

# Gresham Primary School's Design and Technology Curriculum

## Mission Statement

Gresham pupils are problem solving their way to a successful, sustainable future

### Intent (The What)

- Pupils develop the processes of creative thinking; problem solving; questioning and research; purposeful designing; fine motor skills and evaluative reflection.
- Pupils work through the essential elements and concepts of Design and Technology which are to research, design and make, learn focused practical skills and carry out product analysis.
- Pupils become independent, creative and innovative problem solvers.
- Pupils learn to reflect on present and past technologies, evaluating their effectiveness.
- Pupils become critical, informed users of products, enabling them to aspire to become innovators in their own right.
- Pupils develop an understanding of the role finance and the links to business.
- Pupils learn how to consider sustainability within their product design.
- Pupils develop team work, alongside communication and presentational skills.
- Pupils have a rich knowledge of how to prepare themselves healthy and balanced meals.

### Implementation (The How)

- The International Primary Curriculum is used as the foundation for Gresham's DT offer, alongside our own additions and adaptations. This covers and greatly enhances the learning as set out in the National Curriculum.
- The curriculum map ensures teachers know what children have encountered before and can make links to previous learning to support children making connections and building schema.
- Key concepts have been identified and are regularly returned to, gradually developing pupils' understanding of the most important ideas.
- Pupils will engage in three different types of DT lessons: 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 children are taught specific technical knowledge, designing skills and making skills; and Design, Make and Evaluate Assignment (DMEA) where children create functional products with users and purposes in mind.
- Themed units help children to see how subjects are both independent and interdependent, enabling them to see the big picture of their learning, make connections across different subjects, and talk about a topic from multiple perspectives. DT is interwoven into larger units of work, linking to and enhancing various subjects.
- Teachers will teach units themed around each of the core strands – Structures, Textiles, Cooking and Nutrition, Mechanism and Electrical Systems, allowing children the opportunity to build incrementally on previously learned knowledge and skills.
- International learning goals are unique to the IPC and help pupils to develop a national, international and cultural perspective.
- Children are introduced to great designers and engineers from the STEM disciplines and encouraged to understand how they have contributed to the world and technological advancement.
- Our Gresham Learning Super Heroes are integrated into everyday learning, helping children to become skilled, life-long learners.
- Children's books show cohesion between taught sessions with clear end points reached.
- Key vocabulary is explicitly taught to children as part of quality-first teaching.
- Retrieval opportunities are planned for by teachers, to ensure children have opportunity to secure new knowledge.

### Impact

Books, pupil voice, display and collection of work to show the following:

- Pupils will have clear enjoyment and confidence in design and technology that they will then apply to other areas of the curriculum.
- Pupils will ultimately know more, remember more and understand more about Design Technology, demonstrating this knowledge when using tools or skills in other areas of the curriculum and in opportunities out of school.
- The large majority of pupils will achieve age related expectations in Design Technology.
- As designers, pupils will develop skills and attributes they can use beyond school and into adulthood.
- Pupils with SEND will be fully included and will progress well related to their starting points.
- Pupils from disadvantaged backgrounds will benefit from the cultural capital that is offered through our DT curriculum.

## The Essential Elements

Something, for someone, with some purpose

1. **User** – children have a clear idea of who they are designing and making products for, considering their needs, wants, interests or preferences. The user may be themselves, an imaginary character, another person, client, consumer or a specific target audience.

2. **Purpose** – children know what the products they design and make are for. Each product performs a clearly defined task that can be evaluated in use.

3. **Functionality** – children design and make products that function in some way to be successful. Products often combine aesthetic qualities with functional characteristics. We recognise that in D&T, it is insufficient for children to design and make products which are purely aesthetic.

4. **Design Decisions** – when designing and making, children have opportunities to make informed decisions such as selecting materials, components and techniques and deciding what form the products will take, how they will work, what task they will perform and who they are for.
5. **Innovation** – when designing and making, children have scope to be original with their thinking. Projects are planned that encourage innovation, lead to a range of design ideas and products being developed. These projects are characterised by engaging, open-ended starting points for children's learning.
6. **Authenticity** – children design and make products that are believable, real and meaningful to themselves i.e. not replicas or reproductions or models which do not provide opportunities for children to make design decisions with clear users and purposes in mind.

### Key Concepts Big Ideas Revisited Across Units

Innovation	Problem Solving	Sustainability	Research	Purposeful Design	Functionality	Iteration	Evaluative Reflection
The creation, development and implementation of a new product.	Finding solutions to difficult or complex issues through product design.	Avoidance of the depletion of natural resources in order to maintain an ecological balance	Investigating to discover information to inform or review design.	Deliberate, purpose-directed, goal-oriented, intentioned design.	Being useful, practical, and right for the purpose for which something was made	A cyclic process of prototyping, testing, analysing, and refining a product or process.	To analyse and review ideas, designs and products.

