

KOP science and non core subject progression documents

Subject:

FS framework - ages and stages

Year 7 - national curriculum for KS3

Year group	Progression of skills	Progression in knowledge	Key vocabulary and essential experiences
Pre school	<p>Anticipates repeated sounds, sights and actions, e.g. when an adult demonstrates an action toy several times.</p> <p>Shows interest in toys with buttons, flaps and simple mechanisms and beginning to learn to operate them.</p>		<p>Push, pull, button.</p>
Nursery	<p>They safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.</p> <p>Seeks to acquire basic skills in turning on and operating some ICT equipment.</p> <p>Operates mechanical toys, e.g. turns the knob on a wind-up toy or pulls back on a friction car.</p>	<p>Children use what they have learnt about media and materials in original ways, thinking about uses and purposes.</p> <p>They represent their own ideas, thoughts and feelings through design and technology.</p>	<p>Turn, wind, lift, push, pull</p>
Reception	<p>Talks about why things happen and how things work.</p> <p>Knows how to operate simple equipment, e.g. turns on CD player and uses remote control.</p> <p>Shows an interest in technological toys with knobs or pulleys, or real objects such as cameras or mobile phones.</p> <p>Shows skill in making toys work by pressing parts or lifting flaps to achieve effects such as sound, movements or new images.</p> <p>Knows that information can be retrieved from computers.</p> <p>Children recognise that a range of technology is used in places such as homes and schools</p> <p>They select and use technology for particular purposes</p>	<p>Children use what they have learnt about media and materials in original ways, thinking about uses and purposes.</p> <p>They represent their own ideas, thoughts and feelings through design and technology.</p>	

<p>Year 1</p>	<p>Understanding contexts, users and purposes</p> <ul style="list-style-type: none"> 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 <p><i>Draw on their own experience to help generate ideas Suggest ideas and explain what they are going to do Identify a target group for what they intend to design and make Model their ideas in card and paper Develop their design ideas applying findings from their earlier research.</i></p> <p>Generating, developing, modelling and communicating ideas</p> <ul style="list-style-type: none"> Generate ideas by drawing on their own experiences Develop and communicate ideas by talking and drawing <p><i>Make their design using appropriate techniques With help measure, mark out, cut and shape a range of materials Use tools eg scissors and a hole punch safely Assemble, join and combine materials and components together using a variety of temporary methods e.g. glues or masking tape</i></p> <p>Planning</p> <ul style="list-style-type: none"> Plan by suggesting what to do next <p>Practical skills and techniques</p> <ul style="list-style-type: none"> Follow procedures for safety and hygiene Use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components 	<p>Design criteria are the explicit goals that a project must achieve.</p> <p>Computer-aided design is when computers are used to help design products. It has advantages over paper design in that it will show how finished products will look. Different colours and textures can also be trialled.</p> <p>Different materials can be used for different purposes, depending on their properties. For example, cardboard is a stronger building material than paper. Plastic is light and can float. Clay is heavy and will sink.</p> <p>Specific tools are used for particular purposes. For example, scissors are used for cutting and glue is used for sticking.</p> <p>A strength is a good quality of a piece of work. A weakness is an area that could be improved.</p> <p>Using non-standard measures is a way of measuring that does not involve reading scales. For example, weight may be measured using a balance scale and lumps of plasticine. Length may be measured in the number of handspans or pencils laid end to end.</p> <p>Fruit and vegetables are an important part of a healthy diet. It is recommended that people eat at least five portions of fruit and vegetables every day.</p> <p>Some foods come from animals, such as meat, fish and dairy products. Other foods come from plants, such as fruit and vegetables, grains, beans and nuts.</p> <p>Different materials are suitable for different purposes, depending on their specific properties. For example, glass is transparent, so it is suitable to be used for windows.</p>	<p>planning, investigating design, evaluate, make, user, purpose, ideas, product,</p> <p>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,</p> <p>joining and finishing techniques, tools, fabrics and components, template, pattern pieces, mark out, join, decorate, finish</p> <p>slider, lever, pivot, slot, bridge/guide, card, masking tape, paper fastener, join, pull, push, up, down, straight, curve,</p>
---------------	--	--	---

