Progression of Design and Technology in St Pius X 2020-2021

Updated: June 2020

Curriculum Intent of Design and Technology in St Pius X

At the heart of art, we recognise that all children should have opportunities to express their uniqueness, creativity and individual talents. At St Pius X, we aim to exploit these opportunities when they arise. Through the St Pius X curriculum, which is thematic in design, we aim to allow children to transfer their knowledge of Design and Technology to a range of contexts. Design Technology is taught through a wide range of rich, first-hand learning experiences. In line with the National Curriculum, we aim to allow children to explore and develop ideas, investigate and make, evaluate, and develop their knowledge and understanding within Design Technology.

Big Ideas in Design and Technology

Creativity — Within the big idea of creativity, there are two main aspects including generation of ideas and structures.

Materials  — Within the big idea of materials, the aspect focus is on materials for purpose.

Nature — Within the big idea of nature, there are three main aspects including food preparation and cooking, nutrition and the origin of food.

Humankind  — Within the big idea of humankind, there are two main aspects including everyday products and staying safe.

Place — Within the big idea of comparison, the aspect focus is on comparing and contrasting.

Comparison  — Within the big idea of significant individuals, the aspect focus is on significant people.

Significance — Within the big idea of investigation, there are two main aspects including investigating and evaluation.

Investigation 

— Within the big idea of processes, there are three main aspects including electricity, mechanisms and movement.

Processes

Big Idea – **Creativity**

	Year Group	Learning Intention	Knowledge	Coverage
Generation of Ideas	Year 1	Create a design to meet simple design criteria.	Design criteria are the explicit goals that a project must achieve	Taxi KRP within Bright Lights, Big City (Sum1)
	Year 2	Generate and communicate their ideas through a range of different methods.	Ideas can be communicated in a variety of ways, including written work, drawings and diagrams, modelling, speaking and using information and communication technology.	Towers, Tunnels and Turrets (Aut1) Beach Hut KRP within Coastline (Sum2)
	Year 3	Develop design criteria to inform a design.	Design criteria are the exact goals a project must achieve to be successful. These criteria might include the product's use, appearance, cost and target user.	Gods and Mortals (Spr1) Mighty Metals (Sum2)
	Year 4	Use annotated sketches and exploded diagrams to test and communicate their ideas.	Annotated sketches and exploded diagrams show specific parts of a design, highlight sections or show functions. They communicate ideas in a visual, detailed way.	I Am Warrior (Aut1) Burps, Bottoms and Bile (Aut2) Traders and Raiders (Spr1) Misty Mountain Sierra (Sum1)
	Year 5	Use pattern pieces and computer-aided design packages to design a product.	A pattern piece is a drawing or shape used to guide how to make something. There are many different computer-aided design packages for designing products.	Stargazers (Aut2) Scream Machine (Spr2) Alchemy Island (Sum2)
	Year 6	Develop design criteria for a functional and appealing product that is fit for purpose, communicating ideas clearly in a range of ways.	Design criteria should cover the intended use of the product, age range targeted and final appearance. Ideas can be communicated in a range of ways, including through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.	Tomorrow's World (Spr1)
Use of ICT				
	Year 5	Link a physical device to a computer or tablet so that it can be controlled (such as changing motor speed or turning an LED on and off) by a program.	Equipment and devices can be controlled by pressing buttons on a control panel, such as on a washing machine or microwave.	Scream Machine (Spr2)
	Year 6	Use a sensor to monitor an environmental variable, such as temperature, sound or light.	Computer monitoring uses sensors as a scientific tool to record information about environmental changes over time. Computer monitoring can also log data from sensors and record the resulting information in a table or graph.	Tomorrow's World (Spr1)
Structures				
	Year 1	Construct simple structures, models or other products using a range of materials.	Different materials can be used for different purposes, depending on their properties. For example, cardboard is a stronger building material than paper. Plastic is light and can float. Clay is heavy and will sink.	Enchanted Woodland (Aut1) Moon Zoom Aut2) Childhood (Spr1) School Days (Spr2) Bright Lights, Big City (Sum1) Rio de Vida (Sum2)
	Year 2	Explore how a structure can be made stronger, stiffer and more stable.	Structures can be made stronger, stiffer and more stable by using cardboard rather than paper and triangular shapes rather than squares. A broader base will also make a structure more stable.	Towers, Tunnels and Turrets (Aut1) Beat Band Boogie (Aut2) Coastline (Sum2)
	Year 3	Create shell or frame structures using diagonal struts to strengthen them.	Shell structures are hollow, 3-D structures with a thin outer covering, such as a box. Frame structures are made from thin, rigid components, such as a tent frame. The rigid frame gives the structure shape and support. Diagonal struts can strengthen the structure.	Flow (Spr2)
	Year 4	Prototype shell and frame structures, showing awareness of how to strengthen, stiffen and reinforce them.	A prototype is a mock-up of a design that will look like the finished product but may not be full size or made of the same materials. Shell and frame structures can be strengthened by gluing several layers of card together, using triangular shapes rather than squares, adding diagonal support struts and using 'Jinks' corners (small, thin pieces of card cut into a right-angled triangle and glued over each joint to straighten and strengthen them).	Traders and Raiders (Spr1)
	Year 5	Build a framework using a range of materials to support mechanisms.	Various methods can be used to support a framework. These include cross braces, guy ropes and diagonal struts. Frameworks can be built using lolly sticks, skewers and bamboo canes.	Scream Machine (Spr2)
	Year 6	Select the most appropriate materials and frameworks for different structures, explaining what makes them strong.	Strength can be added to a framework by using multiple layers. For example, corrugated cardboard can be placed with corrugations running alternately vertically and horizontally. Triangular shapes can be used instead of square shapes because they are more rigid. Frameworks can be further strengthened by adding an outer cover.	Hola Mexico (Sum1) A Child's War (Sum2)

