

Design and Technology

Vision – ‘all things are possible’

At Benedict Biscop we want our children to learn that all things are possible. We want our children to aspire and to achieve highly. We want our children to develop as **designers**, developing D&T knowledge and skills.

Characteristics of Designers:

- The ability to carry out thorough **research** and **ask questions** to develop a detailed knowledge of users' needs.
- A **knowledge of technological** innovations in materials, products and systems
- A **knowledge of which tools, equipment and materials** to use to make their products.
- The ability to **apply mathematical knowledge** when designing and making.
- Levels of originality and the willingness to take **creative** risks to produce innovative ideas
- The ability to use time efficiently and work constructively and productively **with others**.
- The ability to act as **responsible designers** and makers, working ethically, using finite materials carefully and working safely.
- The ability to **manage risks** exceptionally well to manufacture products safely and hygienically.
- A **passion** for the subject

Our pupils begin their Design and Technology journey at Benedict Biscop in our Early Years environment. Our provision has been carefully created, to provide a range of opportunities both indoor and outdoor to help develop their knowledge and skills. Our pupils are also taken 'beyond' our school environment into the local area experiencing both forest school and beach school provision.

We continue this creative approach within Key Stage 1 and 2, where we actively encourage cross-curricular learning, to give pupils maximum opportunity to transfer skills and knowledge. Year groups are taught through predominately Historic themes, which inspire and motivate our pupils. Themes in KS2 are arranged in chronological order to further aid pupils understanding of chronology. In every year group, one theme is inspired by the United Nations Rights of a Child, pupils think about 'What I believe?' and learn about how events in History have helped to shape our lives today. Where possible, we link learning to our local context so that pupils gain an awareness of where they are from and how this links to their lives today enabling them to become active Global Citizens.

EYFS Statutory Framework – Expressive Art and Design

The development of children's artistic and cultural awareness supports their imagination and creativity. It is important that children have regular opportunities to engage with the arts, enabling them to explore and play with a wide range of media and materials. The quality and variety of what children see, hear and participate in is crucial for developing their understanding, self-expression, vocabulary and ability to communicate through the arts. The frequency, repetition and depth of their experiences are fundamental to their progress in interpreting and appreciating what they hear, respond to and observe.

Early Learning Goals:

Creating with Materials

Children at the expected level of development will:

- Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function;
- Share their creations, explaining the process they have used;

Development Matters progression related to Design and Technology:

Birth to Three	Three to Four	Reception
Expressive Art and Design -Explore different materials, using all their senses to investigate them. -Manipulate and play with different materials. -Use their imagination as they consider what they can do with different materials. -Make simple models, which express their ideas. Physical -Build independently with a range of appropriate resources. -Develop manipulation and control. -Explore different materials and tools.	Expressive Art and Design -Make imaginative and complex 'small worlds' with blocks and construction kits, such as a city with different buildings and a park. -Explore different materials freely, in order to develop their ideas about how to use them and what to make. -Develop their own ideas and then decide which materials to use to express them. -Join different materials and explore different textures. Physical -Use one-handed tools and equipment, for example, making snips in paper with scissors. -Show a preference for a dominant hand.	Expressive Art and Design -Return to and build on their previous learning, refining ideas and developing their ability to represent them. -Create collaboratively sharing ideas, resources, and skills. Physical -Develop their small motor skills so that they can use a range of tools competently, safely, and confidently. Suggested tools: pencils for drawing and writing, paintbrushes, scissors, knives, forks, and spoons.

NURSERY

Autumn Term	Spring Term	Summer Term
Each term focuses on a different focus area/material, however staff may change order based on pupil interest. DESIGN	Each term focuses on a different focus area/material, however staff may change order based on pupil interest. DESIGN	Each term focuses on a different focus area/material, however staff may change order based on pupil interest. DESIGN

-To select ingredients MAKE - To transform materials - To mix ingredients using bowl and spoon TECHNICAL KNOWLEDGE - To describe product made using technical vocabulary e.g. sweet, sour EVALUATE - To observe changes in ingredients when mixed	-Choose colours and shapes to make objects MAKE -Make 2D and 3D models -Use a range of joining materials TECHNICAL KNOWLEDGE -To know properties of different joining materials EVALUATE -Describe if they are happy with their product	To plan the shape of finished item MAKE -Add colour to mouldable materials -Use tools to sculpt TECHNICAL KNOWLEDGE -Know some materials can be moulded EVALUATE -Describe if they are happy with their product
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RECEPTION

Autumn Term	Spring Term	Summer Term
Each term focuses on a different focus area/material, however staff may change order based on pupil interest. DESIGN -To decide what ingredients they will use for a specific product MAKE -To combine flavours/ingredients to make a baked item TECHNICAL KNOWLEDGE -To begin to know how to use a vary of cooking utensils -To learn different skills including: chopping, cutting and baking skills EVALUATE -To know that their design may need to change	Each term focuses on a different focus area/material, however staff may change order based on pupil interest. DESIGN -To design a product based on inspiration from real life MAKE - To select colours to represent different parts of a product - To use joining materials of different strengths TECHNICAL KNOWLEDGE -To know how to combine different materials EVALUATE -Evaluate their product using words such as strong and weak	Each term focuses on a different focus area/material, however staff may change order based on pupil interest. DESIGN -To design a product based on inspiration from real life or imagination MAKE -To mould materials into different shapes -To add colour to mouldable materials TECHNICAL KNOWLEDGE -To know tools that are used to sculpt EVALUATE -Change designs to improve them

National Curriculum Aims

- 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.

Key Stage 1 DT coverage

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in a process of designing and making. When designing and making, pupils should be taught to:

Design

- design purposeful, functional, appealing products for themselves and other users based on design criteria
- generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology

Make

- select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]
- select from and use a wide range of materials and components, including **construction materials, textiles and ingredients**, according to their characteristics

Evaluate

- explore and evaluate a range of existing products
- evaluate their ideas and products against design criteria

Technical knowledge

- build structures, exploring how they can be made stronger, stiffer and more stable
- explore and use mechanisms [for example, levers, sliders, wheels and axles] in their products

Key Stage 2 DT coverage

Through a variety of creative and practical activities, pupils should be taught the knowledge, understanding and skills needed to engage in an process of designing and making. When designing and making, pupils should be taught to:

Design

- use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups
- generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design

Make

- select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
- select from and use a wider range of materials and components, including **construction materials, textiles and ingredients**, according to their functional properties and aesthetic qualities

Evaluate

- investigate and analyse a range of existing products
- evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
- understand how key events and individuals in design and technology have helped shape the world

Technical knowledge

- apply their understanding of how to strengthen, stiffen and reinforce more complex structures
- understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]
- understand and use **electrical systems** in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors]
- apply their understanding of **computing** to program, monitor and control their products

To ensure a balance of curriculum coverage we have mapped long term overview to ensure a broad range is covered and revisited.

	Autumn	Spring	Summer
<u>Year One</u>	<u>Textiles</u> Design brief: to design and make a 3D fabric Christmas decoration.	<u>Mechanisms [sliders and levers]</u> Design brief: to design and create a moving information display.	<u>Cooking and Nutrition</u> Design brief: to create a food item to take on a beach picnic
<u>Year Two</u>	<u>Mechanisms</u> Design brief: to design a vehicle to transport water	<u>Structures</u> Design brief: to design and make a bug hotel	<u>Cooking and Nutrition</u> Design brief: to design a healthy and nutritious meal to be consumed on an aeroplane.
<u>Year Three</u>	<u>Cooking and Nutrition</u>	<u>Textiles</u>	<u>Mechanisms [sliders and levers]</u>

	Design brief: to create alternative recipes for different dietary needs	Design brief: to design and create a fabric items you may need by the river	Design brief: to design and create a moving celebration card
<u>Year Four</u>	Structures Design brief: to design a new outdoor structure for leisure	Structures Design brief: To design and create a bridge	Cooking and Nutrition Design brief: To create a baked snack suitable for 3 different lifestyles.
<u>Year Five</u>	Structures Design brief: to design and make a tensile fabric structure for a warm climate	Cooking and Nutrition/CAD Design brief: to design and create food packaging	Control Design brief: To design and make an alarm for a person and problem of your choice
<u>Year Six</u>	Textiles Design brief: to design and create a fabric item to carry objects a refugee would take with them	Mechanisms [mechanical systems and pulleys] and Electronics Design brief: to design and create a rescue mechanism	Mechanisms and Electronics Design brief: to design and make an electric car

PROGRESSION

To meet our curriculum aims, we have identified core strands of learning [generic learning objectives] which run throughout our curriculum. With support from the **Design and Technology Association**, we have identified what this should look like at the end of key phases within the school [key skills demonstrated]. The curriculum is taught in a spiral design where learning is revisited and embedded – deepening learning and developing Mastery.