	<p><i>Select and use appropriate fruit and vegetables, processes and tools Use basic food handling, hygienic practices and personal hygiene Use simple finishing techniques to improve the appearance of their product</i></p> <p>Own ideas and products</p> <ul style="list-style-type: none"> • Talk about their design ideas and what they are making • Make simple judgements about their products and ideas against design criteria <p><i>Evaluate their product by discussing how well it works in relation to the purpose Evaluate their products as they are developed, identifying strengths and possible changes they might make Evaluate their product by asking questions about what they have made and how they have gone about it</i></p> <ul style="list-style-type: none"> • <p>Existing products</p> <ul style="list-style-type: none"> • Explore what products are • Explore who products are for • Explore what products are for 	<p>Electricity is a form of energy. Many household appliances use electricity to work, such as kettles, televisions and washing machines. They can be switched on and off by breaking the circuit to prevent electricity from flowing. This can be a switch on the appliance or a wall socket switch.</p> <p>An axle is a rod or spindle that passes through the centre of a wheel to connect two wheels.</p> <p>Two products can be compared by looking at a set of criteria and scoring both products against each one.</p> <p>Everyday products are objects that are used routinely at home and school, such as a toothbrush, cup or pencil. All products are designed for a specific purpose.</p> <p>Rules are made to keep people safe from danger. Safety rules include always listening carefully and following instructions, using equipment only as and when directed and wearing protective clothing if appropriate and washing hands before touching food.</p> <p>The importance of a product may be that it fulfils its goals and performs a useful purpose.</p>	<p>forwards, backwards</p>
--	---	--	--------------------------------

- *Use knowledge of existing products to help come up with ideas*

- *Select from a range of tools and equipment*

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 • that a 3-D textiles product can be assembled from two identical fabric shapes • that food ingredients should be combined according to their sensory characteristics • the correct technical vocabulary for the projects they are undertaking

		<p>Across KS1 pupils should know:</p> <ul style="list-style-type: none"> • that all food comes from plants or animals • that food has to be farmed, grown elsewhere (e.g. home) or caught <p>Across KS1 pupils should know:</p> <ul style="list-style-type: none"> • how to name and sort foods into the five groups in The eatwell plate • 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 	
Year 2	<p>Understanding contexts, users and purposes</p> <ul style="list-style-type: none"> • Describe what their products are for • Say how their products will work <p>Generating, developing, modelling and communicating ideas</p> <ul style="list-style-type: none"> • Model ideas by exploring materials, components and construction kits and by 	<ul style="list-style-type: none"> • <i>Say how they will make their products suitable for their intended users</i> • <i>Use simple design criteria to help develop their ideas</i> <ul style="list-style-type: none"> • <i>Use information and communication technology,</i> 	<p>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</p>

	<p>making templates and mock-ups</p> <p>Generate ideas by drawing on their own and other people's experiences Develop their design ideas through discussion, observation, drawing and modelling Identify a purpose for what they intend to design and make Identify simple design criteria Make simple drawings and label parts</p> <p>Planning</p> <ul style="list-style-type: none"> Plan by suggesting what to do next <p>Practical skills and techniques</p> <ul style="list-style-type: none"> 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 <p><i>Begin to select tools and materials; use vocab' to name and describe them Measure, cut and score with some accuracy Use hand tools safely and appropriately Assemble, join and combine materials in order to make a product Cut, shape and join fabric to make a simple garment. Use basic sewing techniques Follow safe procedures for food safety and hygiene Choose and use appropriate finishing techniques</i></p> <p>Own ideas and products</p> <ul style="list-style-type: none"> Suggest how their products could be improved <p><i>Evaluate against their design criteria</i></p>	<p><i>where appropriate to develop and communicate their ideas help develop their ideas</i></p> <p>Pirate pulley</p> <ul style="list-style-type: none"> Select from a range of tools and equipment, explaining their choices Select from a range of materials and components according into their characteristics <p>Annotated sketches and exploded diagrams show specific parts of a design, highlight sections or show functions. They communicate ideas in a visual, detailed way.</p> <p>Remote control is controlling a machine or activity from a distance. Computers can be used to remotely control a device, such as a light, speaker or buzzer.</p> <p>A prototype is a mock-up of a design that will look like the finished product but may not be full size or made of the same materials. Shell and frame structures can be strengthened by gluing several layers of card together, using triangular shapes rather than squares, adding diagonal support struts and using 'Jinks' corners (small, thin pieces of card cut into a right-angled triangle and glued over each joint to straighten and strengthen them).</p> <p>Useful tools for cutting include scissors, craft knives, junior hacksaws with pistol grip and bench hooks. Useful tools for joining include glue guns. Tools should only be used with adult supervision and safety rules must be followed.</p> <p>Evaluation can be done by considering whether the product does what it was designed to do, whether it has an attractive</p>	<p>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</p> <p>vehicle, wheel, axle, axle holder, chassis, body, cab assembling, cutting, joining, shaping, finishing, fixed, free, moving, mechanism names of tools, equipment and materials used</p>
--	--	--	--