Big Idea – **Investigation**

	Year Group	Learning Intention	Knowledge	Coverage
Investigation	Year 1	Select the appropriate tool for a simple practical task.	Specific tools are used for particular purposes. For example, scissors are used for cutting and glue is used for sticking.	Rio de Vida (Sum2)
	Year 2	Select the appropriate tool for a task and explain their choice.	Different tools have characteristics that make them suitable for specific purposes. For example, scissors are used for cutting paper because they have sharp, metal blades that can cut through thin materials.	Beat Band Boogie (Aut2) Movers and Shakers (Spr1) Beach Hut KRP within Coastline (Sum2)
	Year 3	Use tools safely for cutting and joining materials and components.	Specific tools can be used for cutting, such as saws. Wood can be joined using glue, nails, staples, or a combination of these. Safety rules must be followed to prevent injury from sharp blades. These rules include using a bench hook to keep the wood still, using a junior hacksaw with a pistol grip and working under adult supervision.	Gods and Mortals (Spr1) Mighty Metals (Sum2)
	Year 5	Select, name and use tools with adult supervision.	Useful tools for cutting include scissors, craft knives, junior hacksaws with pistol grip and bench hooks. Useful tools for joining include glue guns. Tools should only be used with adult supervision and safety rules must be followed. There are many rules for using tools safely and these may vary depending on the tools being used. For example, someone using a chisel should chip or cut with the cutting edge pointing away from their body. All tools should be cleaned and put away after use, and should not be used if they are loose or cracked.	Pharaohs (Sum1)
	Year 6	Select appropriate tools for a task and use them safely and precisely.	Precision is important in producing a polished, finished product. Correct selection of tools and careful measurement can ensure the parts fit together correctly.	Revolution (Aut2) **Cooking** Hola Mexico (Sum1)
Evaluation				
	Year 1	Talk about their own and each other's work, identifying strengths or weaknesses and offering support.	A strength is a good quality of a piece of work. A weakness is an area that could be improved.	Moon Zoom (Aut2) Taxi KRP within Bright Lights, Big City (Sum1) Rio De Vida (Sum2)
	Year 2	Explain how closely their finished products meet their design criteria and say what they could do better in the future.	Finished products can be compared with design criteria to see how closely they match. Improvements can then be planned.	Towers, Tunnels and Turrets (Aut1) Beach Hut KRP within Coastline (Sum2)
	Year 3	Suggest improvements to their products and describe how to implement them, beginning to take the views of others into account.	Asking questions can help others to evaluate their products, such as asking them whether the selected materials achieved the purpose of the model.	Mighty Metals (Sum2)
	Year 4	Identify what has worked well and what aspects of their products could be improved, acting on their own suggestions and those of others when making improvements.	Evaluation can be done by considering whether the product does what it was designed to do, whether it has an attractive appearance, what changes were made during the making process and why the changes were made. Evaluation also includes suggesting improvements and explaining why they should be made.	Burps, Bottoms and Bile (Aut2) Traders and Raiders (Spr1) Playlist (Spr2)
	Year 5	Test and evaluate products against a detailed design specification and make adaptations as they develop the product.	Testing a product against the design criteria will highlight anything that needs improvement or redesign. Changes are often made to a design during manufacture.	Stargazers (Aut2) Scream Machine (Spr2)
	Year 6	Demonstrate modifications made to a product as a result of ongoing evaluation by themselves and to others.	Design is an iterative process, meaning alterations and improvements are made continually throughout the manufacturing process. Evaluating a product while it's being manufactured, and explaining these evaluations to others, can help to refine it.	Tomorrow's World (Spr1)

