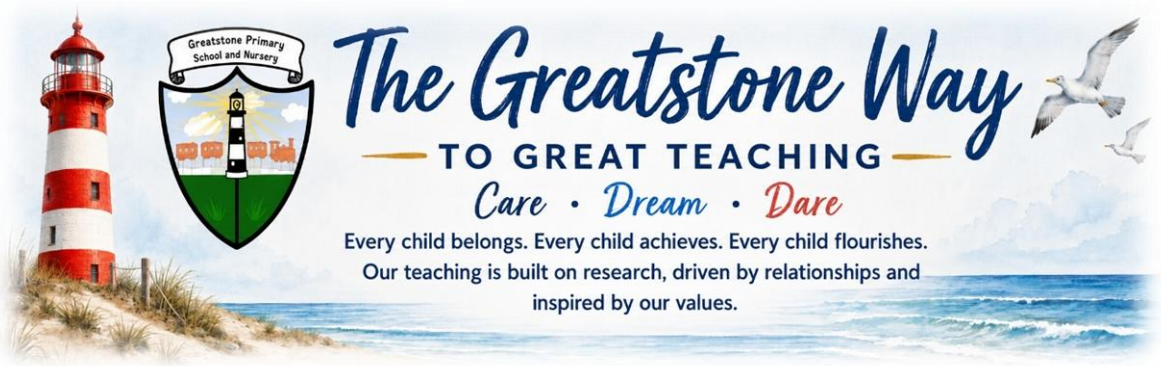

DESIGN TECHNOLOGY: The Greatstone Way Curriculum

Curriculum Intent
At Greatstone Primary, our Expressive Arts curriculum inspires every child to be creative, curious and confident. Through a carefully sequenced curriculum, pupils develop artistic knowledge, technical skills and an appreciation of diverse artists and cultures, using creativity to express ideas, solve problems and make meaningful connections with the world around them through The Greatstone Way.

Curriculum Design Principles for Expressive Arts

The curriculum has been designed around six key principles.

1. Full National Curriculum Coverage

The sequence provides comprehensive coverage of all statutory National Curriculum requirements from EYFS to Year 6.

Art and Design
Pupils progressively develop:

- drawing
- painting
- sculpture
- printmaking
- textiles
- collage
- digital media
- sketchbooks
- evaluation
- knowledge of artists, architects and designers

Design and Technology

Pupils progressively develop:

- designing
- making
- evaluating
- technical knowledge
- structures
- mechanisms
- textiles
- food and nutrition
- electrical systems
- mechanical systems

2. A Carefully Sequenced Expressive Arts Curriculum

Expressive Arts has been deliberately sequenced so that pupils build creative knowledge, technical understanding and practical confidence progressively from EYFS to Year 6.

Rather than studying isolated artistic techniques or design skills, pupils revisit the fundamental concepts of creativity, design, making and evaluation through increasingly ambitious projects. Knowledge is deliberately connected across year groups so that each project builds on previous learning whilst introducing greater technical challenge and creative independence.

Year	Creative Focus
EYFS	Exploring materials, creativity and making
Year 1	Colour, construction and simple design
Year 2	Observation, textiles and purposeful making
Year 3	Refining techniques and designing for function
Year 4	Cultural creativity and technical precision
Year 5	Architecture, engineering and artistic style
Year 6	Independent creative enquiry, innovation and evaluation

Recurring concepts include:

- creativity
- observation
- colour
- form
- texture
- pattern
- function
- structure
- innovation
- evaluation
- sustainability
- expression

These concepts are revisited throughout the curriculum with increasing sophistication, enabling pupils to make meaningful connections between artistic expression, design and technological innovation.

3. Progressive Creative Knowledge and Technical Skills

Knowledge develops progressively across both subjects.
Children become increasingly confident in:

Art and Design

- observing
- recording
- experimenting
- refining
- evaluating
- communicating ideas visually

Design and Technology

- investigating
- designing
- making
- testing
- evaluating
- improving products

Practical experiences become increasingly independent, with pupils applying prior knowledge to solve increasingly complex creative and technical challenges.

4. Developing Creative Thinking

The curriculum has been designed so pupils increasingly think and work as artists and designers.

EYFS

Children

- explore materials through play
- investigate colour, texture and shape
- build, construct and create
- make choices about materials
- talk about what they have created

Years 1–2

Children

- develop control of artistic media and tools
- investigate how products work
- begin recording ideas
- evaluate simple outcomes
- explain creative choices

Years 3–4

Children

- investigate artists, designers and engineers
- refine techniques
- use sketchbooks and design criteria
- evaluate effectiveness
- improve outcomes

Years 5–6

Children

- develop personal creative styles
- solve increasingly complex design problems
- evaluate critically
- justify decisions
- work independently through an iterative design process

Longer projects in Upper Key Stage 2 allow pupils to investigate, refine, evaluate and present increasingly sophisticated artistic and technological outcomes, preparing them well for secondary education.

5. Curriculum Design and Project Sequencing

The Greatstone Expressive Arts Curriculum has been carefully sequenced to ensure pupils develop increasing artistic knowledge, technical understanding and creative independence from EYFS to Year 6. Drawing upon the Cornerstones Curriculum, projects have been thoughtfully selected and organised to provide a coherent progression across both Art and Design and Design and Technology, ensuring full National Curriculum coverage whilst avoiding unnecessary repetition.

Following Greatstone Primary's transition from a historic mixed-age curriculum to a single-form entry model, the curriculum has been reviewed to strengthen progression and remove repeated learning experienced by previous cohorts. Rather than attempting to deliver every available Cornerstones project, carefully chosen units provide the strongest progression of artistic disciplines, technical knowledge and creative thinking. This approach allows pupils to study fewer projects in greater depth, developing mastery through sustained investigation, experimentation, refinement and evaluation.

Art and Design and Design and Technology are taught as complementary disciplines across each term. Each subject retains its own disciplinary integrity and progression whilst contributing to a shared creative journey. Art and Design develops pupils' understanding of visual communication, creativity and artistic expression through drawing, painting, sculpture, printmaking, mixed media and the study of artists, architects and designers. Design and Technology enables pupils to investigate, design, make and evaluate purposeful products through progressively challenging experiences in structures, mechanisms, food and nutrition, textiles and engineering.

Projects have been deliberately aligned with the wider Greatstone curriculum wherever meaningful. Art and Design enriches pupils' understanding of historical periods, geographical places and scientific concepts through artists, architecture, cultural traditions and visual enquiry. Design and Technology provides authentic opportunities to apply scientific understanding whilst responding to practical challenges inspired by History, Geography and the local environment. These carefully considered links enhance learning across the curriculum without compromising the distinct knowledge, skills and disciplinary thinking of each subject.

Knowledge and skills are deliberately revisited throughout the curriculum. Pupils return to key concepts such as observation, creativity, function, structure, materials, innovation and evaluation in increasingly sophisticated contexts, enabling them to make meaningful connections between previous learning and new experiences. By Upper Key Stage 2, pupils are expected to work with increasing independence, confidently selecting appropriate materials and techniques, refining ideas, solving complex design problems and evaluating their outcomes using precise subject-specific vocabulary.

6. A Distinctive Greatstone Expressive Arts Curriculum

Expressive Arts at Greatstone is rooted in creativity, community and place. Our unique coastal location provides an inspiring environment in which pupils observe, investigate and create. Beach School and outdoor learning are woven throughout the curriculum, enabling children to draw inspiration from the beaches, dunes, marshes and changing landscapes that surround them. First-hand experiences of the natural and built environment encourage careful observation, environmental awareness and authentic creative responses.

The curriculum celebrates Greatstone's local identity whilst broadening pupils' cultural understanding. Children explore the work of artists, designers, architects and engineers from a wide range of historical periods, cultures and traditions, developing an appreciation of creativity as a universal form of communication and problem-solving. Local architecture, coastal heritage, sustainability and environmental responsibility provide meaningful contexts for both artistic expression and technological innovation.

Every project contributes to The Greatstone Way, creating a shared creative journey across the school. Through the half-termly themes of ROOTS, SURVIVORS, EXPLORERS, INVENTORS, PROTECTORS and LEGACY, pupils develop not only artistic and technical expertise but also the Greatstone values of Care, Dream and Dare. Autumn projects encourage pupils to care for themselves, others and their communities through creativity and craftsmanship. Spring projects inspire pupils to dream by exploring new ideas, places, materials and possibilities. Summer projects encourage pupils to dare by taking creative risks, solving real-world problems, presenting their work with confidence and considering the legacy their ideas can leave behind.

Creative learning culminates in purposeful outcomes that celebrate pupil achievement and strengthen connections with the wider community. Exhibitions, galleries, design showcases, community projects and collaborative displays provide authentic audiences for pupils' work, encouraging pride, aspiration and reflection. Through these experiences, pupils come to understand that creativity is not simply about making

something attractive; it is about communicating ideas, improving lives, solving problems and making a positive contribution to the world around them.

By the time pupils leave Greatstone Primary, they will have developed the confidence, knowledge and technical expertise to think creatively, work independently and apply artistic and technological understanding across a wide range of contexts. They leave as imaginative, resilient and reflective young people who recognise the power of creativity to inspire change, enrich communities and shape the future.

Progression of Knowledge and Skills

The Expressive Arts curriculum has been designed so that pupils progressively develop both substantive knowledge (the knowledge of art, design and technology) and disciplinary knowledge (how artists, designers and technologists think and work).

Throughout the curriculum, pupils revisit and deepen their understanding of the key concepts of creativity, design, making, evaluation, materials and innovation. Knowledge is deliberately sequenced so that children build secure foundations before applying increasingly sophisticated techniques, processes and ideas across a wide range of artistic and technological contexts.

In Art and Design, pupils learn how artists communicate ideas, emotions and culture through different media and artistic traditions. They develop increasing confidence in drawing, painting, sculpture, printmaking, textiles, digital media and mixed media whilst refining observational skills, technical control and creative decision-making.

In Design and Technology, pupils investigate how products are designed, made and improved. They progressively develop technical understanding across structures, mechanisms, textiles, food and nutrition, electrical systems and engineering whilst applying the iterative design process of researching, designing, making, testing, evaluating and refining.

As pupils move through the school, they become increasingly independent, making informed creative decisions, selecting appropriate materials and techniques, evaluating their work critically and applying prior knowledge to solve increasingly complex design challenges.

Progression of Creative Thinking

The curriculum has been designed so pupils increasingly think and work as artists, designers and makers.

EYFS

Children begin by exploring and creating through play. They investigate colour, shape, texture, materials and construction, learning that creativity allows them to express ideas and solve simple problems.

Years 1–2

Pupils develop confidence in using a range of materials, tools and techniques. They observe carefully, investigate artists and products, begin recording ideas and explain the choices they make when creating and designing.

Years 3–4

Pupils increasingly refine techniques, investigate the work of artists, designers and engineers, develop ideas through sketchbooks and design criteria and begin evaluating outcomes using subject-specific vocabulary. They compare creative approaches and justify improvements.

Years 5–6

Pupils become increasingly independent creators. They analyse artistic styles, evaluate design solutions, combine techniques confidently and work through iterative design processes to create purposeful outcomes. They use evidence, research and experimentation to justify creative decisions and communicate ideas effectively.

Longer projects in Upper Key Stage 2 allow pupils to investigate, refine, evaluate and present increasingly sophisticated creative outcomes, preparing them well for the expectations of secondary education.

Greatstone Way Themes

The **Expressive Arts Curriculum** is planned around the six Greatstone Way themes, ensuring every Art and Design and Design & Technology project contributes towards our wider curriculum vision. Creativity provides pupils with opportunities to communicate ideas, solve problems, express themselves and make a positive contribution to their community and the wider world. Each half-term theme encourages pupils to apply their artistic and design knowledge in purposeful and meaningful contexts whilst developing the Greatstone values of **Care, Dream and Dare**.

Term	Theme	Whole-School Big Question	Expressive Arts Focus
Autumn 1	ROOTS	Who are we and where do we belong?	Exploring identity, culture, community and belonging through observation, creativity and design. Pupils investigate how art and design reflect who we are and where we come from.
Autumn 2	SURVIVORS	How do people overcome challenges and adapt?	Developing resilience through creative experimentation, refining ideas, problem-solving and learning from mistakes. Pupils explore how artists, designers and inventors respond to challenge and change.
Spring 1	EXPLORERS	How does curiosity help us discover more?	Investigating artists, materials, places and creative processes through enquiry, observation and experimentation. Pupils broaden their understanding of the world through artistic and technological exploration.
Spring 2	INVENTORS	How do ideas change the world?	Applying creativity and innovation to design purposeful products and artistic outcomes. Pupils explore how design, engineering and artistic ideas improve everyday life and inspire change.
Summer 1	PROTECTORS	How can we care for people, places and our planet?	Creating responsibly by considering sustainability, environmental art, thoughtful design and the role creativity plays in improving communities and protecting the natural world.
Summer 2	LEGACY	What difference will we leave behind?	Reflecting on the lasting impact of artists, designers, architects and inventors. Pupils create high-quality outcomes that celebrate their own creative journey and consider how creativity can influence future generations.

Greatstone Expressive Arts Long-Term Plan

Year Group	Autumn (ROOTS & SURVIVORS)	Spring (EXPLORERS & INVENTORS)	Summer (PROTECTORS & LEGACY)
Year 1	**Art:** Mixing Colours **DT:** Shade and Shelter	**Art:** Rain and Sunrays **DT:** Taxi!	**Art:** Street Views **DT:** Chop, Slice and Mash
Year 2	**Art:** Exploring Colours **DT:** Remarkable Recipes	**Art:** Flower Head **DT:** Beach Hut	**Art:** Portraits and Poses **DT:** Cut, Stitch and Join
Year 3	**Art:** Contrast and Complement **DT:** Cook Well, Eatwell	**Art:** Ammonite **DT:** Making It Move	**Art:** Beautiful Botanicals **DT:** Greenhouse
Year 4	**Art:** Taotie **DT:** Fresh Food, Good Food	**Art:** Vista **DT:** Functional and Fancy Fabrics	**Art:** Nature's Art **DT:** Tomb Builders
Year 5	**Art:** Colour and Style **DT:** Moving Mechanisms	**Art:** Architecture **DT:** Eat the Seasons	**Art:** Mosaic Masters **DT:** Architecture (Engineering & Structures)
Year 6	**Art:** Trailblazers, Barrier Breakers **DT:** Food for Life	**Art:** Environmental Artists **DT:** Engineer	**Art:** Distortion and Abstraction **DT:** Make Do and Mend

EYFS – Expressive Arts (Art & Design) – Nursery

Curriculum Element	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
EYFS Theme	All About Me	Sparkle and Shine	Years Gone By	Growing and Changing	Our Wider World	The Next Chapter
Greatstone Way Theme	ROOTS	SURVIVORS	EXPLORERS	INVENTORS	PROTECTORS	LEGACY
Whole-School Learning Question	Where do I belong and how can we grow together?	How can we survive challenges and keep going?	What will we discover as we explore the world?	How can we use our ideas to invent the future?	How can we protect our planet and each other?	What kind of legacy do we want to leave behind?
EYFS Big Question	How can I express who I am?	How can I use different materials creatively?	What can I discover by exploring colours, textures and patterns?	How can I create and build something new?	How can creativity help us care for our world?	What can I create that shows everything I have learned?
Prior Learning	Home experiences of drawing, mark making, singing, building and imaginative play.	Developing confidence using paint, collage and construction materials indoors and outdoors.	Growing independence in selecting materials and exploring ideas.	Using previous creative experiences to plan and make independently.	Applying creative skills through Beach School and outdoor exploration.	Reflecting on favourite creations and preparing for Reception.
Curriculum Rationale	Develop children's confidence to explore, investigate and communicate ideas through colour, texture, construction and imaginative play. Children begin to recognise that creativity helps them express themselves and connect with others.	Extend children's understanding of different materials and creative processes through open-ended exploration and collaborative learning.	Foster curiosity by encouraging children to investigate artists, natural materials, pattern and texture through first-hand experiences.	Develop children's creativity through designing, making and problem-solving, encouraging them to test ideas and improve their creations.	Deepen children's appreciation of the natural world by using creativity to respond to their local environment and Beach School experiences.	Celebrate children's creative journey by encouraging independent expression, reflection and confidence as they prepare for Reception.
Greatstone Way Links	**CARE • Belonging • Identity • Ready, Respect, Safe**	**CARE • Resilience • Community • Respect**	**DREAM • Curiosity • Exploration • Independence**	**DREAM • Creativity • Innovation • Problem Solving**	**DARE • Stewardship • Sustainability • Responsibility**	**DARE • Reflection • Confidence • Community**
Characteristics of Effective Learning	Playing and Exploring through open-ended creative experiences.	Active Learning by revisiting and refining creative ideas.	Creating and Thinking Critically by investigating materials and making choices.	Planning, testing and adapting ideas through construction and artwork.	Applying knowledge independently through creative exploration.	Reflecting on learning, evaluating favourite work and sharing ideas confidently.
Sticky Knowledge	Colours, marks and materials can be used to communicate ideas. Everyone can create.	Different materials have different properties and purposes.	Artists observe carefully before creating. Nature provides inspiration.	Designs can be changed and improved. We can solve problems creatively.	Natural materials can be used to create art. We can care for our environment through creativity.	Creative work tells a story about our learning and experiences.
Substantive Concepts	Colour • Line • Shape • Identity	Texture • Pattern • Materials	Observation • Nature • Pattern	Design • Construction • Creativity	Environment • Sustainability • Expression	Reflection • Communication • Achievement
Disciplinary Concepts	Explore • Observe • Create • Talk About Artwork	Experiment • Select • Combine • Improve	Investigate • Compare • Represent	Design • Build • Test • Adapt	Respond • Create • Evaluate	Reflect • Explain • Celebrate
Expressive Arts Skills	Explore paint, drawing, collage, printing, malleable materials and construction.	Mix, join, tear, fold, cut and assemble materials safely.	Observe natural objects and represent them creatively.	Plan simple models, build and adapt designs, explain creative choices.	Create transient art outdoors using natural materials and found objects.	Select favourite media independently to create and present artwork.
Continuous Provision & Adult-Led Learning	Creative workshop, mark-making area, junk modelling, painting easels, loose parts, Beach School.	Open-ended collage, clay, construction, transient art, music and movement.	Artist-inspired provocations, observational drawing, printing and pattern making.	Design challenges, model making, construction and collaborative projects.	Environmental art, sculpture, weaving and outdoor creative exploration.	Independent creative studio celebrating children's interests and achievements.
Beach School & Outdoor Learning	Natural mark making, mud painting, stick drawing, transient art.	Create shelters, sculptures and collages using natural materials.	Explore colour, texture and pattern in the woodland and beach.	Design and build simple structures outdoors.	Environmental art, weaving, nature sculpture and habitat-inspired creations.	Outdoor gallery celebrating the year's creative journey.
Whole-School Hook	Greatstone Time Capsule Launch	Festival of Light Launch	Time Traveller Experience	Greatstone Growing Challenge	Beach Guardians Campaign	Passport Around the World
Nursery Hook	Mystery artist's sketchbook and creative studio appears in Nursery.	Creative workshop challenge using unusual materials.	Nature explorer's art bag.	Inventor's toolbox arrives.	Beach artist challenge.	Nursery Art Gallery opening.
Shared Showcase	Family Self-Portraits Gallery	Creative Materials Exhibition	Little Explorers Art Museum	Young Inventors Showcase	Beach Art Festival	Nursery Creative Celebration
Assessment Opportunities	Observation of exploration, vocabulary and creative confidence.	Evidence of experimenting with materials and developing techniques.	Observation, discussion and artistic choices.	Planning, creating and adapting independently.	Applying creative knowledge outdoors.	Independent creative outcomes and pupil voice.
Preparing for Reception	Children confidently explore a range of materials, communicate ideas creatively, solve simple design problems and begin Reception ready to develop increasingly independent artistic and design thinking.					

EYFS – Expressive Arts (Art & Design & Design Technology) – Reception

Curriculum Element	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
EYFS Theme	All About Me	Sparkle and Shine	Long Ago	Ready, Steady, Grow	On the Beach	Around the World
Greatstone Way Theme	**ROOTS**	**SURVIVORS**	**EXPLORERS**	**INVENTORS**	**PROTECTORS**	**LEGACY**
Whole-School Learning Question	Where do I belong and how can we grow together?	How can we survive challenges and keep going?	What will we discover as we explore the world?	How can we use our ideas to invent the future?	How can we protect our planet and each other?	What kind of legacy do we want to leave behind?
EYFS Big Question	How can I express my ideas, experiences and feelings creatively?	How can I use different materials, tools and techniques to create?	How do artists, designers and makers help us see the world differently?	How can I design, build and improve my own creations?	How can creativity help us care for our beach and environment?	How can I use everything I have learned to create something I am proud of?
Prior Learning	Nursery experiences of drawing, painting, collage, construction, modelling and imaginative play.	Growing confidence selecting media, joining materials and creating independently.	Increasing independence using different materials and discussing artwork.	Applying previous creative experiences to solve simple design challenges.	Using creativity confidently indoors, outdoors and through Beach School.	Reflecting on creative achievements before moving into Key Stage One.
Curriculum Rationale	Develop children's confidence to communicate ideas through drawing, painting, sculpture, collage, construction and imaginative design. Encourage children to represent themselves, their families and their community creatively whilst establishing secure artistic foundations.	Extend children's understanding of artistic processes by exploring colour, texture, pattern and form using an increasingly wide range of materials, tools and techniques. Encourage resilience through experimentation and improvement.	Foster curiosity through the exploration of artists, crafts, architecture and design from the past and present. Encourage children to observe closely, ask questions and develop ideas through sketching, modelling and creative investigation.	Develop children's confidence as designers and makers by encouraging them to plan, create, evaluate and improve their work. Introduce simple design challenges that promote creativity, problem-solving and innovation.	Deepen children's understanding of how creativity can celebrate and protect the natural world. Beach School and outdoor learning inspire environmental art, transient sculpture and sustainable design using natural and recycled materials.	Celebrate children's creative journey by encouraging increasingly independent artistic expression and design thinking. Children apply their skills confidently across a range of media, preparing them for the Key Stage One Art and Design and Design Technology curriculum.
Greatstone Way Links	**CARE • Belonging • Identity • Respect • Ready, Respect, Safe**	**CARE • Resilience • Community • Perseverance**	**DREAM • Curiosity • Exploration • Observation**	**DREAM • Creativity • Innovation • Problem Solving**	**DARE • Stewardship • Sustainability • Responsibility**	**DARE • Reflection • Confidence • Legacy**
Characteristics of Effective Learning	Playing and Exploring through open-ended creative experiences, selecting resources independently and expressing ideas.	Active Learning by revisiting techniques, refining ideas and persevering when challenges arise.	Creating and Thinking Critically through observing, questioning, comparing and developing original ideas.	Planning, testing, adapting and evaluating creative solutions independently.	Applying knowledge confidently through collaborative outdoor creativity and purposeful design.	Reflecting on learning, evaluating creative outcomes and explaining artistic and design decisions confidently.
Sticky Knowledge	Artists and designers communicate ideas in many different ways. Colours, lines, shapes and textures can express meaning.	Different materials have different properties and can be combined for different purposes. Practice improves creative work.	Artists and designers observe carefully before creating. Inspiration comes from nature, people, stories and the environment.	Designs can be planned, tested, adapted and improved. Creative thinking helps solve problems.	Creativity can help us care for people, places and the environment. Natural and recycled materials can be used responsibly.	Everyone develops as an artist and designer through practice, reflection and perseverance. Creative work communicates ideas and celebrates achievement.
Substantive Concepts	Colour • Line • Shape • Identity • Expression	Texture • Pattern • Form • Materials	Observation • Nature • Inspiration • Culture	Design • Function • Construction • Creativity	Environment • Sustainability • Stewardship • Community	Reflection • Communication • Achievement • Legacy
Disciplinary Concepts	Explore • Observe • Represent • Create • Explain	Experiment • Select • Combine • Refine	Investigate • Compare • Develop Ideas • Record	Design • Build • Test • Evaluate • Improve	Respond • Collaborate • Create • Reflect	Present • Evaluate • Celebrate • Explain
Expressive Arts Skills	Draw, paint, print, sculpt, collage, model and construct with increasing control. Explore colour mixing, mark making and joining techniques.	Select appropriate materials and tools independently. Develop cutting, joining, folding, shaping and modelling techniques.	Observe carefully and represent people, objects and environments using a range of artistic media. Explore pattern and texture.	Design, build, adapt and evaluate simple models and products. Communicate ideas through drawings and models.	Create environmental art, transient sculpture and collaborative installations using natural and recycled materials.	Combine artistic techniques confidently, explain creative choices and complete independent creative outcomes across a range of media.
Continuous Provision & Adult-Led Learning	Open-ended creative studio, painting easels, junk modelling, collage, mark making, loose parts and construction challenges.	Clay, weaving, textiles, printing, transient art and collaborative model making.	Artist provocations, observational drawing, architecture exploration, pattern making and sketchbooks.	Design challenges, engineering stations, construction projects and collaborative invention tasks.	Beach School art studio, environmental sculpture, natural weaving, recycled art and outdoor design challenges.	Independent creative workshop with access to a full range of artistic media and construction resources, celebrating children's interests.
Beach School & Outdoor Learning	Observational drawing, natural mark making, transient art and sculpture using found materials.	Build shelters, create collaborative sculptures and investigate textures in the natural environment.	Explore colour, pattern and form through seasonal change and the local landscape.	Design and build structures using natural materials, testing and improving designs.	Environmental art, weaving, natural sculpture, beach installations and sustainable design challenges.	Outdoor gallery celebrating children's creative journey and preparing portfolios for transition into Year One.