Evaluate their products as they are developed, identifying strengths and possible changes they might make. Talk about their ideas, saying what they like and dislike about them

Existing products

- 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

appearance, what changes were made during the making process and why the changes were made. Evaluation also includes suggesting improvements and explaining why they should be made

Cooking techniques include baking, boiling, frying, grilling and roasting.

Fruit kebabs/fruit kebabs

Healthy snacks include fresh or dried fruit and vegetables, nuts and seeds, rice cakes with low-fat cream cheese, homemade popcorn or chopped vegetables with hummus. A healthy packed lunch might include a brown or wholemeal bread sandwich containing eggs, meat, fish or cheese, a piece of fresh fruit, a low-sugar yoghurt, rice cake or popcorn and a drink, such as water or semi-skimmed milk.

Particular areas of the world have conditions suited to growing certain crops, such as coffee in Peru and citrus fruits in California in the United States of America.

Different materials and components have a range of properties, making them suitable for different tasks. It is important to select the correct material or component for the specific purpose, depending on the design criteria. Recipe ingredients have different tastes and appearances. They look and taste better and are cheaper when in season.

Components can be added to circuits to achieve a particular goal. These include bulbs for lighthouses and torches, buzzers for burglar alarms and electronic games, motors for fairground rides and motorised vehicles and switches for burglar alarms and games.

Mechanisms can be used to add functionality to a model. For example, sliders or levers can be

		<p>used in moving pictures, storybooks or simple puppets; linkages in moving vehicles or puppets; gears in motorised vehicles or spinning toys; pulleys in cable cars or transport systems and cams in 3-D moving toys or pictures.</p> <p>A comparison table can be used to compare products by listing specific criteria on which each product can be judged or scored.</p> <p>Design features are the aspects of a product's design that the designer would like to emphasise, such as the use of a particular material or feature that makes the product easier to use or more durable.</p> <p>Italics - are they in the right column</p> <p>Bold - put in correct place</p>	
<p>By the end of Key Stage 1</p>	<p>Will be able to communicate their ideas through talking, drawing,</p> <p>Will have prepared a range of healthy snack, selecting from and using a range of tools and equipment</p> <p>Will have made a model boat that floats by selecting from and using a wide range of materials according to their characteristics</p> <p>Will have made a Tudor home using technical knowledge to build a structure exploring how they can be made stronger, stiffer and more stable</p> <p>Will have made a pulley to explore and use mechanisms</p> <p>Will have explored and evaluated a range of healthy snacks including their own against healthy design criteria</p>		
<p>Year 3</p>	<p>All Key stage 2</p> <p>Understanding contexts, users and purposes</p> <p>Across KS2 pupils should:</p> <ul style="list-style-type: none"> • 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 	<p>Making products work</p> <p>Across KS2 pupils should know:</p> <ul style="list-style-type: none"> • 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 • that materials can be combined and mixed to create more useful characteristics 	<p>user, purpose, design, model, evaluate, prototype, annotated sketch, functional, innovative, investigate, label, drawing, function, planning, design criteria, annotated sketch,</p>

