



St Anselm's D&T Knowledge and skills progression map 2023-2024



Intent

Our design and technology curriculum at St Anselm's intends to develop and apply children's practical skills by encouraging them to solve problems based on initial exploration of designers and their products. We intend to foster creativity, analytical and critical thinking and develop technical competence which will equip children with essential life skills. It aims to encourage children to take risks and develop new innovative designs and to be reflective learners by giving them opportunities to evaluate their own work. Within our curriculum we value the importance of providing children with a variety of real-life problems to solve which are not just relevant to their own society but also other social contexts. This is done by evaluating a diverse range of past and present designs from around the world. We aim to develop the children's understanding of electrical components, control systems, mechanisms and structures while understanding and applying the fundamental principles of design, make and evaluate as a process. Our children will be inspired by designers, chefs and engineers to enable them to create a range of structures, mechanisms, textiles, electrical systems, and food products with a real purpose. We also aim to ensure our children understand the historical and cultural development of all Design and Technology forms. We will encourage inquisitive thinking and research skills to better understand the importance and impact of Design and Technology on the wider world.



St Anselm's D&T Knowledge and skills progression map 2023-2024



	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception	All about me	Celebrations	People who help us/ Transport	Growing	Animals	Water
Year 1	Structures Constructing a windmill/house		Cooking and nutrition Fruit & Vegetables		Mechanism Make a moving story book	
Year 2	Mechanisms Make a moving vehicle		Food and nutrition A balanced diet		Textiles Pouches	
Year 3	Structures Constructing a castle		Cooking and nutrition Eating seasonally		Mechanical Systems Pneumatic toys	
Year 4	Textiles Fastenings		Food and nutrition: Adapting a recipe		Digital World Mindful moments timer	
Year 5	Structure Bridges		Food and nutrition Celebrating culture and seasonality		Textiles Stuffed toys	
Year 6	Mechanical systems Automata toys		Food and nutrition Come dine with me		Digital World Navigating the world	



St Anselm's D&T Knowledge and skills progression map 2023-2024



	Reception		
Skills	<p>I am learning to...</p> <ul style="list-style-type: none"> • Explore and investigate • Explain and describe • Design • Join • Plan and organise • Observe and ask questions • Think critically and solve problems • Make decisions • Take pride in my work • Be creative and innovative • Be resourceful • Assemble and disassemble • Control and manipulate tools 		
Knowledge	Design	Make	Evaluate
	<p>I know....</p> <ul style="list-style-type: none"> • Designs need to be thought about and planned • Designs can be changed and modified • The properties and uses of different materials • What different tools can be used for 	<p>I know...</p> <ul style="list-style-type: none"> • Materials can be used for joining • How to join materials together • Materials can be modified or changed • Products can move, light up, be structurally sound • Some objects can move independently and some can be made to move • How to make a structure strong and stable • How to make a structure balance 	<p>I know...</p> <ul style="list-style-type: none"> • Evaluations can lead to improvements • The criteria for success



St Anselm's D&T Knowledge and skills progression map 2023-2024



Key Vocabulary		<ul style="list-style-type: none"> • Materials can be used for different things and manipulated in different ways • The possibilities and limitations of different materials • How different tools can be used 	
	Safely, tools, bricks, balance, tall, wide, stack, tower, enclosure, make, combine, build, join, stick, cut, plan, draw, ideas, design, modify, purpose, use, joins, edges, change, better, different, next time.		
Intent, Impact and Implementation in the EYFS	Intent	Design Technology is valued and promoted through direct teaching and purposeful learning opportunities across different themes throughout the year. We use planned topics and capture unplanned moments that present themselves to encourage children to design, make and evaluate. Opportunities are also provided for children to practise and apply what they have learnt in different contexts and for a variety of purposes.	
	Suggestions for implementation:	<ul style="list-style-type: none"> • Provide resources for joining things together and combining materials, demonstrating where appropriate. • Provide children with opportunities to use their skills and explore concepts and ideas through their representations. • Children share their creations, explaining the process they have used. • Children make use of props and materials when role playing characters in narratives and stories. • Have a 'holding bay' where models and works can be retained for a period for children to enjoy, develop, or refer to. <p>Continuous Provision The environment has focussed areas for promoting and teaching DT. The environment is organised in a way that encourages children to be independent in their choices and decisions and to use their knowledge to find solutions and use resources in unique and innovative ways. In the provision adults promote children's creativity, originality and problem solving by valuing their ideas and encouraging them to make connections in their learning, take risks and learn from mistakes.</p>	



St Anselm's D&T Knowledge and skills progression map 2023-2024



Questions to measure impact	What materials can we use to build..... What tools can we use to make.... Where does wood come from? What resources can you use to make.... How will you make
Expectations	By the end of Foundation Stage at St. Anselm's children can: <ul style="list-style-type: none">✓ Make a structure strong, stable and balance✓ Evaluate my work so I can make improvements✓ Design and plan✓ Control and manipulate different tools✓ Solve problems✓ Express my imagination✓ Be creative and innovative✓ Share and talk about my creations✓ Talk about and identify what different materials can be used for✓ Join materials together
Possible enrichment opportunities	Drama-based workshops Construction/Creation workshops Offer a wide variety of materials, tools and joining materials to create junk modelling
Curriculum Links	Expressive Arts& Design Physical Development



St Anselm's D&T Knowledge and skills progression map 2023-2024



	Year 1
DT skills	<p>Structures: Constructing a windmill/house</p> <p><u>Design</u></p> <ul style="list-style-type: none">• Learning the importance of a clear design criteria• Including individual preferences and requirements in a design <p><u>Make</u></p> <ul style="list-style-type: none">• 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>Food and nutrition: - Smoothies</p> <p><u>Design</u></p> <p>designing smoothie carton packaging by-hand or on ICT software</p> <p><u>Make</u></p> <p>chopping fruit and vegetables safely to make a smoothie</p> <p>identifying if a food is a fruit or a vegetable</p> <p>learning where and how fruits and vegetables grow</p> <p><u>Evaluate</u></p> <ul style="list-style-type: none">• Tasting and evaluating different food combinations• Describing appearance, smell and taste• Suggesting information to be included on packaging <p>Mechanisms: Making a moving story book</p> <p><u>Design</u></p> <ul style="list-style-type: none">• Explaining how to adapt mechanisms, using bridges or guides to control the movement• Designing a moving story book for a given audience <p><u>Make</u></p> <ul style="list-style-type: none">• Following a design to create moving models that use levers and sliders <p><u>Evaluate</u></p> <ul style="list-style-type: none">• Testing a finished product, seeing whether it moves as planned and if not, explaining why and how it can be fixed



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<ul style="list-style-type: none"> Reviewing the success of a product by testing it with its intended audience 		
	Autumn	Spring	Summer
Unit of work	Structures: Constructing a windmill/house	Cooking and nutrition: Fruit & Vegetables – Create smoothies	Mechanisms: Making a moving story book
Intent	Children to design and construct a windmill for a client (mouse) to live in. Explore various types of windmills, how they work and their key features	Children to distinguish between fruit and vegetables and where they grow. Design a fruit and vegetable smoothie and accompanying packaging.	Children to explore slider mechanisms and the movement they output, to design, make and evaluate a moving storybook from a range of templates.
Vocabulary	Axle, Bridge, Design, Design Criteria, Model, Net, Packaging, Structure, Template, Unstable, Stable, Strong, Week	Fruit, Vegetable, Seed, Leaves, Root, Stem, Smoothie, Healthy, Carton, Design, Flavour, Peel, Slice	<ul style="list-style-type: none"> Sliders, Mechanisms, Adapt, Design criteria, Design, Input, Model, Template, Assemble, Test
Prior Knowledge	<ul style="list-style-type: none"> Use of construction kits to build walls, towers and frameworks Use of using basic tools e.g. scissors or hole punches with construction materials e.g. plastic and card Experiences of different methods of joining card and paper 	<ul style="list-style-type: none"> Experience of common fruit and vegetables, undertaking sensory activities i.e. appearance taste and smell. Experience of cutting soft fruit and vegetables using appropriate utensils. 	<ul style="list-style-type: none"> Early experiences of working with paper and card to make simple flaps and hinges Experience of simple cutting, shaping and joining skills using scissors, glue, paper fasteners and masking tape
Knowledge	<u>Technical</u>	<ul style="list-style-type: none"> Understanding the difference between fruits and vegetables 	<u>Technical</u>