Whole-School Hook	Greatstone Time Capsule Launch	Festival of Light Launch	Time Traveller Experience	Greatstone Growing Challenge	Beach Guardians Campaign	Passport Around the World
Reception Hook	An artist's travelling studio arrives with sketchbooks, unusual tools and mystery materials to inspire creative exploration.	A festive makers' workshop challenges children to create using light, colour and texture.	Children discover famous artworks, buildings and designs through an Explorer's Gallery.	An inventor's workshop appears with loose parts, construction kits and design challenges.	A message from the Beach Guardians asks children to create artwork and designs to help protect Greatstone's coastline.	Reception Creative Exhibition where children curate and present their favourite artistic and design achievements before moving into Year One.
Shared Showcase	Family Portrait Gallery	Creative Winter Exhibition	Young Explorers Art Museum	Reception Inventors Showcase	Beach Art & Design Festival	Reception Creative Celebration & Transition Exhibition
Assessment Opportunities	Observation of artistic exploration, vocabulary, independence and creative confidence.	Evidence of experimentation, resilience, fine motor development and creative decision making.	Assessment of observational skills, artistic vocabulary, discussion and representation.	Evidence of planning, designing, making, evaluating and improving creative outcomes.	Independent application of artistic and design knowledge through Beach School and collaborative projects.	Final independent creative outcomes, pupil voice, portfolios and transition assessment against the Expressive Arts ELG.
Preparing for Year 1	Children leave Reception as confident, independent artists and designers who can communicate ideas creatively, use a wide range of materials and tools appropriately, design and make purposeful creations, evaluate their work and explain their thinking. They are fully prepared for the Key Stage One Art and Design and Design Technology curriculum, building upon secure foundations in creativity, observation, making and problem-solving.					

YEAR 1 DESIGN & TECHNOLOGY – SHADE AND SHELTER - Autumn Term

How can we design and make a shelter that keeps someone safe and comfortable?

Section	Curriculum Overview
Curriculum Rationale	This project introduces pupils to Design and Technology through the familiar need for shade, shelter and protection. Building on construction, joining and imaginative making experienced in EYFS, pupils investigate shelters used by people and animals in different settings. They learn that designers begin with a user and purpose, explore existing products, generate ideas, practise technical skills and evaluate whether a finished structure works. Through practical investigation, pupils develop foundational knowledge of freestanding structures, materials, joining and stability before designing and making a small shelter for a chosen user.
The Greatstone Way	**ROOTS → SURVIVORS – Who are we and where do we belong? How do people overcome challenges and adapt?** Pupils consider how homes and shelters provide belonging, safety and protection before investigating how people and animals adapt to weather and environmental challenges. They develop the autumn value of **Care** by designing thoughtfully for another user, working safely and recognising that successful products respond to people's needs.
National Curriculum Coverage	Pupils design purposeful, functional and appealing products for themselves and others using simple design criteria. They generate and communicate ideas through discussion, drawing, templates and mock-ups; select and use tools for cutting, shaping, joining and finishing; choose materials according to their characteristics; explore existing products; evaluate their ideas and products against design criteria; and explore how structures can be made stronger, stiffer and more stable.
Curriculum Journey	**Previous learning:** In EYFS, children selected materials, joined components and constructed models through continuous provision and outdoor challenges. **Current learning:** Pupils follow a simple design process to investigate, design, make, test and improve a freestanding shelter. **Future learning:** In **Taxi!**, pupils apply material selection and joining skills to a product incorporating wheels and axles. In Year 2 **Beach Hut**, they revisit freestanding structures with more demanding requirements for strength, stability and finish.
Design Brief	Design and make a small freestanding shelter for a chosen user. It must provide protection from an agreed weather condition, remain standing independently and include an entrance. Possible users include a toy person, an animal figure, a Beach School explorer or a story character.
Design Criteria	The shelter must be freestanding; suit its intended user; provide shade or protection; have a stable base; use appropriate materials; include secure joins; and be finished so that its purpose is clear.
Sticky Knowledge	A shelter provides protection from weather or danger. A structure is something that has been made from different parts. Freestanding structures stand without being held. A wide base and secure joins can improve stability. Folding, rolling or layering materials can make them stiffer or stronger. Materials have different characteristics and should be selected according to purpose. Designers test and improve products rather than expecting the first version to be perfect.
Technical Knowledge and Skills	Identify the user and purpose of a product. Explore and compare existing shelters. Recognise freestanding structures. Test the suitability of materials. Fold, roll, layer and shape paper and card. Cut safely with increasing accuracy. Join materials using tabs, slots, tape, glue and simple fastenings. Build a stable base and simple framework. Test a structure against agreed criteria. Explain and make improvements.
Substantive Concepts	User • Purpose • Structure • Shelter • Material • Stability • Protection • Function
Disciplinary Concepts	Investigate • Design • Make • Test • Evaluate • Improve
Core Vocabulary	designer, user, purpose, shelter, shade, structure, freestanding, stable, stability, strong, stiff, base, frame, wall, roof, material, property, waterproof, join, tab, slot, fold, roll, test, evaluate, improve
Designers, Engineers and Product Examples	Pupils investigate tents, parasols, canopies, bus shelters, animal shelters, beach shelters, emergency shelters and simple pavilions. The emphasis is on recognising how designers respond to the intended user, location, weather and available materials rather than completing an extensive named-designer study.
Cross-Curricular Links	**History – Childhood:** how homes and shelters support children and families; similarities and differences in homes. **Science:** seasonal weather; identifying and comparing everyday materials; recognising that materials have different properties. **English:** oral explanations, labelled designs, instructions and evaluations. **Mathematics:** 2-D and 3-D shapes, positional language, comparison and simple measurement. **PSHE:** care, safety, belonging and responding to another person's needs.
Beach School & Outdoor Learning	Investigate wind, shade and shelter around Greatstone. Identify natural and human-made sheltered spaces. Build temporary shelters using sticks, fabric and natural materials. Test how the direction of wind and position of the sun affect where a shelter should be placed. Outdoor challenges should support the classroom design process rather than replace the final designed product.

Greatstone & Kent Links	Examine beach shelters, windbreaks, parasols, beach huts and structures used along the Kent coast. Consider why Greatstone's exposed coastal setting requires protection from sun, wind and rain. Compare structures used by visitors with natural shelters used by coastal wildlife.
Memorable Hook	**The Greatstone Shelter Emergency** – A small toy Beach School explorer arrives with a weather warning and a suitcase of unsuitable materials. Pupils are commissioned as junior designers to investigate how to provide a safe, stable shelter before the weather changes.
Authentic Outcome / Showcase	**Greatstone Shelter Testing Station** – Pupils present their shelters to families or another class. Visitors inspect the designs, ask about the intended user and watch controlled tests for stability, shade and light rain. Pupils explain the choices they made and one improvement they would make to a future version.
Assessment End Point	Pupils design and make a purposeful freestanding shelter for an identified user. They select materials based on simple characteristics, use age-appropriate cutting and joining techniques, explain how they made the structure stable and evaluate the finished product against agreed design criteria.
The statutory KS1 programme expects pupils to work through an iterative process in relevant contexts and to build structures while exploring how they can be made stronger, stiffer and more stable.	

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to Be Secured	Design Enquiry Question	Example Learning Activities	Weekly Resources	Beach School / Outdoor Learning	Assessment Opportunity	Online Example / Teacher Support
1	Launching the design challenge	Products are designed for a user and purpose. Shelters protect people or animals.	**Who needs shelter and why?**	Open the Shelter Emergency suitcase. Sort images into shelters and non-shelters. Identify the user, location and purpose of examples. Generate questions about what a successful shelter needs to do.	Toy explorer or animal; weather-warning letter; photographs of shelters; large sorting hoops; sticky notes; vocabulary cards	Walk around the school or Beach School area to identify places that provide shade or protection.	Can pupils name the user and purpose of different shelters?	Oak: What is a structure?
2	Investigating existing products	Shelters have common features, but their forms and materials change according to need and location.	**What makes a shelter successful?**	Investigate tents, umbrellas, canopies, animal shelters, bus shelters and beach shelters using photographs or real examples. Complete a simple product-analysis grid: user, purpose, material, entrance, roof and stable base.	Product photographs; small tent or umbrella where available; toy shelters; magnifiers; simple analysis sheets; clipboards	Examine windbreaks, shelters, beach huts or covered areas. Photograph useful features.	Can pupils describe how a shelter's features support its purpose?	Oak: Understanding functions of freestanding structures
3	Exploring materials	Materials have different characteristics. A good choice depends on what the shelter needs to do.	**Which materials are suitable for a shelter?**	Compare paper, card, fabric, foil, plastic sheet and natural materials. Test flexibility, stiffness, strength, transparency and water resistance. Record findings with symbols or simple sentences.	Paper; card; corrugated card; fabric; foil; clean plastic sheet; felt; sponges; pipettes; water trays; test-recording sheets	Test how small samples respond to wind, sunlight and light rain outdoors.	Can pupils select a material and explain why it suits a particular part?	Department for Education: KS1 D&T programme
4	Understanding stability	A freestanding structure needs a secure base and balanced arrangement of parts.	**What helps a structure stand up?**	Build quick towers and shelters using construction kits, paper and card. Compare narrow and wide bases. Add toy users and test gentle pushes. Photograph stable and unstable examples.	Construction kits; paper cups; card strips; building blocks; toy figures; fans; cameras or tablets	Build small structures with sticks, stones and sand. Compare different bases on uneven ground.	Can pupils explain why one structure is more stable than another?	Oak: Exploring bridge structures
5	Making materials stronger and stiffer	Folding, rolling, layering and shaping can change the performance of paper and card.	**How can we strengthen a weak material?**	Compare a flat sheet with folded, rolled and layered versions. Make columns, triangular folds and corrugated samples. Test them using small weights. Create a class technique board.	Paper; thin and thick card; masking tape; glue; rulers; small weights or cubes; test charts	Make strong forms from rolled leaves, grass bundles or carefully selected sticks.	Can pupils demonstrate at least two ways of strengthening paper or card?	Oak: Reinforcing bridge structures
6	Cutting and joining	Different joining methods suit different materials and purposes.	**Which join will hold our structure securely?**	Practise glue joins, tape joins, tabs, flanges and slots. Test each join by gently pulling or adding weight. Create labelled samples for a class joining library.	Child-safe scissors; glue sticks; PVA; masking tape; card; paper; split pins where appropriate; pre-cut slot cards; joining cards	Join sticks with string, elastic bands or fabric strips during a supervised outdoor structure challenge.	Can pupils cut safely and choose an appropriate joining method?	Oak: Cutting and joining
7	Developing design criteria	Design criteria describe what a product must do for its user.	**What must our shelter do?**	Choose the intended user and weather challenge. Agree class criteria, then personalise them. Use sentence stems: "My shelter is for…", "It must…", "I will know it works when…".	User cards; weather cards; design-criteria templates; toy figures; vocabulary mats; example criteria	Observe where the intended user would place or use the shelter.	Can pupils state at least three clear criteria linked to user and purpose?	Oak: Generate ideas through talking and drawing
8	Generating and communicating ideas	Designers communicate ideas through talking, drawing, labels and simple mock-ups. Designs can change as thinking develops.	**How can we show someone what we plan to make?**	Produce two quick ideas, discuss them with a partner and select one using the criteria. Draw a labelled final design showing user, materials, roof, entrance, base and joins. Make a small paper mock-up if useful.	Design sheets; pencils; coloured pencils; rulers; material samples; labels; modelling paper; scissors; tape	Sketch a possible shelter location and consider its orientation to sun or wind.	Does the design communicate what will be made and how it will work?	Oak: Designing a structure

9	Making the shelter: structure	Makers follow a plan, work safely and adapt when a problem occurs.	**How can we build a stable base and frame?**	Construct the base and supporting structure. Pause for stability checks before adding walls or roof. Photograph and discuss any changes made to the original design.	Pre-cut corrugated-card bases; card tubes; card strips; paper straws; wooden craft sticks; tape; PVA; scissors; toy users; aprons	Test unfinished frames in a sheltered outdoor space using a gentle breeze.	Can pupils construct a freestanding framework and explain adaptations?	Oak: Making a bridge structure
10	Making the shelter: enclosure and finish	Walls and roofs should suit the intended protection. Finishing should enhance rather than weaken function.	**How can we complete the shelter so that it protects its user?**	Add roof, walls, canopy or covering. Incorporate a suitable entrance. Finish with purposeful colour or signage. Continually check against design criteria.	Fabric; card; paper; foil; clean plastic sheet; tissue; tape; glue; colouring materials; labels; scissors; hole punches	Place completed shelters in the intended location and observe shade, wind exposure and fit.	Are material choices, joins and finishes appropriate to the intended function?	Oak: Develop and finish a structure
11	Testing, evaluating and improving	Testing provides evidence. Evaluation compares a product with its design criteria and identifies improvements.	**Does our shelter work?**	Test fit, stability, shade and controlled light rain. Use a fan, lamp and fine water spray where safe. Record outcomes with ticks, photographs and comments. Make one feasible improvement.	Testing checklist; toy users; desk fan; lamp; pipette or fine spray; trays; towels; cameras; repair materials	Conduct controlled outdoor wind or shade tests, avoiding unsuitable weather.	Can pupils use test evidence to identify a strength and improvement?	Oak: Testing bridge structures
12	Shelter Testing Station and reflection	Designers explain how their products meet needs and use feedback to improve future designs.	**How successfully did we care for our user?**	Display designs, prototypes and finished shelters. Pupils demonstrate tests and explain their user, material choices, stable features and improvement. Complete an independent final evaluation.	Finished shelters; design sheets; display cards; visitor feedback slips; certificates; photographs; evaluation sheets	Create an outdoor shelter trail or testing area for visitors where conditions allow.	Final assessment of investigation, designing, making, technical knowledge, evaluation and vocabulary.	Oak: Year 1 D&T resources
Oak's current Year 1 structures materials provide useful classroom examples of investigating structures, reinforcing materials, generating ideas, making and testing. They can support teacher modelling without replacing the agreed Greatstone design brief.								

Whole-Project Resource List

Products and visual references

- Photographs of tents, gazebos, umbrellas, parasols, canopies, bus shelters, animal shelters, emergency shelters, beach shelters and windbreaks
- A small pop-up tent, umbrella or model shelter where available
- Photographs of Greatstone beach huts, shelters and coastal structures
- Toy people or animal figures representing possible users
- Weather, user and purpose cards

Construction materials

- Cartridge paper and sugar paper
- Thin and corrugated card
- Card tubes
- Paper straws
- Wooden craft sticks
- Fabric scraps and felt
- Foil and tissue paper
- Clean reused plastic sheet or packaging
- String, wool and elastic bands
- Construction kits
- Responsibly collected natural materials
- Tools and joining equipment
- Child-safe scissors
- Rulers
- Pencils and coloured pencils
- Glue sticks and PVA
- Masking and clear tape
- Hole punches
- Split pins where appropriate
- Clips and pegs
- Low-temperature glue gun for adult use only, should a demonstration or teacher-secured join require one
- Testing equipment
- Toy users
- Desk fan on a low setting
- Lamp to test shade
- Pipettes or fine water spray
- Water trays and towels
- Small weights or multilink cubes
- Cameras or tablets
- Design-criteria and testing sheets
- Display and assessment
- Design folders or booklets
- Vocabulary cards
- Photographs of the iterative process
- Product-analysis grids
- Design sheets
- Evaluation prompts
- Visitor feedback cards
- Display boards

Safety and Preparation Notes

- Complete the school's normal risk assessment for tool use, outdoor construction and material testing.
- Model safe passing and use of scissors before independent work.
- Check all recycled and natural materials for sharp edges, dirt, allergens or contamination.
- Use only a light spray for water-resistance testing and protect work surfaces.
- Adults should control electrical testing equipment such as lamps and fans.
- Avoid collecting living plants or removing habitat materials during Beach School.
- Pre-cut very thick card where independent cutting would be unsafe or inaccessible.
- Teach pupils that strength and stability are tested gently; structures should not be deliberately destroyed

Adaptive Teaching

Area	Support and Adaptation
Understanding purpose	Use real products, toy users and picture-supported user–purpose cards. Rehearse ideas orally before recording.
Designing	Offer partially structured drawing frames, removable material samples and vocabulary labels. Allow pupils to communicate through speech, photographs or a supported mock-up.
Fine-motor access	Provide spring scissors, larger components, pre-cut bases, glue spreaders, tabs prepared for folding and construction kits before moving to card.
Making	Use staged visual instructions and a limited, carefully organised material selection. Provide adult support for holding parts while the pupil completes the join.
Greater depth	Ask pupils to compare alternative structures, justify material choices, incorporate more than one strengthening method and develop a repeatable fair test.
Evaluation	Use photographs taken during testing and sentence stems: "It worked because…", "The test showed…", "Next time I would…".

Common Misconception	Teaching Response
Any building is automatically a shelter.	Return to user and purpose: a shelter must provide some form of protection.
Heavier always means stronger or more stable.	Compare heavy narrow structures with lighter structures that have wide, balanced bases.
Waterproof and strong mean the same thing.	Test material characteristics separately and discuss how different parts require different properties.
More glue or tape always creates a better join.	Compare neat, well-positioned joins with overloaded joins that remain weak or untidy.
A drawing cannot change once making begins.	Model adapting a design when testing reveals a problem. Oak's Year 1 guidance also highlights that designs can be changed during making.
Decoration is the most important part.	Revisit the order: function and stability first; purposeful finish afterwards.

Key Online References

- Department for Education: National Curriculum for Design and Technology
- Oak National Academy: Year 1 Design and Technology
- Oak National Academy: Frame Structures
- Oak National Academy: What Is a Structure?
- Oak National Academy: Designing a Structure
- Oak National Academy: Cutting and Joining

YEAR 1 DESIGN & TECHNOLOGY – TAXI! - Spring Term

How can we design and make a vehicle that moves safely and carries a passenger?

Section	Curriculum Overview
Curriculum Rationale	This project introduces pupils to wheels, axles and simple vehicle construction through the purposeful challenge of designing and making a taxi. Building on the structural and joining knowledge developed in **Shade and Shelter**, pupils investigate how vehicles are designed for particular users and journeys. They explore existing vehicles, identify their main components and discover how wheels and axles work together to create rotary movement. Pupils practise constructing a chassis, positioning parallel axles and selecting suitable materials before designing, making, testing and improving a moving taxi for a chosen passenger.
The Greatstone Way	**EXPLORERS → INVENTORS – How does curiosity help us discover more? How do ideas change the world?** Pupils explore how vehicles work before applying their discoveries to an original design. They develop the spring value of **Dream** by imagining journeys, generating creative ideas and recognising how designers and engineers improve transport to meet the needs of different people and communities.
National Curriculum Coverage	Pupils design purposeful, functional and appealing products for themselves and other users based on design criteria. They generate, develop, model and communicate ideas through talking, drawing, templates and mock-ups; select and use tools for cutting, shaping, joining and finishing; select materials and components according to their characteristics; explore and evaluate existing products; evaluate their own ideas and products against design criteria; build structures that are stronger, stiffer and more stable; and explore and use mechanisms, including wheels and axles.
Curriculum Journey	**Previous learning:** In **Shade and Shelter**, pupils identified users and purposes, selected materials, made simple structures and used joining techniques. **Current learning:** Pupils apply these foundations to a moving product, learning how a chassis, wheels, axles and axle holders work together. **Future learning:** In Year 2, pupils encounter more complex structures and mechanisms, while later projects develop mechanical systems with greater precision and independence.
Design Brief	Design and make a moving taxi that can carry a chosen passenger on a journey around Greatstone. The taxi must have a stable body, freely rotating wheels, secure axles and features suited to its passenger and purpose.
Design Criteria	The taxi must have at least four wheels; roll forwards successfully; have parallel axles; include a stable chassis and body; carry its chosen passenger; use secure joins; include features suitable for the intended journey; and have an appealing, purposeful finish.
Sticky Knowledge	A vehicle transports people or goods. A wheel is a circular component that rotates. An axle is a rod on which wheels rotate. An axle holder keeps the axle in position while allowing it to turn. A chassis is the supporting framework of a vehicle. Axles must be parallel so that the vehicle travels effectively. Wheels must not rub against the body. Designers select materials and components according to their properties and purpose. Testing helps designers identify and solve problems.
Technical Knowledge and Skills	Identify the user and purpose of a vehicle. Investigate and compare toy vehicles. Identify the body, chassis, wheels, axles and axle holders. Explore fixed and moving axle arrangements at an introductory level. Measure, mark and cut card with increasing control. Reinforce card to create a stronger chassis. Position axle holders and axles parallel to one another. Select suitable wheels and materials. Join and finish vehicle components. Test movement, stability and passenger capacity. Evaluate and improve the finished taxi.
Substantive Concepts	User • Purpose • Vehicle • Mechanism • Wheel • Axle • Chassis • Movement • Transport
Disciplinary Concepts	Investigate • Design • Model • Make • Test • Evaluate • Improve
Core Vocabulary	designer, user, purpose, taxi, vehicle, transport, wheel, axle, axle holder, chassis, body, rotate, rotary movement, parallel, stable, structure, component, material, measure, mark, cut, join, reinforce, test, evaluate, improve
Designers, Engineers and Product Examples	Pupils investigate taxis, cars, buses, bicycles, delivery vehicles, mobility vehicles and toy cars. They compare how transport designers respond to passenger needs, journey type, safety, comfort and location. The focus remains on accessible product analysis and technical understanding rather than an extensive named-designer study.
Cross-Curricular Links	**Geography – Bright Lights, Big City:** transport in London and Greatstone; routes, journeys and communities. **Science:** Everyday Materials; pushes and pulls through practical exploration; selecting materials according to characteristics. **Mathematics:** circles, position and direction, measurement, equal spacing and parallel lines. **English:** labelled designs, instructions, oral explanations and evaluations. **Computing:** photographing designs and recording vehicle tests. **PSHE:** accessibility, caring for passengers and designing for different needs.
Beach School & Outdoor Learning	Investigate routes, surfaces and transport around Greatstone. Test construction-kit vehicles on sand, grass, paving and slopes to explore how surface and wheel choice affect movement. Map a simple taxi route and identify where passengers might need collecting or dropping off. Final products should be tested on a controlled, smooth surface before optional outdoor trials.

Greatstone & Kent Links	Compare local transport around Greatstone and Romney Marsh with taxis, buses and underground transport in London. Discuss why vehicles differ according to population, distance, road conditions and passenger needs. Design taxis for a Greatstone journey, such as travelling between the school, beach, shops and community facilities.
Memorable Hook	**The Greatstone Taxi Commission** – A passenger arrives with a journey request but no suitable transport. Pupils receive maps, passenger profiles, toy vehicles and a designer's toolbox. As junior transport designers, they must investigate wheels and axles before creating a taxi that can complete the journey safely.
Authentic Outcome / Showcase	**The Greatstone Taxi Rank** – Pupils present their completed vehicles, passenger profiles and labelled designs. Visitors inspect the taxis and watch controlled tests for straight-line movement, passenger capacity and stability. Pupils explain how their wheels and axles operate and identify an improvement for a future model.
Assessment End Point	Pupils design and make a purposeful moving taxi for an identified passenger. They accurately identify wheels, axles, axle holders, chassis and body; position components so the wheels rotate; select and join materials appropriately; test the product against clear design criteria; and explain how the mechanism could be improved.
The statutory KS1 curriculum specifically includes the exploration and use of mechanisms such as wheels and axles, alongside purposeful designing, making, product evaluation and iterative improvement.	

