



Orchard Academy

Design and Technology Curriculum - Overview









Why Teach Design and Technology?

Design and Technology involves learning about designed and manufactured products. It fosters an understanding of how things work and takes children on a journey to design and make functional products for specific purposes and users. It is an avenue through which children can develop their creativity and innovation through design – discovering the manmade world that they live in.




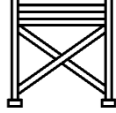


Design and Technology is a practical and valuable subject. It enables children and young people to actively contribute to the creativity, culture, wealth and well-being of themselves, their community and their nation. It teaches how to take risks and so become more resourceful, innovative, enterprising and capable.

Design and Technology Principles

These elements should be in place to ensure that learning is genuinely design and technological in nature. Different projects will have a different profile, depending on the project being undertaken, each D&T principle will be emphasised to a greater or lesser degree.

User 	Purpose 	Functionality 
Who the products are for	What tasks the products will perform	How the products will work
Design Decisions 	Innovation 	Authenticity 
The opportunity to make choices	Being original with thinking	How believable/real the products are

Design and Technology – Substantive Big Ideas




KS1 Only	KS1 and KS2			KS2 only	
Mechanisms	Food	Textiles	Structures	Mechanical Systems	Electrical Systems
					

Curriculum Overview

The following table provides an overview of the projects taught in each year and term. The key aspects of design and technology are covered including, textiles, food, construction materials, mechanical components and in key stage 2 electrical components.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn	Mechanisms Sliders and Levers	Textiles Templates and Joining Techniques	Mechanical Systems Levers and Linkages	Structures Shell Structures	Mechanical Systems Cams	Textiles Combining Different Fabric Shapes
	Structures Freestanding Structures	Food Preparing Fruit and Vegetables	Mechanical Systems Pneumatics	Textiles 2-D Shape to 3-D Product	Structures Frame Structures	Electrical Systems More Complex Switches and Circuits
Spring	Mechanisms Wheels and Axles		Food Healthy and Varied Diets	Electrical Systems Simple Circuits and Switches	Food Celebrating Culture and Seasonality	Mechanical Systems Pulleys or Gears

Disciplinary Knowledge

	Designing	Understanding contexts, users and purposes
		Generating, developing, modelling and communicating ideas
	Making	Planning
		Practical skills and techniques
	Evaluating	Own ideas and products
		Existing products
		Key events and individuals

Design and Technology Teaching Approaches

Following the D&T Association's 'Projects on a Page' we use the following approaches to teaching topics.

- Investigative and Evaluative Activities** (IEAs) where children learn from a range of existing products and find out about D&T in the wider world;
- Focused Tasks** (FTs) where they are taught specific technical knowledge, designing skills and making skills;
- Design, Make and Evaluate Assignment** (DMEA) where children create functional products with users and purposes in mind.



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Design and Technology Curriculum Map