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<ul style="list-style-type: none">• 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 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 <p><u>Additional</u></p> <ul style="list-style-type: none">• 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 client's needs and wants• 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	<ul style="list-style-type: none">• To understand that some foods typically known as vegetables are actually fruits (e.g. cucumber)• To know that a blender is a machine which mixes ingredients together into a smooth liquid• To know that a fruit has seeds and a vegetable does not• To know that fruits grow on trees or vines• To know that vegetables can grow either above or below ground• To know that vegetables can come from different parts of the plant (e.g. roots: potatoes, leaves: lettuce, fruit: cucumber)	<ul style="list-style-type: none">• To know that a mechanism is the parts of an object that move together• To know that a slider mechanism moves an object from side to side• To know that a slider mechanism has a slider, slots , guides and an object• To know that bridges and guides are bits of card that purposefully restrict the movement of the slider <p><u>Additional</u></p> <ul style="list-style-type: none">• To know that in Design and technology we call a plan a 'design'
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St Anselm's D&T Knowledge and skills progression map 2023-2024



	<ul style="list-style-type: none"> • 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 		
<p>Suggestions for implementation</p>	<p>Designing the structure Learning what a windmill is and constructing a model windmill by reference to design criteria designed for the client, mouse who lives in the windmill in Old Amsterdam.</p> <p>Assembling the structure Having decorated their templates children construct the main part of their structure, making sure that it stands freely and holds together.</p> <p>Assembling the windmill Children complete their turbines, through careful cutting and folding, and attach them to their structure, testing its strength and stability.</p> <p>Testing and evaluating After adding the finishing touches to their windmills, children test their structures to check that they would make a suitable home for the mouse.</p>	<p>Fruit or vegetable Learning to distinguish fruits from vegetables, and putting this knowledge into practice, handling and categorising a selection of fruits and vegetables.</p> <p>Where fruit and vegetables grow Having learned to sort fruits by looking for seeds, children learn another clue to classification is where the edible part of the plant grows, on trees, on vines, above the ground or under the soil; and explore which part of these plants we eat.</p> <p>Smoothing ingredients tasting Tasting a selection of potential fruit and vegetable smoothie ingredients, describing their appearance, smell and taste and deciding which to include in a smoothie.</p> <p>Making smoothies Children blend chosen fruits and vegetables to make smoothies and</p>	<p>Exploring sliders and movement Learn about the direction of movements and explore the mechanisms required to make these work, by creating examples of side to side sliders and up and down sliders from templates.</p> <p>Design Children plan their moving story book against a design criterion using differentiated templates, deciding on the backgrounds, moving parts, mechanisms and direction of movement required.</p> <p>Construction Referring to their design templates from the previous lesson, children make the various elements of their moving story books, including bridges and guides to restrict the movement of their sliders where necessary.</p> <p>Testing and evaluation Children test their finished story books with their target audience of Reception children and evaluate their end result against the initial design criteria.</p>



St Anselm's D&T Knowledge and skills progression map 2023-2024



		design packaging for their drinks, to reflect the ingredients.	
<p>Questions to measure impact</p>	<p>What is a structure? (Something that has been made/constructed, for example, a building, bridge, chair or table)</p> <p>What are structures for?</p> <p>Can you identify some structures in the room?</p> <p>What is a windmill?</p> <p>What are windmills for?</p> <p>Who might live in a windmill?</p> <p>What are the three main parts of a windmill?</p> <p>Why did you choose to decorate it in that way?</p> <p>Why will the mouse like that design?</p> <p>Does the windmill stand up on its own?</p> <p>Does the windmill stand up on its own?</p> <p>Why do windmills need turbines?</p> <p>What materials are used?</p> <p>How has it been made?</p> <p>What is an axle? What is it for?</p> <p>What other products use axles (cars, toys, etc)?</p> <p>How could it be improved?</p>	<p>What is this called, who has eaten this before?</p> <p>What are its tastes, smell, texture, and appearance?</p> <p>What will it look like if we peel or cut it in half?</p> <p>How might we describe its shape?</p> <p>Which parts do we eat?</p> <p>What might I need to do before eating this?</p> <p>How do we know what is a fruit or a vegetable?</p> <p>Where do fruit and vegetables grow?</p> <p>What part of plants can we eat?</p> <p>What is a smoothie?</p> <p>Why are smoothies good for us?</p> <p>What might we have to do before taste testing?</p> <p>What parts of these fruits and vegetables do we eat?</p> <p>Why is it important to wash the fruit and vegetables before we eat?</p> <ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • What do you think will move? • How will you make it move? • Which part of the mechanism will move? <p>In what way will it move?</p> <p>What is it that we are making?</p> <p>Who is it for or who will use it?</p> <p>What will it do?</p> <p>Why will people want to have it?</p> <p>What bit do you like best and why?</p> <p>What was easy to make and why?</p> <p>What was hard to make and why?</p> <p>If you did it again, would you do anything differently?</p> <p>Did you find cardboard easy to work with or would you have liked to have used a different material?</p> <p>If something isn't working as well as it should be, do you know why?</p> <p>Who is this for?</p> <p>What is its purpose?</p> <p>What will make it successful?</p> <p>How easy was it to make?</p> <p>How could it have been even easier to make?</p>



St Anselm's D&T Knowledge and skills progression map 2023-2024



<p>Suggestions for the development of greater depth</p>	<p>Structures - Windmill/House Use more advanced decoration methods such as cutting and sticking different materials onto the surface. Include features of a building such as doors, windows and a roof.</p> <p>Food and nutrition - Smoothies To examine the foods in more detail, perhaps with a magnifying glass. Name other parts of the fruits and vegetables, for example, stem, leaves, root. Consider if there are taste similarities with things that grow above or below ground. For example, are all things that grow on a vine sweet? Consider what to exclude or include in response to tasting. Use the internet or clipart library in PowerPoint to find own images for carton designs.</p> <p>Mechanisms - Moving story books Begin to look at how they can better control their movements using guides. Include more than one type of movement on each page. Consider ways in which their design could be altered to make it easier to make as well as to be more appealing to the target audience.</p>		
<p>Enrichment/ curriculum links Diversity BTK</p>	<p>Mathematics: Recognise and name common two-dimensional and three-dimensional shapes</p>	<p><i>Trip which could include; strawberry farm, local grocery store, farmers market, smoothie shop.</i> <i>Creating a blog about their smoothie.</i> <i>Looking at different recipe books.</i> Working scientifically: Identifying and classifying Using their observations and ideas to suggest answers to questions RSE: What constitutes a healthy diet (including understanding calories and other nutritional content). The principles of planning and preparing a range of healthy meals.</p>	
<p>Year 2</p>			
<p>DT Skills</p>	<p><u>Mechanisms – Constructing a moving vehicle</u> <u>Design</u></p>		



St Anselm's D&T Knowledge and skills progression map 2023-2024



- Design a strong movable vehicle
- To use talking, drawing and labels to design mock-ups

Make

- Select and use appropriate materials based on design properties
- Use wheels and axels to create a moving vehicle

Evaluate

- Evaluate product based on design criteria

Food and nutrition – Healthy wrap

Design

- Designing a healthy wrap based on a food combination which work well together

Make

- Slicing food safely using the bridge or claw grip
- Constructing a wrap that meets a design brief

Evaluate

- Describing the taste, texture and smell of fruit and vegetables
- Taste testing food combinations and final products
- Describing the information that should be included on a label
- Evaluating which grip was most effective

Textiles: Making a pouch

Design

- To know that sewing is a method of joining fabric
- To know that different stitches can be used when sewing
- To understand the importance of tying a knot after sewing the final stitch
- To know that a thimble can be used to protect my fingers when sewing

Make

- Selecting and cutting fabrics for sewing
- Decorating a pouch using fabric glue or running stitch
- Threading a needle
- Sewing running stitch, with evenly spaced, neat, even stitches to join fabric