## KEY STAGE 1

### NC Statutory Programme of Study KS1

#### 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

#### Cooking and Nutrition

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

#### 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.

	Unit being taught...	Learners will be finding out...	Knowledge, Skills and Understanding...
<b>EYFS</b>	<b>Dinosaurs &amp; Musical Instruments</b>	<ul style="list-style-type: none"> <li>How to design their own dinosaur toys and musical instruments</li> <li>How to use various materials to model and construct (e.g. clay, playdough, Lego, construction straws)</li> <li>How to plan, make and review</li> </ul>	<p>To handle equipment and tools effectively, including pencils for writing.</p> <p>To safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.</p> <p>To 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.</p>

<b>Year 1 (MP1)</b>	<b>Treasure Island</b> Mechanisms	<ul style="list-style-type: none"> <li>Making our own compass</li> <li>Designing and creating a treasure chest for a character of choice</li> </ul>	1.01 Know that design is driven by a purpose 1.03 Be able to generate a design 1.05 Be able to explore ways of constructing parts of a design 1.08 Be able to use tools and techniques following guidance from an adult 1.09 Know the risks to self and others when using tools 1.11 Understand that the design of products is impacted by material availability
	<b>Time Travellers</b> Food	<ul style="list-style-type: none"> <li>Creating nostalgic flavours for the future generation</li> </ul>	1.01 Know that design is driven by a purpose 1.02 Be able to define a main need of a context/situation 1.03 Be able to generate a design 1.06 Be able to produce a final design proposal 1.13 Be able to design products, taking inspiration from another source
	<b>A Day in The Life</b> Textiles	<ul style="list-style-type: none"> <li>The importance of uniform in a profession and designing making our own</li> </ul>	1.01 Know that design is driven by a purpose 1.03 Be able to generate a design 1.04 Be able to articulate how their design meets the identified need 1.05 Be able to explore ways of constructing parts of a design 1.10 Be able to compare their design and product explaining any differences 1.13 Be able to design products, taking inspiration from another source
	<b>The Earth: Our Home</b> Structures	<ul style="list-style-type: none"> <li>How to make a nesting box for bees.</li> </ul>	1.01 Know that design is driven by a purpose 1.03 Be able to generate a design 1.04 Be able to articulate how their design meets the identified need 1.05 Be able to explore ways of constructing parts of a design 1.08 Be able to use tools and techniques following guidance from an adult 1.13 Be able to design products, taking inspiration from another source
<b>Year 2 (MP1)</b>	<b>Live and Let Live</b> Mechanisms (sliders & levers)	<ul style="list-style-type: none"> <li>How to design and make bird feeders</li> </ul>	1.01 Know that design is driven by a purpose 1.02 Be able to define a main need of a context/situation 1.03 Be able to generate a design 1.04 Be able to articulate how their design meets the identified need 1.05 Be able to explore ways of constructing parts of a design 1.06 Be able to produce a final design proposal 1.07 Be able to list materials and tools needed for production 1.10 Be able to compare their design and product explaining any differences
	<b>Super Humans</b> Food	<ul style="list-style-type: none"> <li>How to plan and prepare a healthy meal or snack</li> </ul>	1.01 Know that design is driven by a purpose 1.03 Be able to generate a design 1.04 Be able to articulate how their design meets the identified need 1.11 Understand that the design of products is impacted by material availability
	<b>Buildings</b> Structures	<ul style="list-style-type: none"> <li>How to make picture frames</li> <li>Using frames to make strong structures</li> <li>Making models of different shaped buildings</li> </ul>	1.01 Know that design is driven by a purpose 1.02 Be able to define a main need of a context/situation 1.03 Be able to generate a design 1.04 Be able to articulate how their design meets the identified need 1.05 Be able to explore ways of constructing parts of a design 1.07 Be able to list materials and tools needed for production 1.08 Be able to use tools and techniques following guidance from an adult 1.09 Know the risks to self and others when using tools 1.10 Be able to compare their design and product explaining any differences 1.11 Understand that the design of products is impacted by material availability 1.13 Be able to design products, taking inspiration from another source

