



Design and Technology

Fairfield Spencer Academy

Intent

"Anyone who has never made a mistake has never tried anything new." Albert Einstein

"Design and technology should be the subject where mathematical brainboxes and science whizzkids turn their bright ideas into useful products." James Dyson

At Fairfield Spencer Academy, our children use their creativity and imagination to design and make products solving real life issues and problems across a variety of contexts. Projects are structured to incorporate all elements of the Design and Technology National Curriculum including: design, make, evaluate and technical knowledge. Design and Technology is woven through our 'SHINE Curriculum' to enable children to draw upon and apply their knowledge and skills from other subjects, such as mathematics, science, computing and art.

Our children are challenged to 'think like an inventor', using their substantive and disciplinary knowledge to ask questions, gather and evaluate information and to draw conclusions. Children work both as individuals and collaboratively to complete a design cycle that meets the criteria of the brief, using a range of materials and practical skills, whilst being taught to critique and evaluate aspects of their plans. Our vision is to encourage children to take risks, so that they become resourceful, innovative, enterprising and capable citizens.

I am a Fairfield designer because...

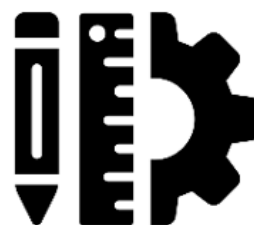


...I confidently use my knowledge and practical skills to explore, use and improve a product.



...I plan, design and communicate my ideas to solve a problem.