Big Idea – **Nature**

	Year Group	Learning Intention	Knowledge	Coverage
Food Preparation & Cooking	Year 1	Measure and weigh food items using non-standard measures, such as spoons and cups.	Using non-standard measures is a way of measuring that does not involve reading scales. For example, weight may be measured using a balance scale and lumps of plasticine. Length may be measured in the number of hand spans or pencils laid end to end.	Rio De Vida (Sum2)
	Year 2	Prepare ingredients by peeling, grating, chopping and slicing.	Some ingredients need to be prepared before they can be cooked or eaten. There are many ways to prepare ingredients: peeling skins using a vegetable peeler, such as potato skins; grating hard ingredients, such as cheese or chocolate; chopping vegetables, such as onions and peppers and slicing foods, such as bread and apples.	Wriggle and Crawl (Spr2)
	Year 4	Identify and use a range of cooking techniques to prepare a simple meal.	Cooking techniques include baking, boiling, frying, grilling and roasting.	I Am Warrior (Aut1) Road Trip USA! (Sum2)
	Year 5	Use an increasing range of preparation and cooking techniques to cook a sweet or savoury dish.	Sweet dishes are usually desserts, such as cakes, fruit pies and trifles. Savoury dishes usually have a salty or spicy flavour rather than a sweet one.	Eat the Seasons KRP within Sow, Grow and Farm (Aut1) Scream Machine (Spr2)
	Year 6	Follow a recipe that requires a variety of techniques and source the necessary ingredients independently.	Ingredients can usually be bought at supermarkets, but specialist shops may stock different items. Greengrocers sell fruit and vegetables, butchers sell meat, fishmongers sell fresh fish and delicatessens usually sell some unusual prepared foods, as well as cold meats and cheeses.	Hola Mexico (Sum1) A Child's War (Sum2)
Nutrition				
	Year 1	Select healthy ingredients for a fruit or vegetable salad.	Fruit and vegetables are an important part of a healthy diet. It is recommended that people eat at least five portions of fruit and vegetables every day	The Enchanted Woodland (Aut1)
	Year 4	Design a healthy snack or packed lunch and explain why it is healthy.	Healthy snacks include fresh or dried fruit and vegetables, nuts and seeds, rice cakes with low-fat cream cheese, homemade popcorn or chopped vegetables with hummus. A healthy packed lunch might include a brown or wholemeal bread sandwich containing eggs, meat, fish or cheese, a piece of fresh fruit, a low-sugar yoghurt, rice cake or popcorn and a drink, such as water or semi-skimmed milk.	Burps, Bottoms and Bile (Aut2)
	Year 5	Evaluate meals and consider if they contribute towards a balanced diet.	A balanced diet gives your body all the nutrients it needs to function correctly. This means eating a wide variety of foods in the correct proportions.	Eat the Seasons KRP within Sow, Grow and Farm (Aut1)
	Year 6	Plan a healthy weekly diet, justifying why each meal contributes towards a balanced diet.	Eating a balanced diet is a positive lifestyle choice that should be sustained over time. Food that is high in fat, salt or sugar can still be eaten occasionally as part of a balanced diet.	Hola Mexico (Sum1)
Origins of Food				
	Year 2	Identify the origin of some common foods (milk, eggs, some meats, common fruit and vegetables	Food comes from two main sources: animals and plants. Cows provide beef, sheep provide lamb and mutton and pigs provide pork, ham and bacon. Examples of poultry include chickens, geese and turkeys. Examples of fish include cod, salmon and shellfish. Milk comes mainly from cows but also from goats and sheep. Most eggs come from chickens. Honey is made by bees. Fruit and vegetables come from plants. Oils are made from parts of plants. Sugar is made from plants called sugar cane and sugar beet. Plants also give us nuts, such as almonds, walnuts and hazelnuts.	Wriggle and Crawl (Spr2)
	Year 5	Describe what seasonality means and explain some of the reasons why it is beneficial.	Seasonality is the time of year when the harvest or flavour of a type of food is at its best. Buying seasonal food is beneficial for many reasons: the food tastes better; it is fresher because it hasn't been transported thousands of miles; the nutritional value is higher; the carbon footprint is lower, due to reduced transport; it supports local growers and is usually cheaper.	Sow, Grow & Farm (Aut1) Eat the Seasons KRP within Sow, Grow & Farm (Aut1) Pharaohs (Sum1)

