Design & Technology

At Hook Lane

Design & Technology

Introduction

Design and Technology involves applying knowledge and skills when designing and making products. Undertaking design and technology activities at Hook Lane will give our children opportunities to use a range of materials and processes and to work independently or as part of a team, and will reflect the National Curriculum requirements for Design and Technology.

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 and be innovative. Through the evaluation of past and present design and technology they develop a critical understanding of its impact on daily life in the wider world.

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Aims

The aims of Design and Technology are:

- *To provide a range of structured and differentiated activities which develop breadth and progression. Where possible these will relate to the interest and everyday experiences of pupils*
- *To develop knowledge and teach skills in order to design and make products successfully.*
- *To help children become aware of and investigate simple products by disassembly and evaluation.*
- *To show understanding and skills in order to design and make high quality prototypes and products for a wide range of users.*
- *To provide adequate time, access to information, skills and resources to make good quality products.*
- *To provide time to critique, evaluate and test their ideas and products and the work of others.*
- *To motivate pupils by providing interesting and stimulating experiences.*
- *To provide equal opportunities and develop the qualities of individual pupils.*
- *To enable children to use design and technology to solve a range of problems.*
- *To help children understand and apply the principles of nutrition and learn how to cook*

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Teaching approach

Through the following teaching approach, we encourage pupils to work creatively and imaginatively. Most importantly, designs are aimed at solving real and relevant problems within a variety of contexts, whilst considering the needs, wants and values of themselves and others.

We like to see ourselves as ENGINEERS, TEXTILE DESIGNERS or SUPER CHEFS and approach each DT project accordingly!

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

TECHNICAL KNOWLEDGE
- Making products work

COOKING AND NUTRITION
- Where food comes from
- Food preparation, cooking and nutrition

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Adaptive Teaching

Using adaptive teaching to provide the opportunity for all pupils to experience success by adapting lessons, whilst maintaining high expectations for all. This may be through:

- The use of mixed ability partners
- Scaffolding tasks
- Directing children to a selection of appropriate resources
- Using visual models
- Pre-teaching subject specific vocabulary and the meaning
- Modelling techniques
- Using real life experiences such as Lego and Forest School
- Providing visual supports and colourful semantics to help Structure recording
- Using IT to provide visual prompts/ideas and stimulus
- Providing alternative ways to record ideas
- Modelling the use of tools and equipment and language at a Child's understanding level to explain their use
- Visual instructions and checklists to follow

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EYFS – Subject Content

DESIGN

Begin to use the language of designing and making, e.g. join, build and shape. -Learning about planning and adapting initial ideas to make them better

MAKE

To learn to construct with a purpose in mind. -Selects tools and techniques needed to shape, assemble and join materials

EVALUATE

Begin to talk about changes made during the making process, e.g. making a decision to use a different joining method.

TECHNICAL KNOWLEDGE

To learn how to use a range of tools, e.g. scissors, hole punch, stapler, woodworking tools, rolling pins, pastry cutters. -Learn how everyday objects work by dismantling things.

COOKING AND NUTRITION

To begin to understand some of the tools, techniques and processes involved in food preparation. -Children have basic hygiene awareness.

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KS1 – Subject Content

DESIGN

Generate ideas by drawing on their own experiences; describe what their products are for; say how their products will work; use knowledge of existing products to come up with ideas; model ideas by exploring materials, components and construction kits.

MAKE

Start to choose their tools and equipment, explaining their choices; select from a range of materials according to characteristics; measure, mark-out, cut and shape materials; assemble, join and combine materials.

EVALUATE

Make simple judgements about their products and designs and suggest how their products could be improved; evaluate what they like and dislike about existing products; describe where (their) products might be used.

TECHNICAL KNOWLEDGE

Know about the movement of simple mechanisms, such as levers, sliders, wheels and axles; how to make freestanding structures stronger, stiffer and more stable; to know the correct technical vocabulary for the project they are working on.

COOKING AND NUTRITION

Know that all food comes from plants and animals; food has to be farmed, grown (elsewhere) or caught; know how to name and sort foods into 5 groups in The 'Eat Well' plate; how to prepare simple cold dishes safely and hygienically; use techniques such as, cutting, peeling and grating.

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Lower KS2 – Subject Content

DESIGN

To describe the purpose of their products; to indicate design features of their products and explain how particular part of their products work; develop own design criteria and use these to inform their ideas; model their ideas through: prototypes, sketches and CAD; develop realistic ideas with a clear purpose or person in mind.