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to Be Secured	Design Enquiry Question	Example Learning Activities	Weekly Resources	Beach School / Outdoor Learning	Assessment Opportunity	Online Example / Teacher Support
1	Launching the Greatstone Taxi Commission	Vehicles are designed to transport particular users or goods.	**Who needs our taxi and where must it travel?**	Open the commission pack. Explore passenger profiles and journey maps. Sort examples of transport by user, purpose and location. Generate questions about what the taxi must do.	Toy passenger; commission letter; Greatstone and London maps; transport photographs; sorting cards; sticky notes; vocabulary cards	Walk or map a short local journey and identify possible collection points, destinations and obstacles.	Can pupils identify a vehicle's user and purpose?	Oak: Wheels and axles in vehicles
2	Investigating existing vehicles	Vehicles contain different components that work together.	**What parts does a vehicle need?**	Examine toy vehicles. Identify wheels, axles, axle holders, chassis and body. Draw and label a dismantled or transparent vehicle example. Compare taxis with other vehicles.	Range of toy vehicles; construction-kit vehicles; magnifiers; trays; labelled component cards; recording sheets	Observe parked vehicles or transport photographs safely, focusing on wheels, body shape and passenger space.	Can pupils correctly identify the main vehicle components?	Oak: Wheels and axles vehicle unit
3	Exploring wheels and axles	Wheels rotate around or with an axle to create movement.	**How do wheels and axles help a vehicle move?**	Test toy cars and simple wheel-and-axle models. Compare a fixed axle with independently rotating wheels at an introductory level. Make a simple demonstration mechanism using dowel, wheels and straw axle holders.	Toy vehicles; wooden dowel; paper straws; pre-made wheels; cotton reels; card; modelling dough; construction kits	Test rolling objects on smooth and rough outdoor surfaces.	Can pupils explain that an axle supports wheels and allows rotary movement?	Oak: Adding wheels to a vehicle
4	Investigating movement and surfaces	Surface, wheel size, alignment and friction affect how a vehicle moves.	**Why do some vehicles roll more successfully than others?**	Conduct simple comparative tests using construction vehicles with different wheels or surfaces. Observe rather than formally quantify friction. Record which arrangements roll smoothly and straight.	Construction vehicles; ramps; smooth board; fabric; corrugated card; sand tray; measuring tape; test sheets	Compare movement on paving, grass and compact sand under controlled conditions.	Can pupils identify a reason why one model moves better than another?	Oak: Testing a vehicle
5	Constructing a strong chassis	The chassis supports the vehicle body and mechanism. Card can be reinforced to make it stronger and stiffer.	**How can we make a strong base for our taxi?**	Compare single-layer, folded and laminated card. Make sample chassis pieces and test them with toy passengers or small weights. Practise measuring and marking a rectangular base.	Thin and corrugated card; rulers; pencils; scissors; glue; masking tape; cubes or small weights; chassis examples	Identify strong flat forms and supporting shapes in outdoor structures.	Can pupils explain and demonstrate one way to reinforce card?	Oak: Card properties and uses
6	Positioning axle holders and axles	Axles must be straight and parallel. Axle holders must allow the axles to rotate freely.	**How can we stop our taxi from wobbling or turning sideways?**	Practise attaching two straw axle holders beneath card chassis samples. Use a ruler or card guide to keep them parallel. Insert dowels and test rotation before adding wheels. Compare successful and unsuccessful examples.	Prepared card bases; paper straws; wooden dowel; masking tape; PVA; rulers; set squares or alignment guides; wheels	Mark parallel lines outdoors using chalk, rope or sticks before relating them to axle placement.	Can pupils position two axle holders so the axles remain parallel?	Oak: Adding wheels to a vehicle
7	Establishing design criteria	A design specification or criteria state what the product must do.	**What must our taxi do for its passenger?**	Review the commission and passenger profiles. Agree core criteria, then add one personalised requirement, such as luggage space, accessibility, weather protection or visibility.	Passenger cards; journey maps; design-criteria templates; toy passengers; vocabulary mats; example specification	Visit or study the intended route and identify features the vehicle design should address.	Can pupils write or explain criteria connected to the user and journey?	Oak: Design specification for wheeled vehicles
8	Designing the taxi	Designers communicate construction and appearance through labelled drawings and simple models.	**How can we show exactly what we plan to make?**	Generate two ideas and select one against the criteria. Draw the taxi from the side and top where appropriate. Label the body, chassis, wheels, axles,	Design sheets; pencils; coloured pencils; rulers; vehicle templates; card	Sketch shapes or colour ideas inspired by local transport, beach huts or London taxis.	Does the design clearly communicate the intended vehicle and mechanism?	Oak: Designing a vehicle

				axle holders, passenger space and chosen materials. Create a quick card body mock-up.	scraps; scissors; tape; component samples			
9	Making the chassis and mechanism	Accurate construction and alignment allow the wheels to rotate successfully.	**How can we build a taxi that rolls?**	Measure and construct the reinforced chassis. Attach axle holders, insert axles and add wheels. Test movement before constructing the body. Photograph problems and adjustments.	Corrugated card bases; paper straws; dowels; wooden or plastic wheels; cotton reels; tape; PVA; rulers; scissors; cameras	Test unfinished chassis models on a smooth outdoor track if conditions allow.	Does the chassis roll freely and travel approximately straight?	
10	Constructing and finishing the body	The body must fit securely without blocking the wheel mechanism. Features and finish should suit the user and purpose.	**How can we complete the taxi without stopping it from moving?**	Construct the body using card nets, boxes or folded card. Add passenger seating, roof, doors, luggage space, signs and purposeful decoration. Recheck wheel clearance frequently.	Recycled boxes; card; paper; acetate scraps; fabric; glue; tape; scissors; colouring materials; passenger figures	Photograph local colours, signs and shapes for purposeful finishing inspiration.	Is the body securely joined, suitable for the user and clear of the wheels?	Oak: Finishing a vehicle
11	Testing, evaluating and improving	Testing shows whether a product meets its design criteria. Problems may be caused by alignment, rubbing wheels, weak joins or unsuitable materials.	**Does our taxi complete its journey successfully?**	Conduct passenger, stability and straight-line movement tests. Use a marked route or gentle ramp. Diagnose problems and make one meaningful improvement. Record before-and-after evidence.	Completed taxis; toy passengers; test track; metre rulers; masking-tape route; gentle ramp; checklists; repair materials; cameras	Complete an optional taxi route trial on a safe, level outdoor surface.	Can pupils use evidence to explain a problem and improvement?	Oak: Test a vehicle
12	The Greatstone Taxi Rank	Designers communicate how products meet users' needs and reflect on improvements.	**How successfully did our taxi serve its passenger?**	Present designs and taxis. Demonstrate the wheel-and-axle mechanism and complete a controlled journey challenge. Pupils explain their user, criteria, material choices, successful feature and next improvement.	Finished vehicles; design sheets; passenger cards; display labels; visitor feedback cards; certificates; evaluation sheets	Create an outdoor or hall taxi route linking model Greatstone destinations.	Final assessment of technical understanding, design, making, testing, evaluation and vocabulary.	
Oak's current wheels-and-axles sequence identifies the axle as the rod supporting wheel rotation and emphasises that axles should be parallel so vehicles travel effectively. Its unit also moves from product analysis and card construction to mechanism selection, vehicle design, finishing, testing and evaluation.								

Whole-Project Resource List

Existing products and visual references

- Taxis, buses, cars, bicycles, mobility vehicles and delivery vehicles
- Toy vehicles with visible or accessible mechanisms
- Construction-kit vehicles
- Photographs of London taxis and local Kent transport
- Greatstone and London maps
- Passenger and journey profile cards
- Labelled vehicle diagrams

Mechanism components

- Wooden dowel or suitable axle rods
- Paper or plastic straws for axle holders
- Commercial wooden or plastic wheels
- Cotton reels, bottle tops with accurately prepared central holes, or card wheels
- Wheel-retaining components where needed
- Construction kits with wheel-and-axle parts

Structural materials

- Corrugated card
- Mounting card and thinner card
- Small clean recycled boxes
- Card tubes
- Paper and coloured card
- Acetate or transparent packaging
- Fabric scraps
- Craft sticks
- Recycled packaging

Tools and joining equipment

- Child-safe scissors
- Rulers
- Pencils and coloured pencils
- Glue sticks and PVA
- Masking tape
- Clear tape
- Hole punches
- Clips and pegs
- Adult-operated low-temperature glue gun only where school policy permits and a secure teacher-made join is necessary

Testing equipment

- Toy passengers and small luggage items
- Smooth test boards
- Gentle ramps
- Masking-tape routes
- Metre rulers or tape measures
- Stop markers
- Testing checklists
- Cameras or tablets
- Repair materials

Display and assessment materials

- Design booklets
- Product-analysis sheets
- Component labels
- Design-criteria templates
- Evaluation sheets
- Vocabulary display
- Visitor feedback cards
- Display boards

Safety and Preparation Notes

- Carry out the school's usual risk assessment for cutting, joining, small components and testing moving products.
- Check bottle tops or reused wheels for sharp edges and prepare central holes in advance.
- Pre-cut dowel to manageable lengths; pupils should not saw independently in this Year 1 project.
- Monitor small components carefully where pupils may still place objects in their mouths.
- Model safe use and transportation of scissors, rulers and construction materials.
- Avoid overly steep ramps that cause models to travel unpredictably.
- Ensure pupils test vehicles in a designated direction and retrieve them only after all models have stopped.
- Provide sufficient drying time before mechanism testing.
- Test all sample wheel-and-axle combinations before the unit to ensure components are compatible.

Adaptive Teaching	Support and Adaptation
Understanding mechanisms	Use enlarged working models, transparent chassis examples, construction kits and repeated oral rehearsal: wheel, axle, axle holder, chassis.
Designing	Offer component stickers, labelled diagrams, partially structured templates and physical samples that pupils can place on their design before drawing.
Measuring and alignment	Provide pre-marked chassis bases, parallel-line guides, set squares and adult support for positioning axle holders.
Fine-motor access	Use larger wheels and components, spring scissors, pre-cut dowel, adhesive dots and card bodies with fold lines already scored.

Making	Break the process into visual stages: chassis → axle holders → axles → wheels → test → body → finish.
Evaluation	Use photographs, visual criteria and sentence stems: “The wheels…”, “The test showed…”, “I improved…”.
Greater depth	Ask pupils to compare different wheel sizes or materials, diagnose why a model veers, independently adjust alignment and design for a passenger with a specific accessibility requirement.

Common Misconception	**Teaching Response**
The wheel and axle are the same component.	Use a dismantled model to show the circular wheel and the rod-shaped axle separately.
Wheels move up and down.	Rehearse that wheels rotate in a circular or rotary movement.
Only cars use wheels and axles.	Compare bicycles, buses, scooters, wheelchairs, trains and toy vehicles. Oak also identifies this as a common misconception.
Axle holders can be positioned at any angle.	Demonstrate how non-parallel axles cause rubbing, veering or poor movement.
Bigger wheels always make a better vehicle.	Test different wheels and discuss suitability, clearance, stability and intended surface.
Decoration makes the taxi successful.	Test the mechanism before adding the body and return to the design criteria.
The chassis and body are the same thing.	Show that the chassis is the supporting framework while the body encloses or carries the passenger.
The first design must be followed exactly.	Model adapting axle position, wheel clearance or body size when testing reveals a problem.

Key Online Examples and Teacher Resources

- Department for Education: National Curriculum for Design and Technology
- Oak National Academy: Wheels and Axles – Vehicles
- Oak: Identifying Wheels and Axles
- Oak: Design Specification for Wheeled Vehicles
- Oak: Adding Wheels to a Vehicle
- Oak: Designing a Vehicle
- Oak: Finishing a Vehicle
- Oak: Testing a Vehicle

YEAR 1 – CHOP, SLICE AND MASH - Summer Term

How can we prepare a healthy dish that is safe, appealing and enjoyable to eat?

Section	**Curriculum Overview**
Curriculum Rationale	This project introduces pupils to food preparation and the principles of healthy eating through the purposeful challenge of designing and making a simple fruit or vegetable-based dish. Building on the designing, material selection, safe tool use and evaluation developed through **Shade and Shelter** and **Taxi!**, pupils investigate where food comes from, explore the sensory qualities of ingredients and learn basic preparation techniques. They practise washing, peeling, chopping, slicing, mashing, grating, mixing and arranging foods before developing a dish for a clearly identified user and occasion. The project establishes secure foundations for later cooking and nutrition projects by emphasising hygiene, safety, informed ingredient choice and evaluation.
The Greatstone Way	**PROTECTORS → LEGACY – How can we care for people, places and our planet? What difference will we leave behind?** Pupils learn that preparing food for themselves and others is an act of care. They consider healthy choices, food hygiene, individual dietary needs and responsible use of ingredients. They develop the summer value of **Dare** by trying unfamiliar foods, learning new practical techniques and confidently presenting a dish that contributes positively to a shared Greatstone celebration.
National Curriculum Coverage	Pupils use the basic principles of a healthy and varied diet to prepare dishes and begin to understand where food comes from. They design purposeful and appealing products for themselves and other users; communicate ideas through discussion, drawings and simple plans; select and use appropriate tools and ingredients; evaluate existing products; and evaluate their finished dish against agreed design criteria. The statutory KS1 programme specifically requires pupils to prepare dishes using healthy eating principles and understand food origins.
Curriculum Journey	**Previous learning:** In EYFS, children explored food, celebrations and simple preparation through continuous provision and adult-led experiences. In Year 1, **Shade and Shelter** introduced user, purpose and evaluation, while **Taxi!** developed planning, component selection and testing. **Current learning:** Pupils apply the same design process to food by investigating, tasting, designing, preparing and evaluating a healthy dish. **Future learning:** Year 2 **Remarkable Recipes** extends ingredient knowledge, sensory evaluation and recipe development. Year 3 **Cook Well, Eatwell** introduces greater independence and a wider repertoire of healthy dishes.
Design Brief	Design and prepare a healthy fruit or vegetable-based dish for a chosen user or Greatstone summer occasion. The dish should include a purposeful combination of ingredients, be prepared hygienically, use at least two practical food-preparation techniques and be presented attractively. Suitable outcomes could include a fruit salad, layered fruit cup, vegetable salad, healthy pitta filling, mashed fruit topping or a class-designed cold dish.
Design Criteria	The dish must suit its intended user; contain fruit, vegetables or both; include a varied combination of colour, flavour and texture; be prepared safely and hygienically; use suitable tools and techniques; avoid unnecessary added sugar or salt; look appealing; and be evaluated against the intended purpose.
Sticky Knowledge	Food comes from plants or animals. Fruit and vegetables are parts of plants and can come from farms, gardens, orchards or other countries. A healthy diet contains a variety of foods. Hands, surfaces, utensils and ingredients must be clean before food preparation. Different tools are suited to different tasks. Cutting means dividing food into smaller pieces; slicing produces flatter pieces; chopping creates smaller pieces; and mashing crushes soft food. Appearance, smell, taste and texture influence whether a dish is appealing. Designers test recipes, listen to feedback and improve their ideas.
Technical Knowledge and Skills	Identify where familiar foods come from. Recognise fruit and vegetables and classify simple examples. Explore the Eatwell Guide at an introductory level. Conduct sensory evaluation using appearance, smell, taste and texture. Follow handwashing and workspace hygiene routines. Wash ingredients. Peel soft fruit by hand or with a suitable peeler under supervision. Use a table knife safely to cut and slice soft ingredients. Grate suitable ingredients with close adult supervision. Mash with a fork or potato masher. Measure using spoons, cups or simple counting. Mix and combine ingredients. Arrange food attractively. Design a dish through labelled drawings and ingredient lists. Prepare, taste, evaluate and suggest improvements.
Substantive Concepts	User • Purpose • Food • Ingredient • Nutrition • Hygiene • Technique • Taste • Presentation
Disciplinary Concepts	Investigate • Taste • Design • Prepare • Make • Evaluate • Improve
Core Vocabulary	designer, user, purpose, ingredient, recipe, fruit, vegetable, plant, animal, farm, orchard, healthy, varied, hygiene, clean, wash, peel, chop, slice, grate, mash, mix, combine, measure, taste, texture, aroma, appearance, sweet, sour, crisp, soft, evaluate, improve

Chefs, Growers and Product Examples	Pupils investigate simple fruit salads, vegetable salads, sandwich or pitta fillings, healthy snack pots and prepared fruit products. They discuss the work of growers, farmers, greengrocers, cooks and chefs, focusing on how ingredients are selected, prepared and presented for particular users. The emphasis is on product investigation, practical technique and healthy choices rather than an extensive named-chef study.
Cross-Curricular Links	**History – School Days:** compare school lunches and children's food in the past and present. **Science:** identify plants and plant parts; distinguish foods that come from plants and animals; discuss the importance of hygiene and a varied diet. **Geography:** identify where ingredients are grown and how some foods travel to Greatstone. **English:** oral instructions, sequencing, ingredient lists and evaluations. **Mathematics:** counting ingredients, simple measurement, halves and quarters in practical contexts. **PSHE:** healthy choices, independence, food preferences and respectful discussion of different diets.
Beach School & Outdoor Learning	Explore edible and non-edible plants through safe observation without foraging for consumption unless led by a suitably qualified adult and covered by school procedures. Investigate picnic foods, food packaging and the importance of leaving no litter. Plan a healthy Greatstone picnic dish and consider how food should be transported and kept clean outdoors.
Greatstone & Kent Links	Explore fruit and vegetables grown in Kent, including apples and other orchard produce, alongside ingredients available in local shops and markets. Discuss how farming, orchards and food transport connect local communities. The final dish may be designed for a Greatstone picnic, Beach School celebration or family showcase.
Memorable Hook	**The Greatstone Picnic Problem** – A picnic basket arrives containing an invitation to a summer celebration, several mystery ingredients and a note explaining that the planned dish is neither colourful nor varied. Pupils are commissioned as junior food designers to investigate ingredients, learn safe preparation skills and create a healthier, more appealing alternative.
Authentic Outcome / Showcase	**The Greatstone Healthy Picnic Café** – Pupils present their designed dishes, recipe cards and evaluation work to families or another class. They explain where ingredients come from, demonstrate selected preparation techniques and discuss how their dish meets the needs of its intended user.
Assessment End Point	Pupils design and prepare a simple healthy dish for an identified user. They explain where key ingredients come from, follow hygiene procedures, select appropriate tools, use basic preparation techniques safely, describe sensory qualities and evaluate their dish against agreed criteria.

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to Be Secured	Design Enquiry Question	Example Learning Activities	Weekly Resources	Beach School / Outdoor Learning	Assessment Opportunity	Online Example / Recipe Support
1	Launching the Greatstone Picnic Problem	Food products are designed for particular users and occasions.	**Who is our dish for and what does it need to do?**	Open the picnic basket and commission letter. Examine images of fruit salads, snack pots, vegetable salads and picnic dishes. Identify intended users, ingredients and occasions. Generate initial design questions.	Picnic basket; commission letter; example food photographs; user cards; occasion cards; sticky notes; vocabulary cards	Visit the planned picnic or showcase location and discuss practical food needs outdoors.	Can pupils identify the user, purpose and occasion for a food product?	NHS Healthier Families recipe collection
2	Understanding food origins	Familiar foods come from plants or animals and may be grown, reared or produced in different places.	**Where does our food come from?**	Sort foods into plant and animal origins. Match fruit and vegetables to the part of the plant where appropriate. Locate selected ingredients from Kent, the UK and other countries using maps and packaging labels.	Real or replica foods; food cards; world and UK maps; packaging; plant diagrams; sorting hoops	Observe plants growing around school. Discuss gardens, farms and orchards without eating gathered plants.	Can pupils explain the origin of familiar ingredients?	Food – a fact of life: food origins resources
3	Healthy and varied eating	Healthy eating involves choosing a varied balance of foods rather than labelling individual foods simply as "good" or "bad".	**What helps make a meal healthy and varied?**	Introduce the Eatwell Guide visually. Sort foods into broad groups. Compare picnic choices and improve an unbalanced example by adding variety, colour and appropriate portions.	Eatwell Guide image; food cards; paper plates; sorting mats; sample lunchbox images	Plan a balanced outdoor picnic using picture cards.	Can pupils identify fruit and vegetables as part of a varied diet?	Department of Health and Social Care: Eatwell Guide school resource
4	Hygiene and safe preparation	Clean hands, surfaces, utensils and ingredients reduce contamination. Safe routines must be followed before, during and after preparing food.	**How can we keep our food safe to eat?**	Sequence a food-hygiene routine. Practise effective handwashing. Identify safe and unsafe preparation images. Set up and clear a workstation correctly.	Handwashing sequence cards; soap; aprons; hair ties; cleaning equipment; chopping boards; utensils; hygiene checklist	Discuss keeping food clean during picnics and outdoor learning, including sealed containers and litter removal.	Can pupils independently follow the agreed preparation routine?	Classroom Cooking Toolkit
5	Sensory evaluation	Designers use appearance, smell, taste and texture to compare ingredients and products.	**How can we describe food accurately?**	Conduct a controlled tasting of suitable fruit and vegetables. Record colour, smell, flavour and texture using a sensory chart. Compare preferences respectfully and identify combinations that might work well.	Pre-washed tasting portions; allergy information; plates; forks; water; sensory vocabulary mats; evaluation charts	Compare the appearance and texture of safe shop-bought ingredients associated with picnics or local produce.	Can pupils use sensory vocabulary rather than only "like" or "dislike"?	NHS breakfast fruit salad
6	Learning preparation techniques	Different tools and techniques suit different ingredients and desired outcomes.	**What is the safest and most effective way to prepare each ingredient?**	Teacher-model washing, peeling, chopping, slicing, grating and mashing. Pupils rotate through closely supervised technique stations using soft ingredients. Compare the result of each technique.	Soft fruit and vegetables; table knives; peelers; graters; forks; mashers; chopping boards; bowls; demonstration visualiser; technique cards	No food preparation outdoors unless school hygiene arrangements support it. Observe how fruit changes when crushed or sliced.	Can pupils choose and use a suitable tool safely?	Oak: Preparing fruit and vegetables

7	Investigating existing dishes	Successful dishes balance flavour, texture, colour, nutrition and purpose.	**What makes a simple dish appealing?**	Compare two or three teacher-prepared examples, such as fruit salad, vegetable salad and a layered fruit cup. Conduct structured sensory evaluation and identify successful features.	Small samples; clear bowls; sensory sheets; ingredient cards; cameras; spoons; water	Consider which dish would be easiest to carry, serve and eat during a picnic.	Can pupils identify features to include or avoid in their own design?	Food – a fact of life: fruit salad
8	Establishing design criteria and designing	A food design should respond to the user, purpose, nutrition, sensory qualities and available techniques.	**What must our healthy dish include?**	Agree core design criteria. Pupils select a user and create two possible dish ideas. Draw and label ingredients, preparation techniques, colours and textures. Select one idea using feedback and criteria.	Design sheets; ingredient cards; technique cards; colouring pencils; sample recipe formats; design-criteria prompts	Plan how the dish could be packed and served at a Greatstone picnic.	Does the design include a clear user, ingredients, techniques and intended sensory qualities?	NHS healthy recipe collection
9	Planning a recipe and practical sequence	Recipes provide ordered instructions, ingredients and quantities. Preparation should be organised before making begins.	**How can we organise our work so that our dish is made safely?**	Create a simple pictorial recipe or flow chart. Count or measure ingredients using pieces, spoonfuls or cups. Assign roles where pupils work in pairs or groups. Check allergy adaptations.	Recipe templates; ingredient and technique symbols; measuring spoons; cups; sequencing cards; allergy checklist	Rehearse the sequence using pretend ingredients at an outdoor picnic station if useful.	Can pupils sequence the preparation process logically?	NHS breakfast fruit salad recipe
10	Preparing the final dish	Food designers follow hygiene procedures, use tools safely and adapt carefully when needed.	**How can we make our dish match our design?**	Set up hygienic workstations. Prepare ingredients using selected techniques. Combine, portion and present the finished dish. Photograph the process and record any changes.	Selected ingredients; aprons; chopping boards; table knives; peelers; graters; mashers; bowls; spoons; serving containers; labels; cleaning equipment	Final dishes may be carried to an outdoor area only when safely covered and immediately supervised.	Can pupils work safely and follow their planned sequence with appropriate independence?	Oak: Making a fruit or vegetable smoothie
11	Evaluating and improving	Evaluation compares the finished product with its design criteria and gathers useful feedback from intended users.	**How successfully does our dish meet the user's needs?**	Conduct sensory evaluation of the finished dish. Compare it with the original design. Gather partner or user feedback. Identify one change to ingredients, texture, portion or presentation. Redesign a future version.	Finished dishes or retained photograph; evaluation sheets; user-feedback forms; sensory vocabulary mats; redesign templates	Discuss whether the dish worked well as an outdoor picnic product and how packaging could be reduced.	Can pupils identify a specific strength and evidence-based improvement?	NHS crunchy salad pittas
12	Greatstone Healthy Picnic Café	Designers communicate the origin, preparation and purpose of their products.	**How can our food design help others make healthy choices?**	Present recipe cards, ingredient origins, photographs and evaluations. Where school procedures permit, prepare small fresh samples or demonstrate techniques. Pupils explain how the dish meets its criteria and what they learned.	Display boards; recipe cards; photographs; utensils for demonstration; visitor feedback slips; certificates; pupil evaluations	Host the showcase outdoors or link it to a supervised Greatstone picnic celebration.	Final assessment of food origins, hygiene, practical skills, designing, making, evaluation and vocabulary.	Classroom Cooking Toolkit

Suggested Recipe Options

Possible Product	Suitable Techniques	Example Link
Seasonal fruit salad	Wash, peel, chop, slice, mix and portion	Food – a fact of life fruit salad
Breakfast fruit cup	Peel, slice, chop, mix, layer and spoon	NHS breakfast fruit salad
Colourful vegetable salad	Wash, grate, chop, mix and dress	NHS fruity winter salad
Crunchy salad pitta filling	Wash, grate, chop and mix	NHS crunchy salad pittas
Fruit or vegetable smoothie	Wash, peel, chop, measure and combine; blending by an adult	Oak Year 1 smoothie lesson
The NHS fruit-salad example uses sliced kiwi, halved grapes and chopped melon, but for Year 1 the school should adapt ingredients and cutting requirements to its own food-safety procedures and pupil needs. The final outcome should remain pupil-designed rather than requiring every pupil to reproduce an identical recipe. These examples provide safe starting points that can be simplified and adapted for Year 1.		

