

Design and Technology



"High- quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation"

The National Curriculum; 2013

Design and Technology



“At Ellington Primary School, Design and Technology strives to explore, creatively design and make products that solve real and relevant problems, and then evaluate how successful the results are.”

Design and Technology Overview

At Ellington Primary School, we follow the National Curriculum for design and technology aims to ensure that all pupils:

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

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Please find National Curriculum document here:

<https://www.gov.uk/government/publications/national-curriculum-in-england-art-and-design-programmes-of-study>

Design and Technology Curriculum Mapping

At Ellington Primary School, we have a clearly mapped out curriculum with clear, sequential progression from EYFS to Year 6.

As a school, we use the Kapow Scheme of work. Kapow is a clear and comprehensive scheme of work in line with the National Curriculum. This ensures there is a progression of skills and consistency of approach across the school, whilst also ensuring that teachers and pupils are supported in developing skills and subject knowledge.

The Kapow progression documents support our mapping of the curriculum. Yearly overviews guide teachers to ensure that coverage of all units of work and National Curriculum expectations are met.

- National Curriculum mapping:
[Design and Technology National Curriculum Mapping – Kapow Primary](#)
- Progression of skills and knowledge:
[Design and technology progression of pupil skills and knowledge \(kapowprimary.com\)](#)
- Long-term planning:
[Design and Technology Long Term Plan \(kapowprimary.com\)](#)

Kapow Overview

Kapow offers full coverage of the KS1 and KS2 Design & Technology curriculum and there are four main strands that run through each topic:

- Design
- Make
- Evaluate
- Technical Knowledge.

The Scheme uses a clear progression of skills and knowledge within these strands, across each year group. It promotes development of skills in 6 key areas:

- Mechanisms
- Structures
- Textiles
- Cooking and nutrition
- Electrical systems (KS2)
- Digital World (KS2)

Foundation Stage

During the Early Years Foundation Stage, the essential building blocks of children's design and technology capability are established. The EYFS framework is structured very differently to the national curriculum as it is organised across seven areas of learning rather than subject areas. Within the Early Year's Foundation Stage (EYFS), children are immersed in art and design in a child-initiated way. As time goes on, they are expected to be more active learners and keep going when they encounter difficulty, until they are developing their own ideas and thinking critically.

There are many opportunities for carrying out D&T-related play activities in all areas of learning. It is very similar to the school process, but it takes the whole foundation stage to complete. Initially children investigate, explore and have a go. Children within Nursery and Reception will be provided with many, varied opportunities to support their learning within this DT. These include:

Constructing: Learning to construct with a purpose in mind, for example, some children use scissors, glue, string and a hole punch to make a bag.

Structure and joins: Using a range of tools: children will learn about planning and adapting initial ideas to make them better. For example, a child might choose to use scissors, a stapler, elastic bands and glue to join bits together to make a toy vehicle. But they might then modify their initial idea by using masking tape.

Cooking techniques: Children will practise stirring, mixing, pouring and blending ingredients during cookery activities.

Exploration: Children will dismantle things and learn about how everyday objects work.

Discussion: Children will be given opportunities to discuss reasons that make activities safe or unsafe, for example hygiene, electrical awareness, and appropriate use of senses when tasting different flavourings. They will also learn to record their experiences by, for example, drawing, writing, taking a photograph and making model.

The table below outlines the most relevant statements taken from the Early Learning Goals in the EYFS statutory framework and the Development Matters age ranges for Three and Four Year-Olds and Reception to match the programme of study for DT.

| Three and Four Year Olds | |
|--|--|
| Personal, Social and Emotional Development | <ul style="list-style-type: none"> Select and use activities and resources, with help when needed. This helps them to achieve a goal they have chosen or one which is suggested to them. |
| Physical Development | <ul style="list-style-type: none"> Use large-muscle movements to wave flags and streamers, paint and make marks. Choose the right resources to carry out their own plan. Use one-handed tools and equipment, including scissors, paintbrushes, and cutlery. |
| Understanding the World | <ul style="list-style-type: none"> Explore how things work. |
| Expressive Arts and Design | <ul style="list-style-type: none"> Make imaginative and complex 'small worlds' with blocks and construction kits, such as a city with different buildings and a park. Explore different materials freely, in order to develop their ideas about how to use them and what to make. Develop their own ideas and then decide which materials to use to express them. Create closed shapes with continuous lines and begin to use these shapes to represent objects. |
| Reception | |
| Physical Development | <ul style="list-style-type: none"> Progress towards a more fluent style of moving, with developing control and grace. Develop their small motor skills so that they can use a range of tools competently, safely, and confidently. Use their core muscle strength to achieve a good posture when sitting at a table or sitting on the floor. |
| Expressive Arts and Design | <ul style="list-style-type: none"> Explore, use, and refine a variety of artistic effects to express their ideas and feelings. Return to and build on their previous learning, refining ideas and developing their ability to represent them. Create collaboratively, sharing ideas, resources, and skills. |
| ELG | |
| Physical Development | Fine Motor Skills <ul style="list-style-type: none"> Use a range of small tools, including scissors, paintbrushes, and cutlery. |
| EAD | Creating with Materials <ul style="list-style-type: none"> 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. |