...I explore existing products to help me design and create



...I select from and use a range of tools and equipment

...I select from and use a range of materials and components

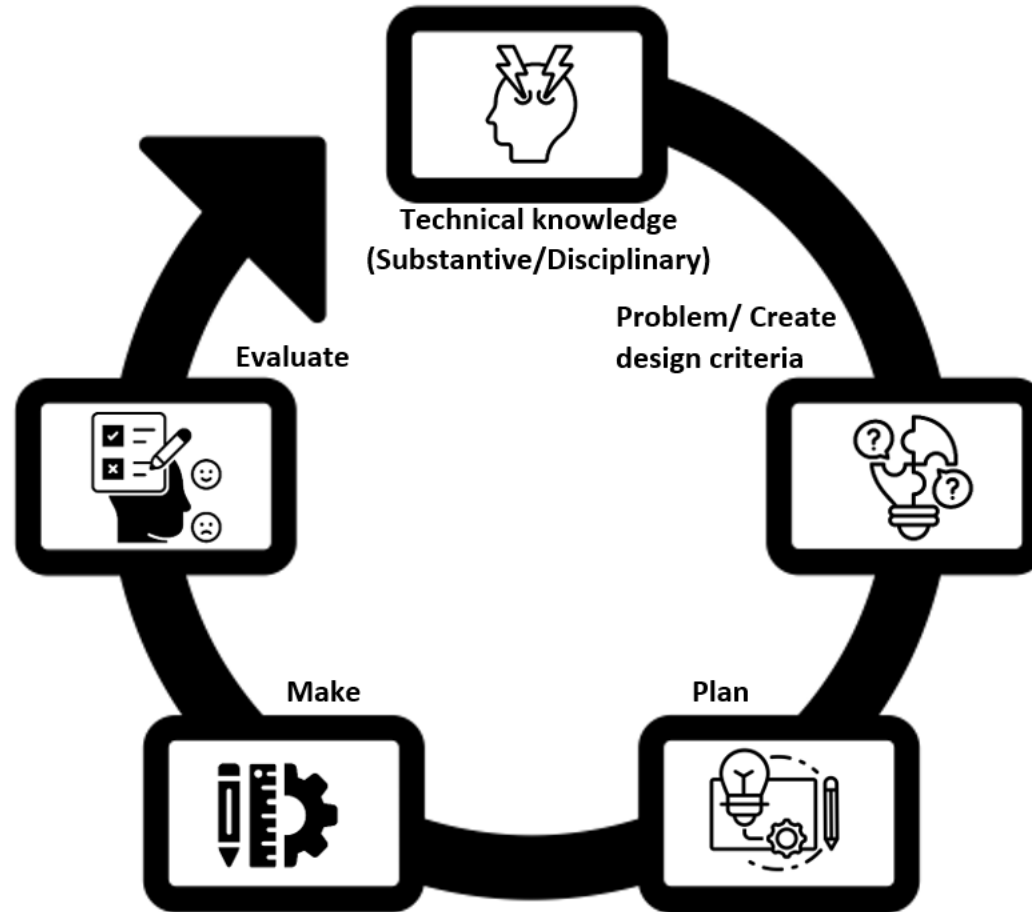


...I critique, evaluate and test my own and others' work against the design criteria.