Whole-Project Resource List

Food and ingredient examples

- Apples, pears, bananas, oranges, satsumas and soft seasonal fruit
- Melon, berries and kiwi where allergies and preparation arrangements allow
- Cucumber, tomatoes, peppers and soft cooked vegetables
- Carrots or cabbage for adult-supported grating
- Natural yoghurt where appropriate
- Lemon or orange juice for flavour and reducing browning
- Wholemeal pitta or bread if included in the chosen design
- Fresh, frozen, dried or canned examples for product comparison
- Food packaging and origin labels

Food-preparation equipment

- Colour-coded or designated chopping boards
- Child-appropriate table knives
- Peelers
- Graters with close adult supervision
- Forks and potato mashers
- Mixing bowls
- Wooden spoons and dessert spoons
- Measuring spoons and cups
- Plates, tasting spoons and serving containers
- Colanders or sieves
- Aprons
- Disposable or washable table coverings
- Lidded containers for outdoor transport
- Visual technique cards

Planning and evaluation resources

- User and occasion cards

- Ingredient-origin maps
- Eatwell Guide visual
- Sensory vocabulary mats
- Product-analysis sheets
- Design criteria
- Recipe planners
- Pictorial sequencing cards
- Evaluation and feedback forms
- Cameras or tablets
- Display boards

Hygiene and cleaning resources

- Access to warm water and liquid soap
- Paper towels or suitable hand-drying arrangements
- Food-safe surface cleaner
- Clean cloths or disposable wipes
- Waste and recycling containers
- Hair ties or head coverings according to school procedures
- Separate utensils and preparation spaces where dietary adaptations require them

Safety, Allergy and Preparation Notes

- Complete the school's food activity risk assessment and follow current school food-hygiene procedures.
- Obtain and check current allergy, intolerance, dietary, cultural and religious information before ingredient selection.
- Check every product label, including apparently familiar ingredients, immediately before use.
- Avoid pupils sharing tasting utensils or food from personal plates.
- Wash hands thoroughly before cooking and after touching faces, hair, floors or waste.
- Clean and disinfect work surfaces and equipment before and after use.
- Wash fruit and vegetables before preparation.
- Use child-appropriate table knives for soft foods; adults should complete tasks involving sharp knives or hard ingredients.
- Graters and peelers require close supervision and may be adult-only for individual pupils according to assessed need.
- Grapes, cherry tomatoes and similarly shaped foods should be prepared in accordance with the school's choking-risk procedures; adults may need to cut them lengthways.
- Keep chilled foods refrigerated until required and return them promptly after use.
- Do not use foods gathered during Beach School unless collection and consumption are led by a suitably qualified practitioner and specifically risk assessed.
- Store photographic evidence rather than leftover tasting samples for later evaluation.
- Food – a fact of life advises checking allergies, intolerances and other dietary requirements and adapting recipes accordingly.

Adaptive Teaching	Support and Adaptation
Food origins	Use real ingredients, packaging, photographs and simple plant-or-animal sorting mats.
Sensory needs	Allow pupils to observe, smell or handle packaged ingredients without requiring tasting. Offer predictable textures and maintain clear separation of foods.
Designing	Provide ingredient stickers, pictorial technique cards and sentence stems. Allow pupils to communicate designs orally or through photographs and arranged ingredient cards.
Fine-motor access	Offer non-slip mats, adapted handles, softer ingredients, larger pieces and adult support. Allocate meaningful roles such as washing, measuring, mixing or arranging.
Following sequences	Use numbered visual steps, model one technique at a time and organise ingredients in order of use.
Vocabulary	Provide sensory word banks grouped by appearance, smell, taste and texture. Rehearse orally before recording.
Greater depth	Ask pupils to compare ingredient combinations, explain how nutritional and sensory choices affect the design, adapt a recipe for a specific dietary need or reduce food and packaging waste.
Evaluation	Use tasting scales, photographs, symbols and stems such as "The user liked… because…" and "I would change…".

Common Misconception	Teaching Response
All healthy food must be fruit or vegetables.	Introduce the Eatwell Guide and explain that a varied diet includes different food groups in suitable proportions.
Foods are simply "good" or "bad".	Focus on balance, variety, frequency and portion rather than moral labels.
All fruit grows on trees.	Compare fruits from trees, bushes, vines and smaller plants.
All vegetables are roots.	Examine leaves, stems, flowers, fruits and roots that people eat.
Chopping, slicing and mashing mean the same thing.	Model each technique and compare the different outcomes side by side.
A recipe cannot be altered.	Explain that food designers adapt ingredients, quantities and presentation for users and dietary needs.
The dish that looks best must taste best.	Use structured sensory evaluation across appearance, smell, flavour and texture.
Wearing an apron alone makes food preparation hygienic.	Revisit the complete routine: hands, hair, surfaces, equipment, ingredients and storage.
Everyone must taste every ingredient.	Reinforce respectful choice and safe inclusion; evaluation can use several senses without forced tasting.
More ingredients always make a better dish.	Compare simple, balanced combinations with mixtures that have clashing flavours or textures.

Key Online Examples and Teacher Resources

- Department for Education: National Curriculum for Design and Technology
- Department of Health and Social Care: Classroom Cooking Toolkit
- Department of Health and Social Care: Eatwell Guide School Resource
- Food – a fact of life
- Food – a fact of life: Fruit Salad
- NHS Healthier Families Recipes
- NHS Breakfast Fruit Salad
- NHS Crunchy Salad Pittas
- Oak National Academy: Preparing Fruit and Vegetables
- Oak National Academy: Making a Fruit or Vegetable Smoothie

YEAR 2 – REMARKABLE RECIPES - Autumn Term

How can we design and make a healthy school meal for a particular user?

Section	Curriculum Overview
Curriculum Rationale	This project develops pupils' food preparation, nutrition and recipe-reading knowledge through the purposeful challenge of designing a new school meal. Building on **Chop, Slice and Mash** in Year 1, pupils move beyond preparing a simple cold dish to investigating a wider range of ingredients, food sources, preparation tools and cooking processes. They explore why some foods are cooked, learn to follow and adapt a simple recipe and use sensory evaluation to make informed decisions. The project remains rooted in the design process: pupils investigate existing meals,

	identify a user and purpose, develop design criteria, practise techniques, make a dish and evaluate how well it meets the intended need. Cornerstones describes **Remarkable Recipes** as teaching food sources, food-preparation tools, reasons for cooking food and simple recipe reading before pupils choose and make a new school meal that meets design criteria.
The Greatstone Way	**ROOTS → SURVIVORS – Who are we and where do we belong? How do people overcome challenges and adapt?** Pupils explore how food connects families, cultures and communities before considering how recipes can be adapted to meet different nutritional, dietary and practical needs. They develop the autumn value of **Care** by designing responsibly for another person, respecting food preferences and cultural traditions, following safe hygiene routines and recognising that shared meals can strengthen a community.
National Curriculum Coverage	Pupils use the basic principles of a healthy and varied diet to prepare dishes and understand where food comes from. They design purposeful and appealing products for themselves and others, generate and communicate ideas, select appropriate tools and ingredients, perform practical tasks safely, evaluate existing products and assess their finished dish against agreed criteria. The statutory KS1 curriculum requires pupils to engage in an iterative process of designing and making, while cooking and nutrition requires them to prepare dishes using healthy-eating principles and understand food origins.
Curriculum Journey	**Previous learning:** In Year 1 **Chop, Slice and Mash**, pupils identified food origins, followed hygiene routines and prepared a simple fruit or vegetable-based dish using basic techniques. **Current learning:** Pupils broaden their ingredient knowledge, investigate why food is cooked, read and sequence simple recipes, practise additional techniques and adapt an existing recipe to design a suitable school meal. **Future learning:** Year 3 **Cook Well, Eatwell** increases independence, introduces a broader repertoire of savoury dishes and deepens understanding of balanced meals and ingredient combinations.
Design Brief	Design and make a healthy, appealing school meal or substantial lunch item for a specified Greatstone pupil group. The dish should reflect the needs of its intended user, contain a suitable variety of ingredients, involve safe food-preparation techniques and follow an adapted simple recipe.
Possible Final Outcomes	Depending on facilities and school procedures, suitable outcomes could include a healthy filled pitta or wrap, couscous or pasta salad, vegetable and bean salad, soup prepared with adult-controlled heat, savoury tortilla turnover, simple pizza pitta or another predominantly savoury school-lunch dish.
Design Criteria	The meal must suit its intended user; include a healthy and varied combination of foods; contain fruit or vegetables; follow relevant dietary and allergy requirements; use safe preparation methods; be visually appealing; have a suitable balance of flavours and textures; be practical to serve as a school meal; and be evaluated using feedback.
Sticky Knowledge	Food comes from plants and animals and may be grown, reared, caught or processed. Some ingredients are eaten raw while others are cooked to make them safer, softer, easier to digest or more appealing. A recipe lists ingredients, quantities and ordered instructions. Healthy meals contain a varied balance of foods rather than relying on one food group. Different tools are designed for particular preparation tasks. Sensory evaluation considers appearance, aroma, flavour and texture. Recipes can be adapted for different users, preferences and dietary needs. Heat must be controlled by an adult unless school procedures permit carefully supervised pupil use.
Technical Knowledge and Skills	Identify where ingredients originate. Distinguish raw, cooked and processed foods at an age-appropriate level. Read and sequence a simple recipe. Measure ingredients using spoons, cups, scales or counting. Wash, peel, chop, slice, grate, mash, tear, mix, spread and combine ingredients. Use appropriate utensils safely. Observe how heating changes selected ingredients. Conduct structured sensory evaluations. Generate design criteria for a school meal. Adapt a simple recipe. Prepare, present, test and evaluate a final dish.
Substantive Concepts	User • Purpose • Ingredient • Recipe • Nutrition • Food Source • Cooking • Hygiene • Meal
Disciplinary Concepts	Investigate • Taste • Analyse • Design • Prepare • Cook • Evaluate • Adapt
Core Vocabulary	ingredient, recipe, quantity, measure, method, instruction, sequence, raw, cooked, processed, grown, reared, caught, healthy, varied, balanced, nutrition, hygiene, preparation, utensil, chop, slice, grate, mash, mix, spread, combine, heat, sensory, appearance, aroma, flavour, texture, adapt, evaluate
Chefs, Growers and Product Examples	Pupils investigate school meals, packed lunches, soups, salads, wraps, pittas, pasta dishes and culturally diverse savoury meals. They consider the roles of growers, farmers, food producers, cooks, chefs and school kitchen staff. The principal emphasis is on how professionals select ingredients, follow recipes, work hygienically and adapt food for particular users.
Cross-Curricular Links	**History – Movers and Shakers:** consider individuals who improved health, nutrition, farming or food provision. **Science:** animals including humans, nutrition, plant sources and material change during heating. **Geography:** origins of ingredients and food journeys. **English:** instructional writing, imperative verbs, recipe reading and evaluation. **Mathematics:** weighing, capacity, counting, time and simple fractions. **PSHE:** healthy choices, cultural respect and individual dietary needs.
Beach School & Outdoor Learning	Investigate the requirements of an outdoor lunch, including portability, hygiene, packaging, waste and weather protection. Conduct a packaging and litter audit and consider how a school meal could be served with less single-use waste. Outdoor tasting should only take place within the school's food-safety arrangements.
Greatstone & Kent Links	Explore ingredients associated with Kent, including orchard fruit, vegetables, cereals and local produce. Speak with Greatstone kitchen staff about menu planning, allergies, portions and reducing waste. Where appropriate, pupils can compare the needs of an indoor school lunch with a meal designed for Beach School.
Memorable Hook	**The Greatstone School Meal Challenge** – A letter arrives from the school kitchen explaining that pupils would like a new healthy menu option. The class receives menus, ingredients, user profiles and an incomplete recipe. Pupils become junior food designers, charged with investigating what makes a successful school meal and creating a suitable new recipe.
Authentic Outcome / Showcase	**Greatstone Junior Menu Tasting** – Pupils present recipe cards, ingredient-origin maps, sensory evaluations and final dishes to classmates, kitchen staff or families. Visitors provide structured feedback, and the strongest ideas can be compiled into a Greatstone junior recipe collection or considered as inspiration for a themed school lunch.
Assessment End Point	Pupils design and make a healthy school meal for an identified user. They explain where ingredients come from and why selected foods are cooked, follow and adapt a simple recipe, measure and prepare ingredients safely, use sensory vocabulary accurately and evaluate the final dish against design criteria and user feedback.

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to Be Secured	Design Enquiry Question	Example Learning Activities	Weekly Resources	Beach School / Outdoor Learning	Assessment Opportunity	Online Example / Recipe Support
1	Launching the school meal challenge	School meals are designed for particular users and must balance nutrition, appeal, safety and practicality.	**What makes a successful school meal?**	Open the kitchen commission. Examine school menus and photographs of different lunches. Identify users, purposes and practical requirements. Generate initial questions for the kitchen team.	Commission letter, current school menu, meal photographs, user cards, sticky notes, vocabulary cards	Discuss how an outdoor Beach School meal might require different features from an indoor lunch.	Can pupils identify the user and purpose of a school meal?	NHS Healthier Families recipe collection
2	Investigating food sources	Ingredients may be grown, reared, caught or processed before reaching the consumer.	**Where do the ingredients in our lunches come from?**	Sort ingredients by origin. Trace selected ingredients from source to plate using maps and picture sequences. Examine packaging for country-of-origin information.	Real ingredients or food cards, maps, packaging, sorting hoops, origin-flow cards	Look for evidence of local farming, gardening or food	Can pupils explain the origin of selected ingredients using appropriate vocabulary?	Food – a fact of life

						transport in the wider environment.		
3	Healthy and varied school meals	A healthy meal includes a suitable balance and variety of foods.	**How can we improve an unbalanced meal?**	Revisit the Eatwell Guide. Analyse example school meals and redesign one to include greater variety and balance. Avoid labelling foods simply as good or bad.	Eatwell Guide visual, food cards, paper plates, example menus, analysis sheets	Plan a balanced Beach School lunch using picture cards and consider suitable packaging.	Can pupils explain how variety improves a meal?	NHS Healthier Families: 5 A Day
4	Why food is cooked	Heating can change flavour, texture, appearance and safety. Some foods are eaten raw; others need to be cooked.	**Why do we cook some foods?**	Compare safe examples of raw and cooked ingredients, such as grated raw carrot and cooked carrot, raw and toasted bread, or uncooked and cooked pasta through teacher-prepared samples. Record changes.	Safe raw and cooked samples, sensory charts, photographs, magnifiers, plates, forks	Observe changes caused by sunlight, drying or warmth without presenting these as cooking.	Can pupils describe at least two changes caused by cooking?	NHS Easy Carrot Soup
5	Reading and sequencing recipes	Recipes contain a title, ingredient list, quantities and instructions in a logical order.	**How does a recipe help a cook?**	Examine several simple recipes. Identify ingredients, quantities, equipment and imperative verbs. Reorder a scrambled recipe and follow a no-cook demonstration sequence.	Enlarged recipes, sequencing cards, ingredient lists, utensils, highlighters, recipe-feature labels	Rehearse a recipe sequence as a physical outdoor relay using picture cards.	Can pupils identify and correctly sequence the main parts of a recipe?	NHS recipes
6	Hygiene, allergies and safe working	Food preparation requires clean routines, organised workspaces and careful management of allergies and dietary needs.	**How do professional cooks keep everyone safe?**	Interview kitchen staff or use a prepared information pack. Practise handwashing, workspace setup and safe movement. Analyse allergy and dietary user profiles.	Hygiene cards, aprons, cleaning resources, user profiles, ingredient labels, allergy checklist	Consider how food can be kept clean, cool and covered outdoors.	Can pupils follow hygiene routines and explain why dietary information matters?	GOV.UK D&T programme of study
7	Developing preparation and measuring skills	Tools and techniques should be selected according to the ingredient and intended result. Accurate measuring supports consistency.	**Which tools and techniques will help us prepare our meal?**	Rotate through supervised stations: measuring with spoons and cups, weighing, chopping soft foods, grating, spreading, tearing, mixing and combining. Record which tools suit each task.	Scales, measuring spoons, cups, bowls, child-safe knives, graters, spreaders, chopping boards, soft ingredients, technique cards	No outdoor cooking unless hygiene and facilities meet school procedures.	Can pupils select suitable tools and work with increased control?	NHS Crunchy Salad Pittas
8	Sensory evaluation of existing meals	Food designers analyse appearance, aroma, flavour and texture before developing recipes.	**Which combinations are most appealing and why?**	Taste small samples of suitable fillings, salads, soups or savoury dishes. Use rating scales and precise sensory vocabulary. Compare views respectfully and identify successful combinations.	Teacher-prepared samples, allergy records, tasting plates, water, sensory mats, evaluation grids	Evaluate which sample would be most practical and least wasteful for an outdoor lunch.	Can pupils justify a preference using sensory evidence?	NHS Healthier Families dinner recipes
9	Establishing criteria and adapting a recipe	Recipes can be adapted to suit a user while retaining a workable method and healthy balance.	**How can we improve an existing recipe for our user?**	Select a base recipe. Identify ingredients that could be added, removed or substituted. Produce two adaptations and select one against agreed criteria.	Simple base recipes, ingredient cards, user profiles, design sheets, criteria checklist, nutrition visuals	Consider adaptations needed for portability, minimal packaging or outdoor serving.	Does the adapted recipe respond clearly to the user and criteria?	NHS Tortilla Cheese Turnovers
10	Planning and making the final meal	Successful making requires an ordered recipe, accurate preparation, safe working and teamwork.	**How can we make our dish safely and consistently?**	Write or complete a pictorial recipe. Organise roles, ingredients and equipment. Prepare the final dish in groups. Any heating, boiling, oven use or blending is completed by an adult unless specifically permitted under school procedures. Photograph key stages.	Selected ingredients, recipe sheets, preparation tools, measuring equipment, aprons, cleaning materials, serving dishes, cameras	Serve outdoors only if dishes are safely covered, transported and supervised.	Can pupils follow the recipe and use techniques with appropriate independence?	NHS Super Veggie Soup
11	Testing, evaluating and improving	User feedback helps food designers judge whether a meal meets its criteria and identify meaningful adaptations.	**How well does our meal meet the kitchen's challenge?**	Conduct a structured tasting with classmates or invited users. Compare results with design criteria. Analyse feedback and produce a revised recipe card showing one evidence-based improvement.	Finished dishes or fresh samples, feedback forms, sensory scales, original designs, revision sheets	Evaluate whether the dish would work well as a Beach School meal and how waste could be reduced.	Can pupils distinguish between personal preference and evidence against the criteria?	NHS Healthier Families recipes
12	Greatstone Junior Menu Tasting	Designers communicate their research, recipe decisions, practical techniques and evaluation.	**Why should our meal be considered for the Greatstone menu?**	Present ingredient origins, adapted recipe, preparation photographs and final evaluation. Deliver a short persuasive pitch to kitchen staff, families or another class. Compile the recipes into a class collection.	Display boards, printed recipes, photographs, presentation cards, visitor feedback, certificates	Hold an outdoor tasting event only where school food-safety procedures allow.	Final assessment of nutrition, food origins, recipe understanding, preparation, adaptation and evaluation.	NHS Healthier Families recipe collection

Suggested Recipe Starting Points

Recipe Starting Point	Likely Pupil Techniques	Adult-Controlled Processes	Example
Healthy filled pitta or wrap	Wash, tear, grate, chop, spread, mix, fill	Cook any meat or heated filling in advance	NHS Crunchy Salad Pittas
Tortilla turnover or quesadilla	Chop soft ingredients, grate, combine and fill	Heat in a pan or oven	NHS Tortilla Cheese Turnovers

Vegetable soup	Wash, measure, prepare soft ingredients with support, combine	Chop hard vegetables as needed, use hob and blender	NHS Easy Carrot Soup
Mixed vegetable soup	Wash, tear, measure and add ingredients	Hob use and blending	NHS Super Veggie Soup
Pasta or couscous salad	Wash, chop, grate, mix, portion and garnish	Cook pasta or prepare couscous using hot water	NHS Recipe Collection
Savoury school-lunch pot	Measure, mix, layer and portion	Cook any grains, eggs, meat or pulses where required	NHS Lunch and Dinner Recipes
The final outcome should remain an adapted, pupil-designed school meal rather than a whole-class reproduction of one fixed recipe.			

Whole-Project Resource List

Food and product-analysis resources

- Current school menus and sample menu formats
- Photographs of school lunches and culturally diverse meals
- Food packaging and country-of-origin labels
- Ingredient cards and origin maps
- Eatwell Guide visuals
- Simple printed recipes
- User, allergy and dietary profile cards
- Sensory vocabulary mats

Ingredients

Select according to the final recipe and current allergy information.

Possible ingredients include:

- Wholemeal pittas, wraps, pasta, couscous or bread
- Cucumber, tomatoes, peppers, carrots, lettuce, spinach and sweetcorn
- Beans, chickpeas or lentils
- Reduced-fat cheese, natural yoghurt or soft cheese where suitable
- Fresh and dried herbs
- Kent-grown fruit or vegetables where seasonally available
- Reduced-salt stocks or sauces
- Cooked protein ingredients where required and safely prepared
- Lemons or limes for flavouring

Preparation and measuring equipment

- Colour-coded chopping boards
- Child-appropriate table knives
- Peelers and graters
- Mixing bowls and serving bowls
- Spoons, spreaders and forks
- Measuring spoons and cups
- Digital or balance scales
- Colanders and sieves
- Plates and tasting utensils
- Aprons
- Non-slip mats
- Lidded containers
- Visual technique cards

Adult-controlled cooking equipment where required

- Hob, oven or microwave
- Saucepan and oven trays
- Kettle
- Blender or stick blender
- Oven gloves
- Heatproof mats
- Thermometer where required by school procedure

Planning, evaluation and display

- Recipe-analysis sheets
- Sequencing cards
- Design-criteria templates
- Adaptation planners
- Pictorial recipe templates
- User-feedback forms
- Cameras or tablets
- Display boards and recipe-book materials

Safety, Allergy and Preparation Notes

- Complete the school's food-activity risk assessment and follow current hygiene and allergy procedures.
- Obtain current medical, allergy, intolerance, dietary, cultural and religious information before selecting recipes.
- Check ingredient labels immediately before use and manage cross-contamination carefully.
- Ensure pupils wash hands, tie back hair and prepare cleaned workspaces.
- Wash fruit and vegetables thoroughly.
- Use child-appropriate knives only for suitable ingredients.
- Closely supervise peelers and graters and provide adapted equipment where needed.
- Adults should manage heat, hard-ingredient chopping, raw meat, blending and draining hot foods unless the school's risk assessment explicitly permits otherwise.
- Cooked foods must reach safe temperatures and be stored, cooled, reheated and served according to school procedures.
- Avoid retaining tasting leftovers for later assessment; use photographs and written evaluation.
- Never require pupils to taste food. Sensory evaluation may include appearance, aroma and texture where tasting is unsuitable.
- Ensure outdoor serving maintains temperature control, covering, hand hygiene and safe transportation.

Adaptive Teaching	Support and Adaptation
Recipe reading	Use pictorial recipes, colour-coded ingredients, numbered steps and paired oral rehearsal.
Food origins	Use real packaging, physical ingredients and maps with simple journey arrows.
Dietary understanding	Present user profiles positively and focus on adapting for inclusion rather than treating differences as problems.
Sensory access	Permit observing, smelling or touching packaged ingredients without tasting. Keep foods separate where mixed textures create barriers.
Practical skills	Provide non-slip mats, adapted handles, softer ingredients, prepared portions and meaningful alternative roles.
Measuring	Use cups, spoon measures and pre-zeroed scales before expecting independent gram measurement.
Greater depth	Ask pupils to justify substitutions, compare nutritional and sensory consequences, calculate simple group quantities or reduce packaging and food waste.
Evaluation	Use photographs, visual rating scales and sentence stems linked directly to the criteria.

Common Misconception	Teaching Response
A recipe is only a list of ingredients.	Identify title, quantities, equipment, method and sequence in several examples.
All food should be cooked.	Compare foods commonly eaten raw with those requiring or benefiting from heat.
Cooking only makes food hotter.	Explore changes in safety, texture, flavour, colour and digestibility.
Healthy meals must be salads.	Analyse a range of balanced soups, wraps, pasta dishes and culturally diverse meals.
Processed always means unhealthy.	Explain that processing means food has been changed; the type and extent of processing matter.
Everyone should like the same food.	Use sensory evidence respectfully and distinguish preference from design effectiveness.
More ingredients automatically create a better recipe.	Compare clarity, balance and practical preparation in simple and overcomplicated dishes.
Adapting a recipe means ignoring it.	Show how designers retain a workable method while making purposeful substitutions.
Wearing gloves replaces handwashing.	Reinforce complete hygiene routines and school policy.
Decoration matters more than nutrition or function.	Return consistently to user, healthy balance, flavour, texture and serving practicality.

Key Online References

- Cornerstones: **Remarkable Recipes** project overview.
- GOV.UK: National Curriculum for Design and Technology.

- NHS Healthier Families Recipes
- NHS Dinner Recipes
- NHS 5 A Day Guidance
- NHS Easy Carrot Soup
- NHS Super Veggie Soup
- NHS Tortilla Cheese Turnovers
- Food – a fact of life

YEAR 2 DESIGN & TECHNOLOGY – BEACH HUT – Spring Term

How can we design and build a strong beach hut for a visitor to Greatstone?

