Canon Popham C of E Primary Academy DT Progression of Substantive and Disciplinary Knowledge

SK = Substantive Knowledge

DK = Disciplinary Knowledge

Design and Technology 2014 National Curriculum

Purpose of study

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.

Aims

The national curriculum for design and technology aims to ensure that all pupils:

- Develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world
- Build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users
- Critique, evaluate and test their ideas and products and the work of others
- Understand and apply the principles of nutrition and learn how to cook.

In each year group, the children will be taught:

- Design
- Make
- Evaluate
- Technical Knowledge
- Cooking and Nutrition

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Design	 Begin to draw on their own experience to help generate ideas. Begin to understand the development of existing products: Explain what they are for, how they work, what materials have been used. Start to suggest ideas and explain what they are going to do. Begin to develop their ideas through talk and simple drawings. Make templates and mock ups of their ideas in card and paper or using ICT (if relevant) Communicate with others about how they want to construct their product. Explain how they intend to fix simple materials. SK 	Start to generate ideas by drawing on their own and other people's experiences. Begin to develop their design ideas through discussion, observation, drawing and modelling. Identify a purpose for what they intend to design and make. Identify a target group for what they intend to design and make based on a design criterion. Develop their ideas through talk and drawings and label parts. Make templates and mock ups of their ideas in card and paper or using ICT (if relevant) Begin to explain why they chose a certain material. Develop their own ideas from given starting points. SK	 With growing confidence generate ideas for an item, considering its purpose and the user/s. Start to order the main stages of making a product. Identify a purpose and establish criteria for a successful product. Understand how well products have been designed, made, what materials have been used and the construction technique. Learn about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products. Start to understand whether products can be recycled or reused. Know to make drawings with labels when designing. When planning, explain their choice of materials and components including function and aesthetics. Put together a step-by-step plan which shows the order and also what equipment and tools they need. SK 	 Start to generate ideas, considering the purposes for which they are designing. Confidently make labelled drawings from different views showing specific features. 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. Identify the strengths and areas for development in their ideas and products. When planning, consider the views of others (including intended users) to improve their work. Learn about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products. When planning, explain their choice of materials and components according to function and aesthetic. Take account of the ideas of others when designing. Produce a plan and explain it to others. Consider how to present their product in an interesting way. SK 	 Start to generate, develop, model and communicate their ideas through discussion, annotated sketches, cross sectional and exploded diagrams, prototypes and patterns. Begin to use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose. Use results of investigations, information sources, including ICT when developing design ideas. Start to understand how much products cost to make, how sustainable and innovative they are and the impact products have beyond their intended purpose. Produce a range of ideas after collecting information. Produce a detailed stepby step plan. Suggest some alternative plans and say what the good points and drawbacks are about each. SK 	 Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross sectional and exploded diagrams, prototypes and pattern pieces. Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose. Draw up a specification for their design. Plan the order of their work, choosing appropriate materials, tools and techniques. Identify the strengths and areas for development in their ideas and products. Know how much products cost to make, how sustainable and innovative they are and the impact products have beyond their intended purpose. Follow and refine their initial plan if necessary. Show consideration to culture and society in a design. Explain how their product should be stored justifying with reasons. Suggest ideas about how their product could be sold. Work within a given budget SK

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- Begin to make their design using appropriate techniques.

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- With help measure, mark out, cut and shape a range of materials.
- Explore using tools e.g. scissors and a hole punch safely.
- Begin to assemble, join and combine materials and components together using a variety of temporary methods e.g. glues or masking tape.
- Begin to use simple finishing techniques to improve the appearance of their product.
- Make a product which moves.
- Select appropriate resources and tools for their building projects.DK

- Begin to select tools and materials; use correct vocabulary to name and describe them.
- With help measure, cut and score with some accuracy.
- Learn to use hand tools safely and appropriately.
- Start to assemble, join and combine materials in order to make a product.
- Demonstrate how to cut, shape and join fabric to make a simple product.
- Use basic sewing techniques - join fabric using a running stitch, glue and tape.
- Start to choose and use appropriate finishing techniques based on own ideas.
- Select the best tools and materials.
- Be able to join things (materials/ components) together in different ways.
- Measure materials to use in a model or structure.
- Attach features to a vehicle (e.g. an axel and wheels). DK