Implementation

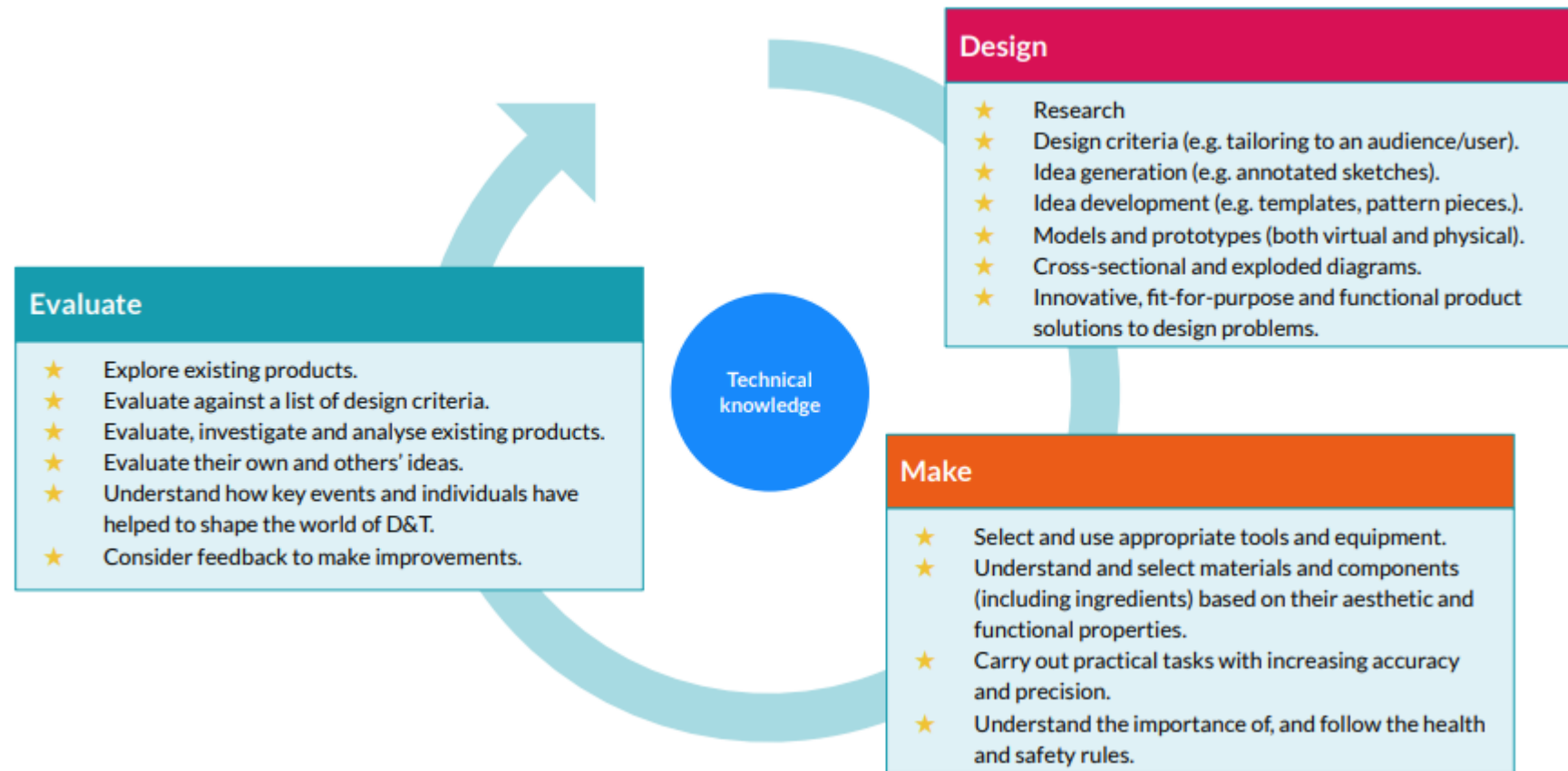
Design Technology Process at Fairfield

Our DT curriculum follows a 5-step cycle:



Each unit of work will follow the Product Design Process.

The Design and technology National Curriculum outlines the three main stages of the design process: design, make and evaluate. Each Design and Technology project studied follows these stages, to form a full project. Each stage of the design process is underpinned by technical knowledge which encompasses the contextual, historical and technical understanding, required for each project.



Evidence of Design and Technology



Design and Technology is a subject that involves practical activity. We are currently implementing pupil Showbie accounts to support evidence collation. Assessment is integrated within every DT lesson: including self/peer evaluation, in the moment feedback, observation, photo and video evidence of pupil's learning.



The children also have their own sketch books where any recorded learning can be presented with pride.

Impact

At Fairfield Spencer Academy, our aim is for our Design and Technology curriculum to develop children to confidently use their creativity to design and create products, to become resourceful and enterprising and knowing how to draw upon their knowledge and skills to make products for specific audiences and purposes. They will be able to critique and analyse their own and other's work. By the time our children are ready to move onto Key Stage 3, they will have the knowledge and expertise to participate in an increasingly technological world. We measure the impact of our Design and Technology curriculum through monitoring work in sketchbooks and on Showbie, pupil voice, by taking learning walks and termly data analysis.

EYFS Early Learning Goals

Physical Development	Fine Motor Skills	• Use a range of small tools, including scissors, paintbrushes and cutlery.
Expressive Arts and Design	Creating with Materials	• Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. • Share their creations, explaining the process they have used. • Make use of props and materials when role playing characters in narratives and stories

Design and Technology National Curriculum

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Design					

- design purposeful, functional, appealing products for themselves and other users based on design criteria - generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology	- use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups - generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design
Make	
- select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] - select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics	- select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately - select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities
Evaluate	
- explore and evaluate a range of existing products - evaluate their ideas and products against design criteria	- investigate and analyse a range of existing products - evaluate their ideas and products against their own design criteria and consider the views of others to improve their work - understand how key events and individuals in design and technology have helped shape the world
Technical Knowledge	
- build structures, exploring how they can be made stronger, stiffer and more stable - explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products	- apply their understanding of how to strengthen, stiffen and reinforce more complex structures - understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] - understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] - apply their understanding of computing to program, monitor and control their products
Cooking and Nutrition	
- use the basic principles of a healthy and varied diet to prepare dishes - understand where food comes from.	- understand and apply the principles of a healthy and varied diet - prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques - understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.
Coverage and Progression (Kapow)	
Kapow – Teacher access to Kapow online resources	