Section	Curriculum Overview
Curriculum Rationale	This project develops pupils' understanding of structures through the purposeful design and construction of a beach hut. Building on Year 1's **Shade and Shelter**, pupils revisit freestanding structures with greater precision, learning how shape, reinforcement, joining methods and materials influence stability and strength. They investigate real beach huts, particularly those found along the Kent coast, before designing and constructing their own model for a specified user. Throughout the project pupils follow the complete design process of investigating, designing, making, testing and improving.
The Greatstone Way	**EXPLORERS → INVENTORS – How does curiosity help us discover more? How do ideas change the world?** Linked to **Let's Explore the World**, pupils investigate coastal environments before designing a structure suited to Greatstone's beach. They develop the value of **Dream** by exploring creative solutions that combine practicality with attractive design.
National Curriculum Coverage	Design purposeful, functional and appealing products. Generate, develop and communicate ideas. Select and use tools accurately. Explore and evaluate existing products. Build structures that are stronger, stiffer and more stable. Evaluate products against design criteria.
Curriculum Journey	**Previous learning:** Shade and Shelter introduced simple freestanding structures. **Current learning:** Pupils investigate stronger structures, reinforcement, accurate measuring and improved joining techniques. **Future learning:** Year 4 Tomb Builders and Year 5 Architecture further develop structural engineering and construction.
Design Brief	Design and construct a beach hut for visitors to Greatstone Beach that is attractive, stable, weather-resistant and suitable for storing beach equipment.
Design Criteria	The beach hut must stand independently, have a roof and doorway, include one opening window, remain stable during testing, use reinforced joins, and be suitable for a seaside environment.
Sticky Knowledge	Beach huts provide storage and shelter. Strong structures need stable bases and secure joins. Reinforcement strengthens card and paper structures. Different materials behave differently in windy coastal environments. Designers improve products through testing.
Technical Knowledge & Skills	Measure accurately using rulers. Mark and cut with increasing precision. Fold, score and reinforce card. Create tabs and flanges. Join accurately. Evaluate stability. Improve designs through testing.
Substantive Concepts	Structure • Stability • Reinforcement • User • Purpose • Materials
Disciplinary Concepts	Investigate • Design • Build • Test • Evaluate • Improve
Core Vocabulary	beach hut, structure, reinforce, strengthen, stable, framework, wall, roof, façade, flap, tab, flange, score, fold, measure, evaluate
Design Inspiration	Investigate colourful Victorian beach huts from Kent, Sussex and Norfolk. Compare traditional and contemporary designs.
Cross-Curricular Links	**Geography:** Coastlines, Greatstone, human features. **Science:** Everyday materials and material properties. **Maths:** Measuring accurately. **English:** Design specifications and evaluations.
Beach School & Outdoor Learning	Visit or virtually investigate Greatstone Beach. Observe beach huts, shelters, kiosks and coastal buildings. Sketch structures and investigate how they withstand wind and weather.
Greatstone & Kent Links	Study local beach huts and discuss why coastal communities need practical seaside buildings. Consider colour, weather resistance and tourism.
Memorable Hook	**Greatstone Beach Hut Competition** – The local council is replacing damaged beach huts. Pupils have been commissioned to design a new model suitable for families visiting Greatstone.
Authentic Outcome	**Greatstone Beach Hut Exhibition** – Finished beach huts displayed as a miniature seaside village with design presentations for families and governors.
Assessment End Point	Pupils independently design, construct and evaluate a reinforced freestanding beach hut that successfully meets the agreed design criteria.

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Key Learning	Activities	Resources	Beach School	Assessment	Online Examples
1	Launch the Design Challenge	Beach huts are designed for particular users.	Explore photographs and maps of Greatstone beach huts. Discuss users and purpose.	Beach hut photos, maps, sketchbooks	Beach walk or virtual visit	Can pupils explain the purpose of a beach hut?	Cornerstones Beach Hut inspiration
2	Investigating Existing Products	Designers investigate before designing.	Examine models and photographs. Identify features that make good beach huts.	Photos, models, investigation sheets	Observe shelters on the beach	Product analysis	Oak DT Structures examples
3	Materials Investigation	Materials behave differently.	Test card, corrugated card, plastic and wood samples.	Material samples, spray bottles	Weather investigation outdoors	Material choice explanations	BBC Bitesize Materials
4	Reinforcement Techniques	Reinforcement improves strength.	Practise folding, laminating, rolling and adding supports.	Card, glue, rulers	Build temporary structures outdoors	Technique assessment	Oak Structures videos
5	Accurate Measuring	Accuracy improves quality.	Measure, mark and cut templates.	Rulers, templates, scissors	Measure beach hut dimensions if visiting	Precision checks	Twinkl measuring activities
6	Joining Techniques	Strong joins create strong products.	Practise tabs, flanges, glue joins and internal supports.	Glue, masking tape, card	Outdoor joining challenge	Quality of joins	Oak DT Joining lesson
7	Design Criteria	Designers work to a specification.	Develop personalised design brief and criteria.	Planning sheets	Consider Greatstone weather	Design quality	Cornerstones planning examples
8	Designing the Beach Hut	Plans communicate ideas.	Draw labelled plans including dimensions and materials.	Design sheets, rulers	Sketch ideas outside	Design review	BBC Bitesize Design Process
9	Building Structure	Build accurately.	Construct walls, roof and frame.	Card, glue, scissors	Test stability outdoors	Teacher observation	Oak Building Structures

10	Finishing Construction	Products require careful finishing.	Add roof, windows, doors and decoration.	Paint, pens, collage materials	Photograph against beach backdrop	Quality of finish	Beach hut gallery inspiration
11	Testing & Improving	Designers evaluate products.	Wind test using fan. Water resistance demonstration. Improve models.	Fan, spray bottle, checklist	Outdoor weather testing	Improvements recorded	Oak Evaluation lesson
12	Greatstone Beach Hut Exhibition	Designers communicate ideas.	Present beach huts and explain design decisions. Complete evaluations.	Display boards, certificates	Outdoor showcase	Final assessment	School exhibition

Whole Project Resource List

Construction Materials

- Corrugated card
- Mount board
- Sugar paper
- Cartridge paper
- Wooden craft sticks
- Dowel
- Acetate
- Fabric scraps
- Recycled packaging
- String
- Lolly sticks

Tools

- Child-safe scissors
- Rulers
- Glue sticks
- PVA glue
- Masking tape
- Hole punches
- Pencil
- Cutting mats (teacher use)

Finishing Materials

- Poster paint
- Paintbrushes
- Felt pens
- Collage papers
- Tissue paper
- Stickers

Testing Equipment

- Small fan
- Water spray bottle
- Measuring tape
- Cameras/iPads
- Toy figures
- Beach equipment props

Recommended Online Resources

Teacher Subject Knowledge

- Cornerstones **Beach Hut** project
- Oak National Academy – Structures
- BBC Bitesize – Materials and Structures
- Design Museum Learning resources

Inspiration

- Greatstone Beach huts
- Mersea Island beach huts
- Southwold beach huts
- Brighton beach huts

Demonstration Videos

- Card reinforcement techniques
- Making strong tabs and flanges
- Building freestanding structures

YEAR 2 – CUT, STITCH AND JOIN - Summer Term

How can we design and make a useful textile product that is strong, attractive and personal to its user?

Section	Curriculum Overview
Curriculum Rationale	This project introduces pupils to textile design through the purposeful challenge of making a sewn bag tag. Pupils investigate everyday fabric products, learn how fabrics differ in appearance and working properties, and explore how designers use templates, stitching and embellishment to produce useful and appealing outcomes. Building on Year 1 experiences of selecting, cutting and joining construction materials, pupils transfer these principles to fabric. They learn to use a paper pattern, cut fabric with increasing accuracy, join two pieces using running stitch and add decorative features appropriate to an intended user. The project follows the complete design process of investigating, designing, practising, making, evaluating and improving. The Cornerstones project specifically focuses on fabric products, Cath Kidston, sewing patterns, running stitch, embellishments and the creation of a sewn bag tag.
The Greatstone Way	**PROTECTORS → LEGACY – How can we care for people, places and our planet? What difference will we leave behind?** Pupils design a product that protects and identifies a belonging while considering the needs, interests and identity of its user. They develop the summer value of **Dare** by learning an unfamiliar practical skill, persevering when stitches or joins are difficult and creating a high-quality textile product that can be used beyond the project.
National Curriculum Coverage	Pupils design purposeful, functional and appealing products for themselves and others using design criteria. They generate, develop and communicate ideas through discussion, drawing, templates and mock-ups; select and use tools for cutting, shaping, joining and finishing; select textiles and components according to their characteristics; investigate existing products; and evaluate their ideas and completed products against agreed criteria. The KS1 programme explicitly includes textiles within the required range of materials and components.
Curriculum Journey	**Previous learning:** In EYFS, pupils explored fabrics, collage, threading and simple joining. During Year 1 DT, they selected materials, cut, joined and finished products through **Shade and Shelter**, **Taxi!** and **Chop, Slice and Mash**. **Current learning:** Pupils learn how two-dimensional fabric pieces can be cut from a template and joined to create a finished textile product. **Future learning:** Year 4 **Functional and Fancy Fabrics** develops more complex textile design, fabric decoration and increasingly secure stitching. Year 6 **Make Do and Mend** revisits textiles through repair, reuse, sustainability and independent construction.
Design Brief	Design and make a sewn bag tag for a named user. The tag should help identify a bag, remain securely attached during use and include colours, shapes or embellishments that communicate something about its owner.
Possible Users	A pupil beginning a new school year; a Reception buddy; a family member; a Beach School explorer; a member of staff; or a fictional traveller linked to **Magnificent Monarchs**.
Design Criteria	The bag tag must suit its intended user; be made from two accurately cut fabric pieces; use running stitch to create a secure seam; include a loop or fastening; remain strong enough for normal use; include purposeful decoration or embellishment; have no loose components; and be evaluated against the original design criteria.
Sticky Knowledge	Textiles are materials made from natural or manufactured fibres. Fabrics have different characteristics, including thickness, softness, flexibility, stretch and strength. A template is a shape used to cut pieces accurately. A seam is the line where two pieces of fabric are joined. Running stitch passes repeatedly through the fabric in an over-and-under pattern. A knot or securing stitch prevents thread from pulling out. Embellishments add decorative detail but must be attached securely. Designers consider function, user and appearance together.
Technical Knowledge and Skills	Investigate fabric products and identify their user, purpose, materials and joining methods. Compare simple fabric properties. Develop and use design criteria. Create and use a paper template. Position and secure a template to fabric. Mark and cut fabric accurately. Thread a large-eye needle. Tie or use a prepared knot. Use running stitch with increasing consistency. Join two matching fabric pieces. Create and attach a fabric or ribbon loop. Add embellishments using stitching, fabric adhesive or securely attached textile components. Test seam strength and attachment. Evaluate and improve the final product.
Substantive Concepts	User • Purpose • Textile • Fabric • Template • Stitch • Seam • Fastening • Decoration • Function
Disciplinary Concepts	Investigate • Compare • Design • Practise • Make • Test • Evaluate • Improve

Core Vocabulary	textile, fabric, fibre, natural, manufactured, property, flexible, strong, soft, thick, thin, template, pattern piece, accurate, pin, clip, mark, cut, needle, thread, running stitch, seam, knot, loop, fastening, embellishment, attach, evaluate, refine
Designers, Makers and Product Examples	Pupils investigate luggage tags, key fobs, labels, purses, small bags, felt decorations and other everyday textile products. They study the recognisable prints and fabric home products associated with the British brand Cath Kidston, as identified within the Cornerstones project, and consider how designers create consistent patterns and appealing products for particular markets.
Cross-Curricular Links	**History – Magnificent Monarchs:** royal symbols, monograms, badges, heraldic colours and objects that identify status or ownership. **Art – Portraits and Poses:** identity, colour choice, pattern and personal representation. **Science:** comparing materials according to observable characteristics. **English:** design descriptions, instructions, oral explanations and evaluations. **Mathematics:** measurement, shape, symmetry, repeating pattern and equal spacing. **PSHE:** identity, belonging, perseverance and creating thoughtfully for another person.
Beach School & Outdoor Learning	Investigate bags, labels, fastenings and textile equipment used during Beach School. Consider why personal equipment needs to be named and easy to identify. Explore colours and repeated patterns found in shells, waves, dunes and coastal plants as inspiration for textile decoration. Outdoor stitching should take place only in a controlled seated area with clear needle-management procedures.
Greatstone & Kent Links	Design bag tags for Greatstone pupils' book bags, PE bags or Beach School bags. Draw inspiration from the school's sea identity, class sea animals, Greatstone Beach, local shells, waves, beach huts and coastal colours. Pupils may create a collective display showing how individual products contribute to the shared identity of the Greatstone community.
Memorable Hook	**The Greatstone Lost Property Challenge** – A collection of identical, unlabelled bags arrives with a message explaining that nobody knows who they belong to. Pupils are commissioned as textile designers to create strong, distinctive bag tags that make each bag easy to recognise and reflect the identity of its owner.
Authentic Outcome / Showcase	**The Greatstone Textile Boutique** – Pupils display their finished bag tags alongside templates, material investigations, stitch samples and design drawings. Each pupil explains the needs of their user, their fabric and decorative choices, how the product was constructed and how testing led to improvement.
Assessment End Point	Pupils design and make a functional textile bag tag for a particular user. They select fabric according to simple properties, use a template to cut two matching shapes, join the pieces using running stitch, attach a secure loop and purposeful embellishment, and evaluate the finished product against agreed design criteria.

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to Be Secured	Design Enquiry Question	Example Learning Activities	Weekly Resources	Beach School / Outdoor Learning	Assessment Opportunity	Online Example / Teacher Support
1	Launching the Lost Property Challenge	Textile products are designed for users and purposes. Appearance and function both influence design.	**Why do people use labels and bag tags?**	Open the collection of unlabelled bags. Investigate examples of luggage tags, key fobs, labels and textile accessories. Identify user, purpose, materials and useful features. Begin a product-investigation page.	Bags; luggage tags; key fobs; fabric labels; product photographs; magnifiers; investigation sheets; vocabulary cards	Audit how Greatstone pupils identify and organise bags and equipment during outdoor learning.	Can pupils identify the user, purpose and essential features of a bag tag?	Cornerstones: Cut, Stitch and Join
2	Exploring fabrics and their properties	Fabrics differ in strength, thickness, flexibility, texture, stretch and tendency to fray. Material choice should relate to function.	**Which fabric would make the best bag tag?**	Handle and compare felt, cotton, fleece, denim, hessian and synthetic fabric. Conduct simple tests for flexibility, fraying, stretch and ease of marking. Record observations and rank fabrics for suitability.	Fabric samples; magnifiers; fabric-property cards; pegs; small weights; rulers; recording grids	Compare the fabrics used in coats, bags, picnic rugs and outdoor equipment.	Can pupils compare fabrics and justify a suitable choice?	Oak: Fabric properties
3	Investigating designers and pattern	Designers use recognisable colours, prints and repeated motifs to make products appealing and distinctive.	**How can pattern make a product easy to recognise?**	Investigate Cath Kidston products and other patterned textile designs. Identify repeated motifs, colour palettes and target users. Create small repeating-pattern studies linked to Greatstone's coast or sea animals.	Designer images; patterned fabric; sketchbooks; pencils; paint or coloured pencils; motif templates	Photograph repeated coastal patterns such as waves, shells, footprints, fences and beach-hut stripes.	Can pupils identify repeated motifs and explain how pattern communicates identity?	Cornerstones project overview
4	Understanding templates and pattern pieces	Templates help designers cut fabric pieces accurately and repeatedly. A textile product can be made by joining matching shapes.	**Why do textile designers use templates?**	Examine templates and compare inaccurate freehand cutting with template-cut pieces. Design simple tag shapes in paper. Fold or trace to check symmetry and size.	Paper and card; rulers; pencils; scissors; sample templates; tracing paper; bag examples	Use cardboard viewfinders to collect simple shapes inspired by local landmarks or natural objects.	Can pupils explain the purpose of a template and produce a workable tag shape?	Oak: Plan and make fabric templates
5	Marking and cutting fabric	Templates must be held securely. Accurate cutting improves fit, finish and construction.	**How can we cut two matching fabric pieces?**	Demonstrate placing the template economically, securing it with clips or pins under close supervision, marking around it and cutting carefully. Pupils make practice pieces before cutting a matched pair.	Felt; paper templates; fabric chalk or washable markers; fabric scissors; clips; trays; name labels	No loose cutting equipment outdoors. Pupils may select coastal colour combinations in an outdoor observation session.	Can pupils position a template and cut two pieces with increasing accuracy?	Oak: Plan and make fabric templates
6	Exploring joining techniques	Fabric can be joined using stitching, adhesive, staples or other fastenings, but the most appropriate method depends	**Which joining method is best for our bag tag?**	Compare sample joins made with fabric glue, staples and running stitch. Test gently for strength, flexibility and appearance. Agree	Fabric strips; completed sample joins; fabric glue; stapler for adult-controlled	Examine how outdoor textile products are joined and reinforced.	Can pupils compare joins and select one using evidence?	Oak: Experiment with different joining techniques

		on purpose, durability and appearance.		why running stitch is appropriate for the final product while recognising other valid methods.	samples; thread; needles; testing sheet			
7	Learning running stitch	Running stitch alternates over and under the fabric. Securing the thread prevents the seam from opening.	**How can we create a strong, even seam?**	Model threading, knotting or using a prepared thread, needle direction and over-and-under movement. Pupils practise on binca or pre-marked felt before progressing to plain fabric. Use dot guides where needed.	Large-eye blunt embroidery needles; embroidery thread; binca; felt strips; pre-marked stitch guides; needle threaders; pin cushions or needle trays	Practise seated in an organised outdoor craft area only where safe needle control can be maintained.	Can pupils independently create a recognisable running stitch and keep track of their needle?	Oak: Joining fabric with running stitch
8	Developing design criteria and final designs	Design criteria must respond to the user, function, construction method and appearance.	**What must my bag tag do for its user?**	Select a named user and gather simple preferences. Agree core criteria. Generate two design ideas showing shape, fabric, loop, stitching, motif and embellishment. Select and annotate the stronger design.	User profiles; interview prompts; design sheets; fabric and ribbon samples; coloured pencils; criteria checklists	Use Greatstone's colours, sea animals or coastal environment as optional design inspiration.	Does the final design clearly communicate construction, materials and user-centred choices?	GOV.UK: KS1 Design and Technology
9	Making the bag tag: joining pieces	Accurate alignment and consistent stitching create a secure seam. The loop must be positioned before the product is fully closed.	**How can we join our pieces without trapping or losing the fastening?**	Align the two pieces using clips. Position a ribbon or fabric loop between them. Stitch around most edges, leaving a small opening where needed. Pause to inspect stitch size and tension.	Cut fabric pieces; ribbon or tape; embroidery thread; blunt needles; clips; fabric pens; visual instructions; needle trays	Photograph colour and pattern references outdoors before making, rather than transporting all equipment unnecessarily.	Are the pieces aligned, the loop captured securely and the seam recognisable as running stitch?	
10	Completing and embellishing the product	Decorative features should suit the user and must not weaken function. Embellishments need secure attachment.	**How can decoration make the tag personal without making it fragile?**	Complete the seam and secure the thread. Add felt motifs, initials, simple embroidery, fabric pens, buttons or ribbon according to risk assessment. Check that decoration does not cover the fastening or loosen the seam.	Felt scraps; fabric pens; buttons; sequins; ribbon; embroidery thread; fabric adhesive; needles; scissors; templates	Draw motifs inspired by Greatstone shells, waves, beach huts and class sea animals.	Are embellishments purposeful, secure and appropriate to the user?	Oak: Explore finishing techniques
11	Testing, evaluating and improving	Textile products should be tested for seam strength, fastening security, recognisability and suitability for their user.	**Will my tag survive being used on a real bag?**	Attach tags to bags and conduct controlled tests: gentle pull, lift, movement, visual identification from a short distance and user feedback. Repair loose stitches or attachments. Complete an evaluation against the criteria.	Finished tags; school bags; testing checklist; user-feedback sheets; thread; needles; repair materials; cameras	Test whether the tag remains recognisable when bags are used in an outdoor equipment area.	Can pupils use evidence to identify a successful feature and complete a meaningful repair or improvement?	
12	Greatstone Textile Boutique	Designers communicate how research, material choice and technical skill produced a product for a real user.	**How successfully does my product represent and serve its user?**	Curate the exhibition. Display product investigation, templates, stitch samples, design development and finished tags. Present products to users and explain construction and evaluation.	Display boards; finished products; design folders; labels; visitor-feedback cards; certificates; reflection sheets	Create a Greatstone bag-identification trail or outdoor display using photographs rather than leaving textiles exposed to poor weather.	Final assessment of investigation, user-centred design, template use, cutting, joining, finishing, testing and evaluation.	Oak textile lesson collection
Oak's textile resources reinforce that a template supports accurate cutting and that a three-dimensional textile product can be assembled from matching fabric shapes. They also model running stitch as a repeated over-and-under method used to create a seam.								

Whole-Project Resource List

Existing products and visual references

- Fabric luggage tags
- Key fobs
- Named school bags
- Small purses and pouches
- Fabric labels
- Felt decorations
- Cath Kidston product and pattern images
- Examples of contrasting plain and patterned fabrics
- Photographs of coastal motifs, Greatstone colours and class sea animals

Fabric and textile components

- Felt in a range of colours
- Cotton fabric
- Fleece, denim, hessian and synthetic samples for investigation
- Embroidery thread
- Yarn or wool
- Ribbon, tape or narrow fabric strips for loops
- Felt scraps for appliqué
- Buttons, sequins and beads where risk assessed
- Iron-on or adhesive interfacing for teacher-prepared examples if appropriate

Tools and equipment

- Paper scissors
- Fabric scissors
- Large-eye blunt embroidery needles
- Needle threaders
- Fabric chalk or washable fabric markers
- Rulers
- Pencils
- Card for templates
- Tracing paper
- Fabric clips or small pegs
- Pin cushions, magnetic needle dishes or numbered needle trays
- Fabric adhesive
- Glue spreaders
- Stapler for adult demonstrations only
- Embroidery hoops where useful

- Binca or plastic canvas for initial stitch practice

Planning and assessment

- Product-analysis grids
- Fabric-property investigation sheets
- User profiles and interview prompts
- Design-criteria checklists
- Template-design sheets
- Stitch-practice cards
- Step-by-step visual instructions
- Testing and evaluation forms
- Cameras or tablets
- Display boards and product labels

Safety and Preparation Notes

- Complete the school's textile and sewing risk assessment before the project.
- Use blunt, large-eye embroidery needles suited to young pupils.
- Count needles and pins out and back in at every session. A numbered needle-management system is strongly recommended.
- Pins should be avoided where fabric clips can be used. Where pins are necessary, they require close adult supervision.
- Teach pupils to carry scissors and needles safely and never walk around with an unsecured needle.
- Provide each pupil or group with a defined work tray so small equipment remains visible.
- Pre-cut thread into manageable lengths to reduce tangling.
- Secure the end of thread in advance for pupils who are not yet able to knot independently; this does not remove the need to teach what the knot does.
- Check buttons, sequins and beads against choking and allergy considerations.
- Fabric glue should be used sparingly and in accordance with manufacturer guidance.
- Store unfinished products with needles removed.
- Ensure handwashing after handling shared textile products and adhesives.
- Oak identifies sewing equipment as requiring risk assessment and adult supervision.

Adaptive Teaching	Support and Adaptation
Understanding products	Use real textile products and allow pupils to handle, turn and examine seams, fastenings and decorations.
Fabric comparison	Limit the number of samples initially and use visual property cards such as strong, soft, stretchy and frays.
Template work	Provide a range of approved simple templates, thicker card edges, fabric clips and pre-drawn cutting lines.
Cutting	Offer spring scissors, larger shapes, non-fraying felt and adult support for rotating fabric while the pupil controls the scissors.
Threading	Use large-eye needles, needle threaders, contrasting thread and shorter lengths. Pre-thread where necessary while continuing to teach the sequence.
Running stitch	Begin with lacing cards, then binca, pre-punched felt or dotted stitch guides before moving to plain felt.
Visual processing	Provide one illustrated stage at a time: align → clip → thread → stitch → secure → embellish → test.
Motor difficulties	Use pre-punched holes, embroidery hoops, thicker cord or alternative meaningful roles such as designing, positioning components and testing.
Greater depth	Ask pupils to develop an original template, maintain more even stitch spacing, attach embellishment through stitching and compare alternative seam or fastening solutions.
Evaluation	Use photographs and sentence stems: "My user needed…", "I chose felt because…", "The pull test showed…", "I repaired…".