	<p>intended users</p> <ul style="list-style-type: none"> • explain how particular parts of their products work <p>In early KS2 pupils should also:</p> <ul style="list-style-type: none"> • gather information about the needs and wants of particular individuals and groups • develop their own design criteria and use these to inform their ideas <p>Generating developing modelling and communicating ideas</p> <p>Across KS2 pupils should:</p> <ul style="list-style-type: none"> • 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 <p>In early KS2 pupils should also:</p> <ul style="list-style-type: none"> • generate realistic ideas, focusing on the needs of the user • make design decisions that take account of the availability of resources <p>Planning</p> <p>Across KS2 pupils should:</p> <ul style="list-style-type: none"> • select tools and equipment suitable for the task • explain their choice of tools and equipment in relation to the skills and techniques they will be using • select materials and components suitable for the task • explain their choice of materials and components according to functional properties and aesthetic qualities <p>Generate ideas for an item, considering its purpose and the user/s Identify a purpose and</p>	<ul style="list-style-type: none"> • that mechanical and electrical systems have an input, process and output • the correct technical vocabulary for the projects they are undertaking <p>In early KS2 pupils should also know:</p> <ul style="list-style-type: none"> • 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 • that a single fabric shape can be used to make a 3D textiles product • that food ingredients can be fresh, pre-cooked and processed <p>Where food comes from</p> <p>Across KS2 pupils should know:</p> <ul style="list-style-type: none"> • 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 <p>Food preparation, cooking and nutrition</p> <p>Across KS2 pupils should know:</p> <ul style="list-style-type: none"> • 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 <p>In early KS2 pupils should also know:</p> <ul style="list-style-type: none"> • that a healthy diet is made up from a variety and balance of different food and drink, as depicted in The eatwell plate • that to be active and healthy, food and 	<p>appealing</p> <p>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</p> <p>shape, net, cube, cuboid, prism, vertex, edge, face, breadth, length, width, capacity, marking out, scoring, shaping, tabs, adhesives, joining, assemble, accuracy, material, stiff, strong, reduce, reuse, recycle, corrugating, ribbing, laminating, font, lettering, text, graphics, decision,</p>
--	---	--	--

<p>establish criteria for a successful product. Plan the order of their work before starting Explore, develop and communicate design proposals by modelling ideas Make drawings with labels when designing</p> <p>Select tools and techniques for making their product Measure, mark out, cut, score and assemble components with more accuracy Work safely and accurately with a range of simple tools Think about their ideas as they make progress and be willing change things if this helps them improve their work Measure, tape or pin, cut and join fabric with some accuracy Demonstrate hygienic food preparation and storage Use finishing techniques strengthen and improve the appearance of their product using a range of equipment including ICT</p> <p>Evaluate their product against original design criteria e.g. how well it meets its intended purpose Disassemble and evaluate familiar products</p> <p>In early KS2 pupils should also:</p> <ul style="list-style-type: none"> • order the main stages of making <p>Practical skills and techniques</p> <p>Across KS2 pupils should:</p> <ul style="list-style-type: none"> • 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 <p>In early KS2 pupils should also:</p> <ul style="list-style-type: none"> • 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 	<p>drink are needed to provide energy for the body</p> <p>Design criteria are the exact goals a project must achieve to be successful. These criteria might include the product's use, appearance, cost and target user.</p> <p>A program is a set of instructions written to perform a specified task on a computer.</p> <p>Shell structures are hollow, 3-D structures with a thin outer covering, such as a box. Frame structures are made from thin, rigid components, such as a tent frame. The rigid frame gives the structure shape and support. Diagonal struts can strengthen the structure.</p> <p>Specific tools can be used for cutting, such as saws. Wood can be joined using glue, nails, staples or a combination. Safety rules must be followed to prevent injury from sharp blades. These rules include using a bench hook to keep the wood still, using a junior hacksaw with a pistol grip and working under adult supervision</p> <p>Asking questions can help others to evaluate their product, such as asking them whether the selected materials achieved the purpose of the model.</p> <p>Preparation techniques for savoury dishes include peeling, chopping, deseeding, slicing, dicing, grating, mixing and skinning</p> <p>There are five main food groups that should be eaten regularly as part of a balanced diet: fruit and vegetables; carbohydrates (potatoes, bread, rice and pasta); proteins (beans, pulses, fish, eggs and meat); dairy and alternatives (milk, cheese and yoghurt) and fats (oils and spreads). Foods high in fat, salt and sugar should only be eaten occasionally as</p>	
--	---	--

