methods of joining fabric by using staples, glue or pins. • To understand that different techniques for joining materials can be used for different purposes. • To understand that a template (or fabric pattern) is used to cut out the same shape multiple times. • To know that drawing a design idea is useful to see how an idea will look.
Cross Curricular Links	**English** develop pleasure in reading […] by: • becoming very familiar with key stories, fairy stories and traditional tales, retelling them and considering their particular characteristics'

TOPAZ CLASS

CYCLE A

SUMMER TERM

Cooking and nutrition: Smoothies

Handle and explore fruits and vegetables and learn how to identify fruit, before undertaking taste testing to establish chosen ingredients for a smoothie they will make, with accompanying packaging.

Key Vocabulary	blend blender chopping board compare cut design evaluate vine vegetable	flavour fork fruit healthy ingredients juice juicer leaf plant	recipe root seed select smoothie stem table knife taste tree
Outcome: most pupils will be able to	• Describe fruits and vegetables and explain how to identify fruits. • Name a range of places that fruits and vegetables grow. • Describe basic characteristics of fruit and vegetables. • Prepare fruits and vegetables to make a smoothie.		
Key Skills	• Designing smoothie carton packaging by hand. • Chopping fruit and vegetables safely to make a smoothie. • Juicing fruits to make a smoothie. • Identifying if a food is a fruit. • Learning where and how fruits and vegetables grow. • Tasting and evaluating different foods. • Describing appearance, smell and taste. • Suggesting information to be included on packaging. •		
Key Knowledge	• Designing smoothie carton packaging by hand.		

	• Chopping fruit and vegetables safely to make a smoothie. • Juicing fruits to make a smoothie. • Identifying if a food is a fruit. • Learning where and how fruits and vegetables grow. • Tasting and evaluating different foods. • Describing appearance, smell and taste. • Suggesting information to be included on packaging.
Cross Curricular Links	**Science**: Identifying and classifying. Using their observations and ideas to suggest answers to questions.

TOPAZ CLASS

CYCLE B

AUTUMN TERM

Structures: Constructing windmills

Designing, decorating and building a windmill for their mouse client to live in, developing an understanding of different types of windmill, how they work and their key features.

Key Vocabulary	axle bridge design design criteria model net packaging structure template unstable stable strong weak
Outcome: most pupils will be able to	• Identify some features that would appeal to the client (a mouse) and create a suitable design. • Explain how their design appeals to the mouse. • Make stable structures, which will eventually support the turbine, out of card, tape and glue. • Make functioning turbines and axles that are assembled into the main supporting structure. • Say what is good about their windmill and what they could do better.
Key Skills	• Learning the importance of a clear design criteria. • Including individual preferences and requirements in a design. • 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.
Key Knowledge	• To understand that the shape of materials can be changed to improve the strength and stiffness of structures. • To understand that cylinders are a strong type of structure (and, therefore, they are the main shape used for windmills and lighthouses). • To understand that axles are used in structures and mechanisms to make parts turn in a circle. • To begin to understand that different structures are used for different purposes. • To know that a structure is something that has been made and put together.
Cross Curricular Links	**Mathematics** Geometry – properties of shape

TOPAZ CLASS

CYCLE B

SPRING TERM

Mechanisms: Fairground wheel

Designing and creating their own Ferris wheels, considering how the different components fit together so that the wheels rotate and the structures stand freely. Pupils select appropriate materials and develop their cutting and joining skills

Key Vocabulary	design design criteria wheel	Ferris wheel pods axle	axle holder frame mechanism
Outcome: most pupils will be able to	• Design and label a wheel. • Consider the designs of others and make comments about their practicality or appeal. • Consider the materials, shape, construction and mechanisms of their wheel. • Label their designs. • Build a stable structure with a rotating wheel. • Test and adapt their designs as necessary. • Follow a design plan to make a completed model of the wheel.		
Key Skills	• Selecting a suitable linkage system to produce the desired motions. • Designing a wheel. • Selecting appropriate materials based on their properties. • Selecting materials according to their characteristics. • Following a design brief. • Evaluating different designs. • Testing and adapting a design.		
Key Knowledge	• To know that different materials have different properties and are therefore suitable for different uses. • To know the features of a Ferris wheel include the wheel, frame, pods, a base, an axle and an axle holder. • To know that it is important to test my design as I go along so that I can solve any problems that may occur.		
Cross Curricular Links	**Mathematics** Identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line **Science** Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses		

TOPAZ CLASS

CYCLE B

SUMMER TERM

Mechanisms: Making a moving monster

After learning the terms; pivot, lever and linkage, children design a monster which will move using a linkage mechanism. Children practise making linkages of different types and varying the materials they use to bring their monsters to life.

