Design and Technology

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

Across 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 and textiles 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.

Across 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 material and textiles 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.

Early Years – Early Learning Goals

Area of EYFS curriculum	Early Learning Goals
Expressive arts and design	• Children sing songs, make music and dance, and experiment with ways of changing them. • They safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.
Being imaginative	• Children use what they have learnt about media and materials in original ways, thinking about uses and purposes. • They represent their own ideas, thoughts and feelings through design and technology, art, music, dance, role-play and stories.

Early Years – Expectations of skills

Expectations
Manipulate materials to achieve a planned effect. Construct with purpose in mind, using a variety of resources. Select appropriate resources and adapt work where necessary. Select tools and techniques needed to shape, assemble and join materials. Create simple representations of events, people and objects.

Year 1	Master practical skills	Design, make, evaluate and improve	Take inspiration from design throughout history
Equipment needed for skill development: • Rulers • Scissors • Pencils, Chalk, Pens • Thread, Material, felt, Wool • Glue, spilt pins • A range of papers and card A range of materials inc. wood, plastic	**Close supervision:** • Cut materials safely using tools provided – scissors • Demonstrate a range of cutting and shaping techniques (e.g. tearing, cutting, folding) • Demonstrate a range of joining techniques (e.g. gluing, combining materials to strengthen) • Shape textiles using templates. • Join textiles using running stich.	• Make products, refining the design as work progresses. • Select from and use a wired range of materials and components, including construction materials, textiles and ingredients according to their characteristics. • Build structures, exploring how they can be made stronger, stiffer and more stable.	Explore objects and designs to identify likes and dislikes of the designs.
Health and Safety Across KS1 pupils should know: • To be able to use all equipment safely.			**Activities and Tasks** Design and make a **Fabric Faces** (textiles), **Dips and Dippers** (food) as well as **Moving Pictures** (mechanisms).

Year 2	Master practical skills	Design, make, evaluate and improve	Take inspiration from design throughout history
Equipment needed for skill development: • Rulers, Measuring tapes • Scissors, Craft knives, Saws • Pencils, Chalk, Pens • Thread, Material, felt, Wool • Glue, spilt pins • A range of papers and card • A range of materials inc. wood, plastic • Cogs, wheels and levers	**With close supervision:** • Use materials to practice drilling, screwing, gluing and nailing **Some supervision:** • Measure and mark out to the nearest centimetre. • Colour and decorate textiles using a number of techniques (e.g. dyeing, adding sequins etc.) • materials to make and strengthen products. • Create products using levers, wheels and winding mechanisms.	• Design products that have a clear purpose and an intended user. • Select from and use a wide range of materials and components, including construction materials, textiles and ingredients according to their characteristics. • Design purposeful, functional, appealing products for themselves and other users based on design criteria. • Explore and use mechanisms in their products. • Build structures, exploring how they can be made stronger, stiffer and more stable.	• Suggest improvements to existing designs. • Explore how products have been created.
Health and Safety Across KS1 pupils should know: • To be able to use all equipment safely.			**Activities and Tasks** Design and make **Sensational Salads** (food), **Fabric Bunting** (textiles) and **Moving Pictures** (mechanisms)

Year 3	Master practical skills	Design, make, evaluate and improve	Take inspiration from design throughout history
Equipment needed for skill development: • Rulers, Measuring tapes • Scissors, Craft knives, Saws • Pencils, Chalk, Pens • Thread, Material, felt, Wool • Glue, spilt pins • A range of papers and card • A range of materials inc. wood, plastic • Cogs, wheels and levers	**With close supervision:** • Cut materials accurately and safely by selecting appropriate tools. • Select from and use a wider range of tools and equipment to perform practical tasks accurately. **Some supervision:** • Select appropriate joining techniques. • Select the most appropriate techniques to decorate textiles. • Select suitable techniques to construct products. • Strengthen materials using suitable techniques.	• Make products by working efficiently (such as carefully selecting materials). • Carefully evaluate product design. • Select from and use a wider range of materials and components including textiles and construction kits according to their functional properties and aesthetic qualities.	• Improve upon existing designs, giving reasons for choices.
Health and Safety Across KS2 pupils should know: • To be able to use all equipment safely.			**Activities and Tasks** Design some **Juggling Balls** (textiles), a **Bread Bake Off** (food) and **Fly a Kite** (structures)