Materials for Purpose	Year Group	Learning Intention	Knowledge	Coverage
	Year 1	Select and use a range of materials, beginning to explain their choices.	Different materials are suitable for different purposes, depending on their specific properties. For example, glass is transparent, so it is suitable to be used for windows.	Enchanted Woodland (Aut1) Moon Zoom (Aut2) Rio de Vida (Sum2)
	Year 2	Choose appropriate components and materials and suggest ways of manipulating them to achieve the desired effect.	Properties of components and materials determine how they can and cannot be used. For example, plastic is shiny and strong but it can be difficult to paint.	Towers, Tunnels and Turrets (Aut1) Beat Band Boogie (Aut2) Movers and Shakers (Spr1) Wriggle and Crawl (Sum1) Beach Hut KRP within Coastline (Sum2)
	Year 3	Plan which materials will be needed for a task and explain why.	Materials for a specific task must be selected on the basis of their properties. These include physical properties as well as availability and cost	Gods and Mortals (Spr1) Flow (Spr2) Urban Pioneers (Sum1) Mighty Metals (Sum2)
	Year 4	Choose from a range of materials, showing an understanding of their different characteristics.	Different materials and components have a range of properties, making them suitable for different tasks. It is important to select the correct material or component for the specific purpose, depending on the design criteria. Recipe ingredients have different tastes and appearances. They look and taste better and are cheaper when in season.	I am Warrior (Aut1) Burps, Bottoms and Bile (Aut2) Traders and Raiders (Spr1) Playlist (Spr2) Misty Mountain Sierra (Sum1) Road Trip USA (Sum2)
	Year 5	Select and combine materials with precision	Materials should be cut and combined with precision. For example, pieces of fabric could be cut with sharp scissors and sewn together using a variety of stitching techniques.	Stargazers (Aut2) Time Traveller Scream Machine (Spr2) Pharaohs (Sum1)
	Year 6	Choose the best materials for a task, showing an understanding of their working characteristics.	It is important to understand the characteristics of different materials to select the most appropriate material for a purpose. This might include flexibility, waterproofing, texture, colour, cost and availability.	Revolution (Aut2) Hola Mexico (Sum1) A Child's War (Sum2)