- Select a wider range of tools and techniques for making their product.
- Explain their choice of tools and equipment in relation to the skills and techniques they will be using.
- Measure, mark out, cut, score and assemble components with more accuracy.
- Start to measure, tape or pin, cut and join fabric with some accuracy.
- Use equipment safely.
- Attempt to make sure that their product looks attractive.
- Make choices of material both for its appearance and qualities.
- Select the most appropriate tools and techniques to use for a given task.
- Make a product which uses both electrical and mechanical components.
- Work accurately to make cuts and holes – e.g. to measure and then use equipment to cut.
- Try alternative ways of fixing something if the first attempt is not successful.
- Create and use simple gears, pulleys, cams, levers and linkages.
- Build models incorporating circuits with buzzers and bulbs
- DK

- Select a wider range of tools and techniques for making their product safely.
- Know how to measure, mark out, cut and shape a range of materials, using appropriate tools, equipment and techniques.
- Start to join and combine materials and components accurately in temporary and permanent ways.
- Now sew using a range of different stitches, to weave and knit.
- Demonstrate how to measure, tape or pin, cut and join fabric with some accuracy.
- Begin to use finishing techniques to strengthen and improve the appearance of their product using a range of equipment including ICT.
- Measure carefully and show initiative to check so as not to make mistakes.
- Persevere with their product even though their original idea might not have worked.
- Use pulleys, levers and linkages in their product.
- Build a model which incorporates a motor.
- Use a glue gun with close supervision (one to one).
- DK

- With growing confidence select appropriate materials, tools and techniques e.g. cutting, shaping, joining and finishing, accurately.
- Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.
- Begin to measure and mark out more accurately.
- With growing confidence cut and join with accuracy to ensure a good-quality finish to the product.
- Use a range of tools and equipment expertly.
- Make up a prototype first. Measure accurately to ensure that everything is precise.
- Demonstrate motivation/perseverance to refine and improve their products.
- Create a 3D product using a range of materials and sewing techniques.
- Use a glue gun with close supervision.
- Incorporate switches to turn on and off models made
- With growing confidence apply a range of finishing techniques, including those from art and design. DK

- Confidently select appropriate tools, materials, components and techniques and use them.
- Use tools safely and accurately.
- Assemble components to make working models.
- Aim to make and to achieve a quality product.
- With confidence pin, sew and stitch materials together to create a product.
- Demonstrate when making modifications as they go along.
- Construct products using permanent joining techniques.
- Combine fabric to make a high quality product for a purpose.
- Accurately apply a range of finishing techniques, including those from art and design. DK