<b>From A to B</b> Mechanisms (wheels & axles)	<ul style="list-style-type: none"> <li>How to apply what we have learned about transport to plan and make our own vehicle</li> <li>How to test our vehicles to see how well they work</li> </ul>	1.01 Know that design is driven by a purpose 1.03 Be able to generate a design 1.04 Be able to articulate how their design meets the identified need 1.05 Be able to explore ways of constructing parts of a design 1.06 Be able to produce a final design proposal 1.08 Be able to use tools and techniques following guidance from an adult 1.10 Be able to compare their design and product explaining any differences
<b>The Magic Toy Maker</b> Mechanisms	<ul style="list-style-type: none"> <li>'Magic' toys that fool our eyes</li> <li>How to design and make our own board game</li> </ul>	1.01 Know that design is driven by a purpose 1.03 Be able to generate a design 1.05 Be able to explore ways of constructing parts of a design 1.06 Be able to produce a final design proposal 1.07 Be able to list materials and tools needed for production 1.08 Be able to use tools and techniques following guidance from an adult 1.10 Be able to compare their design and product explaining any differences 1.13 Be able to design products, taking inspiration from another source

## Key Stage 2

### NC Statutory Programme of Study KS2

#### 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

#### Cooking and Nutrition

- 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

#### 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.

Year 3 (MPS)	Unit being taught...	Learners will be finding out...	Knowledge, Skills and Understanding...
		<b>Bright Sparks</b> Electronics and Textiles	<ul style="list-style-type: none"> <li>How to make a model with light and sound.</li> </ul>

	<b>Shake it</b>	<ul style="list-style-type: none"> <li>The different types of milk packaging</li> <li>Designing our own milkshake brand and packaging.</li> </ul>	2.01 Know that designs should consider aesthetics and function 2.02 Be able to define the criteria that would meet the needs of a context/situation 2.13 Be able to adapt and/or combine others' products for a new creation
	<b>Travel and Tourism Mechanisms</b>	<ul style="list-style-type: none"> <li>Designs for the future of travel</li> <li>Levers and linkages</li> <li>Adding moving parts to models</li> <li>Creating a model of our futuristic design.</li> </ul>	2.01 Know that designs should consider aesthetics and function 2.02 Be able to define the criteria that would meet the needs of a context/situation 2.03 Be able to generate more than one design 2.04 Be able to articulate how each design meets the identified needs 2.05 Be able to use modelling and testing to explore parts of a design 2.07 Be able to list materials, tools and techniques needed for production 2.08 Be able to use appropriate tools and techniques independently 2.09 Know how to avoid the risks associated with using tools and sharing spaces 2.10 Be able to compare their design and product explaining any differences and suggesting improvements
<b>Year 4 (MP2)</b>	<b>Making Waves</b>	<ul style="list-style-type: none"> <li>Making a pitched wind instrument.</li> </ul>	2.02 Be able to define the criteria that would meet the needs of a context/situation 2.05 Be able to use modelling and testing to explore parts of a design 2.08 Be able to use appropriate tools and techniques independently 2.09 Know how to avoid the risks associated with using tools and sharing spaces
	<b>Different Places, Similar Lives Mechanisms</b>	<ul style="list-style-type: none"> <li>Different transport for moving resources</li> <li>Transporting items by pushing, pulling and sliding.</li> </ul>	2.02 Be able to define the criteria that would meet the needs of a context/situation 2.03 Be able to generate more than one design 2.04 Be able to articulate how each design meets the identified needs 2.05 Be able to use modelling and testing to explore parts of a design 2.06 Be able to produce a final design proposal identifying appropriate materials 2.13 Be able to adapt and/or combine others' products for a new creation
	<b>All Aboard Structures and Food</b>	<ul style="list-style-type: none"> <li>Making different bridge designs</li> <li>How to plan and prepare savoury biscuits</li> <li>How to design and make food packaging</li> </ul>	2.01 Know that designs should consider aesthetics and function 2.02 Be able to define the criteria that would meet the needs of a context/situation 2.04 Be able to articulate how each design meets the identified needs 2.07 Be able to list materials, tools and techniques needed for production 2.09 Know how to avoid the risks associated with using tools and sharing spaces 2.13 Be able to adapt and/or combine others' products for a new creation
	<b>Feel the Force Structures &amp; Mechanisms</b>	<ul style="list-style-type: none"> <li>How to design and make a marble run</li> <li>How wheels, levers, pulleys, slides and floats work</li> </ul>	2.04 Be able to articulate how each design meets the identified needs 2.06 Be able to produce a final design proposal identifying appropriate materials 2.07 Be able to list materials, tools and techniques needed for production 2.08 Be able to use appropriate tools and techniques independently 2.09 Know how to avoid the risks associated with using tools and sharing spaces
<b>Year 5 (MP3)</b>	<b>Bake it Food</b>	<ul style="list-style-type: none"> <li>How to design and make a new brand of bread</li> </ul>	3.04 Be able to respond to identified needs, wants and opportunities with informed designs and products 3.05 Be able to gather and use information to suggest solutions to problems 3.06 Be able to devise and use step-by-step plans 3.07 Be able to consider the needs of users when designing and making 3.08 Be able to select the most appropriate available tools and materials for a task 3.09 Be able to work with a variety of tools and materials with some accuracy