Specifically, 'Designing and Making' is identified and assessed as a strand within Expressive Art and Design and links closely to Art. By the end of the EYFS, most children should be able to:

- Construct with a purpose in mind, using a variety of resources.
- Use simple tools and techniques competently and appropriately.
- Build and construct with a wide range of objects, selecting appropriate resources and adapting their work when necessary.
- Select the tools and techniques they need to shape, assemble, and join materials they are using.

Key stage 1

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making.

They should work in a range of relevant contexts [for example, the home and school, gardens and playgrounds, the local community, industry, and the wider environment].

When designing and making, pupils should be taught to:

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.

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.

Evaluate

- explore and evaluate a range of existing products
- evaluate their ideas and products against design criteria

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.

Key stage 2

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an iterative process of designing and making.

They should work in a range of relevant contexts [for example, the home, school, leisure, culture, enterprise, industry, and the wider environment].

When designing and making, pupils should be taught to:

Design

- 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 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

- 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

- 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

As part of their work with food, pupils should be taught how to cook and apply the principles of nutrition and healthy eating. Instilling a love of cooking in pupils will also open a door to one of the great expressions of human creativity. Learning how to cook is a crucial life skill that enables pupils to feed themselves and others affordably and well, now and in later life.

Pupils should be taught to:

Key stage 1

- use the basic principles of a healthy and varied diet to prepare dishes
- understand where food comes from.

Key stage 2

- 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.

Outline for Reception – Year 6

| | Autumn | Spring | Summer |
|-----------|--|--|---|
| Reception | Structures: Junk Modelling Exploring materials through junk modelling, children develop their scissor skills and awareness of different materials and joining techniques. Children begin to make verbal plans and material choices before starting and problem solve while making their model. | Textiles: Bookmarks Exploring different ways of joining fabrics before creating their own hand puppets based upon characters from a well-known fairytale. Children work to develop their technical skills of cutting, glueing, stapling and pinning. | Structures: Boats Considering the properties of materials through water play, children discover which materials are waterproof and whether they float or sink. Children evaluate a variety of boats and use their new-found knowledge to design and make a boat that is waterproof and floats. |
| Year 1 | Structures: Constructing a Windmill Design, decorate and build a windmill for a mouse (client) to live in, develop an understanding of different types of windmill, how they work and their key features. Look at real existing examples and the functions that they carry out. | Textiles: Puppets Explore different ways of joining fabrics before creating hand puppets based upon characters from a well-known fairytale. Develop technical skills of cutting, glueing, stapling and pinning. | Cooking & Nutrition: Fruit and Vegetables Handle and explore fruits and vegetables and learn how to identify fruit, before undertaking taste testing to establish chosen ingredients for a smoothie they will make, with accompanying packaging. Coming soon! Please note that This unit is being updated to include six lessons and will be renamed 'Smoothies'. |

