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, 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.

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.

National curriculum in England 2014 DfE

<table>
<tr><th>EARLY YEAR FOUNDATION STAGE</th><th>KEY STAGE ONE</th><th>KEY STAGE TWO</th></tr>
<tr><td>The most relevant statements for DT are taken from the following areas of learning:
Expressive arts and design
Physical development
Personal, Social, Emotional Development</td><td colspan="2">By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.</td></tr>
<tr><td>Early Learning Goals
Expressive Arts and Design

Creating with Materials
• Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function;

• Share their creations, explaining the process they have used;</td><td>Through a variety of creative and practical activities, pupils should be taught the knowledge and 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 making and designing, pupils should be taught to:
Design
• Design a purposeful, functional, appealing products for themselves and other users based on design criteria
• Generate, develop, model and communicate their ideas through talking, drawing, templates,</td><td>Through a variety of creative and practical activities, pupils should be taught the knowledge and 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 making and designing, 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</td></tr>
</table>

• Make use of props and materials when role playing characters in narratives and stories. **Physical development** **Fine motor skills** • Use a range of small tool, including scissors, paint brushes and cutlery. **Personal, Social, Emotional Development** **Managing Self** • Be confident to try new activities and show independence, resilience and perseverance in the face of challenge; • Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding importance of **healthy food choices.**	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 axels]* in their products **Cooking and nutrition** Pupils should be taught to: • Use the basic principles of a healthy and varied diet to prepare dishes • Understand where food comes from.	• 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 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 • Understanding how key events and individuals in design and technology have helped shape the world **Technical knowledge** • Apply their understanding of how to strengthen, stiffen and reinforce more complex structures • Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages] • Understand and use electrical systems in their products *[for example, series circuits incorporating switches, bulbs, buzzers and motors*] • Apply their understanding of computing to program, monitor and control their products **Cooking and Nutrition** • 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

	Term 1 and 2 Discover	Term 3 and 4 Explore	Term 5 and 6 Create
EYFS	Pupils in the EYFS will build their knowledge, skills and understanding through planned, purposeful play including both child initiated, and adult led activities. Designing, making and evaluating is typically intuitive at this stage and often occurs at the same time, i.e. physically arranging and re-arranging materials and components and orally communicating what they are doing and have done as they make.		
	Cooking and nutrition • Begin to understand some of the tools, techniques and processes involved in food preparation. • Discussion about hygiene and appropriate use of senses when tasting food • Discussing healthy foods and the importance of drinking water Suggested activities: Make pumpkin soup. Make and decorate individual Christmas cake as gift. Make healthy sandwiches for teddy bears picnic. Cooking opportunities may arise as a result of children's interests.		
Outdoor learning opportunities	Outdoor continuous provision includes opportunities for den building, large block play, water channelling		
Design (Plan)	• Talk about what they want to make and who and/or what it is for • Planning and adapting initial ideas to make them better • Discuss and notice materials around them		
Make (Do)	• Make models using variety of materials. Such as Construction toys, junk materials, wooden blocks • Learn to construct with a purpose in mind • Observe closely and replicate a structure, e.g. a castle out of small wooden bricks • Use the language of designing and making		
Evaluate (Review)	• Be excited about what they have made • Exploration – build and join for a purpose and testing their models • Use of evaluative and comparative language, "longer", "shorter", "heavier", "stronger" • Discuss problems and how they might be solved as they arise.		
Cross year links	**Preparing**: Y1 make a freestanding structure (bridge). Y1 breakfast pots		
Technical knowledge	Use a range of tools with increasing care and precision - scissors, hole punch, hammer, screw driver, rolling pin, cutter, knife (with supervision) Joining techniques - glue, string, masking tape, clear tape Stirring, mixing, pouring, blending		
Subject specific vocabulary	Materials, join, cut, attach, fold, tear, build, shape, heavier, shorter, longer, stronger, stable, Plan, create, improve, test, stir, mix, pour, blend, roll, cut, taste		