			3.10 Be able to test and evaluate their own work and improve on it
	<b>Existing, Endangered, Extinct Mechanisms &amp; Structure</b>	<ul style="list-style-type: none"> <li>How to design and make our own compost bin</li> </ul>	3.04 Be able to respond to identified needs, wants and opportunities with informed designs and products 3.05 Be able to gather and use information to suggest solutions to problems 3.06 Be able to devise and use step-by-step plans 3.07 Be able to consider the needs of users when designing and making 3.08 Be able to select the most appropriate available tools and materials for a task 3.09 Be able to work with a variety of tools and materials with some accuracy 3.11 Be able to investigate the way in which simple products in everyday use are designed and made and how they work
	<b>Look Hear Structure</b>	<ul style="list-style-type: none"> <li>How to design and make a stringed instrument</li> </ul>	3.05 Be able to gather and use information to suggest solutions to problems 3.08 Be able to select the most appropriate available tools and materials for a task 3.09 Be able to work with a variety of tools and materials with some accuracy 3.10 Be able to test and evaluate their own work and improve on it 3.11 Be able to investigate the way in which simple products in everyday use are designed and made and how they work
	<b>Earth as an Island Food</b>	<ul style="list-style-type: none"> <li>About the different food groups and their importance in our diets</li> <li>How different foods come from different places, and why that is</li> <li>How to keep safe when preparing food</li> <li>How to prepare simple savoury dishes from islands around the world</li> <li>How to plan, create and evaluate an island-inspired dish</li> </ul>	3.06 Be able to devise and use step-by-step plans 3.08 Be able to select the most appropriate available tools and materials for a task 3.09 Be able to work with a variety of tools and materials with some accuracy 3.10 Be able to test and evaluate their own work and improve on it 3.14 Understand the ways in which technology can be used to meet needs, wants and opportunities 3.16 Understand that the quality of a product depends on how well it is made and how well it meets its intended purpose
<b>Year 6 (MP3)</b>	<b>What Price Progress? CAD, Electronics, Mechanisms.</b>	<ul style="list-style-type: none"> <li>About the types of technology we use in our daily lives</li> <li>About technology that is being developed for the future</li> <li>How to evaluate existing technology against agreed criteria</li> <li>How to design and make our own future technology to meet a need</li> <li>How to evaluate each other's' designs</li> </ul>	3.01 Know that technology affects people's lives 3.02 Know how the lives of people in the host country are affected by the extent of technological advance 3.03 Know how the lives of people in their home country are affected by the extent of technological advance 3.04 Be able to respond to identified needs, wants and opportunities with informed designs and products 3.05 Be able to gather and use information to suggest solutions to problems 3.06 Be able to devise and use step-by-step plans 3.07 Be able to consider the needs of users when designing and making 3.08 Be able to select the most appropriate available tools and materials for a task 3.09 Be able to work with a variety of tools and materials with some accuracy 3.10 Be able to test and evaluate their own work and improve on it 3.11 Be able to investigate the way in which simple products in everyday use are designed and made and how they work 3.12 Be able to evaluate the effectiveness of simple products in everyday use 3.13 Understand the need for accurate design and working 3.14 Understand the ways in which technology can be used to meet needs, wants and opportunities 3.15 Understand that different techniques, tools and materials are needed for different tasks 3.16 Understand that the quality of a product depends on how well it is made and how well it meets its intended purpose
	<b>Being Human Food</b>	<ul style="list-style-type: none"> <li>How to plan and prepare a healthy meal</li> </ul>	3.05 Be able to gather and use information to suggest solutions to problems 3.06 Be able to devise and use step-by-step plans 3.07 Be able to consider the needs of users when designing and making 3.09 Be able to work with a variety of tools and materials with some accuracy