	Across KS1	Lower KS2	Upper KS2	Across KS2	Lower KS3
PDA - DESIGNING Understanding contexts, users and purposes	PDA 1 - work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment PDA 2 - state what products they are designing and making PDA 3 - say whether their products are for themselves or other users PDA 4 - describe what their products are for PDA 5 - say how their products will work PDA 6 - say how they will make their products suitable for their intended users PDA 7 - use simple design criteria to help develop their ideas	PDA 8 - gather information about the needs and wants of particular individuals and groups PDA 9 - develop their own design criteria and use these to inform their idea	PDA 10 - carry out research, using surveys, interviews, questionnaires and web-based resources PDA 11 - identify the needs, wants, preferences and values of particular individuals and groups PDA 12 - develop a simple design specification to guide their thinking	PDA13 - work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment PDA 14 - describe the purpose of their products PDA 15 - indicate the design features of their products that will appeal to intended users PDA 16 - explain how particular parts of their products work	DA 1 - develop detailed design specifications to guide their thinking DA 2 - use research including the study of different cultures, to identify and understand user need DA 3 - identify and solve their own design problems
PDB - DESIGNING	PDB 1 - generate ideas by drawing on their own experiences	PDB 6 - generate realistic ideas, focusing on the needs of the user	PDB 8 - generate innovative ideas, drawing on research	PDB 10 - share and clarify ideas through discussion	DB 1 - use 2D and begin to use 3D CAD packages to model their ideas

Generating, developing, modelling and communicating ideas	PDB 2 - use knowledge of existing products to help come up with ideas PDB 3 - develop and communicate ideas by talking and drawing PDB 4 - model ideas by exploring materials, components and construction kits and by making templates and mockups PDB 5 - use information and communication technology, where appropriate, to develop and communicate their ideas	PDB 7 - make design decisions that take account of the availability of resources	PDB 9 - make design decisions, taking account of constraints such as time, resources and cost	PDB 11 - model their ideas using prototypes and pattern pieces PDB 12 - use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas PDB 13 - use computer-aided design to develop and communicate their ideas	DB 2 - produce models of their ideas using CAM to test out their ideas
PMA - MAKING Planning	PMA 1 - plan by suggesting what to do next PMA 2 - select from a range of tools and equipment, explaining their choices PMA 3 - select from a range of materials and components according to their characteristics	PMA 4 - order the main stages of making	PMA 5 - produce appropriate lists of tools, equipment and materials that they need PMA 6 - formulate step-by-step plans as a guide to making	PMA 7 - select tools and equipment suitable for the task PMA 8 - explain their choice of tools and equipment in relation to the skills and techniques they will be using PMA 9 - select materials and components suitable for the task PMA 10 - explain their choice of materials and components according to functional properties and aesthetic qualities	MA 1 - produce ordered sequences and schedules for manufacturing products they design, detailing resources required MA 2 - produce costings using spreadsheets for products they design and make
PMB - MAKING Practical skills and techniques	PMB 1 - follow procedures for safety and hygiene PMB 2 - use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components PMB 3 - measure, mark out, cut and shape materials and components PMB 4 - assemble, join and combine materials and components PMB 5 - use finishing techniques, including those from art and design	PMB 6 - measure, mark out, cut and shape materials and components with some accuracy PMB 7 - assemble, join and combine materials and components with some accuracy PMB 8 - apply a range of finishing techniques, including those from art and design, with some accuracy	PMB 9 - accurately measure, mark out, cut and shape materials and components PMB 10 - accurately assemble, join and combine materials and components PMB 11 - accurately apply a range of finishing techniques, including those from art and design PMB 12 - use techniques that involve a number of steps PMB 13 - demonstrate resourcefulness when tackling practical problem	PMB 14 - follow procedures for safety and hygiene PMB 15 - use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components	MB 1 - make use of specialist equipment to mark out materials MB 2 - use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives MB 3 - use CAD/CAM to produce and apply surface finishing techniques, for example using dye sublimation MB 4 - investigate and develop skills in modifying the appearance of materials including textiles and other manufactured materials e.g. dying and appliqué
PEA - EVALUATING Own ideas and products	PEA 1 - talk about their design ideas and what they are making PEA 2 - make simple judgements about their products and ideas against design criteria PEA 3 - suggest how their products could be improved	PEA 4 - refer to their design criteria as they design and make PEA 5 - use their design criteria to evaluate their completed products	PEA 6 - critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make PEA 7 - evaluate their ideas and products against their original design specification	PEA 8 - identify the strengths and areas for development in their ideas and products PEA 9 - consider the views of others, including intended users, to improve their work	EA 1 - evaluate their products against their original specification and identify ways of improving them EA 2 - actively involve others in the testing of their products
PEB - EVALUATING	PEB 1 - what products are PEB 2 - who products are for	PEB 9 - who designed and made the products	PEB 13 - how much products cost to make	PEB 17 - how well products have been designed	EB 1 - products through disassembly to determine how

Existing products	PEB 3 - what products are for PEB 4 - how products work PEB 5 - how products are used PEB 6 - where products might be used PEB 7 - what materials products are made from PEB 8 - what they like and dislike about products	PEB 10 - where products were designed and made PEB 11 - when products were designed and made PEB 12 - whether products can be recycled or reused	PEB 14 - how innovative products are PEB 15 - how sustainable the materials in products are PEB 16 - what impact products have beyond their intended purpose	PEB 18 - how well products have been made PEB 19 - why materials have been chosen PEB 20 - what methods of construction have been used PEB 21 - how well products work PEB 22 - how well products achieve their purposes PEB 23 - how well products meet user needs and wants	they are constructed and function EB 2 - the positive and negative impact that products can have in the wider world
PEC - EVALUATING Key events and individuals				PEC 1- about inventors, designers, engineers, chefs and manufacturers who have developed ground-breaking products	EC 1 - about an increasing range of designers, engineers, chefs, technologists and manufacturers and be able to relate their products to their own designing and making
PTK - TECHNICAL KNOWLEDGE Making products work	PTK 1 - about the simple working characteristics of materials and components PTK 2 - about the movement of simple mechanisms such as levers, sliders, wheels and axles PTK 3 - how freestanding structures can be made stronger, stiffer and more stable PTK 4 - that a 3-D textiles product can be assembled from two identical fabric shapes PTK 5 - that food ingredients should be combined according to their sensory characteristics PTK 6 - the correct technical vocabulary for the projects they are undertaking	PTK 7 - how mechanical systems such as levers and linkages or pneumatic systems create movement PTK 8 - how simple electrical circuits and components can be used to create functional products PTK 9 - how to program a computer to control their products PTK 10 - how to make strong, stiff shell structures PTK 11 - that a single fabric shape can be used to make a 3D textiles product PTK 12 - that food ingredients can be fresh, pre-cooked and processed	PTK 13 - how mechanical systems such as cams or pulleys or gears create movement PTK 14 - how more complex electrical circuits and components can be used to create functional products PTK 15 - how to program a computer to monitor changes in the environment and control their products PTK 16 - how to reinforce and strengthen a 3D framework PTK 17 - that a 3D textiles product can be made from a combination of fabric shapes PTK 18 - that a recipe can be adapted by adding or substituting one or more ingredients	PTK 19 - how to use learning from science to help design and make products that work PTK 20 - how to use learning from mathematics to help design and make products that work PTK 21 - that materials have both functional properties and aesthetic qualities PTK 22 - that materials can be combined and mixed to create more useful characteristics PTK 23 - that mechanical and electrical systems have an input, process and output PTK 24 - the correct technical vocabulary for the projects they are undertaking	TK 1 - how to classify materials by structure e.g. hard woods, soft woods, ferrous and nonferrous, thermoplastic and thermosetting plastics TK 2 - about the physical properties of materials e.g. grain, brittleness, flexibility, elasticity, malleability and thermal TK 3 - how more advanced electrical and electronic systems can be powered and used in their products TK 4 - how to use simple electronic circuits incorporating inputs and outputs TK 5 - about textile fibre sources e.g. natural and synthetic and fabrics e.g. plain and woven TK 6 - how to select and modify patterns and use in textile construction
PCNA - COOKING AND NUTRITION Where food comes from	PCNA 1 - that all food comes from plants or animals PCNA 2 - that food has to be farmed, grown elsewhere (e.g. home) or caught		PCNA 3 - that seasons may affect the food available PCNA 4 - how food is processed into ingredients that can be eaten or used in cooking	PCNA 5 - 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	CNA 3 - that food is produced, processed and sold in different ways, e.g. conventional and organic farming, fair trade CNA 4 - 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

PCNB - COOKING AND NUTRITION Food preparation, cooking and nutrition	PCNB 1 - how to name and sort foods into the five groups in The eatwell plate PCNB 2 - that everyone should eat at least five portions of fruit and vegetables every day PCNB 3 - how to prepare simple dishes safely and hygienically, without using a heat source PCNB 4 - how to use techniques such as cutting, peeling and grating	PCNB 5 - that a healthy diet is made up from a variety and balance of different food and drink, as depicted in The eatwell plate PCNB 6 - that to be active and healthy, food and drink are needed to provide energy for the body	PCNB 7 - that recipes can be adapted to change the appearance, taste, texture and aroma PCNB 8 - that different food and drink contain different substances – nutrients, water and fibre – that are needed for health	PCNB 9 - how to prepare and cook a variety of predominantly savoury dishes safely and hygienically including, where appropriate, the use of a heat source PCNB 10 - how to use a range of techniques such as peeling, chopping, slicing, grating, mixing, spreading, kneading and baking	CNB 1 - the importance of a healthy and varied diet as depicted in The eatwell plate and Eight tips for healthy eating CNB 2 - 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 CNB 3 - how to taste and cook a broader range of ingredients and healthy recipes, accounting for a range of needs, wants and values CNB 4 - how to actively minimise food waste such as composting fruit and vegetable peelings and recycling food packaging
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YEAR 1

AUTUMN UNIT	Key generic learning objectives	Unit specific learning objectives	KS1 working at the EXPECTED STANDARD	KS1 working ABOVE the expected standard
Me, My family, My World <u>Textiles</u> Design brief: to design and make a 3D fabric Christmas decoration.	To DESIGN products	To design fabric Christmas decorations for different intended users.	PDA 1 - work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment PDA 2 - state what products they are designing and making PDA 3 - say whether their products are for themselves or other users PDA 6 - say how they will make their products suitable for their intended users PDA 7 - use simple design criteria to help develop their ideas PDB 1 - generate ideas by drawing on their own experiences PDB 2 - use knowledge of existing products to help come up with ideas PDB 3 - develop and communicate ideas by talking and drawing PDB 4 - model ideas by exploring materials, components and construction kits and by making templates and mockups	PDA 8 - gather information about the needs and wants of particular individuals and groups PDA 9 - develop their own design criteria and use these to inform their idea PDB 6 - generate realistic ideas, focusing on the needs of the user PDB 7 - make design decisions that take account of the availability of resources
	To MAKE products	To make a fabric Christmas decoration	PMA 1 - plan by suggesting what to do next PMA 3 - select from a range of materials and components according to their characteristics PMB 1 - follow procedures for safety and hygiene PMB 2 - use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components PMB 3 - measure, mark out, cut and shape materials and components	PMA 4 - order the main stages of making PMB 6 - measure, mark out, cut and shape materials and components with some accuracy PMB 7 - assemble, join and combine materials and components with some accuracy