Year 1			
Textiles: Puppets (4 lessons) Autumn 2 - Join fabrics together using pins, staples or glue. - Design a puppet and use a template. - Join their two puppets' faces together as one. - Decorate a puppet to match their design	Structures: Constructing a windmill Spring 2 - Follow design criteria to meet the needs of a user. - Make a stable structure. - Make functioning sails/blades that attach to the supporting structure. - Improve their windmill	Smoothies (6 lessons) Summer 2 - Describe fruits and vegetables and explain how to identify fruits. - Name a range of places that fruits and vegetables grow. - Describe basic characteristics of fruit and vegetables. - Prepare fruits and vegetables to make a smoothie.	Mechanisms: An introduction to mechanisms (Lesson 1) Summer 2 Identify whether a mechanism is a side-to-side slider or an up-and-down slider and determine what movement the mechanism will make
Year 2			
Mechanisms: Fairground wheel (4 lessons) Autumn 1 - Design and label a wheel. - Consider the designs of others and make comments about their practicality or appeal. - Consider the materials, shape, construction and mechanisms of their wheel. - Label their designs. - Build a stable structure with a rotating wheel. - Test and adapt their designs as necessary. - Follow a design plan to make a completed model of the wheel.	Design and technology Unit: Cooking and nutrition: Balanced diet (Lesson 1) Autumn 2 To recognise foods and their food groups	Structures: Baby bear's chair (4 lessons) Spring 1 - Identify man-made and natural structures. - Identify stable and unstable structural shapes. - Contribute to discussions. - Identify features that make a chair stable. - Work independently to make a stable structure, following a demonstration. - Explain how their ideas would be suitable for Baby Bear. - Produce a model that supports a teddy, using the appropriate materials and construction techniques. - Explain how they made their model strong, stiff and stable	Mechanisms: Making a moving monster (4 lessons) Summer 1 - Identify the correct terms for levers, linkages and pivots. - Analyse popular toys with the correct terminology. - Create functional linkages that produce the desired input and output motions. - Design monsters suitable for children, which satisfy most of the design criteria. - Evaluate their two designs against the design criteria, using this information and the feedback of their peers to choose their best design. - Select and assemble materials to create their planned monster features.

			Assemble the monster to their linkages without affecting their functionality.
Year 3			
Cooking and nutrition: Eating seasonally (6 lessons) Autumn 2 - Explain that fruits and vegetables grow in different countries based on their climates. - Understand that seasonal fruits and vegetables grow in a given season. - Understand that eating seasonal fruit and vegetables positively affects the environment. - Design a tart recipe using seasonal ingredients.	Textiles: Cross-stitch and appliqué (4 lessons – Egyptian Collars) Spring 1 - To learn how to sew cross-stitch and to appliqué. - To develop and use a template. - To assemble fabric parts into a fabric product. - Decorate fabric using appliqué and cross-stitch.	Structures: Constructing a castle (4 lessons) Summer 1 - Draw and label a simple castle that includes the most common features. - Recognise that a castle is made up of multiple 3D shapes. - Design a castle with key features which satisfy a given purpose. - Score or cut along lines on the net of a 2D shape. - Use glue to securely assemble geometric shapes. - Utilise skills to build a complex structure from simple geometric shapes. - Evaluate their work by answering simple questions	Digital world: Wearable technology (6 lessons) Summer 2 - Give a brief explanation of the digital revolution and/or remember key examples. - Suggest a feature from the virtual micro:bit that is suitable for the product. - Write a program that initiates a flashing LED panel, or another pattern, on the virtual micro:bit when a button is pressed. - Identify errors, if testing is unsuccessful, by comparing their code to a correct example. - Explain the basic functionality of their finished program. - Suggest key features for a way to attach the product to the user, with some consideration for the overall theme and the user. - Create annotated diagrams to help illustrate how their product is worn. - Describe what is meant by 'point of sale display' with an example. - Follow basic design requirements using computer-aided design, drawing at least