		Year3	Year 4	Year 5	Year 6
Autumn Term	Aspect	Mechanical Systems	Structures	Mechanical Systems	Textiles
	Focus	Levers and Linkages <i>Human Joints</i>	Shell Structures / Shell Structures using Computer-Aided Design (CAD) <i>Containers for equipment</i>	Cams <i>Viking Longboat</i>	Combining Different Fabric Shapes / Using CAD in Textiles <i>Tool / Equipment Belt</i>
	Design	<ul style="list-style-type: none"> Generate realistic ideas and their own design criteria through discussion, focusing on the needs of the user. Use annotated sketches and prototypes to develop, model and communicate ideas. 	<ul style="list-style-type: none"> Generate realistic ideas and design criteria collaboratively through discussion, focusing on the needs of the user and purpose of the product. Develop ideas through the analysis of existing products and use annotated sketches and prototypes to model and communicate ideas. 	<ul style="list-style-type: none"> Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources. Develop a simple design specification to guide their thinking. Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views. 	<ul style="list-style-type: none"> Generate innovative ideas by carrying out research including surveys, interviews and questionnaires. Develop, model and communicate ideas through talking, drawing, templates, mock-ups and prototypes and, where appropriate, computer aided design (CAD). Design purposeful, functional, appealing products for the intended user that are fit for purpose based on a simple design specification.
	Make	<ul style="list-style-type: none"> Order the main stages of making. Select from and use appropriate tools with some accuracy to cut, shape and join paper and card. Select from and use finishing techniques suitable for the product they are creating. 	<ul style="list-style-type: none"> Order the main stages of making. Select and use appropriate tools to measure, mark out, cut, score, shape and assemble with some accuracy. Explain their choice of materials according to functional properties and aesthetic qualities. Use finishing techniques suitable for the product they are creating 	<ul style="list-style-type: none"> Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team. Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. Work within the constraints of time, resources and cost. 	<ul style="list-style-type: none"> Produce detailed lists of equipment and fabrics relevant to their tasks. Formulate step-by-step plans and, if appropriate, allocate tasks within a team. Select from and use a range of tools and equipment to make products that are accurately assembled and well finished. Work within the constraints of time, resources and cost
	Evaluate	<ul style="list-style-type: none"> Investigate and analyse books and, where available, other products with lever and linkage mechanisms. Evaluate their own products and ideas against criteria and user needs, as they design and make. 	<ul style="list-style-type: none"> Investigate and evaluate a range of existing shell structures including the materials, components and techniques that have been used. Test and evaluate their own products against design criteria and the intended user and purpose 	<ul style="list-style-type: none"> Compare the final product to the original design specification. Test products with the intended user, where safe and practical, and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. Consider the views of others to improve their work. Investigate famous manufacturing and engineering companies relevant to the project. 	<ul style="list-style-type: none"> Investigate and analyse textile products linked to their final product. Compare the final product to the original design specification. Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. Consider the views of others to improve their work.
	Technical Knowledge	<ul style="list-style-type: none"> Understand and use lever and linkage mechanisms. Distinguish between fixed and loose pivots. Know and use technical vocabulary relevant to the project. 	<ul style="list-style-type: none"> Develop and use knowledge of how to construct strong, stiff shell structures. Develop and use knowledge of nets of cubes and cuboids and, where appropriate, more complex 3D shapes. Know and use technical vocabulary relevant to the project. 	<ul style="list-style-type: none"> Understand that mechanical systems have an input, process and an output. Understand how cams can be used to produce different types of movement and change the direction of movement. Know and use technical vocabulary relevant to the project. 	<ul style="list-style-type: none"> A 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics. Fabrics can be strengthened, stiffened and reinforced where appropriate.

		Year3	Year 4	Year 5	Year 6
Spring Term	Aspect	Mechanical Systems	Textiles	Structures	Electrical Systems
	Focus	Pneumatics <i>Forces and movement</i>	2-D Shape to 3-D Product <i>Reusable products</i>	Frame Structures <i>Shelter Building</i>	More Complex Switches and Circuits <i>Security Alarms</i>
	Design	<ul style="list-style-type: none"> Generate realistic and appropriate ideas and their own design criteria through discussion, focusing on the needs of the user. Use annotated sketches and prototypes to develop, model and communicate ideas. 	<ul style="list-style-type: none"> Generate realistic ideas through discussion and design criteria for an appealing, functional product fit for purpose and specific user/s. Produce annotated sketches, prototypes, final product sketches and pattern pieces.	<ul style="list-style-type: none"> Carry out research into user needs and existing products, using surveys, interviews, questionnaires and web-based resources. Develop a simple design specification to guide the development of their ideas and products, taking account of constraints including time, resources and cost. Generate, develop and model innovative ideas, through discussion, prototypes and annotated sketches. 	<ul style="list-style-type: none"> Use research to develop a design specification for a functional product that responds automatically to changes in the environment. Take account of constraints including time, resources and cost. Generate and develop innovative ideas and share and clarify these through discussion. Communicate ideas through annotated sketches, pictorial representations of electrical circuits or circuit diagrams.
Make	<ul style="list-style-type: none"> Order the main stages of making. Select from and use appropriate tools with some accuracy to cut and join materials and components such as tubing, syringes and balloons. Select from and use finishing techniques suitable for the product they are creating. 	<ul style="list-style-type: none"> Plan the main stages of making. Select and use a range of appropriate tools with some accuracy e.g. cutting, joining and finishing. Select fabrics and fastenings according to their functional characteristics e.g. strength, and aesthetic qualities e.g. pattern. 	<ul style="list-style-type: none"> Formulate a clear plan, including a step-by-step list of what needs to be done and lists of resources to be used. Competently select from and use appropriate tools to accurately measure, mark out, cut, shape and join construction materials to make frameworks. Use finishing and decorative techniques suitable for the product they are designing and making. 	<ul style="list-style-type: none"> Formulate a step-by-step plan to guide making, listing tools, equipment, materials and components. Competently select and accurately assemble materials, and securely connect electrical components to produce a reliable, functional product. Create and modify a computer control program to enable an electrical product to work automatically in response to changes in the environment 	