	<p><b>Year 6 Production Textiles</b></p>	<ul style="list-style-type: none"> <li>• How to design and make costumes and scenery for the end of year production</li> </ul>	<p>3.04 Be able to respond to identified needs, wants and opportunities with informed designs and products  3.06 Be able to devise and use step-by-step plans  3.07 Be able to consider the needs of users when designing and making  3.08 Be able to select the most appropriate available tools and materials for a task  3.09 Be able to work with a variety of tools and materials with some accuracy  3.10 Be able to test and evaluate their own work and improve on it  3.13 Understand the need for accurate design and working  3.14 Understand the ways in which technology can be used to meet needs, wants and opportunities  3.15 Understand that different techniques, tools and materials are needed for different tasks  3.16 Understand that the quality of a product depends on how well it is made and how well it meets its intended purpose</p>
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## Key Vocabulary

	<b>EYFS, Years 1 and 2</b>	<b>Year 3 and 4</b>	<b>Year 5 and 6</b>
<b>GENERATING IDEAS, EVALUATING AND MAKING</b>	planning, investigating design, evaluate, make, user, purpose, ideas, product, investigating, planning, design, make, evaluate, user, design criteria, function	user, purpose, design, model, evaluate, prototype, annotated sketch, functional, innovative, investigate, label, drawing, function, planning, design criteria, appealing, evaluating, design brief, design criteria, sensory evaluations	design decisions, functionality, authentic, user, purpose, design specification, design brief, innovative, research, evaluate, design criteria, annotate, evaluate, mock-up, prototype, function, innovative, design brief, prototype, annotated sketch, purpose, functional
<b>FOOD</b>	fruit and vegetable names, names of equipment and utensils sensory vocabulary e.g. soft, juicy, crunchy, sweet, sticky, smooth, sharp, crisp, sour, hard flesh, skin, seed, pip, core, slicing, peeling, cutting, squeezing, healthy diet, choosing, ingredients,	name of products, names of equipment, utensils, techniques and ingredients texture, taste, sweet, sour, hot, spicy, appearance, smell, preference, greasy, moist, cook, fresh, savoury, hygienic, edible, grown, reared, caught, frozen, tinned, processed, seasonal, harvested healthy/varied diet	ingredients, yeast, dough, bran, flour, wholemeal, unleavened, baking soda, spice, herbs fat, sugar, carbohydrate, protein, vitamins, nutrients, nutrition, healthy, varied, gluten, dairy, allergy, intolerance, savoury, source, seasonality utensils, combine, fold, knead, stir, pour, mix, rubbing in, whisk, beat, roll out, shape, sprinkle, crumble
<b>STRUCTURES</b>	cut, fold, join, fix structure, wall, tower, framework, weak, strong, base, top, underneath, side, edge, surface, thinner, thicker, corner, point, straight, curved, metal, wood, plastic circle, triangle, square, rectangle, cuboid, cube, cylinder	shell structure, three-dimensional (3-D) shape, net, cube, cuboid, prism, vertex, edge, face, length, width, breadth, capacity, marking out, scoring, shaping, tabs, adhesives, joining, assemble, accuracy, material, stiff, strong, reduce, reuse, recycle, corrugating, ribbing, laminating, font, lettering, text, graphics, decision,	frame structure, stiffen, strengthen, reinforce, triangulation, stability, shape, join, temporary, permanent
<b>TEXTILES</b>	joining and finishing techniques, tools, fabrics and components, template, pattern pieces, mark out, join, decorate, finish	fabric, names of fabrics, fastening, compartment, zip, button, structure, finishing technique, strength, weakness, stiffening, templates, stitch, seam, seam allowance	seam, seam allowance, wadding, reinforce, right side, wrong side, hem, template, pattern pieces, name of textiles and fastenings used, pins, needles, thread, pinking shears, fastenings,
<b>MECHANISM</b>	slider, lever, pivot, slot, bridge/guide, card, masking tape, paper fastener, join, pull, push, up, down, straight, curve, forwards, backwards vehicle, wheel, axle, axle holder, chassis, body, cab assembling, cutting, joining, shaping, finishing, fixed, free, moving, mechanism names of tools, equipment and materials used	mechanism, lever, linkage, pivot, slot, bridge, guide system, input, process, output linear, rotary, oscillating, reciprocating	pulley, drive belt, gear, rotation, spindle, driver, follower, ratio, transmit, axle, motor, circuit, switch, circuit diagram, annotated drawings, exploded diagrams, mechanical system, electrical system, input, process, output
<b>ELECTRONICS</b>	instructions, circuit, attach, wire, battery, switch, craft knife, assemble, connection	series circuit, fault, connection, toggle switch, push-to-make switch, push-to-break switch, battery, battery holder, bulb, bulb holder, wire, insulator, conductor, crocodile clip, control, program, system, input device, output device	reed switch, toggle switch, push-to-make switch, push-to-break switch, light dependent resistor (LDR), tilt switch, light emitting diode (LED), bulb, bulb holder, battery, battery holder, USB cable, wire, insulator, conductor, crocodile clip control, program, system, input device, output device, series circuit, parallel circuit