Make

Evaluate	Start to evaluate their product by discussing how well it works in relation to the purpose (design criteria). When looking at existing products explain what they like and dislike about the products and why. Begin to evaluate their products as they are developed, identifying strengths and possible changes they might make next time. SK	Evaluate their work against their design criteria. Look at a range of existing products explain what they like and dislike about products and why. Start to evaluate their products as they are developed, identifying what went well and possible changes they might make next time. With confidence talk about their ideas. SK	Start to evaluate their product against original design criteria e.g. how well it meets its intended purpose. Suggest some improvements and say what was good and not so good about their original design. Begin to disassemble and evaluate familiar products and consider the views of others to improve them. Begin to evaluate how the key designs of individuals in design and technology have helped shape the world. SK	Evaluate their work both during and at the end of the assignment. Evaluate their products carrying out appropriate tests. Be able to disassemble and evaluate familiar products and consider the views of others to improve them. Evaluate how the key designs of individuals in design and technology have helped shape the world. Suggest some improvements and say what was good and not so good about their original design. Begin to explain how they can improve their original designs. Evaluate their product, thinking of both appearance and the way it works. SK	Start to evaluate a product against the original design specification and by carrying out tests. Evaluate their work both during and at the end of the assignment. Begin to seek evaluation from others. Evaluate how the key designs of individuals in design and technology have helped shape the world. Evaluate appearance and function against original criteria. SK	Evaluate their products, identifying strengths and areas for development, and carrying out appropriate tests. Evaluate their work both during and at the end of the assignment.
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Technical Knowledge	Identify and talk about products which use electricity to make them work. Begin to build structures, exploring how they can be made stronger, stiffer and more stable. Explore and use mechanisms [for example, levers, sliders, wheels and axles], in their products. Attempt to make their model stronger if it needs to be SK	Apply their knowledge to structures, exploring how they can be made stronger, stiffer and more stable. Create products using mechanisms such as sliders, levers and wheels. SK	Start to understand that mechanical and electrical systems have an input, process and output. Start to understand that mechanical systems such as levers and linkages or pneumatic systems create movement. Know how simple electrical circuits and components can be used to create functional products. SK	Know how mechanical systems such as cams or pulleys or gears create movement. Understand how more complex electrical circuits and components can be used to create functional products. Understand how to reinforce and strengthen a 3D framework. SK	Understand how mechanical systems such as cams or pulleys or gears create movement. Understand that mechanical and electrical systems have an input, process and output. Demonstrate how to use skills in using different tools and equipment safely and accurately. Use finishing techniques to strengthen and improve the appearance of their product using a range of equipment including ICT. SK	Understand how mechanical systems such as cams or pulleys or gears create movement. Know how to reinforce and strengthen a 3D framework. Understand that mechanical and electrical systems have an input, process and output. Use finishing techniques to strengthen and improve the appearance of their product using a range of equipment including ICT. SK
Vocabulary	Plan, investigate, design, make, weak, strong, cut fold, structure, user, purpose, product, function, evaluate, join, fix, framework, base, slider, lever, pivot,	Plan, investigate, design, make, weak, strong, cut fold, structure, user, purpose, product, function, evaluate, join, fix, framework, base, slider, lever, pivot, label, model, appealing, criteria, scoring, assemble, wheel, axle, mechanism,	Plan, investigate, design, make, weak, strong, cut fold, structure, user, purpose, product, function, evaluate, join, fix, framework, base, slider, lever, pivot, , label, model, appealing, criteria, scoring, assemble, wheel, axle, mechanism, prototype, annotate, design brief, net, accuracy, adhesives, linkage, input, process, output,	Plan, investigate, design, make, weak, strong, cut fold, structure, user, purpose, product, function, evaluate, join, fix, framework, base, slider, lever, pivot, , label, model, appealing, criteria, scoring, assemble, wheel, axle, mechanism, prototype, annotate, design brief, net, accuracy, adhesives, linkage, input, process, output, mock-up, specification, innovative, sensory, graphics, font, reinforce, linear, rotary, oscillating,	Plan, investigate, design, make, weak, strong, cut fold, structure, user, purpose, product, function, evaluate, join, fix, framework, base, slider, lever, pivot, label, model, appealing, criteria, scoring, assemble, wheel, axle, mechanism, prototype, annotate, design brief, net, accuracy, adhesives, linkage, input, process, output, mock-up, specification, innovative, sensory, graphics, font, reinforce, linear, rotary, oscillating, innovative, authentic, stiffen, transmit, strengthen, temporary, permanent, stability, rotation, spindle, drive belt, gear, pulley	Plan, investigate, design, make, weak, strong, cut fold, structure, user, purpose, product, function, evaluate, join, fix, framework, base, slider, lever, pivot, , label, model, appealing, criteria, scoring, assemble, wheel, axle, mechanism, prototype, annotate, design brief, net, accuracy, adhesives, linkage, input, process, output, mock-up, specification, innovative, sensory, graphics, font, reinforce, linear, rotary, oscillating, innovative, authentic, stiffen, transmit, strengthen, temporary, permanent, stability, rotation, spindle, drive belt, gear, pulley, budget,

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Cooking and Nutrition

- Begin to understand that all food comes from plants or animals.
- Explore common food sources (e.g. from food or animals)
- Start to understand how to name and sort foods into the five groups in (e.g. could use the 'The Eat well plate')
- Know that everyone should eat at least five portions of fruit and vegetables every day (check current guidelines!)
- Know how to prepare simple dishes safely and hygienically, without using a heat source.
- Know how to use techniques such as cutting, peeling and grating.
- Measure and weigh food items using non-standard measures (e.g. spoons and cups) SK

- Understand that all food comes from plants or animals.
- Develop understanding of where different foods come from (e.g. foods which are farmed, grown elsewhere (e.g. home) or caught) and also food from native to different countries.
- Understand how to name and sort foods into the five groups in (e.g. could use the 'The Eat well plate')
- Know that everyone should eat at least five portions of fruit and vegetables every day (check current guidelines!)
- Recognise the need for a variety of food in a diet.
- Demonstrate how to prepare simple dishes safely and hygienically, without using a heat source.
- Demonstrate how to use techniques such as cutting, peeling and grating
 SK