Y1	**Aspect**: Mechanisms **Focus**: Sliders and levers **Design make and evaluate assignment:** Make toys using sliders and levers	**Aspect**: Food **Focus**: Preparing fruit and vegetables **Design make and evaluate assignment:** 'Bring on Breakfast' – breakfast pots	**Aspect**: Structures **Focus**: Free standing structures **Design make and evaluate assignment:** A bridge for the Billy Goats Gruff
Cross year links	**Anchoring**: Using joining techniques Use of basic tools – scissors, hole punches Use of tape and glue to join card and paper	**Anchoring**: EY – Healthy eating. Making sandwiches, soup	**Anchoring**: Use of construction kits and wooden blocks to build walls and towers Use of basic tools – scissors, hole punches Use of tape and glue to join card and paper
	Preparing: Mechanisms Year 4 – pop up book	**Preparing**: preparing fruit and vegetables -Y2 dips and dippers	**Preparing**:
Technical knowledge	Explore and use sliders and levers. Understand that different mechanisms produce different types of movement. Know and use technical vocabulary relevant to the project.	This food project has been developed to help children learn about healthy eating (specifically the importance of breakfast and 5 A DAY), where some of their food comes from and how to prepare a simple dish safely and hygienically.	Know how to make a free standing structure stronger, stiffer and more stable Know and use technical vocabulary relevant to the project
Subject specific vocabulary	slider, lever, pivot, slot, bridge/guide card, masking tape, paper fastener, join pull, push, up, down, straight, curve, forwards, backwards design, make, evaluate, user, purpose, ideas, design criteria, product, function	Fork secure, bridge hold, peeling, threading	Cut, fold, join fix Structure, framework, weak, strong, stable, base, top, surface. Thinner, thicker, corner, point, straight, curve Design, make evaluate, user, purpose, ideas, design criteria, function
Curriculum links	**Spoken language** –ask relevant questions to extend their knowledge and understanding. Build technical and directional vocabulary. **Art and design**–use colour, pattern, line, shape. **Mathematics–** positional language. Use standard and non-standard measures.	**PSHE -** What helps us stay healthy? That things people put into or onto our bodies can affect how they feel **Geography –** Where breakfast foods originate from	**Mathematics** – use standard and non-standard measures **Science**- properties of materials and suitability for task **Spoken language**- discussing design ideas. Build technical vocabulary
Outdoor learning opportunities			• Create structures on playground using wooden blocks • Create bridges from sticks in the woods • Act out story of Billy goat's Gruff

Y2	**Aspect**: Mechanisms **Focus**: Wheels and Axles **Design make and evaluate assignment:** Design and create a moving 1666 cart	**Aspect**: Food **Focus**: Preparing Fruit and Vegetables **Design make and evaluate assignment:** Dips and Dippers	**Aspect** Textiles **Focus** Templates and Joining Techniques **Design make and evaluate assignment** Design and make a puppet for a younger child
Cross year links	**Anchoring**: Y1 – Sliders and Levers (Mechanisms)	**Anchoring**: Y1 – Breakfast Pots (Fruit and Veg) Cutting soft fruit	**Anchoring**: Y1 - NA
	Preparing: Y3 - NA	**Preparing**: Y3 – Healthy Eating	**Preparing**: Y3 – Textiles Make money container e.g. purse
Technical knowledge	Explore and use wheels, axles and axle holders. Distinguish between fixed and freely moving axles. Know and use technical vocabulary relevant to the project.	Use simple utensils and equipment to e.g. peel, cut, slice, squeeze, grate and chop safely. Understand where a range of fruit and vegetables come from Understand and use basic principles of a healthy and varied diet to prepare dishes, including how fruit and vegetables are part of The Eatwell Guide.	Understand how simple 3-D textile products are made, using a template to create two identical shapes. Understand how to join fabrics using different techniques e.g. running stitch, glue, over stitch, stapling. Explore different finishing techniques e.g. using painting, fabric crayons, stitching, buttons and ribbons.
Subject specific vocabulary	vehicle, wheel, axle, axle holder, chassis, body, cab assembling, cutting, joining, shaping, finishing, fixed, free, moving, mechanism names of tools, equipment and materials used design, make, evaluate, purpose, user, criteria, functional	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, planning, investigating tasting, arranging, popular, design, evaluate, criteria	names of existing products, joining and finishing techniques, tools, fabrics and components template, pattern pieces, mark out, join, decorate, finish features, suitable, quality mock-up, design brief, design criteria, make, evaluate, user, purpose, function
Curriculum links	History – The Great Fire of London	Science – Animals Including Humans Geography – Comparing Eastbourne and Mombasa	Science – Animals including Humans
Links to Outdoor Learning		• Gardening – learning how to grow plants and what they need to survive	• Trip to Port Lympne zoo to study the animals that will be made into puppets • Scavenger hunt to reveal animals which will be studied