## Curriculum Expectations and Guidance

### What pupils should know, be able to do and understand

	Years 1 and 2	Years 3 and 4	Years 5 and 6
<b>DESIGN</b>	<p><b>KS1 Design and Technology National Curriculum</b></p> <p>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.</p> <p>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].</p> <p>Children design purposeful, functional, appealing products for themselves and other users based on design criteria.</p> <p>They generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a use their knowledge of existing products and their own experience to help generate their ideas;</li> <li>b design products that have a purpose and are aimed at an intended user;</li> <li>c explain how their products will look and work through talking and simple annotated drawings;</li> <li>d design models using simple computing software;</li> <li>e plan and test ideas using templates and mock-ups;</li> <li>f understand and follow simple design criteria;</li> <li>g work in a range of relevant contexts, for example imaginary, story-based, home, school and the wider environment.</li> </ul>	<p><b>KS2 Design and Technology National Curriculum</b></p> <p>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.</p> <p>They should work in a range of relevant contexts [for example, the home, school, leisure, culture, enterprise, industry and the wider environment].</p> <p>Children 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.</p> <p>They generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a identify the design features of their products that will appeal to intended customers;</li> <li>b use their knowledge of a broad range of existing products to help generate their ideas;</li> <li>c design innovative and appealing products that have a clear purpose and are aimed at a specific user;</li> <li>d explain how particular parts of their products work;</li> <li>e use annotated sketches and cross-sectional drawings to develop and communicate their ideas;</li> <li>f when designing, explore different initial ideas before coming up with a final design;</li> <li>g when planning, start to explain their choice of materials and components including function and aesthetics;</li> <li>h test ideas out through using prototypes;</li> <li>i use computer-aided design to develop and communicate their ideas (see note on p. 1);</li> <li>j develop and follow simple design criteria;</li> <li>k work in a broader range of relevant contexts, for example entertainment, the home, school, leisure, food industry and the wider environment.</li> </ul>	<p><b>KS2 Design and Technology National Curriculum</b></p> <p>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.</p> <p>They should work in a range of relevant contexts [for example, the home, school, leisure, culture, enterprise, industry and the wider environment].</p> <p>Children 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.</p> <p>They generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a use research to inform and develop detailed design criteria to inform the design of innovative, functional and appealing products that are fit for purpose and aimed at a target market;</li> <li>b use their knowledge of a broad range of existing products to help generate their ideas;</li> <li>c design products that have a clear purpose and indicate the design features of their products that will appeal to the intended user;</li> <li>d explain how particular parts of their products work;</li> <li>e use annotated sketches, cross-sectional drawings and exploded diagrams (possibly including computer-aided design) to develop and communicate their ideas;</li> <li>f generate a range of design ideas and clearly communicate final designs;</li> <li>g consider the availability and costings of resources when planning out designs;</li> <li>h work in a broad range of relevant contexts, for example conservation, the home, school, leisure, culture, enterprise, industry and the wider environment.</li> </ul>

**KS1 Design and Technology National Curriculum**

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 making.

Children select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing].

They select from and use a wide range of materials and components, including construction materials, textiles and ingredients, according to their characteristics.

Children can:

Planning

- a with support, follow a simple plan or recipe;
- b begin to select from a range of hand tools and equipment, such as scissors, graters, zesters, safe knives, juicer;
- c select from a range of materials, textiles and components according to their characteristics;

Practical skills and techniques

- d learn to use hand tools and kitchen equipment safely and appropriately and learn to follow hygiene procedures;
- e use a range of materials and components, including textiles and food ingredients;
- f with help, measure and mark out;
- g cut, shape and score materials with some accuracy;
- h assemble, join and combine materials, components or ingredients;
- i demonstrate how to cut, shape and join fabric to make a simple product;
- j manipulate fabrics in simple ways to create the desired effect;
- k use a basic running stitch;
- l cut, peel and grate ingredients, including measuring and weighing ingredients using measuring cups;
- m begin to use simple finishing techniques to improve the appearance of their product, such as adding simple decorations.

**KS2 Design and Technology National Curriculum**

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 making.

Children select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing] accurately.

They 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.