Common Misconception	Teaching Response
All textiles are the same as fabric.	Explain that textile is the broader term; fabrics are textile materials made from fibres.
A template is part of the final product.	Demonstrate that the paper template guides cutting and is removed before assembly.
Templates need to include every decorative detail.	Clarify that the main template usually gives the product's basic outline; smaller details are added later. Oak highlights this misconception in its template lesson.
The two fabric pieces can be different sizes.	Overlay them before stitching and show how unmatched edges create gaps or an uneven seam.
Any joining method is equally suitable.	Compare appearance, strength, flexibility and durability through controlled tests.
Running stitch should stay only on the top surface.	Model the repeated over-and-under movement through both layers.
Pulling the thread as tightly as possible creates the strongest seam.	Show how excessive tension gathers fabric and distorts the product.
Decoration can be added anywhere.	Revisit the fastening, seam line, function and intended user before embellishing.
More decoration always improves the product.	Compare purposeful, secure decoration with cluttered or fragile examples.
The product is finished as soon as sewing stops.	Require attachment testing, user feedback, evaluation and repair before completion.

Key Online Examples and Teacher Resources

- Cornerstones: Cut, Stitch and Join
- GOV.UK: National Curriculum for Design and Technology
- Oak: Templates in Textiles – Lesson Collection
- Oak: Plan and Make Fabric Templates
- Oak: Joining Fabric with Running Stitch
- Oak: Experiment with Different Joining Techniques
- Oak: Explore Finishing Techniques

YEAR 3 – COOK WELL, EATWELL - Autumn Term

How can we design and cook a healthy taco filling for a particular user?

Section	Curriculum Overview
Curriculum Rationale	This project marks pupils' transition into Key Stage 2 cooking and nutrition. Building on **Chop, Slice and Mash** in Year 1 and **Remarkable Recipes** in Year 2, pupils deepen their understanding of food groups, balanced diets, ingredient origins and cooking methods. They investigate how ingredients change when heated, practise increasingly precise preparation techniques and explore the flavour, texture and nutritional contribution of different foods. Pupils then use research and sensory evaluation to design, prepare and cook a predominantly savoury taco filling for a specified user. The agreed Cornerstones project teaches food groups and the Eatwell Guide, explores cooking through potatoes and ratatouille, and culminates in pupils choosing and making a taco filling to meet design criteria.

The Greatstone Way	**ROOTS → SURVIVORS – Who are we and where do we belong? How do people overcome challenges and adapt?** Pupils explore how food reflects family, culture, place and community before considering how recipes are adapted according to available ingredients, dietary needs and individual circumstances. They develop the autumn value of **Care** by preparing food safely for others, respecting cultural and dietary differences, reducing waste and understanding how nutritious meals support health and wellbeing.
National Curriculum Coverage	At Key Stage 2, pupils should use research to understand user needs, develop design criteria, communicate ideas through annotated sketches and prototypes, select appropriate tools and ingredients, work accurately, evaluate existing products and improve their own outcomes. In cooking and nutrition, pupils should apply the principles of a healthy and varied diet, prepare and cook predominantly savoury dishes using a range of techniques, and understand where and how ingredients are grown, reared, caught and processed.
Curriculum Journey	**Previous learning:** Year 1 introduced food origins, hygiene and basic preparation. Year 2 developed recipe reading, measurement, sensory analysis and recipe adaptation. **Current learning:** Pupils apply a broader understanding of nutrition and use heat to cook ingredients safely, developing a user-centred taco filling through research, testing and refinement. **Future learning:** Year 4 **Fresh Food, Good Food** develops understanding of food preservation, packaging and freshness. Year 5 **Eat the Seasons** deepens seasonality and recipe development, while Year 6 **Food for Life** increases independence and nutritional decision-making.
Design Brief	Research, design and cook a healthy taco filling for an identified Greatstone user or group. The filling must be predominantly savoury, nutritionally varied, prepared hygienically, cooked safely and suitable for serving in a taco or wrap.
Possible Users	A Year 3 classmate; a family attending the autumn showcase; a Viking or Anglo-Saxon traveller linked to **Invasion**; a pupil requiring a vegetarian option; a Beach School group; or a user with a specified dietary preference or requirement.
Design Criteria	The filling must suit its intended user; contain ingredients from more than one food group; include vegetables; be predominantly savoury; use at least three preparation techniques; involve a suitable cooking method; have an appealing balance of flavour, colour and texture; meet all dietary and allergy requirements; minimise avoidable waste; and be evaluated against user feedback.
Sticky Knowledge	The Eatwell Guide shows the proportions and variety of food groups that contribute to a balanced diet. Nutrients perform different roles within the body. Ingredients may be grown, reared, caught or processed. Heating can change the colour, flavour, texture, aroma and safety of food. Cooking methods include boiling, baking, grilling, steaming, frying and simmering. A recipe specifies ingredients, quantities, equipment and an ordered method. Food designers research users, test combinations and adapt recipes before creating a final product.
Technical Knowledge and Skills	Identify the main food groups and explain their broad contribution to a varied diet. Research an intended user. Compare ingredients using sensory vocabulary. Read and adapt recipes. Measure mass and volume using scales, jugs and spoons. Wash, peel, chop, slice, dice, grate, crush, mix and combine ingredients with increasing control. Observe and compare cooking methods. Use heat only through the school's assessed procedures and with appropriate adult supervision. Develop a design specification, produce an annotated recipe plan, cook a taco filling, gather feedback and make evidence-based improvements.
Substantive Concepts	User • Purpose • Nutrition • Food Group • Ingredient • Recipe • Cooking • Seasonality • Culture
Disciplinary Concepts	Research • Investigate • Taste • Analyse • Design • Prepare • Cook • Test • Evaluate • Adapt
Core Vocabulary	nutrition, nutrient, carbohydrate, protein, dairy, fruit, vegetable, oils, balanced, varied, ingredient, recipe, quantity, method, processed, grown, reared, caught, seasonal, sensory, aroma, flavour, texture, savoury, dice, grate, crush, sauté, simmer, boil, bake, design criteria, evaluate, adapt
Chefs, Growers and Product Examples	Pupils investigate tacos, wraps, vegetable fillings, chilli-style fillings, beans, ratatouille and other vegetable-based savoury dishes. They consider how cooks, chefs and food manufacturers develop meals for particular users, balancing nutrition, flavour, cost, presentation and dietary needs.
Cross-Curricular Links	**History – Invasion:** investigate food available to Anglo-Saxon and Viking communities and compare this with modern access to globally sourced ingredients. **Science:** nutrition in animals, including humans; food groups; the importance of an appropriate diet; observable changes caused by heating. **Geography:** ingredient origins, food journeys and links between climate and food production. **English:** research notes, instructional writing, persuasive menu descriptions and evaluations. **Mathematics:** mass, capacity, scaling quantities, fractions and time. **PSHE:** healthy choices, respectful attitudes towards different diets and shared responsibility during practical work.
Beach School & Outdoor Learning	Investigate the requirements of a warm, nutritious outdoor meal, including portability, storage, hygiene, fuel use and waste. Compare suitable and unsuitable foods for an outdoor expedition. Pupils may design a taco filling for a Beach School lunch, but cooking outdoors should occur only where the school has appropriate equipment, trained staff and a separate risk assessment.
Greatstone & Kent Links	Explore vegetables, cereals and other ingredients grown or produced in Kent. Consider how Greatstone's coastal location connects the community to farming, fishing, trade and the movement of foods. Invite school kitchen staff or a local food professional to discuss menu planning, allergens, food waste and preparing healthy meals for large groups.
Memorable Hook	**The Greatstone Taco Test Kitchen** – Pupils receive a food-designer's case containing user profiles, menus, ingredient samples and a recipe that lacks vegetables, balance and clear instructions. They are commissioned to investigate nutrition and cooking methods before developing a healthier, tastier taco filling.
Authentic Outcome / Showcase	**The Greatstone Taco Test Kitchen** – Pupils present their research, annotated recipes, sensory evaluations and freshly prepared fillings to an invited user panel. They explain their nutritional and practical decisions, demonstrate selected techniques and use feedback to recommend a final Greatstone taco filling.
Assessment End Point	Pupils independently research a user and develop appropriate design criteria. They explain how their ingredients contribute to a healthy and varied diet, measure and prepare ingredients with increasing accuracy, describe changes caused by cooking, produce a safe predominantly savoury taco filling and evaluate it using sensory evidence and user feedback.
The National Curriculum expects Key Stage 2 pupils to prepare and cook a range of predominantly savoury dishes while understanding nutrition, seasonality and ingredient sources.	

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to Be Secured	Design Enquiry Question	Example Learning Activities	Weekly Resources	Beach School / Outdoor Learning	Assessment Opportunity	Online Example / Recipe Support
1	Launching the Taco Test Kitchen	Food products are designed for specific users, needs and occasions.	**Who are we designing for, and what does our food need to provide?**	Open the food-designer's case. Examine user profiles and examples of tacos and wraps. Analyse user needs, including taste, nutrition, dietary requirements, portability and occasion. Begin a project design journal.	Commission letter; taco and wrap images; user profiles; sample menus; design journals; sticky notes; vocabulary cards	Compare the needs of a classroom meal with food prepared for an outdoor expedition.	Can pupils distinguish between a user's needs and preferences?	Cornerstones – Cook Well, Eatwell
2	Understanding food groups	A balanced diet includes appropriate variety and proportions from different	**What does our body need from food?**	Study the Eatwell Guide. Sort ingredients into food groups and compare sample meals. Improve an unbalanced taco meal	Eatwell Guide; food and ingredient cards; sample meal photographs; sorting hoops;	Design a balanced meal suitable for a Beach	Can pupils classify familiar ingredients and	Healthy Eating and Cooking Toolkit

		food groups. Nutrients support growth, repair, energy and health.		by adding or changing ingredients. Discuss balance and variety without labelling foods simply as “good” or “bad”.	paper plates; nutrition information	School day using picture cards.	explain why variety is important?	
3	Ingredient sources and processing	Ingredients may be grown, reared, caught or processed. Processing changes food from its original form.	**Where do taco ingredients come from?**	Trace tortillas, tomatoes, beans, cheese, vegetables and herbs from source to product. Use maps, packaging and flow diagrams. Compare minimally processed ingredients with products changed through grinding, cooking, preserving or combining.	Real ingredients or packaging; UK and world maps; flow cards; food-source images; atlases; recording sheets	Identify connections between Kent farming, coastal trade and foods available locally.	Can pupils accurately use grown, reared, caught and processed?	Food – a fact of life
4	Investigating cooking methods	Different cooking methods transfer heat differently and alter food in different ways.	**Why do cooks choose different cooking methods?**	Explore boiling, baking, grilling, steaming, frying and simmering through images, demonstrations and safe teacher-prepared samples. Compare appearance, aroma, texture and flavour before and after cooking.	Cooking-method cards; safe raw and cooked samples; sensory grids; pans and utensils for demonstration; visualiser	Discuss safe methods of cooking or heating food outdoors and why specialist equipment and procedures are needed.	Can pupils match cooking methods to foods and describe changes caused by heat?	GOV.UK – Primary Food Teaching Framework
5	Exploring potatoes and changes caused by cooking	One ingredient can produce different sensory results when cooked in different ways.	**How does the cooking method change an ingredient?**	Compare boiled, baked, mashed and roasted potato prepared by adults. Record differences in colour, aroma, flavour and texture. Discuss oil, added ingredients and how preparation affects the final product.	Prepared potato samples; tasting plates; forks; sensory charts; cooking-method labels; allergy records	Consider which potato preparation would be practical for an outdoor meal and why.	Can pupils use comparative sensory vocabulary and connect changes to cooking method?	Food – a fact of life recipe resources
6	Preparing and investigating ratatouille	Combining vegetables and simmering them develops a different texture and flavour from eating them raw.	**What happens when vegetables are cooked together?**	Investigate the ingredients and sequence of a simple ratatouille. Pupils practise washing, peeling where appropriate, slicing and dicing suitable vegetables. Adults control heat while pupils observe softening, liquid release and aroma development. Conduct a structured tasting.	Courgettes; peppers; tomatoes; onion prepared as required; herbs; chopping boards; child-appropriate knives; bowls; saucepan; wooden spoon; aprons; sensory sheets	Compare the colours and textures of vegetables with those found in the local environment; cooking remains indoors unless separately risk assessed.	Can pupils explain how simmering changed the vegetables?	BBC Good Food – Easy Ratatouille
7	Developing practical techniques	Accurate preparation produces even pieces that cook consistently. Tools must match the task.	**How can accuracy improve our cooking?**	Rotate through closely supervised skill stations: measuring, weighing, grating, crushing, chopping, slicing, dicing, mixing and combining. Compare uneven and evenly cut vegetables and discuss their likely cooking times.	Digital scales; measuring jugs; spoons; graters; garlic crushers; child-appropriate knives; chopping boards; soft vegetables; visual technique cards	Rehearse measurement and sequencing through an outdoor ingredient relay without preparing food.	Can pupils select tools appropriately and prepare ingredients with increasing uniformity?	Classroom Cooking Toolkit
8	Investigating taco fillings	Food designers evaluate existing products before developing their own ideas.	**What makes a successful taco filling?**	Taste several safe teacher-prepared filling combinations, such as beans and tomato, vegetable ratatouille, sweetcorn and pepper, or mild lentil chilli. Assess nutrition, colour, aroma, flavour, texture and practicality. Identify successful features.	Small prepared samples; tasting dishes; water; sensory scales; ingredient cards; allergy information; cameras	Evaluate which filling would be easiest to transport and serve during Beach School.	Can pupils use evidence to compare products rather than relying only on preference?	BBC Good Food – Vegetarian Taco Recipes
9	Researching users and writing design criteria	Research helps designers identify user needs. Criteria should be specific and testable.	**What must our filling achieve for its user?**	Interview or analyse a chosen user profile. Identify dietary needs, preferred flavours, disliked textures and serving context. Develop design criteria covering nutrition, ingredients, sensory qualities, preparation and presentation. Oak’s Year 3 resources model using user research to develop criteria.	Interview sheets; user cards; allergy and dietary profiles; design-criteria templates; sensory vocabulary; example criteria	Consider whether the user requires the meal for school, home or outdoor learning.	Are the criteria linked directly to research and capable of being tested?	Oak – Using Research to Develop Design Criteria
10	Designing and cooking the taco filling	Recipes communicate quantities, techniques, timings and sequence. Designers adapt ideas safely during making.	**How can we turn our research into a successful recipe?**	Produce an annotated recipe plan showing ingredients, quantities, equipment, techniques and method. Prepare and cook the filling in small groups. Pupils measure and prepare; adults supervise or control heat according to the risk assessment. Photograph key stages and record adaptations.	Selected ingredients; tortillas where used; digital scales; measuring equipment; chopping boards; knives; graters; bowls; pans; wooden spoons; aprons; recipe plans; cameras	Serve outdoors only where food is covered, temperature controlled and immediately supervised.	Can pupils follow a planned sequence, work hygienically and explain any adaptations?	BBC Good Food – Easy Vegetarian Tacos

11	Sensory testing, evaluation and improvement	Evaluation compares the final product with criteria and gathers evidence from intended users.	**How well does our filling meet the design brief?**	Conduct a structured user tasting. Compare feedback with the design criteria. Evaluate nutrition, taste, texture, aroma, colour and practicality. Propose one specific recipe improvement and produce a revised ingredient list or method.	Fresh samples; feedback forms; sensory grids; original design criteria; recipe-redesign sheets; photographs	Evaluate whether the product would remain suitable and safe for an outdoor meal.	Can pupils use user feedback and testing evidence to justify an improvement?	Oak – Healthy and Varied Diets Unit
12	Greatstone Taco Test Kitchen	Food designers communicate how research, nutrition and technical skills shaped their product.	**Why should our taco filling be chosen?**	Present research, food-group analysis, recipe development, practical photographs and evaluation. Give a short pitch to families, kitchen staff or another class. Compile successful recipes into a Greatstone taco booklet.	Display boards; recipe cards; design journals; photographs; evaluation summaries; visitor feedback slips; certificates	Host an outdoor tasting or presentation only where school food-safety arrangements permit.	Final assessment of research, nutrition, recipe planning, preparation, cooking, evaluation and communication.	Healthy Eating and Cooking Toolkit

Suggested Recipe Starting Points

Recipe Starting Point	Likely Pupil Techniques	Adult-Controlled or Closely Supervised Processes	Online Example
Vegetable ratatouille taco filling	Wash, measure, slice, dice, tear herbs and combine	Onion preparation where needed; hob use and simmering	BBC Good Food – Ratatouille
Bean and tomato taco filling	Drain, rinse, measure, mash, chop soft vegetables and mix	Heating and stirring on the hob	BBC Good Food – Easy Vegan Tacos
Lentil and vegetable filling	Measure, grate, chop, combine and season	Cooking lentils and simmering filling	BBC Good Food – Vegetarian Taco Collection
Sweetcorn, pepper and bean filling	Drain, rinse, chop, grate, mix and portion	Optional heating by an adult	NHS Healthier Families Recipes
Potato and vegetable taco filling	Measure, mash cooked potato, chop soft vegetables and combine	Boiling or baking potatoes	Food – a fact of life Recipes
Recipes must be adapted to current allergy information, available facilities and the school's risk assessment. The final outcome should remain pupil-designed and adapted to a chosen user. These recipes provide teacher examples rather than a compulsory class outcome.			

Whole-Project Resource List

Food and Nutrition Resources

- Eatwell Guide posters and food-group cards
- Ingredient-origin maps and packaging
- Cooking-method cards and photographs
- Simple nutritional information suitable for Year 3
- User and dietary profile cards
- Taco, wrap and filling photographs
- Sensory vocabulary mats
- Sample recipes and menu cards

Possible Ingredients

Final selection will depend on pupil designs, allergies and dietary requirements.

- Tortillas or taco shells
- Tomatoes or tinned tomatoes
- Peppers
- Courgettes
- Sweetcorn
- Carrots
- Beans, chickpeas or lentils
- Cooked potatoes
- Onion, prepared according to pupil capability
- Fresh or dried herbs
- Mild spices
- Reduced-salt stock where required
- Grated cheese or suitable alternative
- Natural yoghurt or suitable alternative
- Lime or lemon juice
- Salad leaves

Preparation Equipment

- Colour-coded chopping boards
- Child-appropriate knives
- Peelers
- Graters
- Garlic crushers where appropriate
- Digital scales
- Measuring jugs
- Measuring spoons
- Mixing bowls
- Spoons, forks and mashers
- Colanders and sieves
- Plates and tasting utensils
- Aprons
- Non-slip mats
- Recipe stands or wipe-clean visual instructions

Adult-Controlled Cooking Equipment

- Hob or portable induction unit where approved
- Saucepans and frying pans
- Wooden spoons
- Heatproof mats
- Oven gloves
- Timers
- Food thermometer where required by school procedures
- Kettle or hot-water source where appropriate

Planning, Assessment and Display

- Design journals
- User-research sheets
- Sensory-analysis grids
- Design-criteria templates
- Annotated recipe planners
- Food-group and ingredient-origin tasks
- Practical-skills checklists
- User-feedback forms
- Cameras or tablets
- Display boards and recipe-book materials

Safety, Allergy and Preparation Notes

- Complete a project-specific food risk assessment and follow current school food-hygiene procedures.
- Obtain up-to-date information about allergies, intolerances and religious or cultural dietary requirements before selecting ingredients.
- Check every label immediately before use and manage cross-contamination carefully.
- Ensure pupils wash their hands, tie back long hair, wear aprons and clean workspaces appropriately.
- Wash fresh produce before preparation.
- Use child-appropriate knives only with ingredients suited to pupils' level of control.
- Closely supervise graters, peelers and crushers.
- Adults should manage heat, pans, hot liquids, hard ingredients and draining unless school procedures explicitly permit otherwise.
- Position pan handles safely and establish a clearly marked hot zone.
- Do not ask pupils to taste ingredients; sensory evaluation can include sight, aroma and texture where tasting is unsuitable.
- Food served outside must remain covered and within safe temperature limits.
- Use fresh samples for evaluation rather than retaining leftovers.
- The government's classroom cooking toolkit provides practical guidance for organising safe, hygienic and manageable food activities.

Adaptive Teaching

Area	Support and Adaptation
Understanding nutrition	Use real ingredients, colour-coded food groups and simplified Eatwell Guide sections. Revisit vocabulary through repeated sorting and meal-building activities.
User research	Provide picture-supported profiles and allow pupils to interview a familiar adult or partner orally.

Recipe reading	Use pictorial recipes, numbered steps, colour-coded ingredients and one instruction at a time.
Measuring	Begin with spoon and cup measures, pre-zeroed scales and prepared ingredient quantities before expecting greater independence.
Cutting and preparation	Provide non-slip mats, adapted handles, softer ingredients, larger pieces and adult support. Allocate meaningful alternative roles such as weighing, mixing, timing or recording.
Sensory needs	Permit pupils to keep foods separate, observe without tasting or use smell and appearance as valid evidence. Avoid surprise ingredients.
Language	Provide sensory vocabulary grouped into appearance, aroma, taste and texture. Rehearse explanations orally before writing.
Greater depth	Ask pupils to compare nutritional contributions, scale a recipe, justify substitutions, calculate approximate cost or redesign to reduce food and packaging waste.
Evaluation	Link every evaluation prompt directly to a design criterion and provide photographs of the making process.

Common Misconception	**Teaching Response**
A balanced diet means eating equal quantities from every food group.	Use the Eatwell Guide to show that balance refers to appropriate proportions and variety over time.
Protein is only found in meat.	Compare beans, lentils, chickpeas, eggs, dairy and alternatives.
Carbohydrates are only bread and pasta.	Include rice, potatoes, cereals and other starchy foods.
All processed food is unhealthy.	Explain that processed means changed from its original form; processing includes chopping, freezing, cooking and combining as well as industrial production.
Cooking only makes food hot.	Compare changes in colour, aroma, texture, flavour, safety and digestibility.
Frying and sautéing mean exactly the same thing.	Explain that sautéing generally uses a small amount of fat and relatively quick cooking, while frying is a broader category.
More ingredients make a healthier or tastier filling.	Compare purposeful combinations with mixtures that lack balance or have competing flavours and textures.
Spicy and flavourful mean the same thing.	Explore flavour from herbs, citrus, vegetables and mild seasonings as well as heat from chilli.
A personal preference proves that a product has met the brief.	Require evidence from the intended user and agreed design criteria.
Once cooked, a recipe cannot be improved.	Use testing and feedback to revise quantities, seasoning, texture or method.

Key Online Examples and Teacher Resources

- Cornerstones: Cook Well, Eatwell
- GOV.UK: National Curriculum for Design and Technology
- GOV.UK: Food Teaching in Primary Schools Framework
- Healthy Eating and Cooking Toolkit
- Classroom Cooking Toolkit
- Food – a fact of life
- Food – a fact of life Recipes
- Oak: Using Research to Develop Design Criteria
- Oak: Healthy and Varied Diets Unit
- BBC Good Food: Ratatouille
- BBC Good Food: Vegetarian Taco Recipes
- BBC Good Food: Easy Vegan Tacos

YEAR 3 – MAKING IT MOVE - Spring Term

How can we design and make a product that uses mechanical systems to create movement?

Section	Curriculum Overview
Curriculum Rationale	This project introduces pupils to simple mechanical systems through cams, followers and levers. Building on earlier structural projects and the design process established in Key Stage 1, pupils investigate how movement can be transferred and controlled to make products interactive. They explore existing mechanical toys and books, learning how designers and engineers use mechanisms to solve problems and entertain users. Pupils investigate different cam profiles, design criteria and user needs before designing, making and evaluating a moving picture or mechanical toy. This project provides the foundation for more complex mechanisms in Year 5's **Moving Mechanisms** and Year 6's **Engineer**.
The Greatstone Way	**EXPLORERS → INVENTORS – How does curiosity help us discover more? How do ideas change the world?** Pupils investigate how inventors and engineers have developed mechanisms that make everyday products move. They develop the value of **Dream** by experimenting, solving problems and refining ideas through testing. The project links naturally to scientific enquiry and encourages pupils to think creatively about how movement can communicate information or tell a story.
National Curriculum Coverage	Use research and develop design criteria for functional products. Generate and communicate ideas through annotated sketches and prototypes. Select appropriate materials and tools accurately. Understand and use mechanical systems, including cams. Evaluate existing products and improve their own designs.
Curriculum Journey	**Previous learning:** Year 1 Taxi introduced wheels and axles. Year 2 Beach Hut developed structural stability and precision. **Current learning:** Pupils explore rotary motion, cams, followers and axles to create movement. **Future learning:** Year 5 Moving Mechanisms introduces gears, pulleys and more complex mechanical systems, before Year 6 Engineer develops independent mechanical problem solving.
Design Brief	Design and make an interactive mechanical picture or toy that uses a cam mechanism to create movement for a chosen audience.
Design Criteria	The product must include a working cam mechanism, produce smooth movement, be securely constructed, include an attractive design, communicate a clear purpose and be safe to use repeatedly.
Sticky Knowledge	A mechanism transfers movement. Rotary motion becomes linear or oscillating movement using cams and followers. Different cam shapes create different movements. Accurate measuring improves movement. Designers test mechanisms repeatedly before final construction.