Y3	**Aspect**: Food **Focus**: (Healthy and varied diet – including cooking and nutrition requirements for KS2) **Design make and evaluate assignment:** rainbow wraps	**Aspect**: Structures **Focus**: (Shell structures) Zaha Hadid **Design make and evaluate assignment:** To create a package for a product to keep it secure and appealing to a buyer	**Aspect** Textiles **Focus** (2D shape to 3D product) **Design make and evaluate assignment:** To make a money container for a family member to take shopping.
Cross year links	**Anchoring**: Y2: Dips and dippers	**Anchoring**: Y1: Bridge for Billy Goat Gruff	**Anchoring**: Y2: Make puppets
	Preparing: Y4: fillings for a bread-based product	**Preparing**: Y5: Cam	**Preparing**: Y6: Collaborative tapestry
Technical knowledge	Use appropriate equipment and utensils to prepare and combine food. Know about fresh and processed ingredients appropriate for the product and whether they are grown, reared or caught. Know and use relevant technical and sensory vocabulary appropriately.	Develop and use knowledge of nets of cubes and cuboids and where appropriate more complex 3D shapes. Develop and use knowledge of how to construct strong, stiff structures.	Know how to strengthen, stiffen and reinforce existing fabrics. Understand how to securely join two pieces of fabric together. Understand the need for patterns and seam allowances
Subject specific vocabulary	Ingredients, texture, taste, sweet, sour, hot, spicy, appearance, smell, preference, greasy, moist, fresh, savoury, hygienic, edible, grown, caught, reared, frozen, tinned, processed, harvested, seasonal, healthy / varied diet	shell structure, 3D, 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	fabric, fastening, compartment, zip, button, structure, finishing technique, strength, weakness, stiffening, templates, stitch, seam, seam allowance
Curriculum links	**Maths**: mass kg/g Computing: Making use of mathematical and computing skills to present results of sensory evaluations graphically. **Science**: Using and developing skills of observing and questioning; humans get nutrition from what they eat **Spoken language**: develop technical language	**Maths**: Compare and sort common 2D and 3D shapes in everyday objects; recognise 3D shapes in different orientations; use a ruler to measure to the nearest cm; draw 2D shapes and make 3D objects using modelling materials **Science**: Discuss the properties and suitability of materials	**Maths**: Nets of shapes, accurate measurements Science: properties and suitability of fabrics Computing: create pattern pieces **History**: investigating textiles Art: investigate visual and tactile properties of fabrics **Spoken language**: develop technical language
Links to Outdoor Learning			