			one shape with a text box and bright colours, following a demonstration. - Evaluate their design using a focus group Mechanical systems: Pneumatic toys (Lesson 1) Summer 2 - To understand how pneumatic systems work.
Year 4			
Textiles: Fastenings (Lesson 1) Autumn 1 - To explain the advantages and disadvantages of different types of fastening type Mechanical systems: Making a slingshot car (4 lessons) Autumn 2 - Work independently to produce an accurate, functioning car chassis. - Design a shape that is suitable for the project. - Attempt to reduce air resistance through the design of the shape. - Produce panels that will fit the chassis and can be assembled effectively using the tabs they have designed. - Construct car bodies effectively. - Conduct a trial accurately and draw conclusions and improvements from the results	Cooking and nutrition: Adapting a recipe (Lesson 2) Spring 1 - To evaluate existing biscuit products - To prepare and cook a dish.	Electrical systems: Torches (4 lessons) Summer 1 - Identify electrical products and explain why they are useful. - Help to make a working switch. - Identify the features of a torch and how it works. - Describe what makes a torch successful. - Create suitable designs that fit the success criteria and their own design criteria. - Create a functioning torch with a switch according to their design criteria	Structure: Pavilions (4 lessons) Summer 2 - Produce a range of free-standing frame structures of different shapes and sizes. - Design a pavilion that is strong, stable and aesthetically pleasing. - Select appropriate materials and construction techniques to create a stable, free-standing frame structure. - Select appropriate materials and techniques to add cladding to their pavilion
Year 5			
Mechanical systems: Making a pop-up book (4 lessons) Autumn 1	Electrical systems: Doodlers (4 lessons) Spring 2		Developing a recipe (6 lessons) Summer 1

• Produce a suitable plan for each page of their book. • Produce the structure of the book. • Assemble the components necessary for all their structures/mechanisms. • Hide the mechanical elements with more layers using spacers where needed. • Use a range of mechanisms and structures to illustrate their story and make it interactive for the users. • Use appropriate materials and captions to illustrate the story.	• Identify simple circuit components (battery, bulb and switch) with a basic explanation of their function. • Explain that a series circuit is assembled in a loop to allow the electricity to flow along one path. • Describe a motor as a circuit component that changes electrical energy into movement. • Provide examples of motorised products that use movement to rotate or spin different parts. • Remove and replace different parts of a Doodler, as part of a team. • Suggest ways to switch the configuration to amend the form or function of the Doodler. • Explain, in an investigation report, each of the changes they made and the effect this had on the Doodler's ability to draw scribbles (function) and appearance (form). • Develop design criteria with consideration for the target user, the purpose of their Doodler, a key function and the Doodler's form and final appearance (e.g. fun, bright, soft). • Explain simply why their Doodler has a certain configuration based on the findings of their investigation (e.g. I used four pens because the Doodler would fall over with two). • Create a functional Doodler that creates scribbles on paper with or without a switch. • Identify and list each of the required materials, tools and circuit components required to build a Doodler. • Explain simply the steps to assemble a Doodler as part of a set of instructions (or storyboard). • Write instructions to build a functional circuit, explaining how to identify if it is functional or not. • Provide suggestions to improve a peer's set of instructions after testing how effective they are at guiding someone.	• Describe the process of beef production. • Research a traditional recipe and make changes to it. • Add nutritional value to a recipe by selecting ingredients. • Prepare and cook a version of Bolognese sauce.
Year 6		

Textiles: Waistcoats (4 lessons) Autumn 2 - Consider a range of factors in their design criteria and use this to create a waistcoat design. - Use a template to mark and cut out a design. - Use a running stitch to join fabric to make a functional waistcoat. - Attach a secure fastening, as well as decorative objects. - Evaluate their final product	Structure: Playgrounds (4 lessons) Spring 2 - Create five apparatus designs, applying the design criteria to their work. - Make suitable changes to their work after peer evaluation. - Make roughly three different structures from their plans using the materials available. - Complete their structures, improving the quality of their rough versions and applying some cladding to a few areas. - Secure their apparatus to a base. - Make a range of landscape features using a variety of materials which will enhance their apparatus.	Digital world: Navigating the world (4 lessons) Summer 2 - Incorporate key information from a client's design request such as 'multifunctional' and 'compact' in their design brief. - Write a program that displays an arrow to indicate cardinal compass directions with an 'On start' loading screen. - Identify errors (bugs) in the code and suggest ways to fix (debug) them. - Self and peer evaluate a product concept against a list of design criteria with basic statements. - Identify key industries that use 3D CAD modelling and why. - Recall and describe the name and use of key tools used in Tinkercad (CAD) software. - Combine more than one object to develop a finished 3D CAD model in Tinkercad. - Complete a product pitch plan that includes key information.
For an in-depth look at the progression of knowledge and skills, click here.		