- Start to know 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.
- Understand how to prepare and cook a variety of dishes including experience of using a heat source.
- Begin to understand how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking.
- Know how a healthy diet is made up from a variety and balance of different food and drink.
- Begin to know that to be active and healthy, food and drink are needed to provide energy for the body (and begin to distinguish healthy high energy foods)
- Be able to identify foods which come from the UK and other countries in the world SK

- Understand 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.
- Understand how to prepare and cook a variety of predominantly savoury dishes including experience of using a heat source.
- Know how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking.
- Measure and weigh ingredients appropriately.
- Explain why a healthy diet is important.
- Know that to be active and healthy, food and drink are needed to provide energy for the body and identify healthy high energy foods).
- Understand what to do to be hygienic and safe.
- Become familiar with some of the processes that foods go through to preserve them/make them more appealing SK

- Understand 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.
- Begin to understand that seasons may affect the food available.
- Understand how food is processed into ingredients that can be eaten or used in cooking.
- Know how to prepare and cook a variety of predominantly savoury dishes including the use of a heat source.
- Demonstrate increasing confidence in how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking.
- Evaluate a meal and consider if they contribute towards a balanced diet.
- Begin to understand that different food and drink contain different substances (nutrients, water and fibre) that are needed for health.
- Describe what to do to be hygienic and safe.
- Use appropriate tools and equipment, weighing and measuring with scales. SK

- Explain how ingredients were grown, reared and caught.
- Understand that seasons may affect the food available.
- Explain how food is processed into ingredients that can be eaten or used in cooking.
- Know how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including the use of a heat source.
- Understand how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking.
- Know different food and drink contain different substances (nutrients, water and fibre) that are needed for health.
- Use appropriate tools and equipment, weighing and measuring with scales.
- Plan a healthy and affordable diet. SK

Vocabulary		Sensory vocabulary e.g. soft, sweet, sticky, juicy, crunchy, crisp, sour, hard. Names of equipment and some utensils. Fruit and vegetable names. Healthy diet, hygenic	Sensory vocabulary e.g. soft, sweet, sticky, juicy, crunchy, crisp, sour, hard. Names of equipment and some utensils. Fruit and vegetable names. Healthy diet, hygenic Ingredients, technique, texture, fresh, savoury, taste, spicy, edible, grown, reared, caught, seasonal, harvested,	Sensory vocabulary e.g. soft, sweet, sticky, juicy, crunchy, crisp, sour, hard. Names of equipment and some utensils. Fruit and vegetable names. Healthy diet, hygenic, Ingredients, technique, texture, fresh, savoury, taste, spicy, edible, grown, reared, caught, seasonal, harvested, frozen, tinned, processed, varied diet,	Sensory vocabulary e.g. soft, sweet, sticky, juicy, crunchy, crisp, sour, hard. Names of equipment and some utensils. Fruit and vegetable names. Healthy diet, hygenic, Ingredients, technique, texture, fresh, savoury, taste, spicy, edible, grown, reared, caught, seasonal, harvested, frozen, tinned, processed, varied diet, fat, sugar, protein, carbohydrate, vitamins, nutrients,	Sensory vocabulary e.g. soft, sweet, sticky, juicy, crunchy, crisp, sour, hard. Names of equipment and some utensils. Fruit and vegetable names. Healthy diet, hygenic, Ingredients, technique, texture, fresh, savoury, taste, spicy, edible, grown, reared, caught, seasonal, harvested, frozen, tinned, processed, varied diet, fat, sugar, protein, carbohydrate, vitamins, nutrients, yeast, dough, unleavened, combine, fold, knead, beat,	Sensory vocabulary e.g. soft, sweet, sticky, juicy, crunchy, crisp, sour, hard. Names of equipment and some utensils. Fruit and vegetable names. Healthy diet, hygenic, Ingredients, technique, texture, fresh, savoury, taste, spicy, edible, grown, reared, caught, seasonal, harvested, frozen, tinned, processed, varied diet, fat, sugar, protein, carbohydrate, vitamins, nutrients, yeast, dough, unleavened, combine, fold, knead, beat,
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