Y4	**Aspect**: Food **Focus**: Celebrating culture and seasonality **Design, make and evaluate** a baked product	**Aspect**: Electrical systems **Focus**: Simple circuits and switches **Design, make and evaluate** a buzzer game.	**Aspect** Mechanical systems **Focus** Levers and linkages **Design, make and evaluate** a book with levers and linkages for Year 1 children to engage with.
Cross year links	**Anchoring**: KS1 – preparing fruit and vegetables Year 3 – healthy and varied diet – rainbow wraps	**Anchoring**: N/A	**Anchoring**: Year 1 – sliders and levers make (toy with moving part)
	Preparing: Year 5/6 - Celebrating culture and seasonality	**Preparing**: Y5 - electrical system – monitoring and control	**Preparing**: Year 5 mechanical systems and structures - Cam mechanism (automata toy)
Technical knowledge	Know how to use appropriate equipment and utensils to prepare and combine food. Know about a range of fresh and processed ingredients appropriate for their product, and whether they are grown, reared or caught. Know and use relevant technical and sensory vocabulary appropriately.	Understand and use electrical systems in their products, such as series circuits incorporating switches, bulbs and buzzers. Know and use technical vocabulary relevant to the project.	Understand and use lever and linkage mechanisms. Distinguish between fixed and loose pivots. Know and use technical vocabulary relevant to the project.
Subject specific vocabulary	Utensils, techniques, 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, sensory evaluation	Series circuit, fault, connection, switch, battery, bulb, wire, insulator, conductor, crocodile clip, control, input, output	Mechanism, lever, linkage, pivot, slot, guide, purpose, function, prototype, criteria, innovative, appealing, target audience
Curriculum links	**Science** – using and developing skills of observing and questioning. Humans get nutrition from what they eat. Discuss changes of state if heat is used. **Mathematics** – mass kg/g. **Writing** –Use non-fiction texts such as description, explanation and instructions e.g. recipes. Organise their work using e.g. headings, subheadings. **Art & Design** – using and developing drawing skills	**Science -** know how to construct simple series circuits and have a basic understanding of insulators, conductors and open and closed switches. **Art and design –** using and developing drawing skills. **Spoken language** - develop understanding through speculating, hypothesising, imagining and exploring ideas	**Spoken language –** participate in discussion and evaluation of books and, where available, other products with moving pictures **Mathematics –** use the vocabulary of position, direction and movement. Use a ruler to measure to the nearest cm, half cm or mm. **Art and design –** use colour, pattern, line, shape **English –** choosing vocabulary appropriate for Y1 children, using imagination to write a story
Outdoor learning opportunities	Plant and grow a variety of edible herbs and flowers. Take a nature walk to identify or collect edible plants that could be used in biscuits (such as herbs, edible flowers, etc.). let children help bake the biscuits outside.		N/A

Y5	**Aspect**: Electrical systems **Focus**: Monitoring and control **Design make and evaluate assignment:** use crumble to make a sensing device	**Aspect:** Food **Focus:** Celebrate culture and seasonality **Design make and evaluate assignment:** soup	**Aspect**: Mechanical systems and Structures **Focus**: Cam mechanisms **Design make and evaluate assignment:** Make an automata toy
Cross year links	**Anchoring**: Year 4: Electrical systems – buzzer game Year 5: Programming (Crumble)	**Anchoring**: Year 1: preparing fruit and vegetables Year 2: preparing vegetables Year 3: Healthy eating rainbow wrap	**Anchoring**: Y1 – free standing structures Y2- wheels and axels
	Preparing: N/A	**Preparing**: Year 6: celebrating culture and seasonality	**Preparing**: Year 6: Bridge structures
Technical knowledge	• Understand and use electrical systems in their products, including Crumble. • Understand the use of computer control systems in products, including Scratch. • Apply their understanding of computing to program, monitor and control their products, using Crumble and Scratch together.	• Know how to use utensils and equipment including to prepare and cook food, e.g., slicing, chopping, frying, blending, mixing and simmering. • Understand about seasonality in relation to food products and the source of different food products.	• Understand that mechanical systems have an • input, process and an output. • Understand how cams can be used to produce • different types of movement and change the • direction of movement.
Subject specific vocabulary	reed switch, toggle switch, push-to-make switch, push-to-break switch, light dependent resistor (ldr), tilt switch, battery holder, usb cable, wire, insulator, conductor, crocodile clip, control, program, system, input device, output device, series circuit, parallel circuit, function, user, purpose	Vitamins/nutrients, nutrition, healthy, source , spice, ingredients, recipe, equipment, tool, knife, peel, vegetables, peel, chop, slice, dice, simmer, boil, fry, sauté, soften, serve	cam, snail cam, off-centre cam, peg cam, pear shaped cam, follower, axle, shaft, crank, handle, housing, framework, rotation, rotary motion, oscillating motion, reciprocating motion, annotated sketches, exploded diagrams, mechanical system, input movement, process, output movement, design decisions, functionality, design specification
Curriculum links	**Computing** – *Programming A – Selection in physical computing (using Crumble)* – to take place before the DT project	**Mathematics** – measuring mass kg/g. **Science** – using and developing skills of observing, questioning, changing state of ingredients.	**Science –** forces and movement: explore the effects of simple machines on movement. **Mathematics –** choose and use appropriate standard units (i.e. cm/mm) to estimate and accurately measure length/height **Art and design –** use and apply drawing skills. Use techniques with colour, pattern, texture, line and shape
Outdoor learning opportunities			