| | | | |
|---------------|---|--|---|
| Year 2 | Structures: Baby bear's chair Using the tale of Goldilocks and the Three Bears as inspiration, children help Baby Bear by making him a brand new chair. When designing the chair, they consider his needs and what he likes and explore ways of building it so that it is strong. | Mechanisms: Fairground wheel Designing and creating their own Ferris wheels, considering how the different components fit together so that the wheels rotate and the structures stand freely. Pupils select appropriate materials and develop their cutting and joining skills | Mechanisms: Making a moving monster After learning the terms; pivot, lever and linkage, children design a monster which will move using a linkage mechanism. Children practise making linkages of different types and varying the materials they use to bring their monsters to life. |
| Year 3 | Food: Eating seasonally Discovering when and where fruits and vegetables are grown. Learning about seasonality in the UK and the relationship between the colour of fruits and vegetables and their health benefits by making three dishes. | Digital world: Electronic charm Designing, coding, making and promoting a Micro:bit electronic charm to use in low-light conditions. Children develop their understanding of programming to monitor and control their products | Structures: Constructing a castle Learning about the features of a castle, children design and make one of their own. Using configurations of handmade nets and recycled materials to make towers and turrets and constructing a base to secure them. |
| Year 4 | Structure: Pavilions Exploring pavilion structures, children learn about what they are used for and investigate how to create strong and stable structures before designing and creating their own pavilions, complete with cladding. | Mechanical systems: Making a slingshot car Transforming lollipop sticks, wheels, dowels and straws into a moving car. Using a glue gun to, making a launch mechanism, designing and making the body of the vehicle using nets and assembling these to the chassis. | Electrical systems: Torches Applying their scientific understanding of electrical circuits, children create a torch, designing and evaluating their product against set design criteria. |
| Year 5 | Electrical systems: Doodlers Explore series circuits further and introduce motors. Investigating an existing product, which uses a motor, to encourage pupils to problem-solve and work out how the product has been constructed, ready to develop their own | Mechanical systems: Making a pop-up book Creating a four-page pop-up storybook design incorporating a range of mechanisms and decorative features, including: structures, levers, sliders, layers and spacers. | Food: What could be healthier? Researching and modifying a traditional bolognese sauce recipe to make it healthier. Children cook their healthier versions, making appropriate packaging and learn about farming cattle |
| Year 6 | Textiles: Waistcoats Selecting suitable fabrics, using templates, pinning, decorating and stitching to create a waistcoat for a person or purpose of their choice | Structure: Playgrounds Designing and creating a model of a new playground featuring five apparatus, made from three different structures. Creating a footprint as the base, pupils visualise objects in plan view and get creative with their use of natural features | Digital world: Navigating the world Programming a navigation tool to produce a multifunctional device for trekkers. Combining 3D objects to form a complete product in CAD 3D modelling software and presenting a pitch to 'sell' their product. |

DT Learning Objectives 2023-2024

AUTUMN

Reception: Autumn 1 - Structures: Junk Modelling

Lesson 1: To explore and investigate the tools and materials in the junk modelling area.

Lesson 2: To investigate cutting different materials.

Lesson 3: To learn how to plan and select the correct resources needed to make a model.

Lesson 4: To verbally plan and create a junk model.

Lesson 5: To share a finished model and talk about the processes in its creation.

Lesson 6: To explore different ways to temporarily join materials together.

Year 1: Autumn 1 - Structures: Constructing a Windmill

Lesson 1: To include individual preferences and requirements in my design.

Lesson 2: To make a stable structure.

Lesson 3: To assemble the components of my structure.

Lesson 4: To evaluate my project and adapt my design.

Year 2: Autumn 2 - Structures: Baby Bear's Chair

Lesson 1: To explore the concept and features of structures and the stability of different shapes.

Lesson 2: To understand that the shape of the structure affects its strength.

Lesson 3: To make a structure according to design criteria.

Lesson 4: To produce a finished structure and evaluate its strength, stiffness, and stability.

Year 3: Autumn 1 -Food: Eating Seasonally

Lesson 1: To know that climate affects food growth.

Lesson 2: To understand the advantages of eating seasonal foods grown in the UK.

Lesson 3: To create a recipe that is healthy and nutritious using seasonal vegetables.

Lesson 4: To safely follow a recipe when cooking.

Year 4: Autumn 2-Structure: Pavilions

Lesson 1: To create a range of different shaped frame structures.

Lesson 2: To design a structure.

Lesson 3: To build a frame structure.

Lesson 4: To add cladding to a frame structure.

Year 5: Autumn 1 -Electrical Systems: Doodlers

Lesson 1: To understand how motors are used in electrical products.

Lesson 2: To investigate an existing product to determine the factors that affect the product's form and function.

Lesson 3: To apply the findings from research to develop a unique product.

Lesson 4: To develop a DIY kit for another individual to assemble their product.

Year 6: Autumn 2-Textiles: Waistcoats

Lesson 1: To design a waistcoat.

Lesson 2: To mark and cut fabric according to a design.

Lesson 3: To assemble a waistcoat.

Lesson 4: To decorate your waistcoat.

DT Learning Objectives 2023-2024

SPRING

Reception: Spring 1 -Textiles: Bookmarks

Lesson 1: To develop threading and weaving skills.