MAKE

Select tools and equipment, explaining their choices for use; select materials and components suitable for task; explain their choice of materials and components according functional properties and aesthetic qualities; measure, mark-out, cut and shape materials with some accuracy; assemble, join and combine materials with some accuracy; start to apply finishing techniques.

EVALUATE

Refer to their design criteria as they design and make; use their design criteria to evaluate their completed products; evaluate existing designs looking at: how well it was made, why materials were chosen etc; whether products can be recycled and reused; to know about key inventors and designers.

TECHNICAL KNOWLEDGE

How mechanical systems such as levers and linkages or pneumatic systems create movement; how simple electrical circuits and components can be used to create functional products; to learn how to program a computer to control their products; how to make strong, stiff shell structures.

COOKING AND NUTRITION

That food is grown, reared and caught in the UK, Europe and the wider world; how to prepare and cook a variety of savoury foods safely and hygienically including, where appropriate, the use of a heat source; to use a range of techniques such as peeling, chopping, slicing, grating, mixing, kneading and baking; to know that a healthy diet is made up from a variety and balance of different food and drinks

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Upper KS2 -Subject Content

DESIGN

Carry out research, using surveys, interviews, questionnaires and web-based resources; identify the needs, wants, preferences and values of particular individuals and groups; develop a simple design specification to guide their thinking; generate innovative ideas, drawing on research; make design decisions, taking account of constraints such as time, resources and cost.

MAKE

Produce appropriate lists of tools, equipment and materials that they need; formulate step-by-step plans as a guide to making; accurately measure, mark-out, cut and shape materials and components; accurately assemble, join and combine materials and components; accurately apply a range of finishing techniques; use techniques that involve a number of steps; demonstrate resourcefulness tackling practical problems.

EVALUATE

Critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make; evaluate their ideas and products against their original design specification; investigate and analyse how much products cost to make, how innovative products are, how sustainable the materials in products are and what impact the products have beyond their intended purpose; to know more about key inventors, designers, engineers, chefs and manufacturers.

TECHNICAL KNOWLEDGE

How mechanical systems such as cams or pulleys or gears create movement; how more complex electrical circuits and components can be used to create functional products; how to program a computer to monitor changes in the environment and control their products; how to reinforce and strengthen a 3D framework.

COOKING AND NUTRITION

That seasons may affect the food available; how food is processed into ingredients that can be eaten or used in cooking; to know that recipes can be adapted to change the appearance, taste, texture and aroma; to know that different food and drink contain different substances; nutrients, water and fibre that are needed for health

DESIGNING- Skills Progression

Year 1	• *think of some ideas of their own* • *explain what they want to do* • *use pictures and words to create a plan*
Year 2	• *think of ideas and plan what to do next* • *choose the best tools and materials for a task* • *give a reason why these are best tools and materials for a task* • *describe their design by using pictures, diagrams, models and words*
Year 3	• *show that their design meets a range of requirements* • *put together a step-by-step plan which shows the order and also what equipment and tools they need* • *describe their design using an accurately labelled sketch and words* • *explain how realistic their plan is*
Year 4	• *come up with at least one idea about how to create their product* • *take account of the ideas of others when designing* • *produce a plan and explain it to others* • *suggest some improvements and say what was good and not so good about their original design* • *use computer-aided design to develop and communicate their ideas*
Year 5	• *come up with a range of ideas after they have collected information* • *take a user's view into account when designing* • *produce a detailed step-by-step plan* • *suggest some alternative plans and say what the good points and drawbacks are about each*
Year 6	• *use a range of information to inform their design* • *use market research to inform plans – consider the target market* • *work within constraints* • *follow and refine their plan if necessary* • *justify their plan to someone else* • *consider culture and society in their designs*

	MAKING - Skills Progression
Year 1	• *think of some ideas of their own* • *explain what they want to do*
Year 2	• *join materials and components together in different ways*
Year 3	• *use equipment, tools and utensils accurately*
Year 4	• *explain if their finished product is going to be good quality* • *show an awareness of the need to produce something that will be liked by others* • *show a good level of expertise when using a range of tools and equipment*
Year 5	• *explain why their finished product is going to be of good quality* • *explain how their product will appeal to the audience* • *use a range of tools and equipment expertly* • *use a range of techniques such as mashing, whisking, crushing, grating, cutting, kneading and baking*
Year 6	• *use tools and materials precisely* • *change the way they are working if needed* • *make exact measurements and mark out, to within 1 millimetre*