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<ul style="list-style-type: none"> • Neatly pinning and cutting fabric using a template <p>Evaluate</p> <ul style="list-style-type: none"> • Troubleshooting scenarios posed by teacher • Evaluating the quality of the stitching on others' work • Discussing as a class, the success of their stitching against the success criteria • Identifying aspects of their peers' work that they particularly like and why 		
	Autumn	Spring	Summer
Units of work	Mechanisms: Wheels and axels – Making a moving vehicle	Food and nutrition: A balanced diet – making a wrap	Textiles: Pouches
Intent	Children will also develop an understanding of axis and wheels. They will begin to broaden their knowledge and use of tools, such as glue guns, as well as beginning to evaluate their product based on a success criteria.	Through children's exploration of what makes a balanced diet they will taste test food combinations of different food groups. They will aim to make a wrap that includes a healthy mix of proteins, vegetables and dairy, and learn about the term 'hidden sugars.'	Children to explore different examples of textiles and learn a simple running stitch to make and decorate a pouch
Vocabulary	Design, movement, vehicle, functional, mock-up, tech card, cut, join, shape, tools, truck, stiff, strong, wheels & axels, chassis	<ul style="list-style-type: none"> • Balanced diet, Balance, Carbohydrate, Dairy, Fruit, Ingredients, Oils, Sugar, Protein, Vegetable, Design criteria, Balanced diet 	Fabric, Knot, Needle, Needle threader, Running stitch, Sew, Thread, decorate, fabric glue
Prior Knowledge	<ul style="list-style-type: none"> • Some knowledge about different mechanism, levers, sliders, wheels and axels • Developed some cutting, joining and finishing skills with card • Have an understanding how you might make a design stronger, stiffer and more stable. 	<ul style="list-style-type: none"> • Experience of common fruit and vegetables, undertaking sensory activities i.e. appearance taste and smell • Experience of cutting soft fruit and vegetables using appropriate utensils 	<ul style="list-style-type: none"> • Explored and used different fabrics • Cut and joined fabrics with simple techniques • Thought about the user and purpose of products



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<ul style="list-style-type: none"> • Gained some experience of designing, making and evaluating products for a specified user and purpose 		
Knowledge	<p><u>Technical</u></p> <ul style="list-style-type: none"> • To understand how to make structures stiffer and stronger • To understand that for a wheel to move it must be attached to a rotating axle • To know that an axle moves within an axle holder which is fixed to the vehicle or toy • To know that the frame of a vehicle (chassis) needs to be balanced <p><u>Additional</u></p> <ul style="list-style-type: none"> • To know that it is important to test my design as I go along so that I can solve any problems that may occur 	<ul style="list-style-type: none"> • To know that 'diet' means the food and drink that a person or animal usually eats • To understand what makes a balanced diet • To know where to find the nutritional information on packaging • To know that the five main food groups are: Carbohydrates, fruits and vegetables, protein, dairy and foods high in fat and sugar • To understand that I should eat a range of different foods from each food group, and roughly how much of each food group • To know that nutrients are substances in food that all living things need to make energy, grow and develop • To know that 'ingredients' means the items in a mixture or recipe • To know that I should only have a maximum of five teaspoons of sugar a day to stay healthy • To know that many food and drinks we do not expect to contain sugar do; we call these 'hidden sugars' 	<ul style="list-style-type: none"> • To know that sewing is a method of joining fabric • To know that different stitches can be used when sewing • To understand the importance of tying a knot after sewing the final stitch • To know that a thimble can be used to protect my fingers when sewing



St Anselm's D&T Knowledge and skills progression map 2023-2024



Suggestions for implementation	<p>How do wheels move? After investigating how wheels move on a variety of different objects, children create a simple version of a wheel mechanism, including an axle, wheel and axle holder.</p> <p>Fixing broken wheels Children see examples of wheels that do not work and use their problem solving skills to diagnose the issue.</p> <p>Designing a vehicle Children learn the different components of a vehicle with moving wheels and design a moving vehicle of their own.</p> <p>Making and evaluating Using their designs children build and then test their vehicles. Children to evaluate their finished product communicating how it works and how it matches their design criteria, including any changes they made.</p>	<p>Hidden sugars in drinks Children learn about sugar processing from plant to refined sugar. They explore a variety of drinks sugar contents, and compare then categorise different foods into their correct food groups.</p> <p>Taste testing combinations Having tested taste combinations of foods, children design a wrap of balanced ingredients.</p> <p>Designing and making a wrap Building on their taste testing investigations from the previous lesson, children design three possible wrap options before selecting their favourite and drawing and labelling their final design.</p> <p>Making and evaluating Children prepare the wraps they designed, chopping ingredients safely using the 'bridge' or 'claw' grip and then evaluating the outcomes.</p>	<p>Running stitch Introduction to sewing - learning a running stitch</p> <p>Using a template Children create a template and cut out their fabric, beginning to think of who the pouch could belong to and what it should look like.</p> <p>Making a pouch Children to sew their fabric together using a running stitch and design what the front will look like.</p> <p>Decorating a pouch Children add decorations to their pouches using their design ideas from the previous lesson. Use fabric glue or stitching to decorate the pouch.</p>
Questions to measure impact	How do you think the wheels move? How do you think the wheels are fixed on?	Where does sugar come from? What do you think the ingredients are of each drink?	What is this called? (a needle). How do I thread it? What can I do if I have trouble?



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<p>Why do you think the product has the number of wheels it does? Why do you think the wheels are round? What properties should the wheel have and why? How will the wheel attach to the axle? What problems did you face? How did you fix it? What could you do different next time?</p>	<p>Do you think the drink will taste sweeter? How much sugar do you think the drink will include – more or less than...? What food group might this be in? How might we know? What food group is it in? What ingredients have been used? Where do the products grow? How do the sensory characteristics affect your liking the food? What ingredients have been used? What food groups do they belong to? What should we do before we work with food? How do we select the ingredients? How could we make it appealing to eat? How do we make it a balanced diet? What do we need to do before we start preparing food? How do we chop safely? How do we ensure that we are hygienic in the kitchen? What do we do if we drop food?</p>	<p>Which direction am I sewing in? What is the name of the stitch? What must I remember to do? Which sides will be sewn together? Which parts will be open? What will this piece of fabric do? What do we need to consider when we sew? How much glue should be used? What items are in your design? What colours should you use?</p>
<p>Suggestions for the development of greater depth</p>	<p>Mechanisms - Constructing A moving vehicle To refer to the design of wheels when giving justifications, offering alternatives or solutions. Can they adapt their plan/model further to make their vehicle work better? Have they tested their vehicle? How?</p> <p>Food and nutrition - Making a wrap To consider the portion size and could divide or multiply to make a consistent size for comparison. To ensure that their food combinations include elements from each of the food groups. To consider the amount of their ingredients in the wrap and how that may impact the taste.</p> <p>Textiles - Making a Pouch</p>		



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<p>Try sewing a running stitch around a corner or on two pieces of fabric (to join them). Possibly re-trimming it to ensure that the edges are tidy, taking care not to take off too much fabric. Ensure that their stitches are equal in size, close together and run in a straight line, along the edge of the three fabric sides.</p>		
<p>Enrichment/ curriculum links Diversity BTK</p>	<p>Visit form local emergency services thinking about how the vehicles have been adapted to meet the purpose</p>	<p>Healthy Living week Mathematics: Compare and order lengths, mass, volume/capacity and record the results using >, < and =</p>	<p>Look at a variety of fruit and vegetables around the world</p>
	<p>Year 3</p>		
<p>DT skills</p>	<p><u>Structures - constructing a castle including computer aided design</u></p> <p><u>Design</u></p> <ul style="list-style-type: none"> • 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 shapes that will create the features - materials needed and colours • Designing and/or decorating a castle tower on CAD software <p><u>Make</u></p> <ul style="list-style-type: none"> • Constructing a range of 3D geometric shapes using nets • Creating special features for individual designs • Making facades from a range of recycled materials <p><u>Evaluate</u></p> <ul style="list-style-type: none"> • 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><u>Food and nutrition - Eating seasonally</u></p> <p><u>Design</u></p> <ul style="list-style-type: none"> • Creating a healthy and nutritious recipe for a savoury tart using seasonal ingredients, considering the taste, texture, smell and appearance of the dish <p><u>Make</u></p> <ul style="list-style-type: none"> • Knowing how to prepare themselves and a workspace to cook safely in, learning the basic rules to avoid food contamination 		