Lesson 2: To practice and apply weaving skills to a specific material e.g. paper.

Lesson 3: To practise and apply threading skills with specific materials e.g. hessian and wool.

Lesson 4: To use threading or sewing to design a product (bookmark).

Lesson 5: To create a textiles product (bookmark) following their own design.

Lesson 6: To reflect with children on how they have achieved their aims.

Year 1: Spring 1 -Textiles: Puppets

Lesson 1: To join fabrics together using different methods.

Lesson 2: To use a template to create my design.

Lesson 3: To join two fabrics together accurately.

Lesson 4: To embellish my design using joining methods.

Year 2: Spring 2-Mechanisms: Fairground Wheel

Lesson 1: To explore wheel mechanisms and design a Ferris wheel.

Lesson 2: To select appropriate materials.

Lesson 3: To build and test a moving wheel.

Lesson 4: To make and evaluate a structure with a rotating wheel.

Year 3: Spring 1 -Digital World: Electronic Charm

Lesson 1: To understand the impact of the digital revolution in the world of (D&T) product design.

Lesson 2: To write a program to initiate a flashing LED panel after button press and/or automatically initiate using

the Micro:bit light sensing, as part of an eCharm.

Lesson 3: To create and decorate a foam pouch for the eCharm, using a template.

Lesson 4: To design a display badge and/or stand using CAD (computer-aided design) software for an eCharm Product.

Year 4: Spring2-Mechanical Systems: Making a Slingshot Car

Lesson 1: To build a car chassis.

Lesson 2: To design a shape that reduces air resistance.

Lesson 3: To make a model based on a chosen design.

Lesson 4: To assemble and test my completed product.

Year 5: Spring 1-Mechanical Systems: Making a Pop-up Book

Lesson 1: To design a pop-up book.

Lesson 2: To follow my design brief to make my pop-up book.

Lesson 3: To use layers and spacers to cover the working of mechanisms.

Lesson 4: To create a high-quality product suitable for a target user.

Year 6: Spring 2-Structure: Playgrounds

Lesson 1: To design a playground with a variety of structures.

Lesson 2: To build a range of structures.

Lesson 3: To improve and add detail to structures.

Lesson 4: To create a surrounding landscape.

DT Learning Objectives 2023-2024

SUMMER

Reception: Summer 1-Structure: Boats

Lesson 1: To understand what waterproof means and to test whether materials are waterproof.

Lesson 2: To test and make predictions for which materials float or sink.

Lesson 3: To compare the uses of boats.

Lesson 4: To investigate how the shape and structure of boats affects the way they move.

Lesson 5: To design a boat.

Lesson 6: To create a boat based upon their own design.

Year 1: Summer 1-Food: Fruit and Vegetables

Lesson 1: To identify if a food is a fruit or a vegetable.

Lesson 2: To identify where plants grow and which parts we eat.

Lesson 3: To taste and compare fruit and vegetables.

Lesson 4: To make a fruit and vegetable smoothie.

Year 2: Summer2-Mechanisms: Making a Moving Monster

Lesson 1: To look at objects and understand how they move.

Lesson 2: To look at objects and understand how they move.

Lesson 3: To explore different design options.

Lesson 4: To make a moving monster.

Year 3: Summer 1-Structures: Constructing a Castle

Lesson 1: To recognise how multiple shapes (2D and 3D) are combined to form a strong and stable structure.

Lesson 2: To design a castle.

Lesson 3: To construct 3D nets.

Lesson 4: To construct and evaluate my final product.

Year 4: Summer 2-Electrical Systems: Torches

Lesson 1: To learn about electrical items and how they work.

Lesson 2: To analyse and evaluate electrical products.

Lesson 3: To design a product to fit a set of specific user needs.

Lesson 4: To make and evaluate a torch.

Year 5: Summer 1 -Food: What could be Healthier?

Lesson 1: To understand where food comes from

Lesson 2: To understand the term 'healthy'.

Lesson 3: To adapt a traditional recipe.

Lesson 4: To complete a food product.

Year 6: Summer 2-Digital World: Navigating the World

Lesson 1: To write a design brief and criteria based on a client request.

Lesson 2: To write a program to include multiple functions as part of a navigation device.

Lesson 3: To develop a sustainable product concept.

Lesson 4: To develop 3D CAD skills to produce a virtual model.

Lesson 5: To present a pitch to 'sell' the product to a specified client.