Key Vocabulary	axle, design criteria, input, linkage, mechanical, output, pivot, wheel
Outcome: most pupils will be able to	• Identify the correct terms for levers, linkages and pivots. • Analyse popular toys with the correct terminology. • Create functional linkages that produce the desired input and output motions. • Design monsters suitable for children, which satisfy most of the design criteria. • Evaluate their two designs against the design criteria, using this information and the feedback of their peers to choose their best design. • Select and assemble materials to create their planned monster features. • Assemble the monster to their linkages without affecting their functionality.
Key Skills	• 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. • 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. • Evaluating own designs against design criteria. • Using peer feedback to modify a final design.
Key Knowledge	• 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.
Cross Curricular Links	None relevant to this unit.

RUBY CLASS

CYCLE A

AUTUMN TERM

Structures: Constructing a castle

Learning about the features of a castle, children design and make one of their own. Using configurations of handmade nets and recycled materials to make towers and turrets and constructing a base to secure them.

Key Vocabulary	2D 3D castle design key features net scoring shape stable stiff strong structure tab
Outcome: most pupils will be able to	• Draw and label a simple castle that includes the most common features. • Recognise that a castle is made up of multiple 3D shapes. • Design a castle with key features which satisfy a given purpose. • Score or cut along lines on the net of a 2D shape. • Use glue to securely assemble geometric shapes. • Utilise skills to build a complex structure from simple geometric shapes. • Evaluate their work by answering simple questions.
Key Skills	• 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. • Constructing a range of 3D geometric shapes using nets. • Creating special features for individual designs. • Making facades from a range of recycled materials. • 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.
Key Knowledge	• To understand that wide and flat based objects are more stable. • To understand the importance of strength and stiffness in structures.

	• To know the following features of a castle: flags, towers, battlements, turrets, curtain walls, moat, drawbridge and gatehouse – and their purpose. • To know that a façade is the front of a structure. • To understand that a castle needed to be strong and stable to withstand enemy attack.
Cross Curricular Links	**History** a study of an aspect or theme in British history that extends pupils' chronological knowledge beyond 1066' **Mathematics** draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them' **British values** Mutual respect.

RUBY CLASS

CYCLE A

SPRING TERM

Digital world: Wearable technology

Design, code and promote a piece of wearable technology to use in low light conditions, developing their understanding of programming to monitor and control products to solve a design scenario.

Key Vocabulary	analogue analyse annotate badge computer-aided design (CAD) control design criteria develop digital digital revolution net	digital world display electronic electronic products fastening feature feedback form function initiate layers monitor	opinion point of sale product product design program sense simulator smart technology test user
Outcome: most pupils will be able to	• Give a brief explanation of the digital revolution and/or remember key examples. • Suggest a feature from the virtual micro:bit that is suitable for the product. • Write a program that initiates a flashing LED panel, or another pattern, on the virtual micro:bit when a button is pressed. • Identify errors, if testing is unsuccessful, by comparing their code to a correct example. • Explain the basic functionality of their finished program. • Suggest key features for a way to attach the product to the user, with some consideration for the overall theme and the user. • Create annotated diagrams to help illustrate how their product is worn. • Describe what is meant by 'point of sale display' with an example. • Follow basic design requirements using computer-aided design, drawing at least one shape with a text box and bright colours, following a demonstration. • Evaluate their design using a focus group.		