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<ul style="list-style-type: none"> Following the instructions within a recipe <p>Evaluate</p> <ul style="list-style-type: none"> 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>Mechanical Systems - Pneumatic toys</p> <p>Design</p> <ul style="list-style-type: none"> Designing a toy which uses a pneumatic system Developing design criteria from a design brief Generating ideas using thumbnail sketches and exploded diagrams Learning that different types of drawings are used in design to explain ideas clearly <p>Make</p> <ul style="list-style-type: none"> Creating a pneumatic system to create a desired motion Building secure housing for a pneumatic system Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic toy Selecting materials due to their functional and aesthetic characteristics Manipulating materials to create different effects by cutting, creasing, folding, weaving <p>Evaluate</p> <ul style="list-style-type: none"> Using the views of others to improve designs Testing and modifying the outcome, suggesting improvements Understanding the purpose of exploded-diagrams through the eyes of a designer and their client 		
	Autumn	Spring	Summer
Focus	Structures: constructing a castle including computer aided design	Cooking and nutrition: Eating seasonally	Mechanical Systems: Pneumatic toys
Intent	Children to identify and learn about the key features of a castle, before designing and making a recycled-material castle (structure).	Children to learn about various fruits and vegetables, and when, where and why they are grown in different seasons. Discover the relationship between colour and health benefits.	Children to design and make a toy with a pneumatic system, learning how trapped air can be used to create a product with moving parts while also building on their design knowledge. They will then be introduced to thumbnail sketches and exploded diagrams.



St Anselm's D&T Knowledge and skills progression map 2023-2024



Vocabulary	2D Castle, Key features, Scoring, Stable, Strong 3D, Design, Net, Shape, Stiff, Structure, Tab	Climate, Diet, Natural, Processed, Reared, Seasons, Sugar, Imported, Ingredients, Seasonal	Mechanism, Lever, Pivot, Linkage system, Pneumatic system, Input, Output, Component, Thumbnail sketch, Research, Adapt, Properties, Reinforce, Motion
Prior Knowledge	<ul style="list-style-type: none"> • Experience of using different joining, cutting and finishing techniques with paper and card. • A basic understanding of 2-D and 3-D shapes in mathematics and the physical properties and everyday uses of materials in science. • Familiarity with general purpose software that can be used to draw accurate shapes, such as Microsoft Word, 	<ul style="list-style-type: none"> • Know some ways to prepare ingredients safely and hygienically. • Have some basic knowledge and understanding about healthy eating and <i>The eatwell plate</i>. • Have used some equipment and utensils and prepared and combined ingredients to make a product. 	<ul style="list-style-type: none"> • Explored simple mechanisms, such as sliders and levers, and simple structures. • Learnt how materials can be joined to allow movement. • Joined and combined materials using simple tools and techniques.
Knowledge	<p><u>Technical</u></p> <ul style="list-style-type: none"> • To understand that wide and flat based objects are more stable • To understand the importance of strength and stiffness in structures <p><u>Additional</u></p> <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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 know that exported food is food which has been sent to another country. • To understand that imported foods travel from far away and this can negatively impact the 	<p><u>Technical</u></p> <ul style="list-style-type: none"> • To understand how pneumatic systems work • To understand that pneumatic systems can be used as part of a mechanism • To know that pneumatic systems operate by drawing in, releasing and compressing air <p><u>Additional</u></p> <ul style="list-style-type: none"> • To understand how sketches, drawings and diagrams can be used to communicate design ideas • To know that exploded-diagrams are used to show how different parts of a product fit together • To know that thumbnail sketches are small drawings to get ideas down on paper quickly



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<ul style="list-style-type: none"> • 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 	<p>environment</p> <ul style="list-style-type: none"> • To know that each fruit and vegetable gives us nutritional benefits because they contain vitamins, minerals and fibre • To understand that vitamins, minerals and fibre are important for energy, growth and maintaining health • To know safety rules for using, storing and cleaning a knife safely • To know that similar coloured fruits and vegetables often have similar nutritional benefits 	
<p>Suggestions for implementation</p>	<p>Features of a castle After learning the features of a castle, children design their own, deciding which 3D shapes they need to create it with consideration to the castles stability and strength.</p> <p>Designing a castle Children follow a design specification to create a castle, labelling their drawings with the shapes and subsequent nets and recycled materials they will use to make it.</p> <p>Nets and structures Children construct their nets to make 3D shapes to use in the construction of their castle in the next lesson.</p>	<p>Where in the world? Children identify the different climates in which fruits and vegetables grow and follow a recipe to make Japanese fruit skewers with plum sauce.</p> <p>British seasonal foods Children learn that we have to import some foods from other countries, then the children bake a fruit crumble using seasonal British fruits.</p> <p>Rainbow food Children learn that fruits and vegetables of the same colour have similar health benefits and design a seasonal tart using a variety of local vegetables to provide a range of nutrients.</p>	<p>Exploring pneumatics Children investigate and explore different pneumatic systems.</p> <p>Designing a pneumatic toy The children use their understanding of pneumatics to design their own pneumatic toys through thumbnail sketches and exploded diagrams.</p> <p>Making pneumatic toys Children a working pneumatic system and casing for their toys.</p> <p>Decorating and assembly my toy Children add decorations and assemble the final components to complete their pneumatic toys.</p>



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<p>Building a castle After creating the curtain walls of their castle, children make and attach the specific features of their designs, decorating and adding facades to complete the project</p>	<p>Making Tarts Children bring together the lessons from this unit to make their seasonal tart.</p>	
<p>Questions to measure impact</p>	<p>What are castles for? Where do we see castles? Which of these castles looks the strongest or weakest? Stable or unstable? Why? (for example, some are bouncy, soft, strong, big, small and have a variety of purposes) What makes these castles different or the same? Who would use, make or live in this castle? Why? Are these man-made or natural structures? Why are these properties important for structures? Why are the features of a castle important? What did they do for the people living inside them?</p>	<p>In which country has this been grown? Why do we think some ingredients are sourced from so far away? What conditions do you think these foods need to grow? Why do you think these foods can't be grown in the UK? What does the term 'seasonal' mean? Where does the food in our supermarkets come from? Is the food in the supermarket always seasonable to the UK? Do we really need to import food? What are the effects of importing food? What ingredients do we need? How will we prepare each ingredient? What must we consider in order to stay safe in the kitchen? What hygiene risk do we face?</p>	<p>When a car or bike tyres are pumped up, what is happening Why most car tyres are called 'pneumatic'? Car tyres are filled with compressed air. What is compressed air? What is holding the car up What happens when the air escapes a tyre? Is electricity needed to make all machines work? How did machines work before electricity was discovered? Do you think air has power? Consider things blown by the wind, for example, windmills and wind turbines that make electricity. What is a pneumatic system? A system that forces air over a distance to create movement. Can you remember the three different ways to create a pneumatic system?</p>



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<p>Why were a castle's stability and strength important? What difficulties might you run into when creating that castle? What could be done practically to construct the parts? E.g. use/alter junk modelling materials. How could the design be simplified? What went well? Did anyone make any configurations this lesson? What is a net, tab, scoring? What will make a good quality castle? Does your castle include all the features in your original design? Are there any other features you would like to include? Do you think your final castle is suitable for the original person/purpose for which it was designed? Why/why not. What are you happy with or would you like to change something?</p>	<p>How much of each ingredient do we need? What colours are used? What images are used? What words are used? How might you show that your food is seasonal? How might you show that your food is fresh? How will we prepare each ingredient? What must we consider in order to stay safe in the kitchen? What hygiene risks do we face?</p>	<p>How can you use pneumatic systems with linkage systems to create motion? A creature's mouth – opening and closing What products use pneumatic systems? How can you use pivots to create motion? Using split pins How might you decide which materials to select for surface decoration?</p>
<p>Suggestions for the development of greater depth</p>	<p>Structures - constructing a castle Children to label their castle drawing with the key castle features and explain which of the 3D shapes help to make the castle strong and stable and/or can justify their own thoughts and ideas as to why this might be. Advance to more complex geometric shapes. Children can attempt to design their own nets i.e. hexagonal prisms. Create specific features relevant to the person or purpose they are designing for. To create their own net. More complex and wide-ranging structures. Food and nutrition-Eating Seasonally Research recipes, consider quantities and costs when comparing recipes. Look at when the ingredients needed for their soups would need to be planted. Discuss the taste, texture, appearance and smell of their recipes. Adapt this by using a different cheese, herb or base.</p>		



