

Design and Technology Progression Framework

Key Stages 1-3

National Curriculum 2014 – statements which are either derived directly from the programmes of study for D&T or provide an age-related interpretation of the requirements are shown in regular font

School Curriculum – statements which are additional to the programmes of study for D&T are shown in italic font

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Designing	Key Stage 1	Key Stage 2	Key Stage 3
Understanding contexts, users and purposes	Across KS1 pupils should: - work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment - state what products they are designing and making - say whether their products are for themselves or other users - describe what their products are for - say how their products will work - say how they will make their products suitable for their intended users - use simple design criteria to help develop their ideas	Across KS2 pupils should: - work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment - describe the purpose of their products - indicate the design features of their products that will appeal to intended users - explain how particular parts of their products work In early KS2 pupils should also: - gather information about the needs and wants of particular individuals and groups - develop their own design criteria and use these to inform their ideas In late KS2 pupils should also: - carry out research, using surveys, interviews, questionnaires and web-based resources - identify the needs, wants, preferences and values of particular individuals and groups <i>develop a simple design specification to guide their thinking</i>	Across KS3 pupils should: - work confidently within a range of relevant domestic, local and industrial contexts, such as the home, health, leisure, culture, engineering, manufacturing, construction, food, energy, agriculture and fashion <i>consider the influence of a range of lifestyle factors and consumer choices when designing products</i> - take creative risks when making design decisions <i>consider additional factors such as ergonomics, anthropometrics or dietary needs</i> - analyse where human values may conflict and compromise has to be achieved In early KS3 pupils should also: - develop detailed design specifications to guide their thinking - use research including the study of different cultures, to identify and understand user needs - identify and solve their own design problems In late KS3 pupils should also: - develop design specifications that include a wider range of requirements such as environmental, aesthetic, cost, maintenance, quality and safety - research the health and wellbeing, cultural, religious and socio-economic contexts of their intended users - understand how to reformulate design problems given to them
Generating, developing, modelling and communicating ideas	Across KS1 pupils should: - generate ideas by drawing on their own experiences - use knowledge of existing products to help come up with ideas - develop and communicate ideas by talking and drawing - model ideas by exploring materials, components and construction kits and by making templates and mock-ups - use information and communication technology, where appropriate, to develop and communicate their ideas	Across KS2 pupils should: - share and clarify ideas through discussion - model their ideas using prototypes and pattern pieces - use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas - use computer-aided design to develop and communicate their ideas In early KS2 pupils should also: - generate realistic ideas, focusing on the needs of the user <i>make design decisions that take account of the availability of resources</i> In late KS2 pupils should also: - generate innovative ideas, drawing on research <i>make design decisions, taking account of constraints such as time, resources and cost</i>	Across KS3 pupils should: - use specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations <i>combine ideas from a variety of sources</i> - use a variety of approaches, for example biomimicry and user-centred design, to generate creative ideas and avoid stereotypical responses - decide which design criteria clash and determine which should take priority - develop and communicate design ideas using annotated sketches - produce 3D models to develop and communicate ideas - use mathematical modelling to indicate likely performance before using physical materials and components, for instance when developing circuits or gearing systems - give oral and digital presentations and use computer-based tools In early KS3 pupils should also: - use 2D and begin to use 3D CAD packages to model their ideas - produce models of their ideas using CAM to test out their ideas In late KS3 pupils should also: - use 3D CAD to model, develop and present their ideas - use CAD and related software packages to validate their designs in advance of manufacture

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Making	Key Stage 1	Key Stage 2	Key Stage 3
Planning	Across KS1 pupils should: • <i>plan by suggesting what to do next</i> • select from a range of tools and equipment, <i>explaining their choices</i> • select from a range of materials and components according to their characteristics	Across KS2 pupils should: • select tools and equipment suitable for the task • <i>explain their choice of tools and equipment in relation to the skills and techniques they will be using</i> • select materials and components suitable for the task • explain their choice of materials and components according to functional properties and aesthetic qualities In early KS2 pupils should also: • <i>order the main stages of making</i> In late KS2 pupils should also: • <i>produce appropriate lists of tools, equipment and materials that they need</i> • <i>formulate step-by-step plans as a guide to making</i>	Across KS3 pupils should: • select appropriately from specialist tools, techniques, processes, equipment and machinery, including computer-aided manufacture • select appropriately from a wider, more complex range of materials, components and ingredients, taking into account their properties such as water resistance and stiffness In early KS3 pupils should also: • <i>produce ordered sequences and schedules for manufacturing products they design, detailing resources required</i> • <i>produce costings using spreadsheets for products they design and make</i> In late KS3 pupils should also: • <i>create production schedules that inform their own and others' roles in the manufacturing of products they design</i> • <i>make simple use of planning tools, for instance Gant charts</i> • <i>communicate their plans clearly so that others can implement them</i> • match and select suitable materials considering their fitness for purpose
Practical skills and techniques	Across KS1 pupils should: • follow procedures for safety and hygiene • use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components • measure, mark out, cut and shape materials and components • assemble, join and combine materials and components • use finishing techniques, including those from art and design	Across KS2 pupils should: • follow procedures for safety and hygiene • use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components In early KS2 pupils should also: • measure, mark out, cut and shape materials and components with some accuracy • assemble, join and combine materials and components with some accuracy • apply a range of finishing techniques, including those from art and design, with some accuracy In late KS2 pupils should also: • accurately measure, mark out, cut and shape materials and components • accurately assemble, join and combine materials and components • accurately apply a range of finishing techniques, including those from art and design • <i>use techniques that involve a number of steps</i> • demonstrate resourcefulness when tackling practical problems	Across KS3 pupils should: • follow procedures for safety and hygiene and understand the process of risk assessment • use a wider, more complex range of materials, components and ingredients, taking into account their properties • use a broad range of manufacturing techniques including handcraft skills and machinery to manufacture products precisely • exploit the use of CAD/CAM equipment to manufacture products, increasing standards of quality, scale of production and precision • apply a range of finishing techniques, including those from art and design, to a broad range of materials including textiles, metals, polymers and woods In early KS3 pupils should also: • make use of specialist equipment to mark out materials • use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives • use CAD/CAM to produce and apply surface finishing techniques, for example using dye sublimation • investigate and develop skills in modifying the appearance of materials including textiles and other manufactured materials e.g. dying and applique In late KS3 pupils should also: • <i>adapt their methods of manufacture to changing circumstances</i> • <i>recognise when it is necessary to develop a new skill or technique</i>