			PMB 4 - assemble, join and combine materials and components	PMB 8 - apply a range of finishing techniques, including those from art and design, with some accuracy
	To EVALUATE products	To evaluate different fabric Christmas decorations. To evaluate how the making process when and what things they would do to improve their finished product	PEA 1 - talk about their design ideas and what they are making PEA 2 - make simple judgements about their products and ideas against design criteria PEA 3 - suggest how their products could be improved PEB 1 - what products are PEB 2 - who products are for PEB 3 - what products are for PEB 7 - what materials products are made from PEB 8 - what they like and dislike about products	PEA 4 - refer to their design criteria as they design and make PEA 5 - use their design criteria to evaluate their completed products PEB 9 - who designed and made the products PEB 10 - where products were designed and made PEB 11 - when products were designed and made PEB 12 - whether products can be recycled or reused
	To develop TECHNICAL KNOWLEDGE	To learn about different fabrics and their characteristics. To learn different textile joining techniques. To know how to create a simple 3-D textile shape.	PTK 1 - about the simple working characteristics of materials and components PTK 4 - that a 3-D textiles product can be assembled from two identical fabric shapes PTK 6 - the correct technical vocabulary for the projects they are undertaking	PTK 11 - that a single fabric shape can be used to make a 3D textiles product

SPRING UNIT	Key generic learning objectives	Unit specific learning objectives	KS1 working at the EXPECTED STANDARD	KS1 working ABOVE the expected standard
Light and Dark: Living in Victorian Sunderland <u>Mechanisms</u> <u>[sliders and levers]</u> Design brief: to design and create a	To DESIGN products	To design a moving sign.	PDA 1 - work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment PDA 2 - state what products they are designing and making PDA 3 - say whether their products are for themselves or other users PDA 4 - describe what their products are for PDA 5 - say how their products will work PDA 6 - say how they will make their products suitable for their intended users PDA 7 - use simple design criteria to help develop their ideas PDB 1 - generate ideas by drawing on their own experiences	PDA 8 - gather information about the needs and wants of particular individuals and groups PDA 9 - develop their own design criteria and use these to inform their idea PDB 6 - generate realistic ideas, focusing on the needs of the user PDB 7 - make design decisions that take account of the availability of resources

moving information display.			PDB 2 - use knowledge of existing products to help come up with ideas PDB 3 - develop and communicate ideas by talking and drawing PDB 4 - model ideas by exploring materials, components and construction kits and by making templates and mockups PDB 5 - use information and communication technology, where appropriate, to develop and communicate their ideas	
	To MAKE products	To make a range of sliders and levers. To make a mock-up/prototype of their moving display.	PMA 1 - plan by suggesting what to do next PMA 2 - select from a range of tools and equipment, explaining their choices PMA 3 - select from a range of materials and components according to their characteristics PMB 1 - follow procedures for safety and hygiene PMB 2 - use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components PMB 3 - measure, mark out, cut and shape materials and components PMB 4 - assemble, join and combine materials and components PMB 5 - use finishing techniques, including those from art and design	PMA 4 - order the main stages of making PMB 6 - measure, mark out, cut and shape materials and components with some accuracy PMB 7 - assemble, join and combine materials and components with some accuracy PMB 8 - apply a range of finishing techniques, including those from art and design, with some accuracy
	To EVALUATE products	To explore a range of sliders and levers.	PEA 1 - talk about their design ideas and what they are making PEA 2 - make simple judgements about their products and ideas against design criteria PEA 3 - suggest how their products could be improved PEB 1 - what products are for PEB 2 - who products are for PEB 3 - what products are for PEB 4 - how products work PEB 5 - how products are used PEB 6 - where products might be used PEB 7 - what materials products are made from PEB 8 - what they like and dislike about products	PEA 4 - refer to their design criteria as they design and make PEA 5 - use their design criteria to evaluate their completed products PEB 9 - who designed and made the products PEB 10 - where products were designed and made PEB 11 - when products were designed and made PEB 12 - whether products can be recycled or reused
	To develop TECHNICAL KNOWLEDGE	To develop a knowledge of sliders and levers.	PTK 2 - about the movement of simple mechanisms such as levers, sliders, wheels and axles PTK 6 - the correct technical vocabulary for the projects they are undertaking	PTK 7 - how mechanical systems such as levers and linkages create movement

SUMMER UNIT	Key generic learning objectives	Unit specific learning objectives	KS1 working at the EXPECTED STANDARD	KS1 working ABOVE the expected standard
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The Seaside: Sunderland's History Cooking and Nutrition Design brief: to create a food item to take on a beach picnic	To DESIGN products	To think about what food dishes people might take on a picnic to the beach [as part of the design process]. To design a picnic menu to meet the design criteria [healthy, uncooked – prepared in advance, easy to eat for children]	PDA 1 - work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment PDA 2 - state what products they are designing and making PDA 3 - say whether their products are for themselves or other users PDA 4 - describe what their products are for PDA 5 - say how their products will work PDA 6 - say how they will make their products suitable for their intended users PDA 7 - use simple design criteria to help develop their ideas PDB 1 - generate ideas by drawing on their own experiences PDB 2 - use knowledge of existing products to help come up with ideas PDB 3 - develop and communicate ideas by talking and drawing	PDA 8 - gather information about the needs and wants of particular individuals and groups PDA 9 - develop their own design criteria and use these to inform their idea PDB 6 - generate realistic ideas, focusing on the needs of the user PDB 7 - make design decisions that take account of the availability of resources
	To MAKE products	To practice different techniques safely and hygienically [such as cutting, peeling, grating, spreading]. To make an uncooked healthy food dish to take to the beach	PMA 1 - plan by suggesting what to do next PMA 2 - select from a range of tools and equipment, explaining their choices PMA 3 - select from a range of materials and components according to their characteristics PMB 1 - follow procedures for safety and hygiene PMB 2 - use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components PMB 3 - measure, mark out, cut and shape materials and components PMB 4 - assemble, join and combine materials and components	PMA 4 - order the main stages of making PMB 6 - measure, mark out, cut and shape materials and components with some accuracy PMB 7 - assemble, join and combine materials and components with some accuracy PMB 8 - apply a range of finishing techniques, including those from art and design, with some accuracy
	To EVALUATE products	To evaluate their dishes against shop bought dishes.	PEA 1 - talk about their design ideas and what they are making PEA 2 - make simple judgements about their products and ideas against design criteria PEA 3 - suggest how their products could be improved PEB 1 - what products are PEB 2 - who products are for PEB 3 - what products are for PEB 8 - what they like and dislike about products	PEA 4 - refer to their design criteria as they design and make PEA 5 - use their design criteria to evaluate their completed products PEB 9 - who designed and made the products PEB 10 - where products were designed and made PEB 11 - when products were designed and made PEB 12 - whether products can be recycled or reused
	To develop TECHNICAL KNOWLEDGE COOKING AND NUTRITION	To know that everyone should eat at least five portions of fruit and vegetables every day. To know where fruit and vegetables come from. To know different food preparation techniques.	PTK 5 - that food ingredients should be combined according to their sensory characteristics PTK 6 - the correct technical vocabulary for the projects they are undertaking PCNA 1 - that all food comes from plants or animals PCNA 2 - that food has to be farmed, grown elsewhere (e.g. home) or caught	PTK 12 - that food ingredients can be fresh, pre-cooked and processed

YEAR 2

AUTUMN UNIT	Key generic learning objectives	Unit specific learning objectives	KS1 working at the EXPECTED STANDARD	KS1 working ABOVE the expected standard
Homes in Tudor times and the Great Fire of London <u>Mechanisms</u> Design brief: to design a vehicle to transport water	To DESIGN products	To design a moving product to transport water during the Great Fire.	PDA 1 - work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment PDA 2 - state what products they are designing and making PDA 3 - say whether their products are for themselves or other users PDA 4 - describe what their products are for PDA 5 - say how their products will work PDA 6 - say how they will make their products suitable for their intended users PDA 7 - use simple design criteria to help develop their ideas PDB 1 - generate ideas by drawing on their own experiences PDB 2 - use knowledge of existing products to help come up with ideas PDB 3 - develop and communicate ideas by talking and drawing	PDA 8 - gather information about the needs and wants of particular individuals and groups PDA 9 - develop their own design criteria and use these to inform their idea PDB 6 - generate realistic ideas, focusing on the needs of the user PDB 7 - make design decisions that take account of the availability of resources
	To MAKE products	To make their product [vehicle to transport water]	PMA 1 - plan by suggesting what to do next PMA 2 - select from a range of tools and equipment, explaining their choices PMA 3 - select from a range of materials and components according to their characteristics PMB 1 - follow procedures for safety and hygiene PMB 2 - use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components PMB 3 - measure, mark out, cut and shape materials and components PMB 4 - assemble, join and combine materials and components PMB 5 - use finishing techniques, including those from art and design	PMA 4 - order the main stages of making PMB 6 - measure, mark out, cut and shape materials and components with some accuracy PMB 7 - assemble, join and combine materials and components with some accuracy PMB 8 - apply a range of finishing techniques, including those from art and design, with some accuracy
	To EVALUATE products	To explore different products that are used today to help put out fires. To explore and evaluate mechanisms and materials to inform their designing.	PEA 1 - talk about their design ideas and what they are making PEA 2 - make simple judgements about their products and ideas against design criteria PEA 3 - suggest how their products could be improved PEB 1 - what products are PEB 2 - who products are for PEB 3 - what products are for PEB 4 - how products work PEB 5 - how products are used PEB 6 - where products might be used PEB 7 - what materials products are made from PEB 8 - what they like and dislike about products	PEA 4 - refer to their design criteria as they design and make PEA 5 - use their design criteria to evaluate their completed products PEB 9 - who designed and made the products PEB 10 - where products were designed and made PEB 11 - when products were designed and made PEB 12 - whether products can be recycled or reused