<table>
<tr><th>Year 4</th><th>Master practical skills</th><th>Design, make, evaluate and improve</th><th>Take inspiration from design throughout history</th></tr>
<tr><td>Equipment needed for skill development:
Rulers, Measuring tapes
Scissors, Craft knives, Saws
Pencils, Chalk, Pens
Thread, Material, felt, Wool
Batteries, Wires, Crocodile clips, Bulbs and buzzers
Glue, spilt pins
A range of papers and card
A range of materials inc. wood, plastic</td><td rowspan="2">With close supervision:
Apply appropriate cutting and shaping techniques that include cuts within the perimeter of the material.
Some supervision:
Measure and mark out to the nearest millimetre.
Understand the need for seam allowance.
Join textiles with appropriate stitching.
Create series and parallel circuits.</td><td rowspan="2">Designing with purpose by identifying opportunities to design.
Refine work and techniques as work progresses, continually evaluating the product design.
Select from and use a wider range of materials including textiles according to their functional properties and aesthetic qualities
Understand and use electrical systems in their products.</td><td>Identify some of the great designers in all of the areas of study to generate ideas for designs.
Disassemble products to understand how they work.</td></tr>
<tr><td>Health and Safety
Across KS2 pupils should know:
• To be able to use all equipment safely.</td><td>Activities and tasks
Design and make an Edible Garden (food), Torches or Alarms (control/electrical) and Mechanical Posters (mechanisms)</td></tr>
</table>

Year 5	Master practical skills	Design, make, evaluate and improve	Take inspiration from design throughout history
Equipment needed for skill development: • Rulers, Measuring tapes • Scissors, Craft knives, Saws • Pencils, Chalk, Pens • Thread, Material, felt, Wool • Batteries, Wires, Crocodile clips, Bulbs and buzzers • Glue, spilt pins, nails, tacks • A range of papers and card • A range of materials inc. wood, plastic • Cogs, wheels, levers and cams • ICT	**With close supervision:** • Cut materials with precision and refine the finish with appropriate tools. • Develop a range of practical skills to create products (such as cutting, drilling, nailing etc.). **Some supervision:** • Convert rotary motion to linear using cams. • Write code to control and monitor models or products.	• Design with the user in mind, motivated by the service a product will offer. • Use prototypes, cross sectional diagrams to represent designs • Understand and use mechanical systems in their products. • Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.	• Combine elements of design from a range of inspirational designers throughout history, giving reasons for choices. • Create innovative designs that improve upon existing products
Health and Safety **Across KS2 pupils should know:** • To be able to use all equipment safely.			**Activities and tasks** To design and make **Felt Phone Cases** (textiles), **Seasonal Food** (food) and **Marbulous Structures** (structures)

<table>
<tr><th>Year 6</th><th>Master practical skills</th><th>Design, make, evaluate and improve</th><th>Take inspiration from design throughout history</th></tr>
<tr>
<td>Equipment needed for skill development:
Rulers, Measuring tapes
Scissors, Craft knives, Saws
Pencils, Chalk, Pens
Thread, Material, felt, Wool
Batteries, Wires, Crocodile clips, Bulbs and buzzers, LEDs
Glue, spilt pins, nails, tacks
A range of papers and card
A range of materials inc. wood, plastic
Cogs, wheels, levers and cams
ICT</td>
<td rowspan="2">With supervision:
Show an understanding of the qualities of materials to choose appropriate tools to cut and shape.
Create objects (such as a cushion) that employ a seam allowance.
Join textiles with a combination of stitching techniques (such as back stich, running stich)
Understand and use electrical systems in their products.
Create circuits using electronics kits that employ a number of components, such as LEDs.</td>
<td rowspan="2">Make products through stages of prototypes, making continual refinements.
Ensure products have a high quality finish, using art skills where appropriate.
Use the qualities of materials to create suitable visual and tactile effects in the decoration of textiles.</td>
<td>Evaluate the design of products so as to suggest improvements to the user experience.
Understand how key events and individuals in design and technology have helped shape the world.</td>
</tr>
<tr>
<td>Health and Safety
Across KS2 pupils should know:
• To be able to use all equipment safely.</td>
<td>Activities and tasks
Use research and develop design criteria to make recipes using Global Food (food), to design Automata Animals (mechanisms) and make Programming Adventures (control).</td>
</tr>
</table>