	Year Group	Learning Intention	Knowledge	Coverage
Electricity	Year 3	Incorporate a simple series circuit into a model.	An electric circuit can be used in a model, such as a lighthouse. It can be controlled using a switch.	Mighty Metals (Sum2)
	Year 4	Incorporate circuits that use a variety of components into models or products.	Components can be added to circuits to achieve a particular goal. These include bulbs for lighthouses and torches, buzzers for burglar alarms and electronic games, motors for fairground rides and motorised vehicles and switches for lights and televisions.	Can you make a circuit from playdough? LTI within Playlist (Spr2)
	Year 5	Use electrical circuits of increasing complexity in their models or products, showing an understanding of control.	Electrical circuits can be controlled by a simple on/off switch, or by a variable resistor that can adjust the size of the current in the circuit. Real-life examples are a dimmer switch for lights or volume control on a stereo.	Alchemy Island (Sum2)
Mechanisms & Movement				
	Year 1	Use wheels and axles to make a simple moving model.	An axle is a rod or spindle that passes through the centre of a wheel to connect two wheels.	Moon Zoom (Aut1) Taxi KRP within Bright Lights, Big City (Sum1)
	Year 2	Use a range of mechanisms (levers, sliders, wheels and axles) in models or products.	A mechanism is a device that takes one type of motion or force and produces a different one. A mechanism makes a job easier to do. Mechanisms include sliders, levers, linkages, gears, pulleys and cams.	Bounce (Sum1)
	Year 3	Explore and use a range of mechanisms (levers, sliders, axles, wheels and cams) in models or products.	Levers consist of a rigid bar that rotates around a fixed point, called a fulcrum. They reduce the amount of work needed to lift a heavy object. Sliders move from side to side or up and down, and are often used to make moving parts in books. Axles are shafts on which wheels can rotate to make a moving vehicle. Cams are devices that can convert circular motion into up-and-down motion.	Flow (Spr2) Mighty Metals (Sum2)
	Year 5	Use mechanical systems in their products, such as pneumatics and hydraulics.	Pneumatic systems use energy that is stored in compressed air to do work, such as inflating a balloon to open a model monster's mouth. These effects can be achieved using syringes and plastic tubing. Hydraulic mechanisms work in a similar way, but instead of air, the system is filled with a liquid, usually water. It is important that the system is air or watertight.	Scream Machine (Spr2)
	Year 6	Explain and use mechanical systems in their products to meet a design brief.	Mechanical systems can include sliders, levers, linkages, gears, pulleys and cams. Other mechanisms include pneumatics and hydraulics.	Tomorrow's World (Spr1)

	Year Group	Learning Intention	Knowledge	Coverage
Compare and Contrast	Year 1	Describe the similarities and differences between two products.	Two products can be compared by looking at a set of criteria and scoring both products against each one.	Taxi KRP within Bright Lights, Big City (Sum1)
	Year 2			Towers, Tunnels and Turrets (Aut1)
	Year 4	Create and complete a comparison table to compare two or more products.	A comparison table can be used to compare products by listing specific criteria on which each product can be judged or scored.	Burps, Bottoms & Bile (Aut2)
	Year 6	Create a detailed comparative report about two or more products or inventions.	Products and inventions can be compared using a range of criteria, such as the impact on society, ease of use, appearance and value for money.	Tomorrow's World (Spr1)