	To develop TECHNICAL KNOWLEDGE	To learn about the movement of simple mechanisms such as wheels and axis	PTK 1 - about the simple working characteristics of materials and components PTK 2 - about the movement of simple mechanisms such as levers, sliders, wheels and axles PTK 6 - the correct technical vocabulary for the projects they are undertaking	PTK 7 - how mechanical systems to create movement PTK 10 - how to make strong, stiff shell structures
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SPRING UNIT	Key generic learning objectives	Unit specific learning objectives	KS1 working at the EXPECTED STANDARD	KS1 working ABOVE the expected standard
What I Believe: I have the right to a safe place to live. <u>Structures</u> Design brief: to design and make a bug hotel	To DESIGN products	To design a bug hotel. To plan how they will make their design.	PDA 1 - work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment PDA 2 - state what products they are designing and making PDA 3 - say whether their products are for themselves or other users PDA 4 - describe what their products are for PDA 5 - say how their products will work PDA 6 - say how they will make their products suitable for their intended users PDA 7 - use simple design criteria to help develop their ideas PDB 1 - generate ideas by drawing on their own experiences PDB 2 - use knowledge of existing products to help come up with ideas PDB 3 - develop and communicate ideas by talking and drawing	PDA 8 - gather information about the needs and wants of particular individuals and groups PDA 9 - develop their own design criteria and use these to inform their idea PDB 6 - generate realistic ideas, focusing on the needs of the user PDB 7 - make design decisions that take account of the availability of resources
	To MAKE products	To make a bug hotel.	PMA 1 - plan by suggesting what to do next PMA 2 - select from a range of tools and equipment, explaining their choices PMA 3 - select from a range of materials and components according to their characteristics PMB 1 - follow procedures for safety and hygiene PMB 2 - use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components PMB 3 - measure, mark out, cut and shape materials and components PMB 4 - assemble, join and combine materials and components PMB 5 - use finishing techniques, including those from art and design	PMA 4 - order the main stages of making PMB 6 - measure, mark out, cut and shape materials and components with some accuracy PMB 7 - assemble, join and combine materials and components with some accuracy PMB 8 - apply a range of finishing techniques, including those from art and design, with some accuracy
	To EVALUATE products	To explore a range of bug hotel designs. To evaluate their finished product design	PEA 1 - talk about their design ideas and what they are making PEA 2 - make simple judgements about their products and ideas against design criteria PEA 3 - suggest how their products could be improved PEB 1 - what products are PEB 2 - who products are for PEB 3 - what products are for PEB 4 - how products work PEB 6 - where products might be used PEB 7 - what materials products are made from	PEA 4 - refer to their design criteria as they design and make PEA 5 - use their design criteria to evaluate their completed products PEB 9 - who designed and made the products PEB 10 - where products were designed and made

			PEB 8 - what they like and dislike about products	PEB 11 - when products were designed and made PEB 12 - whether products can be recycled or reused
	To develop TECHNICAL KNOWLEDGE	To know what bug hotels are and how they work. To learn different techniques to make structures stronger, stiffer and more stable. To learn different assembly techniques.	PTK 1 - about the simple working characteristics of materials and components PTK 3 - how freestanding structures can be made stronger, stiffer and more stable PTK 6 - the correct technical vocabulary for the projects they are undertaking	PTK 10 - how to make strong, stiff shell structures

SUMMER UNIT	Key generic learning objectives	Unit specific learning objectives	KS1 working at the EXPECTED STANDARD	KS1 working ABOVE the expected standard
Transport: Planes, trains and automobiles <u>Cooking and Nutrition</u> Design brief: to design a healthy and nutritious meal to be consumed on an aeroplane.	To DESIGN products	To design a meal that could be taken and eaten on a plan.	PDA 1 - work confidently within a range of contexts, such as imaginary, story-based, home, school, gardens, playgrounds, local community, industry and the wider environment PDA 2 - state what products they are designing and making PDA 3 - say whether their products are for themselves or other users PDA 4 - describe what their products are for PDA 6 - say how they will make their products suitable for their intended users PDA 7 - use simple design criteria to help develop their ideas PDB 1 - generate ideas by drawing on their own experiences PDB 2 - use knowledge of existing products to help come up with ideas PDB 3 - develop and communicate ideas by talking and drawing	PDA 8 - gather information about the needs and wants of particular individuals and groups PDA 9 - develop their own design criteria and use these to inform their idea PDB 6 - generate realistic ideas, focusing on the needs of the user
	To MAKE products	To practice different techniques safely and hygienically [such as cutting, peeling, grating, spreading]. To make part of their meal.	PMA 2 - select from a range of tools and equipment, explaining their choices PMA 3 - select from a range of materials and components according to their characteristics PMB 1 - follow procedures for safety and hygiene PMB 2 - use a range of materials and components, including construction materials and kits, textiles, food ingredients and mechanical components	PMA 4 - order the main stages of making
	To EVALUATE products	To make part of their meal, evaluating during the making process	PEA 1 - talk about their design ideas and what they are making PEA 2 - make simple judgements about their products and ideas against design criteria PEA 3 - suggest how their products could be improved PEB 1 - what products are PEB 2 - who products are for PEB 3 - what products are for	PEA 4 - refer to their design criteria as they design and make PEA 5 - use their design criteria to evaluate their completed products

			PEB 5 - how products are used PEB 6 - where products might be used PEB 7 - what materials products are made from PEB 8 - what they like and dislike about products	
	To develop TECHNICAL KNOWLEDGE COOKING AND NUTRITION	To name and sort foods into the five groups in the eatwell plate	PTK 5 - that food ingredients should be combined according to their sensory characteristics PTK 6 - the correct technical vocabulary for the projects they are undertaking PCNA 1 - that all food comes from plants or animals PCNA 2 - that food has to be farmed, grown elsewhere (e.g. home) or caught	PTK 12 - that food ingredients can be fresh, pre-cooked and processed

YEAR 3

AUTUMN UNIT	Key generic learning objectives	Unit specific learning objectives	Lower KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
Over 2000 years ago... Stone, Bronze and Iron Age <u>Cooking and Nutrition</u> Design brief: to create alternative recipes for different dietary needs	To DESIGN products	To think about what they would need to consider if making a product for a particular need. To design a baked product for a dietary need.	PDA 8 - gather information about the needs and wants of particular individuals and groups PDA 9 - develop their own design criteria and use these to inform their idea PDA 14 - describe the purpose of their products PDA 15 - indicate the design features of their products that will appeal to intended users PDB 6 - generate realistic ideas, focusing on the needs of the user PDB 10 - share and clarify ideas through discussion PDB 12 - use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas	PDA 10 - carry out research, using surveys, interviews, questionnaires and web-based resources PDA 11 - identify the needs, wants, preferences and values of particular individuals and groups PDA 12 - develop a simple design specification to guide their thinking PDB 8 - generate innovative ideas, drawing on research PDB 9 - make design decisions, taking account of constraints such as time, resources and cost
	To MAKE products	To make a baked product.	PMA 4 - order the main stages of making PMA 7 - select tools and equipment suitable for the task PMA 8 - explain their choice of tools and equipment in relation to the skills and techniques they will be using PMB 6 - measure, mark out, cut and shape materials and components with some accuracy PMB 7 - assemble, join and combine materials and components with some accuracy PMB 14 - follow procedures for safety and hygiene PMB 15 - use a wider range of materials and components than KS1,	PMA 5 - produce appropriate lists of tools, equipment and materials that they need PMA 6 - formulate step-by-step plans as a guide to making PMB 12 - use techniques that involve a number of steps

			including construction materials and kits, textiles, food ingredients, mechanical components and electrical components	
	To EVALUATE products	To explore different products for a particular dietary need. To identify what products might be suitable to include in their design.	PEA 4 - refer to their design criteria as they design and make PEA 5 - use their design criteria to evaluate their completed products PEA 8 - identify the strengths and areas for development in their ideas and products PEA 9 - consider the views of others, including intended users, to improve their work PEB 9 - who designed and made the products PEB 10 - where products were designed and made PEB 11 - when products were designed and made PEB 17 - how well products have been designed PEB 18 - how well products have been made PEB 23 - how well products meet user needs and wants	PEA 7 - evaluate their ideas and products against their original design specification PEB 13 - how much products cost to make
	To develop TECHNICAL KNOWLEDGE COOKING AND NUTRITION	To know that some people have different dietary needs and how this impacts what products they buy. To know about chefs who have developed products to meet different dietary needs. To know how to use different cooking techniques safely and hygienically.	PTK 12 - that food ingredients can be fresh, pre-cooked and processed PTK 19 - how to use learning from science to help design and make products that work PTK 20 - how to use learning from mathematics to help design and make products that work PTK 24 - the correct technical vocabulary for the projects they are undertaking PCNA 5 - 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	PTK 18 - that a recipe can be adapted by adding or substituting one or more ingredients PCNA 4 - how food is processed into ingredients that can be eaten or used in cooking