	<p>Own ideas and products</p> <p>Across KS2 pupils should:</p> <ul style="list-style-type: none"> • identify the strengths and areas for development in their ideas and products • consider the views of others, including intended users, to improve their work <p>In early KS2 pupils should also:</p> <ul style="list-style-type: none"> • refer to their design criteria as they design and make • use their design criteria to evaluate their completed products <p>Existing products</p> <p>Across KS2 pupils should investigate and analyse:</p> <ul style="list-style-type: none"> • 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 <p>In early KS2 pupils should also investigate and analyse:</p> <ul style="list-style-type: none"> • 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 <p>Key events and individuals</p> <p>Across KS2 pupils should know:</p> <ul style="list-style-type: none"> • about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products 	<p>part of a healthy, balanced diet.</p> <p>The types of food that will grow in a particular area depend on a range of factors, such as the rainfall, climate and soil type. For example, many crops, such as potatoes and sugar beet, are grown in the south-east of England. Wheat, barley and vegetables grow well in the east of England.</p> <p>Materials for a specific task must be selected on the basis of their properties. These include physical properties as well as availability and cost.</p> <p>Levers consist of a rigid bar that rotates around a fixed point, called a fulcrum. They reduce the amount of work needed to lift a heavy object. Sliders move from side to side or up and down, and are often used to make moving parts in books. Axles are shafts on which wheels can rotate to make a moving vehicle. Cams are devices that can convert circular motion into up and-down motion.</p> <p>Work from different designers can be compared by assessing specific criteria, such as their visual impact, fitness for purpose and target market.</p> <p>Particular products have been designed for specific tasks, such as nail clippers, the spinning top and the cool box.</p>	
--	---	--	--

		<p>Significant designers and inventors include Leonardo da Vinci (1452–1519), who designed a helicopter and tank; Thomas Edison (1847– 1931), who invented the phonograph and electric lightbulb and Tim Berners-Lee (1955–), who invented the World Wide Web</p>	
--	--	---	--

Year 4	<p>Generate ideas for an item, considering its purpose and the user/s Identify a purpose and establish criteria for a successful product. Plan the order of their work before starting Explore, develop and communicate design proposals by modelling ideas Make drawings with labels when designing</p> <p>Select appropriate tools and techniques for making their product</p>	<p>Annotated sketches and exploded diagrams show specific parts of a design, highlight sections or show functions. They communicate ideas in a visual, detailed way.</p> <p>Remote control is controlling a machine or activity from a distance. Computers can be used to remotely control a device, such as a light, speaker or buzzer.</p>	<p>evaluating, design brief design criteria, innovative, prototype, user, purpose, function, prototype, design criteria, innovative, appealing, design brief,</p>

	<p>Measure, mark out, cut and shape a range of materials, using appropriate tools, equipment and techniques Join and combine materials and components accurately in temporary and permanent ways Sew using a range of different stitches, weave and knit Measure, tape or pin, cut and join fabric with some accuracy Use simple graphical communication techniques</p> <p>Evaluate their work both during and at the end of the assignment Evaluate their products carrying out appropriate tests</p>	<p>A prototype is a mock-up of a design that will look like the finished product but may not be full size or made of the same materials. Shell and frame structures can be strengthened by gluing several layers of card together, using triangular shapes rather than squares, adding diagonal support struts and using 'Jinks' corners (small, thin pieces of card cut into a right-angled triangle and glued over each joint to straighten and strengthen them).</p> <p>Useful tools for cutting include scissors, craft knives, junior hacksaws with pistol grip and bench hooks. Useful tools for joining include glue guns. Tools should only be used with adult supervision and safety rules must be followed.</p> <p>Evaluation can be done by considering whether the product does what it was designed to do, whether it has an attractive appearance, what changes were made during the making process and why the changes were made. Evaluation also includes suggesting improvements and explaining why they should be made</p> <p>Cooking techniques include baking, boiling, frying, grilling and roasting.</p> <p>Healthy snacks include fresh or dried fruit and vegetables, nuts and seeds, rice cakes with low-fat cream cheese, homemade popcorn or chopped vegetables with hummus. A healthy packed lunch might include a brown or wholemeal bread sandwich containing eggs, meat, fish or cheese, a piece of fresh fruit, a low-sugar yoghurt, rice cake or popcorn and a drink, such as water or semi-skimmed milk.</p> <p>Particular areas of the world have conditions suited to growing certain crops, such as coffee in Peru and citrus fruits in California in the United States of America.</p>	<p>planning, annotated sketch, sensory evaluations</p> <p>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</p> <p>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,</p>
--	--	--	--