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<p>Mechanical Systems - Pneumatic toys Draw with detail, label and explain in greater depth and provide examples of products that use pneumatic systems. Children to create their own nets on card. Children to experiment with their use of materials, independently reaching their own conclusions for how to make and finish their toys.</p>		
<p>Enrichment/ curriculum links Diversity BTK</p>	<p>Maths – Geometry, Properties of shape</p>	<p>Geography – Human and physical geography Healthy Loving Week</p>	
<p>Year 4</p>			
<p>DT Skills</p>	<p><u>Textiles – Fastenings - Book sleeve</u></p> <p><u>Design</u></p> <ul style="list-style-type: none"> • Writing design criteria for a product, articulating decisions made • Designing a personalised book sleeve <p><u>Make</u></p> <ul style="list-style-type: none"> • Making and testing a paper template with accuracy and in keeping with the design criteria • Measuring, marking and cutting fabric using a paper template • Selecting a stitch style to join fabric, working neatly sewing small neat stitches • Incorporating fastening to a design <p><u>Evaluate</u></p> <ul style="list-style-type: none"> • Testing and evaluating an end product against the original design criteria • Deciding how many of the criteria should be met for the product to be considered successful • Suggesting modifications for improvement • Articulating the advantages and disadvantages of different fastening types <p><u>Cooking and nutrition – Adapting a recipe</u></p> <p><u>Design</u></p> <ul style="list-style-type: none"> • Designing a biscuit within a given budget, drawing upon previous taste testing <p><u>Make</u></p> <ul style="list-style-type: none"> • Following a baking recipe • Cooking safely, following basic hygiene rules • Adapting a recipe 		



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<p>Evaluate</p> <ul style="list-style-type: none"> Evaluating a recipe, considering: taste, smell, texture and appearance Describing the impact of the budget on the selection of ingredients Evaluating and comparing a range of products suggesting modifications Evaluating electrical products Testing and evaluating the success of a final product <p>Digital World – Mindful moments timer</p> <p>Design</p> <ul style="list-style-type: none"> Writing design criteria for a programmed timer (Micro: bit) Exploring different mindfulness strategies Applying the results of my research to further my design criteria Developing a prototype case for my mindful moment timer Using and manipulating shapes and clipart by using computer-aided design (CAD) to produce a logo Following a list of design requirements <p>Make</p> <ul style="list-style-type: none"> Developing a prototype case for my mindful timers Creating a 3D structure using a net Programming a micro: bit in the Microsoft micro: but editor, to time a set number of seconds/minutes upon button press <p>Evaluate</p> <ul style="list-style-type: none"> Investigating and analysing a range of timers by identifying and comparing their advantages and disadvantages. Evaluating my Micro: but program against points on my design criteria and amending them to include any changes I made Documenting and evaluating my project Understanding what a logo is a why they are important in the world of design and business Testing my program for bugs (errors in the code) Finding and fixing the bugs (debug) in my code. 		
	Autumn	Spring	Summer
Units of work	Textiles: Fastenings – making a book sleeve	Food and nutrition: Adapting a recipe	Digital World: Mindful moments timer



St Anselm's D&T Knowledge and skills progression map 2023-2024



Intent	Children to analyse and evaluate a range of existing fastenings, then devise a list of design criteria to design, generate templates and make a fabric book sleeve.	Children to work in groups to adapt an existing biscuit recipe, whilst taking into account the cost of the ingredients and other expenses against a set budget.	Children explore what is meant by mindfulness and write design criteria to fulfil a brief to develop a programmed product for timing a mindful moment.
Vocabulary	Criteria, Fabric, Fastening, Fix Mock-up, Stitch, Template	Design Criteria, Research, Texture, Innovative, Aesthetic, Measure, Cross-contamination, Diet, Processed, Packaging	Research, disadvantage, advantage, criteria, design, ergonomic, timer, program, loop, coding, block, variable, pause, bug, debug, instructions, net, template, develop join, assemble, test, form, function, prototype, process, cheap, user
Prior Knowledge	<ul style="list-style-type: none"> • Experience of basic stitching, joining textiles and finishing techniques. • Experience of making and using simple pattern pieces. • Discussing as a class, the success of their stitching against the success criteria 	<ul style="list-style-type: none"> • Have experience of creating a healthy and nutritious recipe • Have Knowledge how to prepare themselves and a work space to cook safely in, learning the basic rules to avoid food contamination. • Following instructions within a recipe. • Have established and used design criteria to help test and review dishes. 	<ul style="list-style-type: none"> • Experience using a range of different programmes on the iPad, laptops and computers. • Experience programming a 'loop' (code that repeats something again and again until stopped)
Knowledge	<ul style="list-style-type: none"> • To know that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro • To know that different fastening types are useful for different purposes • To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions 	<ul style="list-style-type: none"> • To know that the amount of an ingredient in a recipe is known as the 'quantity' • To know that it is important to use oven gloves when removing hot food from an oven • To know the following cooking techniques: sieving, creaming, rubbing method, cooling • To understand the importance of budgeting while planning ingredients for biscuits 	<ul style="list-style-type: none"> • To understand what variables are in programming • To know some of the features of a Micro: bit • To know that an algorithm is a set of instructions to be followed by the computer • To know that it is important to check my code for errors (bugs) • To know that a simulator can be used as a way of checking your code works before installing it onto an electronic device. • To know that prototype is a 3D model made out of cheap materials that allow us to test



St Anselm's D&T Knowledge and skills progression map 2023-2024



			design ideas and make better decisions about size, shape and materials.
Suggestions for implementation	<p>Evaluating fastening To identify and evaluate different types of fastenings and consider their advantages and disadvantages.</p> <p>Designing my book sleeve Children design their own design criteria, select a style of book sleeve and finally draw their design on paper.</p> <p>Paper mock up and preparing fabric Children ensure their design will work. They create a mock-up before using this as a template to cut out their fabric</p> <p>Assembling my book sleeve Children attach their fastenings and decorate their book sleeves in accordance with their criteria.</p>	<p>Following a recipe After sampling and evaluating a range of biscuits, children bake a simple biscuit recipe.</p> <p>Testing ingredients Children work in groups to make the biscuit recipe from the previous lesson, then divide the mixture each adding a different ingredient to their dough to discover which tastes best when baked.</p> <p>Final design and budget Working to a budget which includes imaginary costs, children decide which ingredients they will spend the rest of their budget on their biscuits.</p> <p>Biscuit bake off It's the 'Bake Off' - after making a batch of their final adapted biscuit design and packaging, a panel of judges taste and review each group's creation.</p>	<p>Exploring mindfulness Children to understand that mindfulness can help us to look after our mental health and wellbeing. If practised for a short amount of time every day, it can help improve concentration and sleep. Children to explore mindfulness products.</p> <p>Programming a timer Children will write a program for a Micro: bit. It needs to time the set number of seconds or minute(s) specified in their design criteria at the press of a button.</p> <p>Prototypes The children will learn that prototypes are an important part of the design process. The children will create some prototype cases for their mindful moment timers.</p> <p>Brand identity Ask the class to imagine what a new mindfulness company has purchased their mindfulness timers to sell to the public, and they want the children's help to launch them. Children will design a logo and create it on 'sketchpad'.</p>