SPRING UNIT	Key generic learning objectives	Unit specific learning objectives	Lower KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
Along the river <u>Textiles</u> Design brief: to	To DESIGN products	To design an item that would be useful by the river.	PDA 8 - gather information about the needs and wants of particular individuals and groups PDA 9 - develop their own design criteria and use these to inform their idea PDA13 - work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment PDA 14 - describe the purpose of their products	PDA 11 - identify the needs, wants, preferences and values of particular individuals and groups PDA 12 - develop a simple design specification to guide their thinking

design and create a fabric items you may need by the river		PDA 15 - indicate the design features of their products that will appeal to intended users PDA 16 - explain how particular parts of their products work PDB 6 - generate realistic ideas, focusing on the needs of the user PDB 7 - make design decisions that take account of the availability of resources PDB 10 - share and clarify ideas through discussion PDB 11 - model their ideas using prototypes and pattern pieces PDB 12 - use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas	PDB 8 - generate innovative ideas, drawing on research PDB 9 - make design decisions, taking account of constraints such as time, resources and cost
To MAKE products	To make their product.	PMA 4 - order the main stages of making PMA 7 - select tools and equipment suitable for the task PMA 8 - explain their choice of tools and equipment in relation to the skills and techniques they will be using PMA 9 - select materials and components suitable for the task PMA 10 - explain their choice of materials and components according to functional properties and aesthetic qualities PMB 6 - measure, mark out, cut and shape materials and components with some accuracy PMB 7 - assemble, join and combine materials and components with some accuracy PMB 8 - apply a range of finishing techniques, including those from PMB 14 - follow procedures for safety and hygiene PMB 15 - use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components	PMA 5 - produce appropriate lists of tools, equipment and materials that they need PMA 6 - formulate step-by-step plans as a guide to making PMB 9 - accurately measure, mark out, cut and shape materials and components PMB 10 - accurately assemble, join and combine materials and components PMB 11 - accurately apply a range of finishing techniques, including those from art and design PMB 12 - use techniques that involve a number of steps PMB 13 - demonstrate resourcefulness when tackling practical problem
To EVALUATE products	To explore different waterproof fabric items. To describe how they made their product. To evaluate their product.	PEA 4 - refer to their design criteria as they design and make PEA 5 - use their design criteria to evaluate their completed products PEA 8 - identify the strengths and areas for development in their ideas and products PEB 9 - who designed and made the products PEB 10 - where products were designed and made PEB 11 - when products were designed and made PEB 12 - whether products can be recycled or reused PEB 17 - how well products have been designed PEB 18 - how well products have been made PEB 19 - why materials have been chosen PEB 20 - what methods of construction have been used PEB 21 - how well products work PEB 22 - how well products achieve their purposes PEB 23 - how well products meet user needs and wants	PEA 6 - critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make PEA 7 - evaluate their ideas and products against their original design specification PEB 14 - how innovative products are PEB 16 - what impact products have beyond their intended purpose
To develop TECHNICAL KNOWLEDGE	To know the properties of different fabrics. To learn different techniques to join fabrics.	PTK 11 - that a single fabric shape can be used to make a 3D textiles product PTK 12 - that food ingredients can be fresh, pre-cooked and processed PTK 19 - how to use learning from science to help design and make products that work	PTK 17 - that a 3D textiles product can be made from a combination of fabric shapes

			PTK 21 - that materials have both functional properties and aesthetic qualities PTK 22 - that materials can be combined and mixed to create more useful characteristics PTK 24 - the correct technical vocabulary for the projects they are undertaking	
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SUMMER UNIT	Key generic learning objectives	Unit specific learning objectives	Lower KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
What I Believe: The right to choose religion and beliefs [exploring religion around the world] <u>Mechanisms</u> <u>[sliders and levers]</u> Design brief: to design and create a moving celebration card	To DESIGN products	To design a moving card.	PDA 9 - develop their own design criteria and use these to inform their idea PDA13 - work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment PDA 14 - describe the purpose of their products PDA 15 - indicate the design features of their products that will appeal to intended users PDA 16 - explain how particular parts of their products work PDB 6 - generate realistic ideas, focusing on the needs of the user PDB 7 - make design decisions that take account of the availability of resources PDB 10 - share and clarify ideas through discussion PDB 11 - model their ideas using prototypes and pattern pieces PDB 12 - use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas	PDA 12 - develop a simple design specification to guide their thinking PDB 8 - generate innovative ideas, drawing on research
	To MAKE products	To make a moving card.	PMA 4 - order the main stages of making PMA 7 - select tools and equipment suitable for the task PMA 8 - explain their choice of tools and equipment in relation to the skills and techniques they will be using PMA 9 - select materials and components suitable for the task PMA 10 - explain their choice of materials and components according to functional properties and aesthetic qualities PMB 6 - measure, mark out, cut and shape materials and components with some accuracy PMB 7 - assemble, join and combine materials and components with some accuracy PMB 8 - apply a range of finishing techniques, including those from art and design, with some accuracy PMB 14 - follow procedures for safety and hygiene	PMA 5 - produce appropriate lists of tools, equipment and materials that they need PMA 6 - formulate step-by-step plans as a guide to making PMB 9 - accurately measure, mark out, cut and shape materials and components PMB 10 - accurately assemble, join and combine materials and components PMB 11 - accurately apply a range of finishing techniques, including those from art and design PMB 12 - use techniques that involve a number of steps PMB 13 - demonstrate resourcefulness when tackling practical problem

	To EVALUATE products	To explore how different levers work and are made. To describe how they made their card. To evaluate their finished product.	PEA 4 - refer to their design criteria as they design and make PEA 5 - use their design criteria to evaluate their completed products PEA 8 - identify the strengths and areas for development in their ideas and products PEA 9 - consider the views of others, including intended users, to improve their work PEB 9 - who designed and made the products PEB 12 - whether products can be recycled or reused PEB 18 - how well products have been made PEB 19 - why materials have been chosen PEB 20 - what methods of construction have been used PEB 21 - how well products work PEB 22 - how well products achieve their purposes PEB 23 - how well products meet user needs and wants	PEA 6 - critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make PEA 7 - evaluate their ideas and products against their original design specification
	To develop TECHNICAL KNOWLEDGE	To learn how different levers work and are made.	PTK 7 - how mechanical systems such as levers and linkages or pneumatic systems create movement PTK 20 - how to use learning from mathematics to help design and make products that work PTK 21 - that materials have both functional properties and aesthetic qualities PTK 22 - that materials can be combined and mixed to create more useful characteristics PTK 24 - the correct technical vocabulary for the projects they are undertaking	PTK 13 - how mechanical systems create movement

YEAR 4

AUTUMN UNIT	Key generic learning objectives	Unit specific learning objectives	Lower KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
The Ancient Greeks Structures Design brief: to design a new outdoor structure for leisure	To DESIGN products	To design an appropriate play structure for a playground in school.	PDA 8 - gather information about the needs and wants of particular individuals and groups PDA 9 - develop their own design criteria and use these to inform their idea PDA13 - work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment PDA 14 - describe the purpose of their products PDA 15 - indicate the design features of their products that will appeal to intended users PDA 16 - explain how particular parts of their products work PDB 6 - generate realistic ideas, focusing on the needs of the user PDB 7 - make design decisions that take account of the availability of resources PDB 10 - share and clarify ideas through discussion PDB 11 - model their ideas using prototypes and pattern pieces	PDA 10 - carry out research, using surveys, interviews, questionnaires and web-based resources PDA 11 - identify the needs, wants, preferences and values of particular individuals and groups PDB 8 - generate innovative ideas, drawing on research PDB 9 - make design decisions, taking account of constraints such as time, resources and cost

			PDB 12 - use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas	
	To MAKE products	To explore different playground structures.	PMA 4 - order the main stages of making PMA 7 - select tools and equipment suitable for the task PMA 8 - explain their choice of tools and equipment in relation to the skills and techniques they will be using PMA 9 - select materials and components suitable for the task PMA 10 - explain their choice of materials and components according to functional properties and aesthetic qualities PMB 6 - measure, mark out, cut and shape materials and components with some accuracy PMB 7 - assemble, join and combine materials and components with some accuracy PMB 15 - use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components	PMA 5 - produce appropriate lists of tools, equipment and materials that they need PMA 6 - formulate step-by-step plans as a guide to making PMB 9 - accurately measure, mark out, cut and shape materials and components PMB 10 - accurately assemble, join and combine materials and components PMB 11 - accurately apply a range of finishing techniques, including those from art and design PMB 12 - use techniques that involve a number of steps PMB 13 - demonstrate resourcefulness when tackling practical problem
	To EVALUATE products	To evaluate different playground structures. To evaluate the design of a play structure.	PEA 4 - refer to their design criteria as they design and make PEA 8 - identify the strengths and areas for development in their ideas and products PEA 9 - consider the views of others, including intended users, to improve their work PEB 9 - who designed and made the products PEB 19 - why materials have been chosen PEB 21 - how well products work PEB 22 - how well products achieve their purposes PEB 23 - how well products meet user needs and wants	PEA 6 - critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make PEA 7 - evaluate their ideas and products against their original design specification PEB 13 - how much products cost to make PEB 14 - how innovative products are PEB 15 - how sustainable the materials in products are PEB 16 - what impact products have beyond their intended purpose
	To develop TECHNICAL KNOWLEDGE	To learn techniques for building strong structures.	PTK 10 - how to make strong, stiff shell structures PTK 21 - that materials have both functional properties and aesthetic qualities PTK 22 - that materials can be combined and mixed to create more useful characteristics	PTK 16 - how to reinforce and strengthen a 3D framework