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Evaluating	Key Stage 1	Key Stage 2	Key Stage 3
Own ideas and products	Across KS1 pupils should: • talk about their design ideas and what they are making • make simple judgements about their products and ideas against design criteria • <i>suggest how their products could be improved</i>	Across KS2 pupils should: • identify the strengths and areas for development in their ideas and products • consider the views of others, including intended users, to improve their work In early KS2 pupils should also: • refer to their design criteria as they design and make • use their design criteria to evaluate their completed products In late KS2 pupils should also: • critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make • <i>evaluate their ideas and products against their original design specification</i>	Across KS3 pupils should: • test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups In early KS3 pupils should also: • evaluate their products against their original specification and identify ways of improving them • actively involve others in the testing of their products In late KS3 pupils should also: • select appropriate methods to evaluate their products in use and modify them to improve performance • produce short reports, making suggestions for improvements
Existing products	Across KS1 pupils should explore: • what products are • who products are for • what products are for • how products work • how products are used • where products might be used • what materials products are made from • what they like and dislike about products	Across KS2 pupils should investigate and analyse: • how well products have been designed • how well products have been made • why materials have been chosen • what methods of construction have been used • how well products work • how well products achieve their purposes • how well products meet user needs and wants In early KS2 pupils should also investigate and analyse: • who designed and made the products • where products were designed and made • when products were designed and made • whether products can be recycled or reused In late KS2 pupils should also investigate and analyse: • how much products cost to make • how innovative products are • how sustainable the materials in products are • what impact products have beyond their intended purpose	Across KS3 pupils should investigate and analyse: • new and emerging technologies In early KS3 pupils should investigate and analyse: • products through disassembly to determine how they are constructed and function • the positive and negative impact that products can have in the wider world In late KS3 pupils should investigate and analyse: • products that they are less familiar with using themselves • <i>products considering life cycle analysis</i> • <i>how products can be developed considering the concept of 'cradle to grave'</i> • <i>the concept of circular economy approaches in relation to product development and consumption</i>
Key events and individuals	Not a requirement in KS1	Across KS2 pupils should know: • about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products	Across KS3 pupils should know: • about an increasing range of designers, engineers, chefs, technologists and manufacturers and be able to relate their products to their own designing and making

