Design Technology Curriculum Guide

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

Contents

Our Intent:

At Knighton Mead, we aim to ensure that all pupils: develop the creative, technical and practical expertise they need to perform everyday tasks confidently and to participate successfully in an increasingly technological world.

National Curriculum Aims

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.

Outcomes

Key Stage 1 Subject Content

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 academy, gardens and playgrounds, the local community, industry and the wider environment].

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.

Key stage 1 pupils should be taught:

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 1 - Cooking

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

Key stage 2 pupils should be taught:

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.

Key stage 2 - Cooking

- 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.

Whole school Coverage:

At Knighton Mead we study Design Technology throughout the year during our topics. Below is an overview of the coverage for each year group.

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Design – cooking and nutrition – fruit and vegetables - smoothies	Design - textiles – basic joining - puppets	Design – cooking and nutrition – eating seasonally/British food	Design - Mechanical systems – making a slingshot car	Design – cooking and nutrition – what could be healthier (link to poor diet)	Design - Textiles – waistcoat
Design – Mechanisms – Fairground wheel	Design - Structures – freestanding structure - landmark	Design – structures – withstand an earthquake	Design – textiles – roman purse with fastenings	Mechanical systems – pop up map	Design - Electrical systems – electronic greeting cards

Skills Progression

	Year 1	Year 2	Year 3	Year4	Year 5	Year 6
Design, make, evaluate and improve	• Explain what they are making and which materials they are using. • Design products that have a clear purpose and an intended user. • Use pictures and words to convey what they want to make. • Make products, using a range of tools to cut, shape, join and finish. • Say what they like and don't like about their product and explain why. • Talk about how closely their finished product meets their design criteria. • Begin to use software to represent 2D designs.		• Investigate existing products, including drawing them to analyse and understand how they are made. • Plan a sequence of actions to make a product. • Develop more than one design. • Develop prototypes. • Generate designs with annotated sketches and computer-aided design (CAD) where appropriate. • Refine work and techniques as work progresses, continually evaluating the product design. • Identify strengths and weaknesses of their design ideas. • Talk about how closely their finished product meets their design criteria and meets the need of the user		• Undertake research to inform design process. This may include surveys and interviews. • Use prototypes, cross-sectional diagrams, exploded diagrams and CAD software to represent designs. • Consider the views of others when evaluating their own work. • Ensure products have a high-quality finish, using art skills where appropriate. • Justify their decisions about materials and methods of construction. • Make suggestions on how their design/product could be improved.	
Construction, mechanics and electronics	Mark out materials to be cut using a template. Attach wheels to chassis using an axle. With support cut strip wood/dowel using a hacksaw.	Use a range of materials to create models with wheels and axles e.g. tubes, dowel and cotton reels. Use materials to practise drilling, screwing, nailing and gluing to strengthen products.	Create series circuits. Strengthen frames using diagonal struts. Begin to use mechanical systems in their products e.g. gears, pulleys and levers.	Create series and parallel circuits. Investigate how to make structures more stable e.g by widening the base. Understand and use mechanical structures in their products e.g. gears, pulleys, levers and gears.	Control a model using an ICT control model. Use a glue gun with close supervision. Join materials using appropriate methods.	Create circuits that employ a number of components (such as LEDs, resistors and transistors). Build frameworks using a range of materials e.g. wood, card and corrugated plastic. Use a cam to make an up and down mechanism.

Materials	Fold, tear and cut paper or card. Investigate strengthening sheet materials. Roll paper to create tubes. Demonstrate a range of joining techniques such as gluing or taping. Measure and mark out lines.	Demonstrate a range of joining techniques such as gluing, taping or creating hinges. Cut materials safely using tools provided. Demonstrate a range of cutting and shaping techniques such as tearing, cutting, folding and curling. Use simple pop-ups.	Measure and mark out accurately. Cut materials accurately and safely by selecting appropriate tools. Cut slots.	Measure and mark out to the nearest mm. Use and explore complex popups. Cut slots and internal shapes. Create nets.	Cut materials with precision. Cut accurately and safely to a marked line. Join/combine materials with temporary, fixed or moving joints.	Cut materials with precision and refine the finish with appropriate tools (such as sanding wood). Show an understanding of the qualities of materials to choose appropriate tools to cut and shape.
Cooking and nutrition	Understand where food comes from. Follow a recipe. Understand the importance of correct storage. Understand seasonality and know where and how a variety of ingredients are grown, reared, caught and processed. Prepare simple dishes-safely and hygienically. Understand the importance of a healthy and varied diet. Measure and weigh ingredients using cups and then scales.					
	Group familiar food products e.g. fruit and vegetables. Cut ingredients safely.	Group foods into the five groups in The Eatwell Plate. Cut, grate or peel ingredients safely.	Cut foods accurately and safely by selecting appropriate tools.	Prepare ingredients hygienically and using the appropriate utensils by following a recipe.	Assemble or cook ingredients, controlling the temperature of the oven or hob if cooking. Create recipes, including ingredients, methods, cooking times and temperatures.	Combine ingredients appropriately e.g. beating or rubbing. Measure ingredients to the nearest gram and millilitre and calculate ratios of ingredients to scale up or down from a recipe. Create and refine recipes, including ingredients, methods, cooking times and temperatures.

Planning, marking and feedback

DT plans are completed by class teachers following the school format in the topic planners. Planning should identify objectives, resources, success criteria (WILFs), Captain Stretch activity, key vocabulary, key questions and use of adults.

Work is evidenced using the 'Design Task Booklet' for each project completed and recorded on Tapestry. The 'Design Task Booklet' can be found in the DT subject folder on the server.

Marking and Feedback should be within the task booklets and verbally during lessons.

Expectations	
Design Task Booklet	**Tapestry**
• Booklet per child to support the DT process completed. • This booklet is to the filed in each child's red slip wallet and passed up each year to create a portfolio of DT work.	• For a collaborative piece, physical session a journal entry saved in the DT folder • Written comment explaining what activity has been taking place • Relevant skills selected and given a star rating.

Assessment

In DT, a range of formative assessment strategies are used in lessons. Clear objectives and success criteria should be shared with children and they are assessed against these. Tasks should be well matched to learning objectives and success criteria. Attainment is recorded as **working below age related**, **at age related** or **above age-related** expectations.

Judgements about pupil attainment are formed from:

- Teacher observations
- Contributions to class discussions
- Work in Design Task Booklets, final pieces of DT projects and on Tapestry

Children's attainment is reported twice yearly to parents via their reports.

Resources

General DT resources are stored centrally in the resources room opposite the Year 6 classroom or collage bits are stored in the drawer unit in the KS1 corridor. Prior to a DT event such as 'Enterprise Fortnight' the DT subject lead will email staff for an updated list on any resources they may need ordering. Staff are responsible for informing the DT subject leader when extra resources are needed. If any additional resources are required, staff should speak to the subject leader. Small purchases can be made by teachers. Costs can be claimed by speaking to the Business Manager.

Enrichment:

At Knighton Mead we aim to provide as much enrichment for the children to enhance their experiences and learning. In DT we aim to do this through:

- Ensuring that children have opportunities to cook and eat healthy food.
- Enterprise weeks – using DT for our Christmas / Autumn Fair products.
- Trips to local restaurants – cooking/hygiene/food design/equipment in working restaurants.
- Wood work sessions with groups across all key stages.
- Good quality and extensive resources.