SPRING UNIT	Key generic learning objectives	Unit specific learning objectives	Lower KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
What did the Roman's do for us? <u>Structures</u> Design brief: To design and create a bridge	To DESIGN products	To design a bridge.	PDA 9 - develop their own design criteria and use these to inform their idea PDA13 - work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment PDA 14 - describe the purpose of their products PDA 15 - indicate the design features of their products that will appeal to intended users PDA 16 - explain how particular parts of their products work PDB 6 - generate realistic ideas, focusing on the needs of the user PDB 7 - make design decisions that take account of the availability of resources PDB 10 - share and clarify ideas through discussion PDB 11 - model their ideas using prototypes and pattern pieces PDB 12 - use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas	PDA 10 - carry out research, using surveys, interviews, questionnaires and web-based resources PDA 11 - identify the needs, wants, preferences and values of particular individuals and groups PDA 12 - develop a simple design specification to guide their thinking PDB 8 - generate innovative ideas, drawing on research PDB 9 - make design decisions, taking account of constraints such as time, resources and cost
	To MAKE products	To explore bridges. To make a bridge out of certain materials in a set time limit. To make a bridge.	PMA 4 - order the main stages of making PMA 7 - select tools and equipment suitable for the task PMA 8 - explain their choice of tools and equipment in relation to the skills and techniques they will be using PMA 9 - select materials and components suitable for the task PMA 10 - explain their choice of materials and components according to functional properties and aesthetic qualities PMB 6 - measure, mark out, cut and shape materials and components with some accuracy PMB 7 - assemble, join and combine materials and components with some accuracy PMB 14 - follow procedures for safety and hygiene PMB 15 - use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components	PMA 5 - produce appropriate lists of tools, equipment and materials that they need PMA 6 - formulate step-by-step plans as a guide to making PMB 9 - accurately measure, mark out, cut and shape materials and components PMB 10 - accurately assemble, join and combine materials and components PMB 12 - use techniques that involve a number of steps PMB 13 - demonstrate resourcefulness when tackling practical problem
	To EVALUATE products	To visit Durham and investigate different bridges around the town. To explore the structure of bridges. To evaluate the product.	PEA 4 - refer to their design criteria as they design and make PEA 5 - use their design criteria to evaluate their completed products PEA 8 - identify the strengths and areas for development in their ideas and products PEA 9 - consider the views of others, including intended users, to improve their work PEB 9 - who designed and made the products PEB 10 - where products were designed and made PEB 11 - when products were designed and made PEB 17 - how well products have been designed PEB 18 - how well products have been made PEB 19 - why materials have been chosen PEB 20 - what methods of construction have been used	PEA 6 - critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make PEA 7 - evaluate their ideas and products against their original design specification PEB 13 - how much products cost to make PEB 14 - how innovative products are PEB 15 - how sustainable the materials in products are PEB 16 - what impact products have beyond their intended purpose

			PEB 21 - how well products work PEB 22 - how well products achieve their purposes PEB 23 - how well products meet user needs and wants	
	To develop TECHNICAL KNOWLEDGE	To understand features of a bridge. To look at different styles of bridges.	PTK 10 - how to make strong, stiff shell structures PTK 19 - how to use learning from science to help design and make products that work PTK 20 - how to use learning from mathematics to help design and make products that work PTK 21 - that materials have both functional properties and aesthetic qualities PTK 22 - that materials can be combined and mixed to create more useful characteristics	PTK 16 - how to reinforce and strengthen a 3D framework

SUMMER UNIT	Key generic learning objectives	Unit specific learning objectives	Lower KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
What I believe: Everyone and everything has the right to be alive. Life in the rainforest. <u>Cooking and Nutrition</u> Design brief: To create a baked snack suitable for 3 different lifestyles.	To DESIGN products	To design a healthy, suitable snack for an explorer in the rainforest.	PDA 8 - gather information about the needs and wants of particular individuals and groups PDA 9 - develop their own design criteria and use these to inform their idea PDA13 - work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment PDA 14 - describe the purpose of their products PDB 6 - generate realistic ideas, focusing on the needs of the user PDB 7 - make design decisions that take account of the availability of resources PDB 10 - share and clarify ideas through discussion PDB 12 - use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas	PDA 10 - carry out research, using surveys, interviews, questionnaires and web-based resources PDA 11 - identify the needs, wants, preferences and values of particular individuals and groups PDA 12 - develop a simple design specification to guide their thinking PDB 8 - generate innovative ideas, drawing on research PDB 9 - make design decisions, taking account of constraints such as time, resources and cost
	To MAKE products	To make a healthy, suitable snack for an explorer in the rainforest.	PMA 4 - order the main stages of making PMA 7 - select tools and equipment suitable for the task PMA 8 - explain their choice of tools and equipment in relation to the skills and techniques they will be using PMB 6 - measure, mark out, cut and shape materials and components with some accuracy PMB 7 - assemble, join and combine materials and components with some accuracy PMB 14 - follow procedures for safety and hygiene PMB 15 - use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components	PMA 5 - produce appropriate lists of tools, equipment and materials that they need PMA 6 - formulate step-by-step plans as a guide to making PMB 9 - accurately measure, mark out, cut and shape materials and components PMB 10 - accurately assemble, join and combine materials and components

			PMB 11 - accurately apply a range of finishing techniques, including those from art and design PMB 12 - use techniques that involve a number of steps PMB 13 - demonstrate resourcefulness when tackling practical problem
To EVALUATE products	To explore healthy snacks to have in the rainforest. To evaluate a snack.	PEA 4 - refer to their design criteria as they design and make PEA 5 - use their design criteria to evaluate their completed products PEA 8 - identify the strengths and areas for development in their ideas and products PEA 9 - consider the views of others, including intended users, to improve their work PEB 9 - who designed and made the products PEB 10 - where products were designed and made PEB 11 - when products were designed and made PEB 17 - how well products have been designed PEB 18 - how well products have been made PEB 19 - why materials have been chosen PEB 20 - what methods of construction have been used PEB 21 - how well products work PEB 22 - how well products achieve their purposes PEB 23 - how well products meet user needs and wants	PEA 6 - critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make PEA 7 - evaluate their ideas and products against their original design specification PEB 13 - how much products cost to make PEB 14 - how innovative products are PEB 15 - how sustainable the materials in products are PEB 16 - what impact products have beyond their intended purpose
To develop TECHNICAL KNOWLEDGE COOKING AND NUTRITION	To explore healthy snacks to have in the rainforest.	PTK 12 - that food ingredients can be fresh, pre-cooked and processed PTK 19 - how to use learning from science to help design and make products that work PTK 20 - how to use learning from mathematics to help design and make products that work PTK 21 - that materials have both functional properties and aesthetic qualities PTK 24 - the correct technical vocabulary for the projects they are undertaking	PTK 13 - how mechanical systems such as cams or pulleys or gears create movement PTK 14 - how more complex electrical circuits and components can be used to create functional products PTK 15 - how to program a computer to monitor changes in the environment and control their products PTK 16 - how to reinforce and strengthen a 3D framework PTK 17 - that a 3D textiles product can be made from a combination of fabric shapes PTK 18 - that a recipe can be adapted by adding or substituting one or more ingredients

AUTUMN UNIT	Key generic learning objectives	Unit specific learning objectives	Upper KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
Settlers and Settlements Anglo-Saxon, Vikings and Scots Structures Design brief: to design and make a tensile fabric structure for a warm climate	To DESIGN products	To design a tensile fabric structure for a settler in a warm climate.	PDA 10 - carry out research, using surveys, interviews, questionnaires and web-based resources PDA 11 - identify the needs, wants, preferences and values of particular individuals and groups PDA 12 - develop a simple design specification to guide their thinking PDA13 - work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment PDA 14 - describe the purpose of their products PDA 15 - indicate the design features of their products that will appeal to intended users PDA 16 - explain how particular parts of their products work PDB 8 - generate innovative ideas, drawing on research PDB 9 - make design decisions, taking account of constraints such as time, resources and cost PDB 10 - share and clarify ideas through discussion PDB 11 - model their ideas using prototypes and pattern pieces PDB 12 - use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas	DA 1 - develop detailed design specifications to guide their thinking DA 2 - use research including the study of different cultures, to identify and understand user need DA3 - identify and solve their own design problems
	To MAKE products	To make a tensile fabric structure.	PMA 5 - produce appropriate lists of tools, equipment and materials that they need PMA 6 - formulate step-by-step plans as a guide to making PMA 7 - select tools and equipment suitable for the task PMA 8 - explain their choice of tools and equipment in relation to the skills and techniques they will be using PMA 9 - select materials and components suitable for the task PMA 10 - explain their choice of materials and components according to functional properties and aesthetic qualities PMB 9 - accurately measure, mark out, cut and shape materials and components PMB 12 - use techniques that involve a number of steps PMB 13 - demonstrate resourcefulness when tackling practical problem PMB 14 - follow procedures for safety and hygiene PMB 15 - use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components	MA 2 - produce costings using spreadsheets for products they design and make MB 1 - make use of specialist equipment to mark out materials MB 2 - use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives
	To EVALUATE products	To evaluate a tensile fabric structure.	PEA 6 - critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make PEA 7 - evaluate their ideas and products against their original design specification PEA 8 - identify the strengths and areas for development in their ideas and products PEA 9 - consider the views of others, including intended users, to improve their work PEB 13 - how much products cost to make	EA 1 - evaluate their products against their original specification and identify ways of improving them EA 2 - actively involve others in the testing of their products EB 1 - products through disassembly to determine how they are constructed and function

			PEB 16 - what impact products have beyond their intended purpose PEB 17 - how well products have been designed PEB 18 - how well products have been made PEB 19 - why materials have been chosen PEB 20 - what methods of construction have been used PEB 21 - how well products work PEB 22 - how well products achieve their purposes PEB 23 - how well products meet user needs and wants	EB 2 - the positive and negative impact that products can have in the wider world
	To develop TECHNICAL KNOWLEDGE	To learn about tensile fabric structures. To learn different assembly and strengthening techniques.	PTK 16 - how to reinforce and strengthen a 3D framework PTK 20 - how to use learning from mathematics to help design and make products that work PTK 21 - that materials have both functional properties and aesthetic qualities PTK 22 - that materials can be combined and mixed to create more useful characteristics PTK 23 - that mechanical and electrical systems have an input, process and output PTK 24 - the correct technical vocabulary for the projects they are undertaking	TK 1 - how to classify materials by structure e.g. hard woods, soft woods, ferrous and nonferrous, thermoplastic and thermosetting plastics TK 2 - about the physical properties of materials e.g. grain, brittleness, flexibility, elasticity, malleability and thermal