Key Skills	• Problem solving by suggesting potential features on a micro:bit and justifying my ideas. • Drawing and manipulating 2D shapes, using computer-aided design, to produce a point of sale badge. • Developing design ideas through annotated sketches to create a product concept. • Developing design criteria to respond to a design brief. • Following a list of design requirements. • Writing a program to control (button press) and/or monitor (sense light) that will initiate a flashing LED algorithm. • Analysing and evaluating an existing product. • Using feedback from peers to improve a design.
Key Knowledge	• To understand that, in programming, a 'loop' is code that repeats something again and again until stopped. • To know that a micro:bit is a pocket-sized, codeable computer. • To know that a simulator is able to replicate the functions of an existing piece of technology. • To know what the 'Digital revolution' is and features of some of the products that have evolved as a result. • To understand what is meant by 'point of sale display.' • To know that CAD stands for 'Computer-aided design'. • To know what a focus group is by taking part in one.
Cross Curricular Links	**History**: Changes within living memory. **Computing**: Design, write and debug programs that accomplish specific goals.

RUBY CLASS

CYCLE A

SUMMER TERM

Cooking and nutrition: Eating seasonally (6 lessons)

Pupils discover when and where fruits and vegetables are grown and learn about seasonality in the UK. They respond to a design brief to design a seasonal food tart using ingredients harvested in the UK in May and June.

Key Vocabulary	complementary country cut design evaluate export fruit grate import ingredients Mediterranean mock-up mountain peel polar seasonal seasons snip taste temperate texture tropical vegetable weather
Outcome: most pupils will be able to	• Explain that fruits and vegetables grow in different countries based on their climates. • Understand that seasonal fruits and vegetables grow in a given season. • Understand that eating seasonal fruit and vegetables positively affects the environment. • Design a tart recipe using seasonal ingredients.
Key Skills	• Describing how climate affects where foods grow. • Identifying seasonal ingredients from the UK. • Tasting seasonal ingredients. • Describing the texture and flavour of ingredients. • Peeling foods by hand or with a peeler. • Cutting ingredients safely. • Choosing ingredients based on a design brief. • Following the instructions within a recipe. • Describing the benefits of seasonal fruits and vegetables and their impact on the environment.
Key Knowledge	• That seasonal means foods that grow in a given season in a given country. • Some seasonal foods that grow in the UK and what season they grow in.

	• That eating seasonal foods can have a positive impact on the environment. • How to describe the flavour and texture of foods. How to cut and peel safely. • That the appearance of food is as important as taste. • That similar coloured fruits and vegetables often have similar nutritional benefits.
Cross Curricular Links	**Geography** Human and physical geography – climate zones.

RUBY CLASS **CYCLE B**	
AUTUMN TERM **Structures: Pavilions** Exploring pavilion structures, children learn about what they are used for and investigate how to create strong and stable structures before designing and creating their own pavilions, complete with cladding.	
Key Vocabulary	3D shapes Cladding Design criteria Innovative Natural Reinforce Structure
Outcome: most pupils will be able to	• Produce a range of free-standing frame structures of different shapes and sizes. • Design a pavilion that is strong, stable and aesthetically pleasing. • Select appropriate materials and construction techniques to create a stable, free-standing frame structure. • Select appropriate materials and techniques to add cladding to their pavilion.
Key Skills	• Designing a stable pavilion structure that is aesthetically pleasing and selecting materials to create a desired effect. • Building frame structures designed to support weight. • 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 for the cladding. • Reinforcing corners to strengthen a structure. • Creating a design in accordance with a plan. • Learning to create different textural effects with materials.
Key Knowledge	• To understand what a frame structure is. • To know that a ‘free-standing’ structure is one that 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.
Cross Curricular Links	**Maths** Geometry, Properties of shape

RUBY CLASS

CYCLE B

SPRING TERM

Mechanical systems: Making a slingshot car

Transforming lollipop sticks, wheels, dowels and straws into a moving car. Using a glue gun to, making a launch mechanism, designing and making the body of the vehicle using nets and assembling these to the chassis.