		<p>Different materials and components have a range of properties, making them suitable for different tasks. It is important to select the correct material or component for the specific purpose, depending on the design criteria. Recipe ingredients have different tastes and appearances. They look and taste better and are cheaper when in season.</p> <p>Components can be added to circuits to achieve a particular goal. These include bulbs for lighthouses and torches, buzzers for burglar alarms and electronic games, motors for fairground rides and motorised vehicles and switches for burglar alarms and games.</p> <p>Mechanisms can be used to add functionality to a model. For example, sliders or levers can be used in moving pictures, storybooks or simple puppets; linkages in moving vehicles or puppets; gears in motorised vehicles or spinning toys; pulleys in cable cars or transport systems and cams in 3-D moving toys or pictures.</p> <p>A comparison table can be used to compare products by listing specific criteria on which each product can be judged or scored.</p> <p>Design features are the aspects of a product's design that the designer would like to emphasise, such as the use of a particular material or feature that makes the product easier to use or more durable.</p>	<p>ribbing, laminating, font, lettering, text, graphics, decision.</p>
<p>By the end of lower KS2</p>			
<p>Year 5</p>	<p>Understanding contexts, users and purposes</p> <p>In late KS2 pupils should also:</p> <ul style="list-style-type: none"> • carry out research, using 	<p>Where food comes from.</p> <p>In late KS2 pupils should also know:</p> <ul style="list-style-type: none"> • that seasons may affect the food available • how food is 	<p>ingredients, yeast, dough, bran, flour, wholemeal, unleavened,</p>

	<p>surveys, interviews, questionnaires and web-based resources</p> <ul style="list-style-type: none"> • identify the needs, wants, preferences and values of particular individuals and groups • develop a simple design specification to guide their thinking <p>Generating developing modelling and communicating ideas</p> <p>In late KS2 pupils should also: • generate innovative ideas, drawing on research • make design decisions, taking account of constraints such as time, resources and cost</p> <p>Planning</p> <p>In late KS2 pupils should also: • produce appropriate lists of tools, equipment and materials that they need • formulate step-by-step plans as a guide to making</p> <p>Practical skills and techniques</p> <p>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 • use techniques that involve a number of steps • demonstrate resourcefulness when tackling practical problems</p> <p>Own ideas and products</p> <p>In late KS2 pupils should also: • critically evaluate the quality of the design, manufacture and fitness for purpose of their</p>	<p>processed into ingredients that can be eaten or used in cooking</p> <p>Food preparation, cooking and nutrition</p> <p>In late KS2 pupils should also know: • that recipes can be adapted to change the appearance, taste, texture and aroma • that different food and drink contain different substances – nutrients, water and fibre – that are needed for health</p> <p>A pattern piece is a drawing or shape used to guide how to make something. There are many different computeraided design packages for designing products.</p> <p>Equipment and devices can be controlled by pressing buttons on a control panel, such as on a washing machine or microwave.</p> <p>Various methods can be used to support a framework. These include cross braces, guy ropes and diagonal struts. Frameworks can be built using lolly sticks, skewers and bamboo canes.</p> <p>There are many rules for using tools safely and these may vary depending on the tools being used. For example, someone using a chisel should chip or cut with the cutting edge pointing away from their body. All tools should be cleaned and put away after use, and should not be used if they are loose or cracked.</p> <p>Testing a product against the design criteria will highlight anything that needs improvement or redesign. Changes are often made to a design during manufacture.</p> <p>Sweet dishes are usually desserts, such as cakes, fruit pies and trifles. Savoury dishes usually have a salty or spicy flavour rather than a sweet</p>	<p>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</p> <p>frame structure, stiffen, strengthen, reinforce, triangulation, stability, shape, join, temporary, permanent</p>
--	---	--	---