SPRING UNIT	Key generic learning objectives	Unit specific learning objectives	Upper KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
What happened after 1066? Tudors and Stewarts Cooking and Nutrition/CAD Design brief: to design and create food packaging	To DESIGN products	To research the use of and different types of food packaging. To design an appropriate packaging for a particular food.	PDA 10 - carry out research, using surveys, interviews, questionnaires and web-based resources PDA 11 - identify the needs, wants, preferences and values of particular individuals and groups PDA 12 - develop a simple design specification to guide their thinking PDA13 - work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment PDA 14 - describe the purpose of their products PDA 15 - indicate the design features of their products that will appeal to intended users PDA 16 - explain how particular parts of their products work PDB 8 - generate innovative ideas, drawing on research PDB 9 - make design decisions, taking account of constraints such as time, resources and cost PDB 10 - share and clarify ideas through discussion PDB 11 - model their ideas using prototypes and pattern pieces PDB 12 - use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas PDB 13 - use computer-aided design to develop and communicate their ideas	DA 1 - develop detailed design specifications to guide their thinking DA 2 - use research including the study of different cultures, to identify and understand user need DA3 - identify and solve their own design problems

	To MAKE products	To make an appropriate packaging for a particular food.	PMA 5 - produce appropriate lists of tools, equipment and materials that they need PMA 6 - formulate step-by-step plans as a guide to making PMA 7 - select tools and equipment suitable for the task PMA 8 - explain their choice of tools and equipment in relation to the skills and techniques they will be using PMA 9 - select materials and components suitable for the task PMA 10 - explain their choice of materials and components according to functional properties and aesthetic qualities PMB 9 - accurately measure, mark out, cut and shape materials and components PMB 10 - accurately assemble, join and combine materials and components PMB 11 - accurately apply a range of finishing techniques, including those from art and design PMB 12 - use techniques that involve a number of steps PMB 13 - demonstrate resourcefulness when tackling practical problem PMB 14 - follow procedures for safety and hygiene PMB 15 - use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components	MA 1 - produce ordered sequences and schedules for manufacturing products they design, detailing resources required MA 2 - produce costings using spreadsheets for products they design and make MB 1 - make use of specialist equipment to mark out materials MB 3 - use CAD/CAM to produce and apply surface finishing techniques, for example using dye sublimation
	To EVALUATE products	To evaluate packaging for a particular food.	PEA 6 - critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make PEA 7 - evaluate their ideas and products against their original design specification PEA 8 - identify the strengths and areas for development in their ideas and products PEA 9 - consider the views of others, including intended users, to improve their work PEB 13 - how much products cost to make PEB 14 - how innovative products are PEB 15 - how sustainable the materials in products are PEB 16 - what impact products have beyond their intended purpose PEB 17 - how well products have been designed PEB 18 - how well products have been made PEB 19 - why materials have been chosen PEB 20 - what methods of construction have been used PEB 21 - how well products work PEB 22 - how well products achieve their purposes PEB 23 - how well products meet user needs and wants	EA 1 - evaluate their products against their original specification and identify ways of improving them EA 2 - actively involve others in the testing of their products EB 1 - products through disassembly to determine how they are constructed and function EB 2 - the positive and negative impact that products can have in the wider world
	To develop TECHNICAL KNOWLEDGE	How information about food available to the consumer, including labelling and marketing, influences food choice.	PTK 13 - how mechanical systems such as cams or pulleys or gears create movement PTK 14 - how more complex electrical circuits and components can be used to create functional products PTK 15 - how to program a computer to monitor changes in the environment and control their products PTK 16 - how to reinforce and strengthen a 3D framework PTK 17 - that a 3D textiles product can be made from a combination of fabric shapes PTK 18 - that a recipe can be adapted by adding or substituting	

	COOKING AND NUTRITION	Mandatory information included on food packaging in accordance with current European Union and Food Standards Agency (FSA) legislation Non-mandatory information: provenance, serving suggestions How to interpret nutritional labelling How food marketing can influence food choice eg buy one get one free, special offers, meal deals, media influences, advertising, point of sales marketing.	one or more ingredients PTK 19 - how to use learning from science to help design and make products that work PTK 20 - how to use learning from mathematics to help design and make products that work PTK 21 - that materials have both functional properties and aesthetic qualities PTK 22 - that materials can be combined and mixed to create more useful characteristics PTK 23 - that mechanical and electrical systems have an input, process and output PTK 24 - the correct technical vocabulary for the projects they are undertaking	
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SUMMER UNIT	Key generic learning objectives	Unit specific learning objectives	Upper KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
What I believe: No one is allowed to punish you in a cruel or harmful way.	To DESIGN products	To design an alarm.	PDA 12 - develop a simple design specification to guide their thinking PDA 14 - describe the purpose of their products PDA 15 - indicate the design features of their products that will appeal to intended users PDA 16 - explain how particular parts of their products work PDB 10 - share and clarify ideas through discussion PDB 11 - model their ideas using prototypes and pattern pieces PDB 12 - use annotated sketches, cross-sectional drawings	DA 1 - develop detailed design specifications to guide their thinking DA 2 - use research including the study of different cultures, to identify and understand user need DA3 - identify and solve their own design problems

Exploring crime and punishment. Control Design brief: To design and make an alarm for a person and problem of your choice			and exploded diagrams to develop and communicate their ideas	
	To MAKE products	To make an alarm.	PMA 5 - produce appropriate lists of tools, equipment and materials that they need PMA 6 - formulate step-by-step plans as a guide to making PMA 9 - select materials and components suitable for the task PMB 9 - accurately measure, mark out, cut and shape materials and components PMB 10 - accurately assemble, join and combine materials and components PMB 12 - use techniques that involve a number of steps PMB 13 - demonstrate resourcefulness when tackling practical problem	MA 1 - produce ordered sequences and schedules for manufacturing products they design, detailing resources required MA 2 - produce costings using spreadsheets for products they design and make MB 1 - make use of specialist equipment to mark out materials
	To EVALUATE products	To explore using a coding programme [www.microbit.org].	PEA 6 - critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make PEA 7 - evaluate their ideas and products against their original design specification PEA 8 - identify the strengths and areas for development in their ideas and products PEA 9 - consider the views of others, including intended users, to improve their work PEB 17 - how well products have been designed PEB 18 - how well products have been made PEB 21 - how well products work PEB 22 - how well products achieve their purposes PEB 23 - how well products meet user needs and wants	EA 1 - evaluate their products against their original specification and identify ways of improving them EA 2 - actively involve others in the testing of their products EB 1 - products through disassembly to determine how they are constructed and function EB 2 - the positive and negative impact that products can have in the wider world
	To develop TECHNICAL KNOWLEDGE	To know how to use the microbit technology. To explore different alarms to learn how they work.	PTK 15 - how to program a computer to monitor changes in the environment and control their products PTK 16 - how to reinforce and strengthen a 3D framework PTK 23 - that mechanical and electrical systems have an input, process and output PTK 24 - the correct technical vocabulary for the projects they are undertaking	

YEAR 6

AUTUMN UNIT	Key generic learning objectives	Unit specific learning objectives	Upper KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
Children in WWII in Sunderland	To DESIGN products	To look at different items a refugee carries with them. To design an appropriate item to carry objects.	PDA 10 - carry out research, using surveys, interviews, questionnaires and web-based resources PDA 11 - identify the needs, wants, preferences and values of particular individuals and groups PDA 12 - develop a simple design specification to guide their thinking	DA 1 - develop detailed design specifications to guide their thinking DA 2 - use research including the study of different cultures, to identify and understand user need DA3 - identify and solve their own design problems

Textiles Design brief: to design and create a fabric item to carry objects a refugee would take with them			PDA13 - work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment PDA 14 - describe the purpose of their products PDA 15 - indicate the design features of their products that will appeal to intended users PDA 16 - explain how particular parts of their products work PDB 8 - generate innovative ideas, drawing on research PDB 9 - make design decisions, taking account of constraints such as time, resources and cost PDB 10 - share and clarify ideas through discussion PDB 11 - model their ideas using prototypes and pattern pieces PDB 12 - use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas PDB 13 - use computer-aided design to develop and communicate their ideas	
	To MAKE products	To make an appropriate item to carry objects.	PMA 5 - produce appropriate lists of tools, equipment and materials that they need PMA 6 - formulate step-by-step plans as a guide to making PMA 7 - select tools and equipment suitable for the task PMA 8 - explain their choice of tools and equipment in relation to the skills and techniques they will be using PMA 9 - select materials and components suitable for the task PMA 10 - explain their choice of materials and components according to functional properties and aesthetic qualities PMB 9 - accurately measure, mark out, cut and shape materials and components PMB 10 - accurately assemble, join and combine materials and components PMB 11 - accurately apply a range of finishing techniques, including those from art and design PMB 12 - use techniques that involve a number of steps PMB 13 - demonstrate resourcefulness when tackling practical problem PMB 14 - follow procedures for safety and hygiene PMB 15 - use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components	MA 1 - produce ordered sequences and schedules for manufacturing products they design, detailing resources required MA 2 - produce costings using spreadsheets for products they design and make MB 1 - make use of specialist equipment to mark out materials MB 2 - use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives MB 4 - investigate and develop skills in modifying the appearance of materials including textiles and other manufactured materials e.g. dyeing and appliqué
	To EVALUATE products	To evaluate an appropriate item to carry objects.	PEA 6 - critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make PEA 7 - evaluate their ideas and products against their original design specification PEA 8 - identify the strengths and areas for development in their ideas and products PEA 9 - consider the views of others, including intended users, to improve their work PEB 13 - how much products cost to make PEB 14 - how innovative products are PEB 15 - how sustainable the materials in products are	EA 1 - evaluate their products against their original specification and identify ways of improving them EA 2 - actively involve others in the testing of their products EB 1 - products through disassembly to determine how they are constructed and function EB 2 - the positive and negative impact that products can have in the wider world