St Anselm's D&T Knowledge and skills progression map 2023-2024



Questions to measure impact			
	<p>What fastenings are being used in this room? What does a fastening do? How does it fasten the two pieces of fabric? How secure is it? How easy is it to do up? How likely is it to break? How strong is it?</p> <p>How attractive is it? How comfortable is it? Who is this for? What do you know about them? What do they like? What will they use this for? What will they value more: aesthetics or practicality? Why is it useful to have a list of design criteria? How will those pieces be joined? What size is that face? What shape is it? How many faces do you have? Are they all joined the same way? What will you assemble first? What needs to be attached to what? What will be the best way to attach each part? What must you consider when sewing?</p>	<p>What does it taste like? What ingredients/flavours can you taste? How does it feel when you put it into your mouth? Does it crumble or crack? What is its texture like? What does it remind you of? What colours are used? How will that change the taste/smell/texture/appearance? Who would that appeal to? What would you like to change? How might that alter the biscuit? What will you include? Will that add value? How much will it cost? How will it change your biscuit's taste/smell/appearance?</p>	<p>What do we mean by a 'product'? (An object or service designed and made for sale) Why is it important to look after your mental health? How did it feel when you tried mindfulness? What is a Micro: bit? Which of the existing timers did you feel was most successful? Why? Why is a list of design criteria important when designing a product? What features does it have? What do you need to begin the programme? What were the errors? What was the solution? What variable did we create for the program? How does your program meet the design criteria? Why are prototypes an important part of the design process? What could we do if our first prototype does not work or look as it should? How could this box be improved? What advice would you give to someone cutting and assembling a card net? How did you feel the project went? Why? Which part of the project did you find the most challenging? Which part of the project did you find most challenging? Does your logo fulfil the design requirements? What could you improve about the logo?</p>



St Anselm's D&T Knowledge and skills progression map 2023-2024



<p>Suggestions for the development of greater depth</p>	<p>Textiles - Fastenings – Book sleeve Consider about the future of the fastening, easy to fix? Repairable? Replaceable? To create their own templates for their book cover, rather than using those provided – reminding them to allow the extra room required for the book itself. To consider what parts of their product will take more stress and ensure that the stitches in those areas are reinforced.</p> <p>Cooking and nutrition - Adapting a recipe Apply what they see, smell, feel and taste, as well as looking at the biscuit packaging to make predictions about the biscuit's target audience. Will help their group to measure the correct ingredient quantities using the correct intervals on the scale. To relate their adaptations to changes in the sensory characteristics of the biscuit.</p> <p>Digital world – Mindful moments timer Challenge the children to consider where different timer types will be useful (e.g. one-minute sand times for young children who do not yet understand time) Children should be encouraged to complete and test their program independently and adapt it as they see fit. Children to experiment with alternative 3D net designs. Fulfil the design requirements of the logo and justify their choices.</p>		
<p>Enrichment/ curriculum links Diversity BTK</p>		<p>Healthy Living Week Have panel of judges to taste and review each group's creation.</p>	<p>RSE/PSHE – mindfulness Computing – design, write and debug programmes British values – Mutual respect</p>
<p>Year 5</p>			
<p>DT Skills</p>	<p>Structures – Bridges</p> <p><u>Design</u></p> <ul style="list-style-type: none"> • Designing a stable structure that is able to support weight • Creating frame structure with focus on triangulation <p><u>Make</u></p> <ul style="list-style-type: none"> • Making a range of different shaped beam bridges • Using triangles to create truss bridges that span a given distance and supports a load • Building a wooden bridge structure • Independently measuring and marking wood accurately • Selecting appropriate tools and equipment for particular tasks • Using the correct techniques to saws safely 		



St Anselm's D&T Knowledge and skills progression map 2023-2024



- Identifying where a structure needs reinforcement and using card corners for support
- Explaining why selecting appropriating materials is an important part of the design process
- Understanding basic wood functional properties

Evaluate

- Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary
- Suggesting points for improvements for own bridges and those designed by others

Food and nutrition - Celebrating culture and seasonality

Design

- Generate innovative ideas through research and discussion with peers and adults to develop a design brief and criteria for a design specification.
- Explore a range of initial ideas, and make design decisions to develop a final product linked to user and purpose.
- Use words, annotated sketches and information and communication technology as appropriate to develop and communicate ideas.

Make

- Write a step-by-step recipe, including a list of ingredients, equipment and utensils
- Select and use appropriate utensils and equipment accurately to measure and combine appropriate ingredients.
- Make, decorate and present the food product appropriately for the intended user and purpose.

Evaluate

- Carry out sensory evaluations of a range of relevant products and ingredients. Record the evaluations using e.g. tables/graphs/charts such as star diagrams.
- Evaluate the final product with reference back to the design brief and design specification, considering the views of others when identifying improvements.
- Understand how key chefs have influenced eating habits to promote varied and healthy diets.

Textiles – Stuffed toys

Design

- Design a stuffed toy, considering the main component shapes required and creating an appropriate template.
- Considering the proportions of individual components.

Make

- Create a 3D studded toy from a 3D design.



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<ul style="list-style-type: none"> Measuring, marking and cutting fabric accurately and independently. Creating strong and secure blanket stitches when joining fabric. Threading needles independently. Using applique to attach pieces of fabric decoration. Sewing blanket stitch to join fabric. Applying blanket stitch so the spaces between the stitches are even and regular. <p>Evaluate</p> <ul style="list-style-type: none"> Testing and evaluating an end product and giving point for further improvements. 		
	Autumn	Spring	Summer
Topic:	Structure: Bridges	Food and nutrition: Celebrating culture and seasonality soup/bread/pizza?	Textiles: Stuffed toys
Intent	Children to test and analyse various types of bridges to determine their strength and stability. Explore material properties and sources, before marking, sawing and assembling a wooden truss bridge.	To draw children's awareness of culture and to support understanding seasons may affect the food available.	To create a stuffed toy by applying skills learnt in previous units. Introduce blanket stitch.
Vocabulary	Beam bridge, Arch bridge, Truss bridge, Strength, Factors, Stability, Technique, Corrugation, Lamination, Stiff, Visual appeal, Mark out, Softwood, Wood file/rasp, Sandpaper, Bench hook/vice, Assemble, Reinforce, Evaluate Quality of finish, Accuracy, Joints	Ingredients, Yeast, Dough, Bran, Flour, Wholemeal, Unleavened, Baking soda, Spice, Herbs, Fat, Sugar, Carbohydrate, Protein, Vitamins, Nutrients, Nutrition, Healthy, Varied, Gluten, Dairy, Allergy, Intolerance, Savoury, Seasonality Fold, Knead, Stir, Pour, Mix, Rubbing in, Whisk, Beat, Roll out, shape, Sprinkle, Crumble, Design specification	Accurate, appendage, design criteria, evaluation, sew, stuffed toy, annotate, blanket-stitch, detail, fabric, shape, stuffing, template
Prior Knowledge	<ul style="list-style-type: none"> Experience of using measuring, marking out, cutting, joining, 	<ul style="list-style-type: none"> Have knowledge and understanding about food hygiene, nutrition, healthy eating and a varied diet. 	<ul style="list-style-type: none"> To know that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<p>shaping and finishing techniques with construction materials.</p> <ul style="list-style-type: none"> • Basic understanding of what structures are and how they can be made stronger, stiffer and more stable. 	<ul style="list-style-type: none"> • Be able to use appropriate equipment and utensils, and apply a range of techniques for measuring out, preparing and combining ingredients. 	<ul style="list-style-type: none"> • To know that different fastening types are useful for different purposes • To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions
Knowledge	<p><u>Technical</u></p> <ul style="list-style-type: none"> • To understand some different ways to reinforce structures • To understand how triangles can be used to reinforce bridges • To know that properties are words that describe the form and function of materials • To understand why material selection is important based on their properties • To understand the material (functional and aesthetic) properties of wood <p><u>Additional</u></p> <ul style="list-style-type: none"> • To understand the difference between arch, beam, truss and suspension bridges • To understand how to carry and use a saw safely 	<ul style="list-style-type: none"> • Know how to use utensils and equipment including heat sources to prepare and cook food. • Understand about seasonality in relation to food products and the source of different food products. • To know that climate affects food growth • Know and use relevant technical and sensory vocabulary. 	<ul style="list-style-type: none"> • To know that blanket stitch is useful to reinforce the edges of a fabric material or join two pieces of fabric. • To understand that it is easier to finish simpler designs to a high standard. • To know that soft toys are often made by creating appendages separately and then attaching them to the main body. • To know that small, neat stitches which are pulled taut are important to ensure that the soft toy is strong and holds the stuffing securely
Suggestions for implementation	<p>Arch and beam bridges</p> <p>Children develop their understanding of structures by investigating how different shapes affect their strength.</p>	<p>Investigative and Evaluative Activities</p> <p>Children use first hand and secondary sources to carry out relevant research into existing products to include personal/cultural preferences, ensuring a</p>	<p>Designing a stuffed toy</p> <p>The children will begin to design their stuffed toy – they will have to think carefully and make links with their Shakespeare project. The children should add</p>