Evaluate	<ul style="list-style-type: none"> Investigate and analyse books, videos and products with pneumatic mechanisms. Evaluate their own products and ideas against criteria and user needs, as they design and make. 	<ul style="list-style-type: none"> Investigate a range of 3-D textile products relevant to the project. Test their product against the original design criteria and with the intended user. Take into account others' views. Understand how a key event/individual has influenced the development of the chosen product and/or fabric. 	<ul style="list-style-type: none"> Investigate and evaluate a range of existing frame structures. Critically evaluate their products against their design specification, intended user and purpose, identifying strengths and areas for development, and carrying out appropriate tests. Research key events and individuals relevant to frame structures. 	<ul style="list-style-type: none"> Continually evaluate and modify the working features of the product to match the initial design specification. Test the system to demonstrate its effectiveness for the intended user and purpose. Investigate famous inventors who developed ground-breaking electrical systems and components.
	Technical Knowledge	<ul style="list-style-type: none"> Understand and use pneumatic mechanisms. Know and use technical vocabulary relevant to the project. 	<ul style="list-style-type: none"> Know how to strengthen, stiffen and reinforce existing fabrics. Understand how to securely join two pieces of fabric together. Understand the need for patterns and seam allowances. Know and use technical vocabulary relevant to the project. 	<ul style="list-style-type: none"> Understand how to strengthen, stiffen and reinforce 3-D frameworks. Know and use technical vocabulary relevant to the project.

		Year3	Year 4	Year 5	Year 6
Summer Term	Aspect	Food	Electrical Systems	Food	Mechanical Systems
	Focus	Healthy and Varied Diets <i>Lunch on the road</i>	Simple Circuits and Switches <i>Light</i>	Celebrating Culture and Seasonality <i>Savoury Food</i>	Pulleys or Gears <i>Vehicles</i>
	Design	<ul style="list-style-type: none"> Generate and clarify ideas through discussion with peers and adults to develop design criteria including appearance, taste, texture and aroma for an appealing product for a particular user and purpose. Use annotated sketches and appropriate information and communication technology, such as web-based recipes, to develop and communicate ideas. 	<ul style="list-style-type: none"> Gather information about needs and wants and develop design criteria to inform the design of products that are fit for purpose, aimed at particular individuals or groups. Generate, develop, model and communicate realistic ideas through discussion and, as appropriate, annotated sketches, cross-sectional and exploded diagrams. 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Generate innovative ideas by carrying out research using surveys, interviews, questionnaires and web-based resources. Develop a simple design specification to guide their thinking. Develop and communicate ideas through discussion, annotated drawings, exploded drawings and drawings from different views.
	Make	<ul style="list-style-type: none"> Plan the main stages of a recipe, listing ingredients, utensils and equipment. Select and use appropriate utensils and equipment to prepare and combine ingredients. Select from a range of ingredients to make appropriate food products, thinking about sensory characteristics. 	<ul style="list-style-type: none"> Order the main stages of making. Select from and use tools and equipment to cut, shape, join and finish with some accuracy. Select from and use materials and components, including construction materials and electrical components according to their functional properties and aesthetic qualities 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Produce detailed lists of tools, equipment and materials. Formulate step-by-step plans and, if appropriate, allocate tasks within a team. Select from and use a range of tools and equipment to make products that that are accurately assembled and well finished. Work within the constraints of time, resources and cost.
	Evaluate	<ul style="list-style-type: none"> Carry out sensory evaluations of a variety of ingredients and products. Record the evaluations using e.g. tables and simple graphs. Evaluate the ongoing work and the final product with reference to the design criteria and the views of others. 	<ul style="list-style-type: none"> Investigate and analyse a range of existing battery-powered products. Evaluate their ideas and products against their own design criteria and identify the strengths and areas for improvement in their work. 	<ul style="list-style-type: none"> 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, taking into account the views of others when identifying improvements. Understand how key chefs have influenced eating habits to promote varied and healthy diets. 	<ul style="list-style-type: none"> Compare the final product to the original design specification. Test products with intended user and critically evaluate the quality of the design, manufacture, functionality and fitness for purpose. Consider the views of others to improve their work. Investigate famous manufacturing and engineering companies relevant to the project.
Technical Knowledge	<ul style="list-style-type: none"> Know how to use appropriate equipment and utensils to prepare and combine food. Know about a range of fresh and processed ingredients appropriate for their product, and whether they are grown, reared or caught. Know and use relevant technical and sensory vocabulary appropriately. 	<ul style="list-style-type: none"> Understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs and buzzers. Apply their understanding of computing to program and control their products. Know and use technical vocabulary relevant to the project. 	<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. Know and use relevant technical and sensory vocabulary. 	<ul style="list-style-type: none"> Understand that mechanical and electrical systems have an input, process and an output. Understand how gears and pulleys can be used to speed up, slow down or change the direction of movement. Know and use technical vocabulary relevant to the project. 	