	EVALUATING - Skills Progression
Year 1	• *describe how something works* • *talk about their own work and things that other people have done*
Year 2	• *think of some ideas of their own* • *explain what they want to do*
Year 3	• *explain what changes were made to make their design even better*
Year 4	• *consider how they will check if their design is successful* • *begin to explain how they can improve their original design* • *evaluate their product, thinking of both appearance and the way it works*
Year 5	• *keep checking that their design is the best it can be* • *check whether anything could be improved* • *evaluate appearance and function against the original criteria*
Year 6	• *explain how well they tested and evaluated their final product* • *explain how a product is fit for purpose* • *explain how they would improve their product* • *explain how different resources would have improved their product* • *explain if they would need more, or different, information to make their product even better*

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Breadth of study

Pupils will be taught subject content through the following three core strands:

ENGINEERING

- ***Construction***
- ***Use of Materials***
- ***Mechanisms***

TEXTILES

- ***Textiles***

COOKING AND NUTRITION

- ***Cooking and Nutrition***

Breadth of Study - An Overview 2022/23

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn	**Cooking and Nutrition:** **WE ARE CHEFS** *Make a nutritious pizza!*	**Construction:** ***WE ARE ENGINEERS*** *Make a new mode of transport for London*	**Textiles:** ***WE ARE TEXTILE DESIGNERS*** *Design a blanket for a homeless person*	**Construction:** ***WE ARE ENGINEERS*** *Make a dreamcatcher to stop the nightmares!*	**Textiles:** ***WE ARE TEXTILE DESIGNERS*** *Design and make a Christmas stocking to improve falling sales in the John Lewis Christmas department*	**Construction** ***WE ARE ENGINEERS*** *Make a rainforest shelter to keep you safe, warm and dry until you are rescued.*
Spring	**Mechanisms:** **WE ARE ENGINEERS** ***Design and make a page for a book with moving parts***	**Use of Materials:** ***WE ARE ENGINEERS*** *Design and make a shelter for our forest school birds*	**Mechanisms:** ***WE ARE ENGINEERS*** *Design an aqueduct to transport the water from the fresh water lake, to the town*	**Use of Materials:** ***WE ARE ENGINEERS*** *Make siege weapons to fend off attack from the Meatheads!*	**Mechanisms:** ***WE ARE ENGINEERS*** *Using a motor and pulleys, design and build a Mars Rover to replace NASA's 'Curiosity'*	**Mechanisms:** ***WE ARE ENGINEERS*** ***Design and make a motorised fairground ride***
Summer	**Textiles:** **WE ARE TEXTILE DESIGNERS** *Design a fabric for Queen Victoria's curtains*	**Cooking and Nutrition:** **WE ARE CHEFS** *Invent a new flavour of ice-cream for Ben and Jerry!*	**Cooking and Nutrition:** **WE ARE CHEFS** *Modernise an Egyptian recipe for a party*	**Mechanisms:** ***WE ARE ENGINEERS*** *Design a magical moving puppet that will bring the crowds back to the circus*	**Construction** ***WE ARE ENGINEERS*** *Design and build playground equipment to fill a space at Danson Park*	**Cooking and Nutrition:** **WE ARE CHEFS** *design and make a soup for people with heart problems*

WE ARE ENGINEERS!

Construction - *Skills Progression*

Year 1	Year 2 *Make a new mode of transport for London*	Year 3	Year 4 *Make a dreamcatcher to stop the nightmares!*	Year 5 *Design and build playground equipment to fill a space at Danson Park*	Year 6 *Make a rainforest shelter to keep you safe, warm and dry until you are rescued.*
• talk with others about how they want to construct their product • select appropriate resources and tools for their building projects • make simple plans before making objects, eg. drawings, arranging pieces of construction before building	• make sensible choices as to which material to use for their construction • develop their own ideas from initial starting points • incorporate some type of movement into models • consider how to improve their construction • exploring how models can be made stronger, stiffer and more stable	• use a range of techniques to shape and mould • use finishing techniques	• take time to consider how they could have made their idea better • work at their product even though their original idea might not have worked	• refine and improve their product • persevere through different stages of the making process	• explain how their product met all design criteria • ensure that their work is precise and accurate • hide joints so as to improve the look of their product

WE ARE ENGINEERS!