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<p>Spaghetti truss bridges Children create spaghetti truss bridges, learning how different shapes can improve the strength of a structure.</p> <p>Building bridges Children learn about material properties and why they are important. They learn to use tools including saws to build a wooden bridge.</p> <p>Finalising bridges Children continue to build their truss bridges, reinforce and evaluate them.</p>	<p>healthy diet, meeting dietary needs and the availability of locally sourced/seasonal/organic ingredients. Children carry out sensory evaluations of a variety of existing food products and ingredients relating to the project. The ingredients could include those that could be added to a basic recipe such as herbs, spices, vegetables or cheese. These could be locally sourced, seasonal, Fair Trade or organic. Present results in e.g. tables/graphs/charts and by using evaluative writing. Research key chefs and how they have promoted seasonality, local produce and healthy eating.</p> <p>Focused Tasks Demonstrate how to measure out, cut, shape and combine e.g. knead, beat, rub and mix ingredients. Demonstrate how to use appropriate utensils and equipment that the children may use safely and hygienically. When using a basic dough recipe, explore making different shapes to change the appearance of the food product</p> <p>Design, Make and Evaluate Assignment Develop a design brief and simple design</p>	<p>notes on extra pieces of fabric they want to use for detail: any decorative stitches buttons or beads.</p> <p>Make The children will make their stuffed toy. Encourage children to sew using a blanket stitch. Children to sew on decorations. The children can use a running, blanket or cross-stitch to attach pieces of fabric or objects.</p> <p>Evaluate Children to present their stuffed toys on their tables and then walk around to look at each other's finished products. Children to evaluate their own stuffed toy by writing at least two positive aspects and one thing they would improve or do differently.</p>
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St Anselm's D&T Knowledge and skills progression map 2023-2024



		<p>Specification with the children within a context that is authentic and meaningful. This can include design criteria relating to nutrition and healthy eating.</p> <p>Discuss the purpose of the products that the children will be designing, making and evaluating and who the products will be for.</p> <p>Ask children to generate a range of ideas encouraging innovative responses. Agree on design criteria that can be used to guide the development and evaluation of the children's product.</p> <p>Using annotated sketches, discussion and information and communication technology if appropriate, ask children to develop and communicate their ideas.</p> <p>Ask children to record the steps, equipment, utensils and ingredients for making the food product</p> <p>Evaluate the work as it progresses and the final product against the intended purpose and user reflecting on the design specification previously agreed.</p>	
<p>Questions to measure impact</p>	<p>Can you suggest other ways to make the bridge stronger and/or stiffer? Can you describe a beam and/or an arch bridge? Did your suggestions improve the strength of the bridge (structure)?</p>	<p>What ingredients are sourced locally/in the UK/from overseas? What are the key ingredients needed to make a particular product? How have ingredients been processed? What is the nutritional value of a product?</p>	<p>Which of these skills may be useful in this project and what for? Which material would be good to use to fill a soft toy? What is a blanket stitch used for? Which picture shows applique/blanket stitch/cross stitch?</p>



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<p>What is the difference between a beam, arch and truss bridge? What techniques did you use to improve the strength of the beam last lesson? What other factors could change to increase the strength, stability and stiffness of the bridge? How smooth is the wood Are there any gaps? How does it look overall?</p>	<p>What ingredients help to make the product spicy/crisp/crunchy etc? What is the impact of added ingredients/finishes/shapes on the finished product? Which ingredients could be changed or added in a basic recipe such as types of flour, seeds, garlic, and vegetables. Which shape is most appealing and why?</p>	<p>What do we mean by an objects form?</p>
<p>Suggestions for the development of greater depth</p>	<p>Structures - Bridges Provide with extra bridge design development sheets if they have already made a beam, arch, laminated and corrugated bridge beam to include their own ideas and designs. Could make a sophisticated bridge from more accurate equilateral triangles, which are securely constructed and assembled with sufficient amounts of tape and glue. Express the need to achieve a high-quality finish, sanded down, accurate with no gaps and secured at all joints effectively. Add labels to the photograph or sketch to identify where the bridge had weak points in testing. Discuss what they would change if they were to do the truss bridge project again.</p> <p>Food and nutrition – Celebrating culture and seasonally Consider texture, taste, appearance and smell.</p> <p>Structures Textiles – Children should incorporate different techniques and materials into their design. Children should practise a few different stitches, in line with what they will do for their toy. Use neat, small stitches to attach decorative fabrics as well as adding decorative stitching according to their designs. Consider adding more components to their finished toy.</p>		



St Anselm's D&T Knowledge and skills progression map 2023-2024



<p>Enrichment/ curriculum links Diversity BTK</p>	<p>Science – properties of materials</p>	<p>A visit to a local bakery, farm, farm shop or supermarket</p> <p>Mathematics and computing: making use of mathematical and computing skills to present results of sensory evaluations graphically, handling and interpreting data.</p> <p>Science: using and developing skills of observing, questioning, changing state of ingredients.</p>	<ul style="list-style-type: none"> •
<p>Year 6</p>			
<p>DT Skills</p>	<p>Mechanical Systems - Automata toys</p> <p><u>Design</u></p> <ul style="list-style-type: none"> • Designing a toy which uses a pneumatic system • Developing design criteria from a design brief • Generating ideas using thumbnail sketches and exploded diagrams • Learning that different types of drawings are used in design to explain ideas clearly <p><u>Make</u></p> <ul style="list-style-type: none"> • Creating a pneumatic system to create a desired motion • Building secure housing for a pneumatic system • Using syringes and balloons to create different types of pneumatic systems to make a functional and appealing pneumatic to • Selecting materials due to their functional and aesthetic characteristics • Manipulating materials to create different effects by cutting, creasing, folding, weaving <p><u>Evaluate</u></p> <ul style="list-style-type: none"> • Using the views of others to improve designs • Testing and modifying the outcome, suggesting improvements • Understanding the purpose of exploded-diagrams through the eyes of a designer and their client <p><u>Food and nutrition – Come dine with me</u></p> <p><u>Design</u></p>		



St Anselm's D&T Knowledge and skills progression map 2023-2024



- Writing a recipe, explaining the key steps, method and ingredients
- Including facts and drawings from research undertaken

Make

- Following a recipe, including using the correct quantities of each ingredient
- Adapting a recipe based on research
- Working to a given timescale
- Working safely and hygienically with independence
- Identifying

Evaluate

- Evaluating a recipe, considering: taste, smell, texture and origin of the food group
- Taste testing and scoring final products
- Suggesting and writing up points of improvements in productions
- Evaluating health and safety in production to minimise cross contamination

Digital World – Navigating the World

Design

- 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

- 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

- Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<ul style="list-style-type: none"> 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 		
	Autumn 1	Spring 1	Summer 1
Topic:	Mechanical systems: Automata toys	Food and nutrition: Come dine with me	Digital World: Navigating the world
Intent	Develop a functional automata window display, to meet the requirements in a design brief. Explore and create cam, follower and axle mechanisms to mimic different movements.	Develop a three-course menu focused on three key ingredients, as part of a paired challenge to develop the best class recipes. Explore each key ingredient's farm to fork process.	Design and program a navigation tool to produce a multifunctional device for trekkers using CAD 3D modelling software. Pitch and explain the product to a guest panel.
Vocabulary	Automata, Accurate, Mark out, Tenon saw, Bench hook, Sandpaper, Design brief, Design criteria, Components Woodwork, Storefront, Evaluation, Housing, Mechanism, Flat-pack, Inner-workings, Cam, Cam profile, Follower, Follower base, Follower topper, Cross-sectional diagram, storyboard, Designer, client, customer, communication, verbal, visual	<ul style="list-style-type: none"> Equipment, Flavours, Ingredients, Method, Research, Recipe, Bridge method, Cookbook, Cross-contamination, Preparation, Storyboard 	Smart, Equipment, Compass, Pedometer GPS tracker, Tablet, Smartphone Navigation, Application (apps,) Design brief, Design criteria, Client, Function, Program, Duplicate, Copy, Loop, Variable, Value, If statement, Boolean, Materials, Lightweight, Concept Sustainable, Sustainable design, Unsustainable design, Environmentally friendly, Biodegradable, Recyclable, Non-recyclable , Product lifecycle lifespan, CAD, CGI, Replica, Tinkercad
Prior Knowledge	<ul style="list-style-type: none"> To know that mechanisms control movement To understand that mechanisms can be used to change one kind of motion into another 	<ul style="list-style-type: none"> Have knowledge and understanding about food hygiene, nutrition, healthy eating and a varied diet. Be able to use appropriate equipment and utensils, and apply a range of techniques for measuring out, preparing and combining ingredients. 	<ul style="list-style-type: none"> To understand what a virtual model is and the pros and cons of traditional vs CAD modelling To understand that conditional statements (and, or, if booleans) in programming are a set of rules which are followed if certain conditions are met Placing and manoeuvring 3D objects, using CAD