<p>products as they design and make</p> <ul style="list-style-type: none"> • evaluate their ideas and products against their original design specification <p>Existing products</p> <p>In late KS2 pupils should also investigate and analyse:</p> <ul style="list-style-type: none"> • 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 <p>Across KS2 pupils should know:</p> <ul style="list-style-type: none"> • about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products <p>Generate ideas through brainstorming and identify a purpose for their product Draw up a specification for their design Develop a clear idea of what has to be done, planning how to use materials, equipment and processes, and suggesting alternative methods of making if the first attempts fail Use results of investigations, information sources, including ICT when developing design idea</p> <p>Select appropriate materials, tools and techniques Measure and mark out accurately Use skills in using different tools and equipment safely and accurately Weigh and measure accurately (time, dry ingredients, liquids) Apply the rules for basic food hygiene and other safe practices e.g. hazards relating to the use of ovens Cut and join with accuracy to ensure a good-quality finish to the product</p> <p>Evaluate a product against the original design specification Evaluate it personally and seek evaluation from others</p>	<p>one</p> <p>A balanced diet gives your body all the nutrients it needs to function correctly. This means eating a wide variety of foods in the correct proportions.</p> <p>Seasonality is the time of year when the harvest or flavour of a type of food is at its best. Buying seasonal food is beneficial for many reasons: the food tastes better; it is fresher because it hasn't been transported thousands of miles; the nutritional value is higher; the carbon footprint is lower, due to reduced transport; it supports local growers and is usually cheaper.</p> <p>Electrical circuits can be controlled by a simple on/off switch, or by a variable resistor that can adjust the size of the current in the circuit. Real-life examples are a dimmer switch for lights or volume control on a stereo</p> <p>Pneumatic systems use energy that is stored in compressed air to do work, such as inflating a balloon to open a model monster's mouth. These effects can be achieved using syringes and plastic tubing. Hydraulic mechanisms work in a similar way, but instead of air, the system is filled with a liquid, usually water. It is important that the system is air or watertight.</p> <p>A focus group is a small group of people whose reactions and opinions about a product are taken and studied. Evaluations can be made by asking product users a selection of questions to obtain data on how the product has met its design criteria.</p> <p>Culture is the language, inventions, ideas and art of a group of people. A society is all the people in a community or group. Culture affects the design of some products. For</p>	
--	--	--

		<p>example, knives and forks are used in the western world, whereas chopsticks are used mainly in China and Japan. The design of products needs to take into account the culture of the target audience. For example, colours might mean very different things in different cultures.</p> <p>Safety features are often incorporated into products that might cause harm. Some examples include the child-safety caps on medicine bottles, seatbelts in cars, covers for electrical sockets and finger guards on doors.</p> <p>Many new designs and inventions influenced society. For example, labour-saving devices in the home reduced the amount of housework, which was traditionally done by women. This enabled them to have jobs.</p>	
Year 6	<p>Communicate their ideas through detailed labelled drawings Develop a design specification Explore, develop and communicate aspects of their design proposals by modelling their ideas in a variety of ways Plan the order of their work, choosing appropriate materials, tools and techniques</p> <p>Select appropriate tools, materials, components and techniques Assemble components make working models Use tools safely and accurately Construct products using permanent joining techniques Make modifications as they go along Pin, sew and stitch materials together create a product Achieve a quality product</p> <p>Evaluate their products, identifying strengths and areas for development, and carrying out appropriate tests Record their evaluations using drawings with labels Evaluate against their original criteria and suggest ways that their product could</p>	<p>Many new designs and inventions influenced society. For example, labour-saving devices in the home reduced the amount of housework, which was traditionally done by women. This enabled them to have jobs.</p> <p>Design criteria should cover the intended use of the product, age range targeted and final appearance. Ideas can be communicated in a range of ways, including through discussion, annotated sketches, cross sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.</p> <p>Computer monitoring uses sensors as a scientific tool to record information about environmental changes over time. Computer monitoring can also log data from sensors and record the resulting information in a table or graph</p> <p>Strength can be added to a</p>	<p>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,</p>