Technical Knowledge & Skills	Identify mechanical systems. Construct axle supports. Create eccentric, pear-shaped and snail cams. Build followers. Join accurately using card and dowel. Measure and mark precisely. Evaluate movement and improve mechanisms.
Substantive Concepts	Mechanism • Movement • Cam • Follower • Rotary Motion • Linear Motion • User • Purpose
Disciplinary Concepts	Investigate • Prototype • Design • Make • Test • Evaluate • Improve
Core Vocabulary	mechanism, cam, follower, axle, rotary, linear, oscillating, eccentric, pear cam, snail cam, dowel, guide, prototype, engineer, movement, rotation, pivot
Design Inspiration	Mechanical toys, moving greetings cards, automata, moving storybooks and simple engineering mechanisms.
Cross-Curricular Links	**History – Dynamic Dynasties:** Ancient Chinese inventions and engineering. **Science:** Forces and magnets, pushes and pulls. **Maths:** Measuring accurately and angles of rotation. **Computing:** Designing moving animations before creating mechanical versions. **Art:** Illustrating moving scenes.
Beach School & Outdoor Learning	Investigate moving gates, pulleys, bridges and playground mechanisms outdoors. Observe how movement changes direction through simple machines found in the environment.
Greatstone & Kent Links	Explore mechanical equipment found at Greatstone, including playground equipment, lifeboat equipment or harbour mechanisms. Consider how engineers design equipment to withstand coastal conditions.
Memorable Hook	**The Greatstone Inventors' Workshop** – Pupils discover a collection of mysterious moving toys that work without batteries. They are challenged to discover how the movement is created before designing their own invention.
Authentic Outcome	**Greatstone Mechanical Toy Fair** – Pupils demonstrate their working mechanisms to younger children and explain how the cam system creates movement.
Assessment End Point	Pupils independently design, build and evaluate a working cam mechanism, accurately explaining how the movement is created and how they improved their design through testing.

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Activities	Resources	Outdoor Learning	Assessment	Online Examples
1	Launch the Inventors' Workshop	Investigate mysterious moving toys and books. Discuss how movement is created.	Mechanical toys, moving books, automata, videos	Identify moving playground equipment	Product investigation	Cornerstones Making It Move
2	Exploring Mechanisms	Investigate levers, pivots, wheels and cams.	Mechanism kits, card models	Find mechanisms around school	Vocabulary assessment	Oak DT Mechanisms
3	Rotary Movement	Explore circular movement using wheels and axles.	Dowel, wheels, card	Observe rotating playground equipment	Practical observations	BBC Bitesize Forces
4	Cam Investigation	Compare eccentric, pear and snail cams.	Cam templates, dowel, followers	Outdoor investigation of repetitive movement	Cam comparison	Oak Cam Mechanisms
5	Building Followers	Construct guides and followers.	Card strips, glue, dowel	Test movement outdoors	Prototype evaluation	Design Museum Learning
6	Prototype Mechanisms	Create working cam systems.	Card, split pins, dowel	Testing station outside	Teacher observation	Oak DT Prototype lesson
7	Design Brief	Develop design criteria and choose audience.	Planning sheets	Sketch moving ideas outdoors	Design review	Cornerstones planning
8	Designing Product	Produce annotated designs showing mechanism.	Sketchbooks, rulers	Nature inspiration for moving parts	Annotated design	BBC Bitesize Design
9	Construct Product	Build mechanism and structure.	Card, dowel, glue, scissors	Test stability outdoors	Making observations	Oak Construction
10	Add Moving Artwork	Create artwork linked to mechanism.	Paint, collage, pens	Sketch outdoor scenes	Product quality	Art links
11	Testing & Improving	Test movement repeatedly and refine.	Evaluation sheets	Outdoor demonstrations	Improvements	Oak Evaluation
12	Mechanical Toy Fair	Present products and explain mechanisms.	Display materials	Outdoor showcase	Final assessment	School exhibition

Whole Project Resource List

Mechanisms
- Wooden dowel
- Card wheels
- Cam templates
- Split pins
- Drinking straws
- Corrugated card
- Mount board

Construction
- Scissors
- Glue
- Masking tape
- Rulers
- Pencils
- Hole punches
- Craft knives (teacher use)

Art Materials
- Paint
- Felt pens
- Coloured pencils
- Tissue paper
- Collage papers

Testing
- Cam testing rigs
- Cameras/iPads
- Evaluation sheets

Recommended Online Resources

Subject Knowledge
- Cornerstones **Making It Move**
- Oak National Academy **Mechanical Systems**
- Design Museum Learning
- BBC Bitesize Forces and Mechanisms

Demonstrations
- Cam mechanism demonstrations
- Automata examples
- Simple mechanical toys
- Making cam followers
- Mechanical greetings cards

Adaptive Teaching	Purpose
Demonstrate each mechanism (lever, linkage and pivot) using large working models before pupils begin designing.	Helps pupils visualise how mechanisms create movement before applying the concepts independently.
Provide pre-cut card components, templates or partially assembled mechanisms where appropriate.	Reduces cognitive load and supports pupils developing fine motor or construction skills.
Break the design process into manageable stages using visual success criteria and design checklists.	Supports organisation and enables all pupils to experience success throughout the project.
Use photographs, videos and real moving products to reinforce how mechanisms work in everyday life.	Strengthens understanding by linking learning to familiar examples.

Pair pupils strategically during testing and evaluation activities to encourage discussion, problem-solving and peer support.	Develops collaborative learning and supports pupils in evaluating and improving their designs.
Challenge higher-attaining pupils to combine more than one mechanism or modify an existing mechanism to create increasingly complex movement.	Extends design thinking, creativity and technical understanding.

Common Misconception	Teaching Response
A mechanism and a machine are the same thing.	Explain that a mechanism is one part of a machine that creates or changes movement, using real-life examples.
More moving parts automatically make a product better.	Encourage pupils to evaluate whether each component has a clear purpose and improves the effectiveness of the design.
If a mechanism does not work first time, it has failed.	Reinforce that testing, refining and improving are essential stages of the design process and are used by real engineers and designers.
All linkages produce the same type of movement.	Demonstrate and compare different linkage systems, discussing how each changes movement in different ways.
Finished products should not be changed once they have been made.	Model iterative design by testing, evaluating and making purposeful improvements based on evidence and feedback.

YEAR 3 – GREENHOUSE - Summer Term

How can we design and make a strong greenhouse that protects plants and helps them grow?

Section	Curriculum Overview
Curriculum Rationale	This project develops pupils' understanding of framed structures through the purposeful challenge of designing and constructing a mini-greenhouse. Building on the freestanding structures explored through **Shade and Shelter** and **Beach Hut**, pupils investigate how frameworks, diagonal supports, secure joints and suitable coverings create stronger, stiffer and more stable structures. They explore how greenhouses protect plants and provide warmer, sheltered growing conditions before creating prototypes and a final structure for an identified plant and location. The agreed Cornerstones project focuses on structures and frameworks, with pupils making mini-greenhouse prototypes using strengthening, joining and finishing techniques.
The Greatstone Way	**PROTECTORS → LEGACY – How can we care for people, places and our planet? What difference will we leave behind?** Pupils investigate how structures can protect living things and support sustainable food growing. They develop the summer value of **Dare** by tackling an increasingly complex structural challenge, testing ideas honestly, persevering when frames fail and creating a product that could support plants and future growing at Greatstone.
National Curriculum Coverage	Pupils use research and develop design criteria to create functional products for particular users. They generate, model and communicate ideas through annotated sketches, exploded diagrams, prototypes and computer-aided design where appropriate. They select appropriate tools and materials, work with increasing accuracy, investigate existing products, evaluate their outcomes and apply their understanding of how to strengthen, stiffen and reinforce more complex structures.
Curriculum Journey	**Previous learning:** Year 1 **Shade and Shelter** introduced protection, freestanding structures, material choice and stability. Year 2 **Beach Hut** developed reinforced card structures, accurate measuring, tabs, flanges and weather-related design. **Current learning:** Pupils progress from solid card structures to skeletal frameworks, learning how members, joints, bracing and cladding work together. **Future learning:** Year 4 **Tomb Builders** develops larger and more complex structures; Year 5 **Architecture** applies structural understanding to engineering and the built environment; and Year 6 **Engineer** demands increasingly independent technical problem-solving.
Design Brief	Design and make a model mini-greenhouse for a specified plant, user and Greatstone location. It must provide protection, allow light to enter, remain stable, include access for plant care and use suitable strengthening and joining techniques.
Possible Users	Greatstone's gardening or eco team; a class growing seedlings; a community gardener; the school kitchen garden; a family with limited growing space; or younger pupils caring for a plant.
Design Criteria	The greenhouse must suit its intended plant, user and location; include a strong and stable framework; use secure joints; include reinforcement or diagonal bracing; allow sufficient light to enter; provide access for watering and ventilation; withstand controlled wind testing; use materials responsibly; and be evaluated against the agreed criteria.
Sticky Knowledge	A greenhouse is a transparent or translucent structure used to provide plants with a warmer, sheltered growing environment. A framework is a supporting structure made from connected members. Triangles and diagonal braces strengthen frames because they resist changing shape. A joint is where two or more components meet. Cladding covers a framework but should not be relied upon to hold a weak frame together. A wider or securely anchored base improves stability. Greenhouses require light, ventilation and access as well as warmth and protection. Designers make prototypes to test structure, materials and scale before producing a final product.
Technical Knowledge and Skills	Investigate greenhouses, cold frames and polytunnels. Identify frame members, joints, bases, braces, coverings, doors and vents. Compare structural materials and transparent coverings. Construct square and triangular frames. Join straws, dowel, card strips or craft sticks using tabs, tape, glue, connectors or gussets. Strengthen frames using diagonal bracing, triangulation and reinforcement. Develop annotated sketches and simple exploded diagrams. Produce scaled or proportionate models. Test frame strength, stability, access, light and weather protection. Evaluate and refine the finished structure.
Substantive Concepts	User • Purpose • Structure • Framework • Joint • Reinforcement • Stability • Protection • Sustainability
Disciplinary Concepts	Research • Investigate • Model • Design • Construct • Test • Evaluate • Refine
Core Vocabulary	greenhouse, mini-greenhouse, cold frame, polytunnel, structure, framework, frame member, joint, brace, diagonal, triangulation, reinforce, stiffen, strengthen, stable, stability, base, anchor, cladding, transparent, translucent, opaque, ventilation, access, prototype, scale, specification, evaluate
Designers, Engineers and Product Examples	Pupils investigate domestic greenhouses, school greenhouses, cold frames, polytunnels, conservatories and large-scale structures such as the Eden Project. The Cornerstones project specifically includes greenhouse design, significant designers and the Eden Project within its scope.
Cross-Curricular Links	**Geography – Misty Mountain, Winding River:** climate, weather, water and how physical conditions influence plant growth. **History – Dynamic Dynasties:** Chinese agriculture, innovation and the importance of food production where useful. **Science:** plant nutrition and reproduction; requirements for growth; light; water; temperature; seed germination. **Mathematics:** length, perimeter, 2-D and 3-D shape, angles, scale and accurate measurement. **English:** design specifications, explanations, instructions and evaluations. **Computing:** photographing tests or producing a simple digital design.
Beach School & Outdoor Learning	Investigate sheltered and exposed growing locations around Greatstone. Compare temperature, wind, light and shade in different microclimates. Construct temporary frames using canes or sticks, test anchoring methods and observe how transparent coverings respond to coastal wind. Any full-size outdoor prototype should use safe materials and be separately risk assessed.
Greatstone & Kent Links	Explore how exposed coastal conditions affect growing around Greatstone and Romney Marsh. Consider the need for wind protection, anchoring, ventilation and salt-resistant positioning. Connect the project with local farming, school gardening and sustainable food production. Greenhouses can extend growing seasons and protect crops from poor weather, while mini-greenhouses offer a compact alternative where space is limited.

Memorable Hook	**The Greatstone Growing Emergency** – A tray of vulnerable seedlings arrives with a weather warning explaining that wind, cold and heavy rain may prevent them from surviving. Pupils are commissioned as junior structural designers to investigate greenhouses and create a protective growing structure for the school.
Authentic Outcome / Showcase	**Greatstone Greenhouse Design Expo** – Pupils present prototypes, technical drawings, material tests and completed mini-greenhouses to families, governors, gardeners or the eco team. Visitors inspect the frames and observe controlled tests for strength, stability, light, access and ventilation.
Assessment End Point	Pupils independently design and construct a framed mini-greenhouse for an identified plant, user and location. They select suitable structural and covering materials, use accurate measuring and secure joining methods, strengthen the frame through bracing or triangulation, test the product systematically and explain evidence-based improvements using technical vocabulary.
The RHS explains that greenhouses can increase the temperature around plants, protect them from weather and extend the growing season. It also highlights ventilation, siting and vulnerability to wind as important practical considerations for mini-greenhouses.	

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to Be Secured	Design Enquiry Question	Example Learning Activities	Weekly Resources	Beach School / Outdoor Learning	Assessment Opportunity	Online Example / Teacher Support
1	Launching the Growing Emergency	Products are designed in response to a user, purpose, location and need. Greenhouses protect plants and influence growing conditions.	**Why might Greatstone need a greenhouse?**	Open the seedling delivery and weather-warning commission. Examine images of greenhouses, mini-greenhouses, cold frames and polytunnels. Identify users, purposes, locations and key features. Begin a design journal with initial questions.	Seedlings or plant models; commission letter; weather warning; greenhouse images; design journals; sticky notes; feature cards	Survey potential growing locations and identify exposed, sheltered, sunny and shaded areas.	Can pupils identify the user, purpose and core function of a greenhouse?	Cornerstones: Greenhouse
2	Investigating existing structures	Greenhouses vary in size, shape, materials and function, but usually include a framework, transparent covering, access and ventilation.	**What features help a greenhouse work successfully?**	Analyse photographs, diagrams or a real greenhouse. Label frame, base, covering, door, roof, vent and shelving. Compare a greenhouse, cold frame and polytunnel using a product-analysis grid.	Product photographs; diagrams; model greenhouse if available; magnifiers; analysis grids; label cards	Visit a school greenhouse, garden structure or suitable local example where available.	Can pupils describe how key features support plant care and protection?	RHS: Greenhouses in School Grounds
3	Understanding plant and user needs	A successful structure must suit the plant as well as the person using it. Plants require suitable light, warmth, water, air and space.	**What does our greenhouse need to provide?**	Research the needs of possible plants. Compare users who need different access, capacity or locations. Develop plant-and-user profiles and identify potential conflicts, such as retaining warmth while providing ventilation.	Plant information cards; seed packets; user profiles; thermometers; light and watering diagrams; research sheets	Compare light, temperature, wind and access at possible outdoor sites.	Can pupils connect a plant or user need to a design feature?	RHS: Growing Vegetables in Schools
4	Exploring frame shapes	Frames are formed from connected members. Rectangles can distort, while triangles resist changing shape.	**Why are triangles useful in structures?**	Construct squares and triangles from straws, craft sticks or construction kits. Apply gentle pressure and compare deformation. Add a diagonal brace to a square and retest. Record results through diagrams and explanations.	Paper straws; craft sticks; reusable connectors; split pins; elastic bands; construction kits; test sheets	Build large square and triangular frames with canes or sticks and compare their stability.	Can pupils explain how a diagonal brace changes a frame?	GOV.UK: KS2 D&T Technical Knowledge
5	Investigating joints and reinforcement	Joints transfer forces between members and must be appropriate to the material. Gussets and bracing can strengthen weak connections.	**Which joints create the strongest framework?**	Compare butt joints secured with tape or glue, overlapping joints, tabs, corner braces and triangular gussets. Make test samples and apply controlled loads. Create a class joint-reference board.	Card strips; paper straws; craft sticks; masking tape; PVA; glue spreaders; triangular card gussets; clips; small weights	Lash sticks or canes using string and compare different outdoor joins under supervision.	Can pupils construct and evaluate at least two joining methods?	Design and Technology Association: Primary Resources
6	Investigating structural and covering materials	Frame and covering materials perform different jobs. Coverings need to transmit light, while frames require stiffness and strength.	**Which materials are most suitable for each part?**	Test card, wood, straws and wire for stiffness and strength. Compare acetate, clear recycled plastic, tracing paper and mesh for transparency, flexibility and water resistance. Rank materials against plant, user and sustainability needs.	Structural samples; covering samples; torches or light meters; pipettes; water trays; weights; property-testing grids	Observe how coverings move in wind and how different materials create shade or shelter.	Can pupils justify different materials for the frame and covering?	RHS: Cold Frames and Mini-Greenhouses
7	Developing a design specification	A specification converts research into precise, testable requirements.	**What must our greenhouse achieve?**	Select a plant, user and location. Develop criteria covering dimensions, framework, reinforcement, covering, access, ventilation, stability, sustainability and appearance. Identify how each criterion will be tested.	Plant and user profiles; site photographs; specification templates; vocabulary mats; test-planning prompts	Revisit the intended location and confirm the environmental requirements.	Are the criteria specific, connected to research and testable?	Cornerstones: Greenhouse Project Scope
8	Generating and modelling ideas	Designers communicate structures through	**How can we communicate and**	Generate two possible greenhouse forms. Produce annotated front, side	Design journals; pencils; rulers; graph paper; transparent	Mark the proposed footprint at full scale	Does the design clearly show frame members,	RHS: Container Gardening

		annotated sketches, different views and prototypes. Models reveal problems that drawings may not show.	**test our design before making it?**	and top views or a simple exploded diagram. Select one using the specification. Build a rapid paper-straw prototype and evaluate frame shape, access and bracing.	overlays; paper straws; modelling card; tape; scissors	using rope or chalk to check size and access.	joints, bracing, covering, access and ventilation?	
9	Constructing the final framework	Accuracy, repeated measurement and secure joints are essential when constructing a three-dimensional frame.	**How can we build a square, stable and accurately joined frame?**	Measure and cut frame members from selected materials. Construct the base and vertical framework using jigs or corner guides. Add roof members and check alignment before components set. Photograph adaptations.	Square-section wood, dowel, craft sticks, sturdy paper straws or selected materials; rulers; mitre or corner guides; masking tape; PVA; low-temperature glue gun for adult use; cutting tools according to risk assessment	Construct or test a larger temporary cane frame if appropriate.	Is the framework accurately assembled, freestanding and securely joined?	
10	Reinforcing, cladding and adding access	Bracing strengthens the structure; cladding encloses it. Access and ventilation must remain functional.	**How can we protect the plant without preventing care or airflow?**	Add diagonal bracing and gussets. Apply transparent or translucent covering without relying on it to correct a weak frame. Construct a hinged, removable or lifting access panel and add a simple ventilation feature.	Card gussets; braces; acetate or recycled clear plastic; tape; PVA; clips; simple hinges; hook-and-loop fastening; scissors; craft knives for adult use	Observe how wind pressure affects a covered frame and discuss anchoring.	Does the final structure combine strength, light transmission, access and ventilation?	RHS: Greenhouses in School Grounds
11	Testing, evaluating and refining	Testing should measure performance against the specification rather than simply judge appearance.	**How effectively does our greenhouse protect plants and support the user?**	Conduct controlled tests for frame strength, stability, light transmission, fine-water protection, access, ventilation and plant capacity. Use a desk fan or outdoor breeze at a safe level. Gather user feedback and make one structural or functional improvement.	Completed greenhouses; test checklist; plant pots; torch or light meter; fine spray; desk fan; small weights; user-feedback forms; repair materials; cameras	Test products in their proposed outdoor position where weather conditions are suitable.	Can pupils use evidence to identify the cause of a weakness and implement a meaningful improvement?	RHS: Mini-Greenhouses
12	Greatstone Greenhouse Design Expo	Designers communicate how research, testing and technical decisions produced a solution for a real need.	**How could our design support growing at Greatstone?**	Present product research, plant and user needs, design specifications, prototypes, technical drawings, test evidence and final structures. Pupils explain one key structural decision and one change made after testing. Where suitable, place a plant inside for short-term demonstration.	Finished models; design journals; display boards; plant pots; testing photographs; technical labels; visitor-feedback cards; certificates	Display models near the proposed growing location or create an outdoor design trail in suitable weather.	Final assessment of research, specification, structural knowledge, accuracy, construction, testing, refinement and communication.	RHS School Gardening Resources

Suggested Product and Prototype Options

The final product should remain pupil-designed rather than every group reproducing one identical model.

Possible Outcome	Structural Focus	Possible User or Purpose
Tabletop mini-greenhouse	Cuboid or prism frame, bracing and removable cover	Germinating class seedlings
Mini cold frame	Stable low frame with sloping or hinged transparent lid	Protecting young plants outdoors
Window greenhouse	Lightweight vertical frame and transparent panels	Growing herbs in a limited indoor space
Portable propagation shelter	Reinforced frame, handle or easy-moving base	Gardening club or Reception pupils
Coastal mini-greenhouse	Anchoring, diagonal bracing and low profile	Exposed Greatstone growing conditions
Recycled bottle greenhouse prototype	Modular panels and responsible material reuse	Eco-team sustainability demonstration
The RHS notes that cut-down plastic bottles can act as inexpensive covers for individual seedlings, while mini-greenhouses provide a compact way to protect plants where a full greenhouse is not possible.		

Whole-Project Resource List

Existing Products and Visual References

- Photographs and diagrams of greenhouses, mini-greenhouses, cold frames and polytunnels
- Images of the Eden Project
- A real mini-greenhouse or cold frame where available
- Seed trays, plant pots and young plants
- Photographs of exposed and sheltered growing locations
- User and plant-profile cards
- Examples of frame structures and structural joints

Prototype Materials

- Paper straws
- Drinking straws
- Wooden craft sticks
- Bamboo skewers with sharp ends removed
- Construction kits
- Thin card strips
- Corrugated card
- Split pins
- Elastic bands
- Masking tape
- Reusable connectors
- String and wool

Final Structural Materials

Select according to school facilities and risk assessment:

- Square-section wood
- Wooden dowel
- Sturdy craft sticks
- Paper or biodegradable straws
- Corrugated card
- Mount board
- Bamboo canes for supervised larger prototypes
- Triangular card gussets
- Corner blocks
- Reclaimed construction materials checked for safety

Covering and Cladding Materials

- Acetate sheets
- Clear recycled packaging
- Transparent or translucent plastic sheet
- Tracing paper for prototypes
- Mesh or netting
- Clear document pockets

- Reused plastic bottles
- Tissue paper for material comparisons only

Tools and Joining Equipment

- Rulers and metre sticks
- Set squares
- Pencils
- Child-safe scissors
- Hole punches
- Clips and pegs
- PVA glue
- Masking and clear tape
- Low-temperature glue gun for trained adult use
- Cutting mats
- Junior hacksaws and bench hooks only where school policy, staffing and risk assessment permit
- Card corner guides or simple construction jigs

Testing Equipment

- Small plant pots or model plants
- Desk fan on low settings
- Fine water spray or pipettes
- Torches or light meters
- Small weights
- Spring scales if available
- Thermometers
- Stopwatches
- Testing grids
- Cameras or tablets

Planning, Assessment and Display

- Design journals
- Product-analysis sheets
- Plant and user research templates
- Material-testing grids
- Joint and bracing reference cards
- Design-specification templates
- Annotated-drawing frames
- Prototype-evaluation sheets
- Testing and user-feedback forms
- Display boards and technical labels

Safety and Preparation Notes

- Complete a project-specific risk assessment for tools, structural materials, adhesives, testing and outdoor construction.
- Remove or cover all sharp ends from bamboo skewers and canes.
- Adults should pre-cut difficult materials unless the school's procedures permit closely supervised junior hacksaw use.
- Use bench hooks, clamps and safety glasses where sawing is undertaken.
- Low-temperature glue guns should be used only by trained adults unless school policy and risk assessment explicitly permit supervised pupil use.
- Check recycled plastic for sharp edges, contamination and brittleness.
- Do not use glass in pupil-made models.
- Use only a fine water spray for weather testing and protect work surfaces.
- Fans should be adult controlled and kept clear of loose clothing, hair and small components.
- Wash hands after handling soil, pots or outdoor materials.
- Do not place edible plants inside models made from materials that may transfer glue, ink or contaminants unless a safe internal pot fully separates them.
- Test all example joints and chosen components before teaching to ensure that the proposed materials are compatible.
- The RHS advises that lightweight mini-greenhouses can be vulnerable to gusts of wind, making stability and anchoring important design considerations.

Adaptive Teaching

Area	Support and Adaptation
Understanding structures	Use large physical models with colour-coded frame members, joints, braces and covering. Allow pupils to manipulate square and triangular frames directly.
Technical vocabulary	Provide labelled diagrams and repeated oral rehearsal of framework, member, joint, brace, cladding, access and ventilation.
Research	Offer picture-supported plant and user profiles and reduce the number of variables pupils must consider initially.
Measuring and cutting	Use pre-marked materials, cutting jigs, corner guides, larger components and adult-prepared pieces where needed.
Joining	Begin with reusable connectors or masking tape prototypes before moving to adhesive joints. Provide pre-cut gussets and clips to hold parts while glue sets.
Designing	Offer isometric paper, view templates, component stickers and physical mock-up materials. Accept oral or photographic annotations where appropriate.
Sequencing	Use staged visual instructions: base → uprights → roof → check → brace → cover → access → test.
Motor difficulties	Use larger frame members, construction kits, pre-cut pieces and meaningful roles in measuring, positioning, testing, photographing and evaluating.
Greater depth	Ask pupils to compare alternative roof forms, investigate material efficiency, calculate approximate frame lengths, design adjustable ventilation or evaluate how anchoring would change for a full-size structure.
Evaluation	Use photographs from each test and sentence stems: "The diagonal brace…", "The light test showed…", "Our user needed…", "We changed… because…".