Key Vocabulary	chassis energy kinetic mechanism	air resistance design structure graphics	research model template
Outcome: most pupils will be able to	• Work independently to produce an accurate, functioning car chassis. • Design a shape that is suitable for the project. • Attempt to reduce air resistance through the design of the shape. • Produce panels that will fit the chassis and can be assembled effectively using the tabs they have designed. • Construct car bodies effectively. • Conduct a trial accurately and draw conclusions and improvements from the results.		
Key Skills	• 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. • Measuring, marking, cutting and assembling with increasing accuracy. • Making a model based on a chosen design. • Evaluating the speed of a final product based on: the effect of shape on speed and the accuracy of workmanship on performance.		
Key Knowledge	• 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.		
Cross Curricular Links	None relevant to this unit.		

RUBY CLASS

CYCLE B

SUMMER TERM

Electrical systems: Torches

Applying their scientific understanding of electrical circuits, children create a torch, designing and evaluating their product against set design criteria.

Key Vocabulary	battery	component	input
	bulb	design	recyclable
	buzzer	design criteria	theme
	conductor	diagram	aesthetics
	circuit	evaluation	assemble
	circuit diagram	LED	equipment
	electricity	model	ingredients
	insulator	shape	packaging
	series circuit	target audience	properties
	switch	test	sketch
Outcome: most pupils will be able to	• Identify electrical products and explain why they are useful. • Help to make a working switch. • Identify the features of a torch and how it works. • Describe what makes a torch successful. • Create suitable designs that fit the success criteria and their own design criteria. • Create a functioning torch with a switch according to their design criteria.		
Key Skills	• Designing a torch, giving consideration to the target audience and creating both design and success criteria focusing on features of individual design ideas. • Making a torch with a working electrical circuit and switch. • Using appropriate equipment to cut and attach materials. • Assembling a torch according to the design and success criteria. • Evaluating electrical products. • Testing and evaluating the success of a final product.		
Key Knowledge	• 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.
Cross Curricular Links	**Science** • identify common appliances that run on electricity • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • recognise some common conductors and insulators, and associate metals with being good conductors.'

SAPPHIRE CLASS

CYCLE A

AUTUMN TERM

Mechanical systems: Making a pop-up book

Creating a four-page pop-up storybook design incorporating a range of mechanisms and decorative features, including: structures, levers, sliders, layers and spacers.

Key Vocabulary	design input motion	mechanism criteria research	reinforce model
Outcome: most pupils will be able to	• Produce a suitable plan for each page of their book. • Produce the structure of the book. • Assemble the components necessary for all their structures/mechanisms. • Hide the mechanical elements with more layers using spacers where needed. • Use a range of mechanisms and structures to illustrate their story and make it interactive for the users. • Use appropriate materials and captions to illustrate the story.		
Key Skills	• Designing a pop-up book which uses a mixture of structures and mechanisms. • Naming each mechanism, input and output accurately. • Storyboarding ideas for a book. • Following a design brief to make a pop up book, neatly and with focus on accuracy. • Making mechanisms and/or structures using sliders, pivots and folds to produce movement. • Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result. • Evaluating the work of others and receiving feedback on own work. • Suggesting points for improvement.		
Key Knowledge	• To know that mechanisms control movement. • To understand that mechanisms can be used to change one kind of motion into another. • To understand how to use sliders, pivots and folds to create paper-based mechanisms. • To know that a design brief is a description of what I am going to design and make. • To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.		
Cross Curricular Links	None relevant to these lesson.		

SAPPHIRE CLASS

CYCLE A

SPRING TERM

Electrical systems: Doodlers

Explore series circuits further and introduce motors. Explore how the design cycle can be approached at a different starting point, by investigating an existing product, which uses a motor, to encourage pupils to problem-solve and work out how the product has been constructed, ready to develop their own.