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<ul style="list-style-type: none"> To understand how sketches, drawings and diagrams can be used to communicate design ideas To know that exploded-diagrams are used to show how different parts of a product fit together 	<ul style="list-style-type: none"> Know how to use heat sources to prepare and cook food. To know that climate affects food growth 	<ul style="list-style-type: none"> Changing the properties of, or combine one or more 3D objects, using CAD
Knowledge	<p>Technical</p> <ul style="list-style-type: none"> To understand that the mechanism in an automata uses a system of cams, axles and followers To understand that different shaped cams produce different outputs <p>Additional</p> <ul style="list-style-type: none"> To know that an automata is a hand powered mechanical toy To know that a cross-sectional diagram shows the inner workings of a product To understand how to use a bench hook and saw safely To know that a set square can be used to help mark 90° angles 	<ul style="list-style-type: none"> To know that 'flavour' is how a food or drink tastes To know that many countries have 'national dishes' which are recipes associated with that country To know that 'processed food' means food that has been put through multiple changes in a factory To understand that it is important to wash fruit and vegetables before eating to remove any dirt and insecticides To understand what happens to a certain food before it appears on the supermarket shelf (Farm to Fork) 	<p>Technical</p> <ul style="list-style-type: none"> 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 <p>Additional</p> <ul style="list-style-type: none"> 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
Suggestions for implementation	<p>Automatas</p> <p>The children are given a design brief to produce a mechanical shop window display and work together to prepare (mark, cut, saw) the materials required for a functional automata frame.</p>	<p>Three ingredients, three courses</p> <p>In pairs children research a recipe for the course they will make: a pepper starter or salmon main course or pineapple dessert.</p> <p>To start.</p>	<p>Navigating the world</p> <p>Developing an informed design brief and criteria based on information extracted and analysed from a client's letter.</p> <p>Programming a navigation tool</p> <p>Children program a navigation tool, combining multiple functions learnt across the Digital World units</p>



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<p>Frame assembly Children learn about exploded diagrams and apply this knowledge to help them the automata frame components.</p> <p>Experimenting with cams Children experiment the relationship between cam profiles and follow movement, to inform a design decision.</p> <p>Finishing touches Children apply the housing design to the automata frame and evaluate the final product, comparing it with the design brief and criteria.</p>	<p>Those pairs of children making the pepper starters prepare and make the recipes they researched in the previous lesson, whilst the rest of the class research how salmon are reared, caught and processed, or make a recipe page for a class book.</p> <p>The main course Those children making the main course prepare and make the recipes they researched in the previous lesson whilst the remainder of the class trace the journey food makes across the world to reach our supermarkets, or make a recipe page for a class book.</p> <p>Dessert Those children making the pineapple desserts, prepare and make the recipes they researched in the previous lesson, whilst the remainder of the class find out how peppers are grown, or make a recipe page for a class book.</p>	<p>and new functions such as cardinal compass, to produce a multifunctional device, for trekkers.</p> <p>Product concept Children learn about the impact humans are having on the planet. They consider how we make more sustainable concept for housing the processor (microbit) of our navigation tool.</p> <p>3D CAD Models Developing existing essential 3D CAD skills to combine 3D objects to form a complete product in CAD 3 modelling software.</p> <p>Product Pitch Celebrating the completion of the project by supporting the children through a pitch (presentation) to share and 'sell' their final product concepts and programs to the Adventure Awaits company guest panel.</p>
<p>Questions to measure impact</p>	<p>What is a list of design criteria? How does a design brief help us? Why do the automata frame components need to be accurate? What information can you identify? How could we use this information?</p>	<p>For which course and ingredient are you researching recipes? How will the flavours work together in the recipe? Will the three dishes that you are making as a group work well together?</p>	<p>Have you used any of the equipment shown on slide 3 before? If so, what for? Are there any pieces of equipment that are missing? How could a new smart product improve the weight of a person's load for their adventure? What is a design problem?</p>



St Anselm's D&T Knowledge and skills progression map 2023-2024



	<p>Why is this information important to the assembly of a product? What is an exploded-diagram? Why is good communication important? When assembling the automata, what difficulties did you come across? How did you resolve these difficulties? Can you think of a toy or product with inner workings? Could the design idea use different images and still fulfil the corresponding list of design criteria? What is a cross-sectional diagram? What form of communication is this? What is a cam? Cam profile? Follower? What went well with the follower topper designs? What could be improved? Why? How do your follower toppers fit into your design idea, theme and criteria? What is a storefront? Why is a shop display window important for the business? How does your automata meet the design criteria points? Does your automata meet the requirements in the design brief? Why? Can you suggest a way that the automata could be used as a shop display window?</p>	<p>Are you following a theme – what is it? How easy will the recipe be to make? What ingredients do you need? How long does the recipe take to cook? What additional ingredients does the recipe need? How long does it take to prepare? What cooking techniques are used? How long does it take to cook? How would you categorise this food – what nationality/food type? What health and safety considerations are there when preparing food? How should we cut safely? What does 'Farm to Fork' mean? What have you learnt? Did anything surprise you? What illustrations could accompany your recipe page? What top tips can you give to accompany the recipe?</p>	<p>What is the design brief? Define the word 'client'. What is the design criteria? How did Aria identify an opportunity for a new product? What is a Micro: bit? Have you used one before and if so, what for? What do we mean by 'function' and 'form'? Does the program operate as it should? Does the program fulfil points two and three of your design brief? Did you find any bugs (errors) in the code and how did you fix (debug) them? Have you amended or added any additional code to your program? If so, why? How does it function? What benefits do the extra functions bring to the customer? Does your product concept meet all of the design criteria? What could be improved about your product concept? Which materials did you choose and why? Which tools did you use? Why? Can you describe your design? What does your design represent? Did you use any other tools additional to the ones you were shown? Does your 3D CAD model fulfil the design requirements? What could you improve about the 3D CAD model? Which tools did you find easy/difficult and why?</p>
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St Anselm's D&T Knowledge and skills progression map 2023-2024



	<p>If you were to repeat this project what would you do differently?</p>		<p>How could CAD (computer-aided design) be used in other industries and why? What is a product pitch and its purpose? What key information should be included in a product pitch? How does your navigation tool fit (our) Aria's (Adventure Awaits Co) design request? How does your navigation tool benefit (our) customers?</p>
<p>Suggestions for the development of greater depth</p>	<p>Mechanical systems - Automa toys Add detailed annotations to their design ideas. To create customised cam profiles to suit their design idea. Food and nutrition – come dine with me Consider the cost of ingredients of their chosen recipe – can they rate the expense of their chosen recipe? Digital World – Navigating the world. To explore beyond the prescribed Micro: bit program and extension, to tinker and develop their own addition to the code. Challenge them to add programming comments (right-click on code blocks and select 'Add comment') to explain functions in the program itself.</p>		
<p>Enrichment/ curriculum links Diversity BTK</p>		<p>Science - Children should be taught to: Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function RSE-PSHE - The principles of planning and preparing a range of healthy meals</p>	<p>Computing - Pupils should be taught to: Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</p>