Use of Materials - *Skills Progression*

Year 1	Year 2 *Design and make a shelter for our forest school birds*	Year 3	Year 4 *Make siege weapons to fend off attack from the Meatheads!*	Year 5	Year 6
• make a structure/model using different materials • work tidily • make their model stronger if it needs to be	• measure materials to use in a model or structure • join materials in different ways • use joining, folding or rolling to make materials stronger	• select and use the most appropriate materials • work accurately to make cuts and holes • join materials	• measure carefully so as to make sure they have not made mistakes • attempt to make their product strong	• measurements are accurate enough to ensure that everything is precise • ensure that their product is strong and fit for purpose	• justify why they selected specific materials • consider the use of the product when selecting materials • work within a budget

WE ARE ENGINEERS!

Mechanisms - *Skills Progression*

Year 1 ***Design and make a page for a book with moving parts***	Year 2	Year 3 *Design an aqueduct to transport the water from the fresh water lake, to the town*	Year 4 *Design a magical moving puppet that will bring the crowds back to the circus*	Year 5 *Using a motor and pulleys, design and build a Mars Rover to replace NASA's 'Curiosity'*	Year 6 ***Design and make a motorised fairground ride***
• *make a product which moves* • *cut materials using scissors* • *describe the materials using different words* • *say why they have chosen moving parts, such as levers, sliders and wheels*	• *join materials together as part of a moving product* • *add some kind of design to their product*	• *select the most appropriate tools and techniques to use for a given task* • *make a product which uses both electrical and mechanical components* • *use a simple circuit* • *use a number of components*	• *add things to their circuits – bulbs buzzers, motors* • *alter their product after checking it* • *show confidence about trying out new and different ideas* • *understand and demonstrate how mechanical and electrical systems have an input and output process*	• *incorporate a switch into their product* • *refine their product after testing it* • *incorporate levers and cams, hydraulics and pneumatics*	• *use different kinds of circuits in their product* • *think of ways in which adding a circuit would improve their product*

WE ARE TEXTILE DESIGNERS!

Textiles - *Skills Progression*

Year 1 *Design a fabric for Queen Victoria's curtains*	Year 2	Year 3 *Design a blanket for a homeless person*	Year 4	Year 5 *Design and make a Christmas stocking to improve falling sales in the John Lewis Christmas department*	Year 6
• describe how different textiles feel • make a product from textile(s) by gluing	• measure textiles • join textiles together to make something • cut textiles • explain why they chose a certain textile • use a basic running stitch	• use textiles of different types in different ways • choose textiles both for their appearance and also qualities	• consider what the end user would want when choosing textiles • consider how to make their product strong • devise a template • explain how to join things in a different way • begin to select and use different and appropriate finishing techniques to improve a product's appearance - hemming, tie-dye, fabric paints and digital graphics	• consider what the end user would want when choosing textiles • explain how they made their product attractive and strong • make a prototype first • use a range of joining techniques • cut a range of materials with precision and accuracy • join textiles using a greater variety of stitches - backstitch, whip stitch, blanket stitch	• consider how their product could be sold • give considered thought about what would improve their product even more • demonstrate how to measure, make a seam allowance, tape, pin, cut, shape and join fabric with precision to make a more complex product

WE ARE CHEFS!

Cooking and Nutrition - *Skills Progression*

Year 1 *Make a nutritious pizza!*	Year 2 *Invent a new flavour of ice-cream for Ben and Jerry!*	Year 3 *Modernise an Egyptian recipe for a party*	Year 4	Year 5	Year 6 *design and make a soup for people with heart problems*
• cut food safely • describe the texture of foods • wash their hands before handling food and make sure that surfaces are clean • think of interesting ways of decorating food they have made, such as cakes • explain where in the world different foods originate from • understand that all food comes from plants or animals	• describe the properties of the ingredients used • explain what it means to be hygienic • pupils are hygienic in the kitchen • understand that food has to be farmed, grown elsewhere (eg. at home) or caught • understand that everyone should eat at least five portions of fruit and vegetables every day and start to explain why	• choose the right ingredients for a product • use equipment safely • make sure that their product looks attractive • describe how their combined ingredients come together • grow plants such as cress and herbs from seed with the intention of using them for their food product	• know what to do to be hygienic and safe • consider what they can do to present their product in an interesting way • start to independently follow a recipe	• explain how they are being both hygienic and safe • present their product well • prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques	• explain how their product should be stored, with reasons • set out to grow their own products with a view to making a salad, taking account of time required to grow different foods • explain that foods contain different substances, such as protein • independently follow a recipe