Children can:

Plan

- a with growing confidence, carefully select from a range of tools and equipment, explaining their choices;
- b select from a range of materials and components according to their functional properties and aesthetic qualities;
- c place the main stages of making in a systematic order;

Practical skills and techniques

- d learn to use a range of tools and equipment safely, appropriately and accurately and learn to follow hygiene procedures;
- e use a wider range of materials and components, including construction materials and kits, textiles and mechanical and electrical components;
- f with growing independence, measure and mark out to the nearest cm and millimetre;
- g cut, shape and score materials with some degree of accuracy;
- h assemble, join and combine material and components with some degree of accuracy;
- i demonstrate how to measure, cut, shape and join fabric with some accuracy to make a simple product;
- j join textiles with an appropriate sewing technique;
- k begin to select and use different and appropriate finishing techniques to improve the appearance of a product such as hemming, tie-dye, fabric paints and digital graphics.

**KS2 Design and Technology National Curriculum**

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 making.

Children select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.

They 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.

Children can:

Planning

- a independently plan by suggesting what to do next;
- b with growing confidence, select from a wide range of tools and equipment, explaining their choices;
- c select from a range of materials and components according to their functional properties and aesthetic qualities;
- d create step-by-step plans as a guide to making;

Practical skills and techniques

- e learn to use a range of tools and equipment safely and appropriately and learn to follow hygiene procedures;
- f independently take exact measurements and mark out, to within 1 millimetre;
- g use a full range of materials and components, including construction materials and kits, textiles, and mechanical components;
- h cut a range of materials with precision and accuracy;
- i shape and score materials with precision and accuracy;
- j assemble, join and combine materials and components with accuracy;
- k demonstrate how to measure, make a seam allowance, tape, pin, cut, shape and join fabric with precision to make a more complex product;
- l join textiles using a greater variety of stitches, such as backstitch, whip stitch, blanket stitch;
- m refine the finish using techniques to improve the appearance of their product, such as sanding or a more precise scissor cut after roughly cutting out a shape.

<b>EVALUATE</b>	<p><b>KS1 Design and Technology National Curriculum</b></p> <p>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.</p> <p>Children explore and evaluate a range of existing products. They evaluate their ideas and products against design criteria. Children can:</p> <ul style="list-style-type: none"> <li>a explore and evaluate existing products mainly through discussions, comparisons and simple written evaluations;</li> <li>b explain positives and things to improve for existing products;</li> <li>c explore what materials products are made from;</li> <li>d talk about their design ideas and what they are making;</li> <li>e as they work, start to identify strengths and possible changes they might make to refine their existing design;</li> <li>f evaluate their products and ideas against their simple design criteria;</li> <li>g start to understand that the iterative process sometimes involves repeating different stages of the process.</li> </ul>	<p><b>KS2 Design and Technology National Curriculum</b></p> <p>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.</p> <p>Children investigate and analyse a range of existing products.</p> <p>They evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.</p> <p>They understand how key events and individuals in design and technology have helped shape the world.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a explore and evaluate existing products, explaining the purpose of the product and whether it is designed well to meet the intended purpose;</li> <li>b explore what materials/ingredients products are made from and suggest reasons for this;</li> <li>c consider their design criteria as they make progress and are willing to alter their plans, sometimes considering the views of others if this helps them to improve their product;</li> <li>d evaluate their product against their original design criteria;</li> <li>e evaluate the key events, including technological developments, and designs of individuals in design and technology that have helped shape the world.</li> </ul>	<p><b>KS2 Design and Technology National Curriculum</b></p> <p>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.</p> <p>Children investigate and analyse a range of existing products.</p> <p>They evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.</p> <p>They understand how key events and individuals in design and technology have helped shape the world.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a complete detailed competitor analysis of other products on the market;</li> <li>b critically evaluate the quality of design, manufacture and fitness for purpose of products as they design and make;</li> <li>c evaluate their ideas and products against the original design criteria, making changes as needed.</li> </ul>
<b>TECHNICAL KNOWLEDGE</b>	<p><b>KS1 Design and Technology National Curriculum</b></p> <p>Children build structures, exploring how they can be made stronger, stiffer and more stable.</p> <p>They explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a build simple structures, exploring how they can be made stronger, stiffer and more stable;</li> <li>b talk about and start to understand the simple working characteristics of materials and components;</li> <li>c explore and create products using mechanisms, such as levers, sliders and wheels.</li> </ul>	<p><b>KS2 Design and Technology National Curriculum</b></p> <p>Children apply their understanding of how to strengthen, stiffen and reinforce more complex structures.</p> <p>They understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages].</p> <p>They understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors].</p> <p>They apply their understanding of computing to program, monitor and control their products.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a understand that materials have both functional properties and aesthetic qualities;</li> <li>b apply their understanding of how to strengthen, stiffen and reinforce more complex structures in order to create more useful characteristics of products;</li> </ul>	<p><b>KS2 Design and Technology National Curriculum</b></p> <p>Children apply their understanding of how to strengthen, stiffen and reinforce more complex structures.</p> <p>They understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages].</p> <p>They understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors].</p> <p>They apply their understanding of computing to program, monitor and control their products.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a apply their understanding of how to strengthen, stiffen and reinforce more complex structures in order to create more useful characteristics of products;</li> <li>b understand and demonstrate that mechanical and electrical systems have an input, process and output;</li> <li>c explain how mechanical systems, such as cams, create</li> </ul>