	Year Group	Learning Intention	Knowledge	Coverage
Everyday Products	Year 1	Name and explore a range of everyday products and describe how they are used.	Everyday products are objects that are used routinely at home and school, such as a toothbrush, cup or pencil. All products are designed for a specific purpose.	Moon Zoon (Aut2) Taxi KRP within Bright Lights, Big City (Sum1)
	Year 2	Explain how an everyday product could be improved.	Products can be improved in different ways, such as making them easier to use, more hardwearing or more attractive.	Towers, Tunnels & Turrets (Aut1)
	Year 3	Explain how an existing product benefits the user.	Particular products have been designed for specific tasks, such as nail clippers, the spinning top and the cool box.	Mighty Metals (Sum2)
	Year 4	Investigate and identify the design features of a familiar product.	Design features are the aspects of a product's design that the designer would like to emphasise, such as the use of a particular material or feature that makes the product easier to use or more durable.	I Am Warrior (Aut1) Playlist (Spr2) Misty Mountain Sierra (Sum1) Road Trip USA (Sum2)
	Year 5	Explain how the design of a product has been influenced by the culture or society in which it was designed or made.	Culture is the language, inventions, ideas and art of a group of people. A society is all the people in a community or group. Culture affects the design of some products. For example, knives and forks are used in the western world, whereas chopsticks are used mainly in China and Japan. The design of products needs to take into account the culture of the target audience. For example, colours might mean very different things in different cultures.	Stargazers (Aut2)
	Year 6	Analyse how an invention or product has significantly changed or improved people's lives.	People's lives have been improved in countless ways due to new inventions and designs. For example, the Morrison shelter, designed by John Baker in 1941, was an indoor air-raid shelter used in over half a million homes during the Second World War. It saved the lives of many people caught in bombing raids.	Tomorrow's World (Spr1)
Staying Safe				
	Year 1	Follow the rules to keep safe during a practical task.	Rules are made to keep people safe from danger. Safety rules include always listening carefully and following instructions, using equipment only as and when directed, wearing protective clothing if appropriate and washing hands before touching food.	Taxi KRP within Bright Lights, Big City (Sum1)
	Year 2	Work safely and hygienically in construction and cooking activities.	Hygiene rules include washing hands before handling food, cleaning surfaces, tying long hair back, storing food appropriately and wiping up spills.	Bounce (Sum1)
	Year 3	Use appliances safely with adult supervision.	Electrical appliances must only be used under the supervision of an adult. Safety rules must also be followed when using electricity: fingers and other objects must not be put into electrical outlets, anything with a cord or plug should never be used around water and a plug should never be pulled out by its cord.	Mighty Metals (Sum2)
	Year 4	Work safely with everyday chemical products under supervision, such as disinfectant hand wash and surface cleaning spray.	Chemicals are used in the home every day. They include cleaning products, such as bleach and disinfectant, but also paints, glues, oils, pesticides and medicines. Most chemical products carry a hazard symbol showing in what way the chemical could be harmful. Chemicals should only be used under adult supervision. Appropriate safety precautions, such as wearing goggles and gloves, working in a well-ventilated room, wiping up spills and tying back long hair, should be taken.	I Am Warrior (Aut1)
	Year 5	Explain the functionality and purpose of safety features on a range of products.	Safety features are often incorporated into products that might cause harm. Some examples include the child-safety caps on medicine bottles, seatbelts in cars, covers for electrical sockets and finger guards on doors.	Scream Machine (Spr2)
	Year 6	Demonstrate how their products take into account the safety of the user.	The safety of the user has to be taken into account when designing a new product. Methods to help keep users safe include providing clear instructions for use; clear indication of the age range for which it is designed; safety features (such as child-resistant packaging); warning symbols and electrical safety checks.	Tomorrow's World(Spr1)

Big Idea – **Significance**

Significant People	Year Group	Learning Intention	Knowledge	Coverage
	Year 1	Describe why a product is important.	The importance of a product may be that it fulfils its goals and performs a useful purpose.	Taxi KRP within Bright Lights, Big City (Sum1)
	Year 2	Explain why a designer or inventor is important.	Many key individuals have helped to shape the world. These include engineers, scientists, designers, inventors and many other people in important roles.	Towers, Tunnels and Turrets (Aut1)
	Year 3	Explain how and why a significant designer or inventor shaped the world.	Significant designers and inventors can shape the world.	Through the Ages (Aut1)
	Year 4	Explain how and why a significant designer or inventor shaped the world.	Significant designers and inventors can shape the world.	I Am Warrior (Aut1)
	Year 6	Present a detailed account of the significance of a favourite designer or inventor.	**The** significance of a designer or inventor can be measured in various ways. Their work may benefit society in health, transport, communication, education, the built environment or technology. It may enhance culture in different areas, such as fashion, ceramics or computer games.	Tomorrow's World (Spr1)