Y6	**Aspect:** Food **Focus:** Celebrating seasonality **Design make and evaluate assignment:** design and make food using rationed foods.	**Aspect: Structures** **Focus:** Apply understanding of how to strengthen, stiffen and reinforce more complex structures **Design make and evaluate assignment:** design and build a bridge using different structures depending on the distance the bridge has to cross vs the type of load it must carry	**Aspect**: Textiles **Focus**: Sewing **Design make and evaluate assignment:** make a soft toy for Yr reading buddies
Cross year links	**Anchoring**: Year 1: preparing fruit and vegetables Year 2: preparing vegetables Year 3: Healthy eating rainbow wrap Year 5 : seasonal soup	**Anchoring**: • Y5 Explore project – Mechanical systems and Structures	**Anchoring**: Y2 – sewing puppets (running stitch, whip stitch) Y3 – money bag for family member (running stich, back stitch, over sew stitch, using a pattern)
Technical knowledge	• Know how to use utensils and equipment including to prepare and cook food, including weighing, mixing, kneading and proving. • Know and use relevant technical and sensory vocabulary.	• Know and use technical vocabulary relevant to the project. • Structural features including strongest shapes. • Knowledge of different bridge structures and their purpose	• Understand a 3-D textile product can be made from a combination of accurately made pattern pieces, fabric shapes and different fabrics. • Understand that fabrics can be strengthened, stiffened and reinforced where appropriate.
Subject specific vocabulary	Stir, pour, mix, melt, dough, trim, series circuit, parallel circuit, input device, output device, system, monitor, control	Beam, Structure, Load, Foundation, Reinforce, Truss, Cantilever, Prototype, Cable-stayed, Suspension, Arch	Seam, seam allowance (15mm), Wadding, Reinforce, Hem, Template, pattern pieces, Pins, Needles, thread, Annotate, design decisions
Curriculum links	**PSHE** – How can we keep healthy as we grow? – planning a healthy meal **Spoken language** – developing relevant vocabulary including sensory descriptors. Give well-structured explanations. **Mathematics** – measuring mass kg/g. **Science** – using and developing skills of observing, questioning, changing state of ingredients. **Geography** – distribution of natural resources i.e. food	**Geography-**Describe physical and human features of a region in N America. Recognise how environments can be improved or sustained, with links to how human processes can impact upon them (e.g. renewable energy). **Mathematics –** choose and use appropriate standard units (i.e. cm/mm) to estimate and accurately measure length/height **Art and design –** use and apply drawing skills.	**Spoken language –** ask questions, formulate, articulate and justify answers, arguments and opinions. Consider different viewpoints **Mathematics** – apply knowledge of how 2-D patterns can be joined to make 3-D products; apply skills of accurate measuring using standard units i.e. cm/mm. **Art and design** – use and apply drawing skills
Outdoor opportunities			