	<p>be improved</p>	<p>framework by using multiple layers. For example, corrugated cardboard can be placed with corrugations running alternately vertically and horizontally. Triangular shapes can be used instead of square shapes because they are more rigid. Frameworks can be further strengthened by adding an outer cover.</p> <p>Precision is important in producing a polished, finished product. Correct selection of tools and careful measurement can ensure the parts fit together correctly</p> <p>Design is an iterative process, meaning alterations and improvements are made continually throughout the manufacturing process. Evaluating a product while it's being manufactured, and explaining these evaluations to others, can help to refine it.</p> <p>Ingredients can usually be bought at supermarkets, but specialist shops may stock different items. Greengrocers sell fruit and vegetables, butchers sell meat, fishmongers sell fresh fish and delicatessens usually sell some unusual prepared foods, as well as cold meats and cheeses.</p> <p>Eating a balanced diet is a positive lifestyle choice that should be sustained over time. Food that is high in fat, salt or sugar can still be eaten occasionally as part of a balanced diet</p> <p>Organic produce is food that has been grown without the use of man-made fertilisers, pesticides, growth regulators or animal feed additives. Organic farmers use crop rotation, animal and plant manures, hand weeding and biological pest control.</p> <p>It is important to understand the characteristics of different materials</p>	<p>crumble</p> <p>frame structure, stiffen, strengthen, reinforce, triangulation, stability, shape, join, temporary, permanent</p>
--	--------------------	--	--

to select the most appropriate for a purpose. This might include flexibility, waterproofing, texture, colour, cost and availability.

Computer programs can control electrical circuits that include a variety of components, such as switches, lamps, buzzers and motors

Mechanical systems can include sliders, levers, linkages, gears, pulleys and cams. Other mechanisms include pneumatics and hydraulics.

Products and inventions can be compared using a range of criteria, such as the impact on society, ease of use, appearance and value for money

People's lives have been improved in countless ways due to new inventions and designs. For example, the Morrison shelter, designed by John Baker in 1941, was an indoor air-raid shelter used in over half a million homes during the Second World War. It saved the lives of many people caught in bombing raids.

The safety of the user has to be taken into account when designing a new product. Methods to help keep users safe include providing clear instructions for use, clear indication of the age range for which it is designed, safety features (such as child-resistant packaging), warning symbols and electrical safety checks.

The significance of a designer or inventor can be measured in various ways. Their work may benefit society in health, transport, communication, education, the built environment or technology. It may enhance culture in different areas, such as fashion, ceramics or computer games.

<p>Year 7</p>	<p>Use research and exploration, such as the study of different cultures, to identify and understand user needs identify and solve their own design problems and understand how to reformulate problems given to them develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations use a variety of approaches to generate creative ideas and avoid stereotypical responses develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties Analyse the work of past and present professionals and others to develop and broaden their understanding investigate new and emerging technologies test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists</p> <p>Understand and apply the principles of nutrition and health. Cook a repertoire of predominantly savoury dishes so that they are able to feed themselves and others a healthy and varied diet become competent in a range of cooking techniques [for example, selecting and preparing ingredients; using utensils and electrical equipment; applying heat in different ways; using awareness of taste, texture and smell</p>	<p>Understand and use the properties of materials and 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. Understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and movement as inputs and outputs] Apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using programmable components [for example, microcontrollers].</p> <p>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</p>	
---------------	---	---	--

	to decide how to season dishes and combine ingredients; adapting and using their own recipes] understand the source, seasonality and characteristics of a broad range of ingredients.		
By the end of upper KS2			