			PEB 16 - what impact products have beyond their intended purpose PEB 17 - how well products have been designed PEB 18 - how well products have been made PEB 19 - why materials have been chosen PEB 20 - what methods of construction have been used PEB 21 - how well products work PEB 22 - how well products achieve their purposes PEB 23 - how well products meet user needs and wants	
	To develop TECHNICAL KNOWLEDGE	Join fabrics together using any of the previously learnt stitches. Choose an appropriate fastener for the design brief. Position it so we don't waste fabric.	PTK 13 - how mechanical systems such as cams or pulleys or gears create movement PTK 14 - how more complex electrical circuits and components can be used to create functional products PTK 15 - how to program a computer to monitor changes in the environment and control their products PTK 16 - how to reinforce and strengthen a 3D framework PTK 17 - that a 3D textiles product can be made from a combination of fabric shapes PTK 18 - that a recipe can be adapted by adding or substituting one or more ingredients PTK 19 - how to use learning from science to help design and make products that work PTK 20 - how to use learning from mathematics to help design and make products that work PTK 21 - that materials have both functional properties and aesthetic qualities PTK 22 - that materials can be combined and mixed to create more useful characteristics PTK 23 - that mechanical and electrical systems have an input, process and output PTK 24 - the correct technical vocabulary for the projects they are undertaking	TK 2 - about the physical properties of materials e.g. grain, brittleness, flexibility, elasticity, malleability and thermal TK 5 - about textile fibre sources e.g. natural and synthetic and fabrics e.g. plain and woven TK 6 - how to select and modify patterns and use in textile construction

SPRING UNIT	Key generic learning objectives	Unit specific learning objectives	Upper KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
Sunderland's Heritage: Coalmining <u>Mechanisms</u> <u>[mechanical]</u>	To DESIGN products	To look at different rescue mechanisms. To design a rescue mechanism.	PDA 10 - carry out research, using surveys, interviews, questionnaires and web-based resources PDA 11 - identify the needs, wants, preferences and values of particular individuals and groups PDA 12 - develop a simple design specification to guide their thinking PDA13 - work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment PDA 14 - describe the purpose of their products	DA 1 - develop detailed design specifications to guide their thinking DA 2 - use research including the study of different cultures, to identify and understand user need DA3 - identify and solve their own design problems

systems and pulleys] and Electronics Design brief: to design and create a rescue mechanism			PDA 15 - indicate the design features of their products that will appeal to intended users PDA 16 - explain how particular parts of their products work PDB 8 - generate innovative ideas, drawing on research PDB 9 - make design decisions, taking account of constraints such as time, resources and cost PDB 10 - share and clarify ideas through discussion PDB 11 - model their ideas using prototypes and pattern pieces PDB 12 - use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas PDB 13 - use computer-aided design to develop and communicate their ideas	
	To MAKE products	To make a rescue mechanism.	PMA 5 - produce appropriate lists of tools, equipment and materials that they need PMA 6 - formulate step-by-step plans as a guide to making PMA 7 - select tools and equipment suitable for the task PMA 8 - explain their choice of tools and equipment in relation to the skills and techniques they will be using PMA 9 - select materials and components suitable for the task PMA 10 - explain their choice of materials and components according to functional properties and aesthetic qualities PMB 9 - accurately measure, mark out, cut and shape materials and components PMB 10 - accurately assemble, join and combine materials and components PMB 11 - accurately apply a range of finishing techniques, including those from art and design PMB 12 - use techniques that involve a number of steps PMB 13 - demonstrate resourcefulness when tackling practical problem PMB 14 - follow procedures for safety and hygiene PMB 15 - use a wider range of materials and components than KS1, including construction materials and kits, textiles, food ingredients, mechanical components and electrical components	MA 1 - produce ordered sequences and schedules for manufacturing products they design, detailing resources required MA 2 - produce costings using spreadsheets for products they design and make MB 1 - make use of specialist equipment to mark out materials MB 2 - use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives MB 3 - use CAD/CAM to produce and apply surface finishing techniques, for example using dye sublimation MB 4 - investigate and develop skills in modifying the appearance of materials including textiles and other manufactured materials e.g. dyeing and appliqué
	To EVALUATE products	To evaluate a rescue mechanism.	PEA 6 - critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make PEA 7 - evaluate their ideas and products against their original design specification PEA 8 - identify the strengths and areas for development in their ideas and products PEA 9 - consider the views of others, including intended users, to improve their work PEB 13 - how much products cost to make PEB 14 - how innovative products are PEB 15 - how sustainable the materials in products are PEB 16 - what impact products have beyond their intended purpose PEB 17 - how well products have been designed PEB 18 - how well products have been made PEB 19 - why materials have been chosen	EA 1 - evaluate their products against their original specification and identify ways of improving them EA 2 - actively involve others in the testing of their products EB 1 - products through disassembly to determine how they are constructed and function EB 2 - the positive and negative impact that products can have in the wider world

			PEB 20 - what methods of construction have been used PEB 21 - how well products work PEB 22 - how well products achieve their purposes	
	To develop TECHNICAL KNOWLEDGE	Explore & use mechanical systems (gears, pulleys and cams). Use innovative combinations of mechanics in product designs.	PEB 23 - how well products meet user needs and wants PTK 13 - how mechanical systems such as cams or pulleys or gears create movement PTK 14 - how more complex electrical circuits and components can be used to create functional products PTK 15 - how to program a computer to monitor changes in the environment and control their products PTK 16 - how to reinforce and strengthen a 3D framework PTK 17 - that a 3D textiles product can be made from a combination of fabric shapes PTK 18 - that a recipe can be adapted by adding or substituting one or more ingredients PTK 19 - how to use learning from science to help design and make products that work PTK 20 - how to use learning from mathematics to help design and make products that work PTK 21 - that materials have both functional properties and aesthetic qualities PTK 22 - that materials can be combined and mixed to create more useful characteristics PTK 23 - that mechanical and electrical systems have an input, process and output PTK 24 - the correct technical vocabulary for the projects they are undertaking	TK 1 - how to classify materials by structure e.g. hard woods, soft woods, ferrous and nonferrous, thermoplastic and thermosetting plastics TK 2 - about the physical properties of materials e.g. grain, brittleness, flexibility, elasticity, malleability and thermal TK 3 - how more advanced electrical and electronic systems can be powered and used in their products TK 4 - how to use simple electronic circuits incorporating inputs and outputs

SUMMER UNIT	Key generic learning objectives	Unit specific learning objectives	Upper KS2 working at the EXPECTED STANDARD	Lower KS2 working ABOVE the expected standard
What I believe: I have the right to protection from any kind of exploitation. I have the right to give my opinion. <u>Mechanisms and Electronics</u> Design brief: to design and make an electric car	To DESIGN products	To design a car for an intended purpose.	PDA 12 - develop a simple design specification to guide their thinking PDA13 - work confidently within a range of contexts, such as the home, school, leisure, culture, enterprise, industry and the wider environment PDA 16 - explain how particular parts of their products work PDB 8 - generate innovative ideas, drawing on research PDB 9 - make design decisions, taking account of constraints such as time, resources and cost PDB 10 - share and clarify ideas through discussion PDB 12 - use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas	DA 1 - develop detailed design specifications to guide their thinking DA 2 - use research including the study of different cultures, to identify and understand user need DA3 - identify and solve their own design problems
	To MAKE products	To make their design prototype.	PMA 5 - produce appropriate lists of tools, equipment and materials that they need PMA 7 - select tools and equipment suitable for the task PMA 8 - explain their choice of tools and equipment in relation to the skills and techniques they will be using	MA 1 - produce ordered sequences and schedules for manufacturing products they design, detailing resources required

			PMA 9 - select materials and components suitable for the task PMA 10 - explain their choice of materials and components according to functional properties and aesthetic qualities PMB 9 - accurately measure, mark out, cut and shape materials and components PMB 10 - accurately assemble, join and combine materials and components PMB 12 - use techniques that involve a number of steps PMB 13 - demonstrate resourcefulness when tackling practical problem PMB 14 - follow procedures for safety and hygiene	MA 2 - produce costings using spreadsheets for products they design and make MB 1 - make use of specialist equipment to mark out materials MB 2 - use a broad range of material joining techniques including stitching, mechanical fastenings, heat processes and adhesives MB 3 - use CAD/CAM to produce and apply surface finishing techniques, for example using dye sublimation MB 4 - investigate and develop skills in modifying the appearance of materials including textiles and other manufactured materials e.g. dyeing and appliqué
	To EVALUATE products	To explore how pulleys and gears can create movement. To evaluate their product design.	PEA 6 - critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make PEA 8 - identify the strengths and areas for development in their ideas and products PEB 14 - how innovative products are PEB 15 - how sustainable the materials in products are PEB 16 - what impact products have beyond their intended purpose PEB 17 - how well products have been designed PEB 18 - how well products have been made PEB 19 - why materials have been chosen PEB 20 - what methods of construction have been used PEB 21 - how well products work PEB 22 - how well products achieve their purposes PEB 23 - how well products meet user needs and wants	EA 1 - evaluate their products against their original specification and identify ways of improving them EA 2 - actively involve others in the testing of their products EB 1 - products through disassembly to determine how they are constructed and function EB 2 - the positive and negative impact that products can have in the wider world
	To develop TECHNICAL KNOWLEDGE	To learn about inventors, designs and engineers [electric cars]. To know how pulleys and gears create movement.	PTK 13 - how mechanical systems such as cams or pulleys or gears create movement PTK 18 - that a recipe can be adapted by adding or substituting one or more ingredients PTK 19 - how to use learning from science to help design and make products that work	TK 1 - how to classify materials by structure e.g. hard words, soft woods, ferrous and nonferrous, thermoplastic and thermosetting plastics TK 2 - about the physical properties of materials e.g. grain, brittleness, flexibility, elasticity, malleability and thermal TK 3 - how more advanced electrical and electronic systems can be powered and used in their products TK 4 - how to use simple electronic circuits incorporating inputs and outputs