Key Vocabulary	circuit component configuration current develop DIY	investigate motor motorised problem solve	product analysis series circuit stable target user
Outcome: most pupils will be able to	• Identify simple circuit components (battery, bulb and switch) with a basic explanation of their function. • Explain that a series circuit is assembled in a loop to allow the electricity to flow along one path. • Describe a motor as a circuit component that changes electrical energy into movement. • Provide examples of motorised products that use movement to rotate or spin different parts. • Remove and replace different parts of a Doodler, as part of a team. • Suggest ways to switch the configuration to amend the form or function of the Doodler. • Explain, in an investigation report, each of the changes they made and the effect this had on the Doodler's ability to draw scribbles (function) and appearance (form). • Develop design criteria with consideration for the target user, the purpose of their Doodler, a key function and the Doodler's form and final appearance (e.g. fun, bright, soft). • Explain simply why their Doodler has a certain configuration based on the findings of their investigation (e.g. I used four pens because the Doodler would fall over with two). • Create a functional Doodler that creates scribbles on paper with or without a switch. • Identify and list each of the required materials, tools and circuit components required to build a Doodler. • Explain simply the steps to assemble a Doodler as part of a set of instructions (or storyboard). • Write instructions to build a functional circuit, explaining how to identify if it is functional or not. • Provide suggestions to improve a peer's set of instructions after testing how effective they are at guiding someone.		

Key Skills	• Identifying factors that could be changed on existing products and explaining how these would alter the form and function of the product. • Developing design criteria based on findings from investigating existing products. • Developing design criteria that clarifies the target user. • Altering a product's form and function by tinkering with its configuration. • Making a functional series circuit, incorporating a motor. • Constructing a product with consideration for the design criteria. • Breaking down the construction process into steps so that others can make the product. • Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses. • Determining which parts of a product affect its function and which parts affect its form. • Analysing whether changes in configuration positively or negatively affect an existing product. • Peer evaluating a set of instructions to build a product.
Key Knowledge	• To know that, in a series circuit, electricity only flows in one direction. • To know when there is a break in a series circuit, all components turn off. • To know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin. • To know a motorised product is one which uses a motor to function.
Cross Curricular Links	**Science** • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers' **English** Evaluate and edit by: • assessing the effectiveness of their own and others' writing • proposing changes to vocabulary, grammar and punctuation to enhance effects and clarify meaning'

SAPPHIRE CLASS

CYCLE A

SUMMER TERM

Cooking and nutrition: Developing a recipe (6 lessons)

Research and modify a traditional Bolognese sauce recipe to improve the nutritional value. Cook improved version and create packaging that fits design criteria. Learn about where beef comes from.

Key Vocabulary	beef, brand, cook, cross-contamination, cut, design, enhance, equipment, evaluate, farm, grate, hygiene, ingredients, label, measure, nutrient, nutrition, nutritional value, preference, press, process, recipe, safety, theme
Outcome: most pupils will be able to	• Describe the process of beef production. • Research a traditional recipe and make changes to it. • Add nutritional value to a recipe by selecting ingredients. • Prepare and cook a version of Bolognese sauce.
Key Skills	• Explaining the farm-to-fork process. • Researching existing recipes. • Suggesting alternative ingredients. • Analysing nutritional content. Writing an alternative recipe. • Understanding cross-contamination. • Using preparation skills. • Designing a jar label. • Making a developed recipe.
Key Knowledge	• That beef comes from cows reared on farms. • That recipes can be adapted to suit nutritional needs and dietary requirements. • That nutritional information is found on food packaging.

	• That coloured chopping boards can prevent cross-contamination. • That food packaging serves many purposes.
Cross Curricular Links	**Mathematics**: Statistics – Complete, read and interpret information in tables, including timetables **Computing**: Select, use and combine a variety of software

SAPPHIRE CLASS CYCLE B			
AUTUMN TERM **Textiles: Waistcoats** Selecting suitable fabrics, using templates, pinning, decorating and stitching to create a waistcoat for a person or purpose of their choice.			
Key Vocabulary	annotate decorate design criteria	fabric target customer	waistcoat waterproof
Outcome: most pupils will be able to	• Consider a range of factors in their design criteria and use this to create a waistcoat design. • Use a template to mark and cut out a design. • Use a running stitch to join fabric to make a functional waistcoat. • Attach a secure fastening, as well as decorative objects. • Evaluate their final product.		
Key Skills	• Designing a waistcoat in accordance with a specification and design criteria to fit a specific theme. • Annotating designs. • Using a template when pinning panels onto fabric. • Marking and cutting fabric accurately, in accordance with a design. • Sewing a strong running stitch, making small, neat stitches and following the edge. • Tying strong knots. • Decorating a waistcoat – attaching objects using thread and adding a secure fastening. • Learning different decorative stitches. • Sewing accurately with even regularity of stitches. • Evaluating work continually as it is created.		
Key Knowledge	• To understand that it is important to design clothing with the client/target customer in mind. • To know that using a template (or clothing pattern) helps to accurately mark out a design on fabric. • To understand the importance of consistently sized stitches.		
Cross Curricular Links	None relevant to this unit.		