		<ul style="list-style-type: none"> <li>c understand and demonstrate how mechanical and electrical systems have an input and output process;</li> <li>d make and represent simple electrical circuits, such as a series and parallel, and components to create functional products;</li> <li>e explain how mechanical systems such as levers and linkages create movement;</li> <li>f use mechanical systems in their products.</li> </ul>	<ul style="list-style-type: none"> <li>d apply their understanding of computing to program, monitor and control a product.</li> </ul>
<b>COOKING AND NUTRITION</b>	<p><b>KS1 Design and Technology National Curriculum</b></p> <p>Children use the basic principles of a healthy and varied diet to prepare dishes.</p> <p>They understand where food comes from. Children can:</p> <ul style="list-style-type: none"> <li>a explain where in the world different foods originate from;</li> <li>b understand that all food comes from plants or animals;</li> <li>c understand that food has to be farmed, grown elsewhere (e.g. home) or caught;</li> <li>d name and sort foods into the five groups in the Eatwell Guide;</li> <li>e understand that everyone should eat at least five portions of fruit and vegetables every day and start to explain why;</li> <li>f use what they know about the Eatwell Guide to design and prepare dishes.</li> </ul>	<p><b>KS2 Design and Technology National Curriculum</b></p> <p>Children understand and apply the principles of a healthy and varied diet.</p> <p>They prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.</p> <p>They understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a start to know when, where and how food is grown (such as herbs, tomatoes and strawberries) in the UK, Europe and the wider world;</li> <li>b understand how to prepare and cook a variety of predominantly savoury dishes safely and hygienically;</li> <li>c with support, use a heat source to cook ingredients showing awareness of the need to control the temperature of the hob and/or oven;</li> <li>d use a range of techniques such as mashing, whisking, crushing, grating, cutting, kneading and baking;</li> <li>e explain that a healthy diet is made up of a variety and balance of different food and drink, as represented in the Eatwell Guide and be able to apply these principles when planning and cooking dishes;</li> <li>f understand that to be active and healthy, nutritious food and drink are needed to provide energy for the body;</li> <li>g prepare ingredients using appropriate cooking utensils;</li> <li>h measure and weigh ingredients to the nearest gram and millilitre;</li> <li>i start to independently follow a recipe;</li> <li>j start to understand seasonality.</li> </ul>	<p><b>KS2 Design and Technology National Curriculum</b></p> <p>Children understand and apply the principles of a healthy and varied diet.</p> <p>They prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.</p> <p>They understand seasonality, and know where and how a variety of ingredients are grown, reared, caught and processed.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a know, explain and give examples of food that is grown (such as pears, wheat and potatoes), reared (such as poultry and cattle) and caught (such as fish) in the UK, Europe and the wider world;</li> <li>b understand about seasonality, how this may affect the food availability and plan recipes according to seasonality;</li> <li>c understand that food is processed into ingredients that can be eaten or used in cooking;</li> <li>d demonstrate how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source;</li> <li>e demonstrate how to use a range of cooking techniques, such as griddling, grilling, frying and boiling;</li> <li>f explain that foods contain different substances, such as protein, that are needed for health and be able to apply these principles when planning and preparing dishes;</li> <li>g adapt and refine recipes by adding or substituting one or more ingredients to change the appearance, taste, texture and aroma;</li> <li>h alter methods, cooking times and/or temperatures;</li> <li>i measure accurately and calculate ratios of ingredients to scale up or down from a recipe;</li> <li>j independently follow a recipe.</li> </ul>

# Additional Cultural Capital Opportunities

<b>General</b>	<b>V and A Museum; Natural History Museum, Science Museum; The Silverstone Experience; Fashion Enter, The Institution of Engineering and Technology (online), Mouse Open Projects (online), Engineering at Home (online), Dyson Challenge Cards (online), Six Bricks (online), #StoryCity, Neon, Cracking Ideas Competition, The Royal Mint, Best Technology and Engineering Playlist,</b>					
<b>Reception</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>