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Technical knowledge	Key Stage 1	Key Stage 2	Key Stage 3
Making products work	Across KS1 pupils should know: - about the simple working characteristics of materials and components - about the movement of simple mechanisms such as levers, sliders, wheels and axles - how freestanding structures can be made stronger, stiffer and more stable <i>that a 3D textiles product can be assembled from two identical fabric shapes</i> <i>that food ingredients should be combined according to their sensory characteristics</i> <i>the correct technical vocabulary for the projects they are undertaking</i>	Across KS2 pupils should know: - how to use learning from science to help design and make products that work - how to use learning from mathematics to help design and make products that work - that materials have both functional properties and aesthetic qualities <i>that materials can be combined and mixed to create more useful characteristics</i> - that mechanical and electrical systems have an input, process and output <i>the correct technical vocabulary for the projects they are undertaking</i> In early KS2 pupils should also know: - how mechanical systems such as levers and linkages or pneumatic systems create movement - how simple electrical circuits and components can be used to create functional products - how to program a computer to control their products - how to make strong, stiff shell structures <i>that a single fabric shape can be used to make a 3D textiles product</i> <i>that food ingredients can be fresh, pre-cooked and processed</i> In late KS2 pupils should also know: - how mechanical systems such as cams or pulleys or gears create movement - how more complex electrical circuits and components can be used to create functional products - how to program a computer to monitor changes in the environment and control their products - how to reinforce and strengthen a 3D framework <i>that a 3D textiles product can be made from a combination of fabric shapes</i> <i>that a recipe can be adapted by adding or substituting one or more ingredients</i>	Across KS3 pupils should: - use learning from science to help design and make products that work - use learning from mathematics to help design and make products that work - understand the properties of materials, including smart materials, and how they can be used to advantage - understand the performance of structural elements to achieve functioning solutions - understand how more advanced mechanical systems used in their products enable changes in movement and force - how to competently use a range of cooking techniques for example, selecting and preparing ingredients; using utensils and electrical equipment In early KS3 pupils should also know: <i>how to classify materials by structure e.g. hard words, soft woods, ferrous and non-ferrous, thermoplastic and thermosetting plastics</i> - about the physical properties of materials e.g. grain, brittleness, flexibility, elasticity, malleability and thermal - how more advanced electrical and electronic systems can be powered and used in their products - how to use simple electronic circuits incorporating inputs and outputs <i>about textile fibre sources e.g. natural and synthetic and fabrics e.g. plain and woven</i> <i>how to select and modify patterns and use in textile construction</i> In late KS3 pupils should also know: <i>how materials can be cast in moulds</i> - how to make adjustments to the settings of equipment and machinery such as sewing machines and drilling machines - how to apply computing and use electronics to embed intelligence in products that respond to inputs - make use of sensors to detect heat, light, sound and movement such as thermistors and light dependant resistors - how to apply the concepts of feedback in systems - how to control outputs such as actuators and motors - how to use software and hardware to develop programmes and transfer these to programmable components for example, microcontrollers - how to make use of microcontrollers in products they design and manufacture themselves - how to construct and use simple and compound gear trains to drive mechanical systems from a high revving motor

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Cooking and nutrition	Key Stage 1	Key Stage 2	Key Stage 3
Where food comes from	Across KS1 pupils should know: - that all food comes from plants or animals - that food has to be farmed, grown elsewhere (e.g. home) or caught	Across KS2 pupils should know: - that a recipe can be adapted a by adding or substituting one or more ingredients - that food is grown (such as tomatoes, wheat and potatoes), reared (such as pigs, chickens and cattle) and caught (such as fish) in the UK, Europe and the wider world In late KS2 pupils should also know: - that seasons may affect the food available - how food is processed into ingredients that can be eaten or used in cooking	Across KS3 pupils should know: - that food is produced, processed and sold in different ways, e.g. conventional and organic farming, fair trade - that people choose different types of food and that this may be influenced by availability, season, need, cost, where the food is produced, culture and religion In late KS3 pupils should also know: - how to compare the cost of food when planning to eat out or cook at home <i>about the influence of food marketing, advertising and promotion on their own diet and purchasing behaviour</i>
Food preparation, cooking and nutrition	Across KS1 pupils should know: - how to name and sort foods into the five groups in the Eatwell Guide - that everyone should eat at least five portions of fruit and vegetables every day - how to prepare simple dishes safely and hygienically, without using a heat source - how to use techniques such as cutting, peeling and grating	Across KS2 pupils should know: - how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source - how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking In early KS2 pupils should also know: - that a healthy diet is made up from a variety and balance of different food and drink, as depicted in the Eatwell Guide - that to be active and healthy, food and drink are needed to provide energy for the body In late KS2 pupils should also know: <i>that recipes can be adapted to change the appearance, taste, texture and aroma</i> - that different food and drink contain different substances – nutrients, water and fibre – that are needed for health	Across KS3 pupils should know: - how to store, prepare and cook food safely and hygienically <i>how to use date-mark and storage instructions when storing and using food and drinks</i> - how to select and prepare ingredients - how to use utensils and electrical equipment - how to apply heat in different ways - how to use taste, texture and smell to decide how to season dishes and combine ingredients - how to adapt and use their own recipes - how to cook a repertoire of predominantly savoury dishes to feed themselves and others a healthy and varied diet In early KS3 pupils should also know: - the importance of a healthy and varied diet as depicted in the Eatwell Guide and Eight tips for healthy eating - that food provides energy and nutrients in different amounts; that they have important functions in the body; and that people require different amounts during their life - how to taste and cook a broader range of ingredients and healthy recipes, accounting for a range of needs, wants and values <i>how to actively minimise food waste such as composting fruit and vegetable peelings and recycling food packaging</i> In late KS3 pupils should also know: - the importance of energy balance and the implications of dietary excess or deficiency, e.g. malnutrition, maintenance of a healthy weight - how to use nutrition information and allergy advice panels on food labels to help make informed food choices - how to use a broader range of preparation techniques and methods when cooking, e.g. stir-frying, steaming, blending - how to modify recipes and cook dishes that promote current healthy eating messages - the principles of cleaning, preventing cross-contamination, chilling, cooking food thoroughly and reheating food until it is steaming hot