SAPPHIRE CLASS

CYCLE B

SPRING TERM

Structures: Playgrounds

Designing and creating a model of a new playground featuring five apparatus, made from three different structures. Creating a footprint as the base, pupils visualise objects in plan view and get creative with their use of natural features.

Key Vocabulary	apparatus, equipment, landscape features, design criteria, playground, cladding
Outcome: most pupils will be able to	• Create five apparatus designs, applying the design criteria to their work. • Make suitable changes to their work after peer evaluation. • Make roughly three different structures from their plans using the materials available. • Complete their structures, improving the quality of their rough versions and applying some cladding to a few areas. • Secure their apparatus to a base. • Make a range of landscape features using a variety of materials which will enhance their apparatus.
Key Skills	• Designing a playground featuring a variety of different structures, giving consideration to how the structures will be used. • Considering effective and ineffective designs. • Building a range of play apparatus structures drawing upon new and prior knowledge of structures. • Measuring, marking and cutting wood to create a range of structures. • Using a range of materials to reinforce and add decoration to structures. • Improving a design plan based on peer evaluation. • Testing and adapting a design to improve it as it is developed. • Identifying what makes a successful structure.
Key Knowledge	• To know that structures can be strengthened by manipulating materials and shapes. • To understand what a 'footprint plan' is. • To understand that in the real world, design can impact users in positive and negative ways. • To know that a prototype is a cheap model to test a design idea.
Cross Curricular Links	None relevant to this unit.

SAPPHIRE CLASS

CYCLE B

SUMMER TERM

Digital world: Navigating the world

Programming a navigation tool to produce a multifunctional device for trekkers. Combining 3D objects to form a complete product in CAD 3D modelling software and presenting a pitch to 'sell' their product.

Key Vocabulary	smart	design criteria	if statement
	smartphone	client	boolean
	equipment	function	corrode
	navigation	program	moudable
	cardinal compass	duplicate	lightweight
	application (apps)	replica	sustainable design
	pedometer	loop	environmentally friendly
	GPS tracker	variable	biodegradable
	design brief	value	recyclable
		product lifespan	product lifecycle
Outcome: most pupils will be able to	• Incorporate key information from a client's design request such as 'multifunctional' and 'compact' in their design brief. • Write a program that displays an arrow to indicate cardinal compass directions with an 'On start' loading screen. • Identify errors (bugs) in the code and suggest ways to fix (debug) them. • Self and peer evaluate a product concept against a list of design criteria with basic statements. • Identify key industries that use 3D CAD modelling and why. • Recall and describe the name and use of key tools used in Tinkercad (CAD) software. • Combine more than one object to develop a finished 3D CAD model in Tinkercad. • Complete a product pitch plan that includes key information.		
Key Skills	• Writing a design brief from information submitted by a client. • Developing design criteria to fulfil the client's request. • Developing a product idea through annotated sketches. • Placing and manoeuvring 3D objects, using CAD. • Changing the properties of, or combine one or more 3D objects, using CAD.		

	• Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo). • Explaining material choices and why they were chosen as part of a product concept. • Programming an N,E, S,W cardinal compass. • Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool. • Developing an awareness of sustainable design. • Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch. • Demonstrating a functional program as part of a product concept.
Key Knowledge	• To know that accelerometers can detect movement. • To understand that sensors can be useful in products as they mean the product can function without human input. • To know that designers write design briefs and develop design criteria to enable them to fulfil a client's request. • To know that 'multifunctional' means an object or product has more than one function. • To know that magnetometers are devices that measure the Earth's magnetic field to determine which direction you are facing.
Cross Curricular Links	**English**: Reading – comprehension, Spoken language **Computing** – programming **Geography** – sustainability