Common Misconception	Teaching Response
A greenhouse makes plants grow without water, light or care.	Revisit plant requirements and explain that the structure modifies conditions but does not replace plant care.
A greenhouse is always made entirely from glass.	Compare glass, polycarbonate, flexible plastic, recycled panels and cold-frame coverings.
Transparent and waterproof mean the same thing.	Test light transmission and water resistance separately.
The clear covering makes the structure strong.	Test an unbraced frame before and after covering, then compare it with a properly braced framework.
A square is always stronger than a triangle because it has more sides.	Demonstrate how a square distorts and how a diagonal creates two stable triangles.
More glue or tape automatically creates a stronger joint.	Compare overloaded joints with accurately fitted and reinforced joints.
A roof only keeps rain out.	Discuss light, heat, drainage, wind and internal space.
A completely sealed greenhouse is best because it keeps all heat inside.	Investigate the need for ventilation and access to avoid overheating and support plant care.
The heaviest structure is always the most stable.	Compare base width, centre of mass, anchoring and wind resistance.
A prototype is simply a smaller decorative model.	Emphasise that prototypes are built to test structure, joints, scale and function before final making.

Key Online Examples and Teacher Resources

- Cornerstones: Greenhouse
- GOV.UK: National Curriculum for Design and Technology
- RHS: Greenhouses in School Grounds
- RHS: Cold Frames and Mini-Greenhouses
- RHS: School Gardening Resources
- RHS: Container Gardening
- RHS: Growing Vegetables in Schools
- Design and Technology Association

- Cornerstones: Primary Design and Technology Curriculum

YEAR 4 – FUNCTIONAL AND FANCY FABRICS - Spring Term

How can we design and create a printed and embellished fabric for a particular user and purpose?

Section	Curriculum Overview
Curriculum Rationale	This project develops pupils' understanding of textiles by exploring how fabric can be designed, printed and embellished to become both functional and visually appealing. Building on the template cutting, running stitch and user-centred design developed through Year 2 **Cut, Stitch and Join**, pupils investigate household textile products, fabric properties, motifs, repeating patterns, block printing, embroidery and decorative techniques. They study the work of William Morris and consider how designers draw inspiration from the natural world before developing an original Greatstone-inspired fabric sample for a specific home product and user. The Cornerstones project specifically focuses on home fabric products, William Morris, block printing, motifs, pattern, embellishment and embroidery.
The Greatstone Way	**EXPLORERS → INVENTORS – How does curiosity help us discover more? How do ideas change the world?** Pupils explore how designers investigate nature, culture, colour and pattern before transforming their observations into repeatable textile designs. They develop the spring value of **Dream** by imagining new decorative possibilities, experimenting with printing and embroidery and recognising how an original idea can become a useful product for the home or community.
National Curriculum Coverage	Pupils use research to understand the needs of particular users and develop design criteria for functional and appealing products. They communicate ideas through annotated sketches, prototypes and pattern pieces; select textiles according to their functional properties and aesthetic qualities; use tools and equipment accurately for cutting, joining and finishing; investigate existing textile products; and evaluate their own work against their criteria and the views of others. These expectations align with the statutory Key Stage 2 Design and Technology programme.
Curriculum Journey	**Previous learning:** In Year 2 **Cut, Stitch and Join**, pupils compared fabrics, used templates, cut matching pieces and joined textiles using running stitch. **Current learning:** Pupils now move from assembling a simple product to designing the fabric surface itself. They investigate motifs, repeat patterns, block printing, embroidery and embellishment before producing a coordinated textile sample for a named user and product. **Future learning:** Year 6 **Make Do and Mend** develops more independent textile construction, repair, reuse, sustainability and increasingly purposeful selection of joining and finishing techniques.
Design Brief	Research, design and create an original printed and embellished textile sample for a specified home product and user. The fabric design should combine a repeated motif with at least one embellishment or embroidery technique and show consideration of function, durability and appearance.
Possible Final Products	A fabric panel for a cushion, storage pocket, table mat, wall hanging, decorative bunting, simple reusable wrap, book bag panel or Beach School equipment organiser. The focus is the designed fabric and its intended use rather than requiring every pupil to construct a full complex product.
Design Criteria	The textile must suit its intended user and home product; use a clearly developed motif; include an organised repeat pattern; use colour purposefully; demonstrate controlled block printing; include securely attached embellishment or embroidery; use fabric suited to the intended function; be neatly finished; and be evaluated against user feedback.
Sticky Knowledge	Textiles are materials made from fibres. Fabrics are selected for both functional properties and appearance. A motif is a decorative image or shape used within a design. Repeating patterns can follow arrangements such as straight, half-drop, mirrored or rotated repeats. Block printing transfers a design repeatedly from a raised printing surface onto fabric. Embroidery decorates fabric using thread and stitches. Embellishment adds decorative surface detail. Designers trial colour, placement and technique before printing a final fabric.
Technical Knowledge and Skills	Investigate domestic textile products and identify their users, purposes and construction. Compare woven and non-woven fabrics at an introductory level. Research William Morris and nature-inspired textile design. Draw and simplify natural forms into motifs. Explore repeat-pattern arrangements. Create a safe printing block using foam or card. Mix and apply fabric paint evenly. Register and repeat a printed motif with increasing accuracy. Practise running stitch, backstitch and simple decorative stitches where appropriate. Add appliqué, beads, buttons, sequins, ribbon or embroidery securely. Produce annotated designs and paper or fabric prototypes. Test appearance, durability and suitability for the intended product. Evaluate and refine the final fabric.
Substantive Concepts	User • Purpose • Textile • Motif • Pattern • Print • Embroidery • Embellishment • Function • Aesthetics
Disciplinary Concepts	Research • Investigate • Generate • Prototype • Design • Print • Embellish • Test • Evaluate • Refine
Core Vocabulary	textile, fabric, fibre, woven, non-woven, functional, aesthetic, motif, natural form, repeat pattern, straight repeat, half-drop, mirror, rotation, block print, relief, registration, fabric paint, embroidery, running stitch, backstitch, appliqué, embellishment, seam, fastener, prototype, evaluate, refine
Designers, Makers and Product Examples	Pupils investigate household textiles such as cushions, curtains, tablecloths, tea towels, storage pockets and wall hangings. William Morris provides the core designer study because of his nature-inspired motifs and repeated surface patterns. Contemporary and accessible textile examples can be used to compare how designers respond to different users and purposes. Cornerstones identifies William Morris, home fabric products, block printing, motifs, embroidery and embellishment as central to this project.
Cross-Curricular Links	**Geography – Interconnected World:** textile production, cultural pattern and the movement of materials and products. **Art – Vista:** observation, composition, colour and landscape-inspired motifs. **Science:** properties and suitability of materials. **Mathematics:** translation, reflection, rotation, symmetry, spacing and measurement. **English:** designer profiles, annotated specifications, process explanations and evaluations. **History:** changes in domestic products and the Arts and Crafts movement where appropriate.
Beach School & Outdoor Learning	Pupils photograph and sketch patterns found in shells, waves, grasses, footprints, fences, pebbles and beach huts. These observations become starting points for motifs and repeated designs. Natural objects may be used for experimental printing, but final outcomes should demonstrate planned textile-printing techniques rather than relying only on spontaneous nature prints.
Greatstone & Kent Links	Designs can draw directly on Greatstone's sea identity, coastal plants, beach huts, shells, waves and class sea animals. Pupils might create a coordinated fabric collection for a Greatstone reading corner, Beach School storage area, community display or school celebration.
Memorable Hook	**The Greatstone Textile Studio** – A box arrives containing plain household textiles, pattern fragments, fabric swatches and an unfinished designer's sketchbook. Pupils are commissioned to create an original Greatstone fabric collection that transforms ordinary textiles into useful and distinctive products.
Authentic Outcome / Showcase	**The Greatstone Textile Studio Exhibition** – Pupils display research, motif development, repeat-pattern trials, printing blocks, stitch samples and finished fabric panels. Visitors compare the designs against their intended products and provide feedback on function, appearance and originality.
Assessment End Point	Pupils independently research a user and textile product, develop an original motif, organise it into a repeat pattern and transfer it accurately onto fabric through block printing. They add an appropriate embroidered or embellished feature, justify fabric and colour choices and evaluate the final textile against design criteria and user feedback.

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to Be Secured	Design Enquiry Question	Example Learning Activities	Weekly Resources	Beach School / Outdoor Learning	Assessment Opportunity	Online Example / Teacher Support

1	Launching the Textile Studio	Textile products are designed for particular users, purposes and settings. Function and appearance must work together.	**How can fabric make an everyday product useful and appealing?**	Open the Textile Studio box. Investigate cushions, table mats, tea towels, storage pockets and wall hangings. Identify users, functions, materials, patterns, joins and decorative techniques. Begin a design journal.	Household textile products; fabric swatches; magnifiers; product-analysis sheets; design journals; vocabulary cards	Audit textile products used at Beach School or outdoors, such as bags, picnic blankets and equipment organisers.	Can pupils distinguish functional features from decorative features?	Cornerstones: Functional and Fancy Fabrics
2	Investigating fabric properties	Fabric suitability depends on strength, thickness, flexibility, absorbency, texture, durability and appearance.	**Which fabric suits which purpose?**	Compare cotton, calico, felt, fleece, denim, hessian and synthetic fabric. Test absorbency, strength, flexibility, stretch and fraying. Match fabrics to possible products and justify choices.	Fabric samples; droppers; water trays; small weights; rulers; magnifiers; property cards; testing grids	Compare fabrics used in waterproof clothing, bags, shade cloths and picnic equipment.	Can pupils link a fabric property to a product requirement?	Oak: Select fabrics for functional and aesthetic properties
3	Learning from William Morris	Designers often simplify natural forms into motifs and organise them into repeating patterns.	**How did William Morris turn nature into textile design?**	Study examples of Morris wallpaper and textiles. Identify leaves, flowers, birds, symmetry and repeated forms. Produce observational sketches and simplify one natural form into a motif.	Morris images; sketchbooks; natural specimens; tracing paper; pencils; coloured pencils; viewfinders	Sketch coastal plants, shells, grasses or seaweed as possible motif sources.	Can pupils explain how an observed natural form has been simplified into a motif?	Cornerstones project overview
4	Exploring repeat patterns	Motifs can be repeated through translation, reflection, rotation and different spacing arrangements.	**How does the arrangement of a motif change the pattern?**	Use paper motifs or stamps to test straight repeats, half-drop repeats, mirrored patterns and rotations. Compare balance, rhythm and gaps. Record preferred arrangements in design journals.	Pre-cut paper motifs; grid paper; tracing paper; stamps; ink pads; rulers; pattern templates	Create temporary repeating patterns using shells, stones or leaves and photograph them from above.	Can pupils accurately create and identify at least two repeat arrangements?	Oak: Using CAD in textiles and pattern design
5	Developing printing blocks	A printing block needs a clear raised design, suitable scale and strong edges. Fine details may not transfer successfully.	**What makes a motif suitable for block printing?**	Compare successful and unsuccessful block designs. Simplify motifs further, transfer them onto printing foam or layered card and produce paper proof prints. Refine blocks after examining missing or unclear areas.	Printing foam; foam sheets; card; blunt pencils; safe cutting tools; glue; rollers; printing ink; proof paper; aprons	Try direct natural-object printing for comparison and discuss why a designed block gives greater control and repeatability.	Can pupils create and refine a printing block that transfers a recognisable motif?	Design and Technology Association
6	Printing technique and registration	Consistent pressure, paint quantity and positioning improve print quality. Registration helps motifs repeat accurately.	**How can we make repeated prints clear and evenly spaced?**	Demonstrate loading a block, test printing, applying even pressure and lifting vertically. Use grid lines or registration marks to create controlled repeats on paper and scrap fabric. Compare smudged, faint and successful prints.	Printing blocks; fabric paint; rollers or sponge applicators; trays; paper; scrap calico; grid guides; masking tape; drying racks	Photograph the effect of repeated motifs against natural coastal backgrounds for design comparison.	Can pupils control paint, pressure and placement with increasing consistency?	Cornerstones: Block printing and pattern scope
7	Developing embroidery and embellishment skills	Embroidery uses thread to decorate fabric. Embellishments should be securely attached and appropriate to function.	**How can stitching and embellishment add detail without weakening the fabric?**	Revisit running stitch and introduce backstitch or a simple decorative stitch. Practise on binca or calico. Compare appliqué, buttons, beads, sequins and ribbon. Test attachment methods and consider safety and durability.	Binca; calico; blunt embroidery needles; embroidery thread; needle threaders; hoops; buttons; ribbon; felt scraps; beads or sequins where risk assessed; needle trays	Develop stitch lines inspired by waves, pathways or grasses observed outdoors.	Can pupils select and execute a suitable decorative technique?	Oak: Fabric fasteners
8	Researching the user and developing criteria	Successful designs respond to a particular person, product and setting rather than only the designer's preferences.	**Who is my textile for and what must it achieve?**	Select a user and product, such as a cushion panel for a reading area or storage-pocket fabric for Beach School. Gather simple user feedback on colour, pattern and function. Develop criteria covering fabric, motif, repeat, colour, durability and embellishment.	User profiles; interview sheets; product cards; fabric samples; criteria templates; design journals	Visit or photograph the intended setting to identify colours, scale and functional requirements.	Are the criteria specific, user-centred and testable?	GOV.UK: Key Stage 2 Design and Technology
9	Designing the final fabric	Textile designers communicate motif, repeat, colour, fabric and finishing through annotated plans and samples.	**How can we combine pattern, colour and embellishment into one coherent design?**	Produce two colourways and repeat-pattern options. Select one against the criteria. Create an annotated final design and a small prototype showing the intended print and embellishment placement.	Design templates; tracing paper; coloured pencils; fabric swatches; paper motifs; prototype fabric; thread samples; criteria checklist	Use photographs and sketches from Greatstone as a design-reference board.	Does the design clearly communicate how the finished fabric will look and function?	Cornerstones: Functional and Fancy Fabrics
10	Printing the final fabric	Careful preparation and systematic working	**How can we transfer our design**	Prepare and secure fabric. Mark discreet registration guides. Print the repeated pattern using the selected	Pre-washed calico or cotton; printing blocks; fabric paint; rollers or	Photograph completed prints in natural light and compare their	Does the printed fabric demonstrate controlled	

		produce a consistent textile print.	**accurately onto fabric?**	colourway, allowing sufficient drying time. Record any adaptations made during printing.	sponges; trays; masking tape; protective sheets; aprons; drying space	impact in the intended setting.	repetition, clear motifs and purposeful colour?	
11	Embellishing, testing and refining	Finishing techniques should strengthen the design and suit its intended use. Testing should examine both appearance and durability.	**How can we complete and improve our textile for its user?**	Add planned stitching, appliqué or embellishment after the print is dry. Conduct gentle rub, flex, pull and user-appeal tests. Repair loose components, refine unfinished areas and complete an evaluation.	Printed fabrics; embroidery equipment; appliqué pieces; fabric glue where appropriate; testing checklist; user-feedback forms; repair materials	Test the textile in or beside its intended location, using a mock-up if it is designed for a larger product.	Can pupils use testing and feedback to make a purposeful refinement?	Oak: Accessible fasteners and textile finishing
12	Greatstone Textile Studio Exhibition	Designers communicate how research, testing and technical processes shaped their final outcome.	**How successfully does our fabric combine function and decoration?**	Display product research, Morris studies, motif development, repeat trials, print blocks, stitch samples and finished panels. Pupils explain their user, product, fabric choice, printing process and improvements.	Finished textiles; design journals; printing blocks; stitch samples; display boards; labels; visitor-feedback cards; reflection sheets	Create a photographed outdoor fabric display if weather conditions are suitable, without leaving work exposed.	Final assessment of research, material selection, motif development, printing, embellishment, testing and evaluation.	Cornerstones: Functional and Fancy Fabrics

Suggested Final Outcomes

Textile Outcome	Functional Considerations	Possible Greatstone Context
Cushion-front panel	Comfortable fabric, durable print, embellishment that will not catch easily	Reading corner or class library
Storage-pocket panel	Strong fabric, clear visual identity, secure decorative details	Beach School or classroom organisation
Table mat or runner section	Flat surface, washable fabric, repeated pattern visible from above	Community or family showcase
Wall hanging	Lightweight fabric, clear large motif and strong visual impact	Greatstone Way display
Reusable fabric wrap	Flexible but strong fabric, limited raised embellishment	Sustainable gift or book wrap
Decorative bunting panel	Clear motif, secure edge finish and weather-aware use	Indoor school celebration
Book-bag decorative panel	Durable fabric and low-profile embellishment	Class or school identity

Whole-Project Resource List

Existing Products and Visual References

- Cushions, curtains, tea towels, table mats and storage pockets
- Printed and embroidered textile samples
- William Morris textile and wallpaper images
- Contemporary patterned fabrics
- Greatstone coastal photographs
- Examples of successful and unsuccessful printing
- Examples of appliqué and embroidery
- User and product profile cards

Fabric and Printing Materials

- Pre-washed calico or cotton
- Felt and fleece for comparison and appliqué
- Hessian, denim and synthetic samples
- Scrap fabric for trials
- Fabric printing paint
- Printing foam
- Corrugated and mounting card
- Rollers or sponge applicators
- Printing trays
- Masking tape
- Protective table coverings
- Drying racks or lines

Embroidery and Embellishment

- Blunt, large-eye embroidery needles
- Embroidery thread
- Needle threaders
- Binca
- Embroidery hoops
- Felt scraps
- Ribbon and braid
- Buttons
- Beads and sequins where risk assessed
- Fabric clips
- Fabric adhesive
- Appliqué templates

Designing and Recording

- Design journals
- Tracing paper
- Grid and isometric paper
- Pencils and coloured pencils
- Rulers
- Motif templates
- Repeat-pattern grids
- Fabric swatches
- Colour-palette cards
- User-research sheets
- Design-criteria templates
- Evaluation and feedback forms
- Cameras or tablets

Tools

- Paper scissors
- Fabric scissors
- Child-safe cutting tools
- Hole punches
- Glue spreaders
- Clips and pegs
- Pencil or stylus tools for printing foam
- Needle trays or magnetic dishes

Safety and Preparation Notes

- Complete a project-specific risk assessment covering printing materials, sewing equipment, embellishments and adhesives.
- Check fabric paint and printing media are suitable for children and follow manufacturer instructions.
- Protect clothing and surfaces during printing.
- Pre-wash final fabric if required so shrinkage or surface treatments do not affect printing.
- Use blunt embroidery needles and maintain a counted needle system.
- Avoid pins where fabric clips are sufficient.
- Pre-cut thread into manageable lengths to reduce tangling.
- Check small embellishments against choking risks and individual pupil needs.
- Avoid raised or easily detached embellishment on products likely to receive frequent handling.
- Fabric adhesive should be used in a well-ventilated area and only as directed.
- Ensure prints dry fully before stitching or embellishment.
- Teach pupils never to place paint-covered blocks directly onto finished work without first checking registration and paint quantity.
- Oak notes that fastening choice should be informed by user accessibility rather than assuming one solution suits everyone.

Adaptive Teaching

Area	Support and Adaptation
Fabric investigation	Limit the number of materials initially and use visual property cards such as strong, flexible, absorbent and soft.

Motif development	Use viewfinders, tracing paper, enlarged photographs and simple shape overlays to help pupils simplify natural forms.
Repeat patterns	Provide pre-drawn grids, movable paper motifs and colour-coded arrows for translation, reflection and rotation.
Printing blocks	Offer thicker foam, larger motifs and pre-cut base blocks. Avoid intricate internal details where motor control is a barrier.
Printing	Use registration corners, taped fabric and a limited colour palette. Provide a print buddy to stabilise materials.
Stitching	Use binca, pre-punched felt, contrasting thread, large-eye needles and shorter thread lengths.
Embroidery alternatives	Where stitching remains inaccessible, pupils can develop appliqué placement, select motifs, use fabric pens or direct an adult-supported stitch process while retaining design ownership.
Greater depth	Ask pupils to develop coordinated colourways, compare repeat systems, alter scale for different products or justify how embellishment affects function and maintenance.
Evaluation	Use photographs, criteria checklists and stems such as “My fabric suits the user because…”, “The repeat became more accurate when…”, “The durability test showed…”.

Common Misconception	**Teaching Response**
Pattern and motif mean the same thing.	Explain that the motif is the individual design element; the pattern is created when motifs are arranged or repeated.
All repeat patterns are simple straight rows.	Model mirrored, rotated and half-drop arrangements using movable motifs.
More paint creates a clearer print.	Compare overloaded, smudged prints with evenly loaded proof prints.
Printing is successful if every print is different.	Distinguish expressive one-off printing from repeat surface-pattern design, where consistency and registration matter.
Decoration automatically improves function.	Evaluate whether embellishment affects comfort, washing, flexibility or durability.
Embroidery and sewing are identical.	Clarify that sewing joins or constructs fabric, while embroidery primarily decorates a surface, though both use stitches.
Felt is suitable for every textile product because it does not fray.	Compare absorbency, strength, flexibility, comfort and washability across several fabrics.
William Morris simply copied plants exactly.	Show how observation was simplified, stylised and organised into carefully controlled repeat patterns.
Every user will find the same fastening or embellishment easy to use.	Discuss accessibility and user needs when selecting any interactive feature. Oak’s guidance notes that fasteners should be selected with the specific user in mind.
The design process finishes after printing.	Require embellishment, testing, user feedback, evaluation and refinement.

Key Online Examples and Teacher Resources

- Cornerstones: Functional and Fancy Fabrics
- GOV.UK: National Curriculum for Design and Technology
- Oak: Fabric Fasteners
- Oak: Combining Fabrics – Accessible Textiles
- Oak: Accessible Fasteners
- Design and Technology Association
- Victoria and Albert Museum: William Morris
- Victoria and Albert Museum: Textiles Collection
- William Morris Gallery

YEAR 4 – TOMB BUILDERS - Summer Term

How can simple machines help us move a heavy load safely and efficiently?

Section	Curriculum Overview
Curriculum Rationale	This project develops pupils’ understanding of mechanical systems through the investigation of simple machines used to lift and move heavy loads. Building on the wheels and axles explored in Year 1 **Taxi!** and the cam mechanisms developed in Year 3 **Making It Move**, pupils investigate levers, pulleys, wheels and axles, and inclined planes. They explore how these mechanisms reduce the effort needed to move a load or change the direction of a force before designing and constructing a working machine for an ancient building challenge. The official Cornerstones **Tomb Builders** project focuses on components, inventions and machines, particularly how wheels, axles, inclined planes, pulleys and levers could help ancient builders lift and transport heavy materials.
The Greatstone Way	**PROTECTORS → LEGACY – How can we care for people, places and our planet? What difference will we leave behind?** Pupils consider how designers protect workers by making difficult tasks safer and more manageable. They develop the summer value of **Dare** by tackling an ambitious engineering challenge, testing unsuccessful ideas, modifying mechanisms and recognising how engineering achievements can leave a lasting legacy.
National Curriculum Coverage	Pupils use research to understand users and contexts; develop design criteria; communicate ideas through annotated sketches, exploded diagrams, prototypes and models; select and use tools and materials accurately; investigate and evaluate existing products; and refine their products using test evidence. Technical knowledge focuses on strengthening structures and understanding mechanical systems, including pulleys and levers. These are explicit expectations within the Key Stage 2 Design and Technology programme of study.
Curriculum Journey	**Previous learning:** Year 1 **Taxi!** introduced wheels, axles, chassis and rotary movement. Year 3 **Making It Move** developed understanding of cams, followers and the transfer of movement. Year 3 **Greenhouse** strengthened pupils’ ability to build stable, reinforced frameworks. **Current learning:** Pupils compare simple machines and combine structures with mechanical components to lift or move a load. **Future learning:** Year 5 **Moving Mechanisms** develops more complex mechanical systems, while Year 6 **Engineer** requires increasingly independent selection, combination and refinement of mechanisms.
Position in the Wider Curriculum	The project deliberately retrieves knowledge from Year 4 Autumn **Ancient Civilisations**, particularly ancient Egyptian building and monumental architecture. It runs alongside **Groundbreaking Greeks** in the summer but remains a distinct technical enquiry. Relevant comparisons can be made with Greek engineering, cranes, construction and the use of simple machines without changing the core Cornerstones project. Ancient Egypt formed one of the earliest civilisations studied in the Year 4 history sequence and is known for major monuments including pyramids and temples.
Design Brief	Design and make a working lifting or transporting machine that can move a model stone block from one position to another for an ancient building project. The machine must be safe, stable, controllable and suitable for use by a team of model builders.

Possible Outcomes	A pulley-operated lifting frame; lever-based lifting machine; wheeled block transporter; inclined-plane transport system; simple crane; or a combined machine using more than one simple mechanism. Pupils should select the system most appropriate to their own design criteria rather than reproduce one identical model.
Design Criteria	The machine must move or lift the specified load; include at least one functioning simple machine; have a stable and reinforced supporting structure; keep the load secure; allow the user to control the movement; use appropriate materials and joins; operate repeatedly; and be evaluated through fair testing.
Sticky Knowledge	A force is a push or pull. A simple machine changes the size or direction of a force and can make a task easier to control. A lever rotates around a fixed point called a fulcrum. Moving the fulcrum changes the mechanical advantage of a lever. A pulley consists of a grooved wheel with a rope or cord running around it and can change the direction of a pulling force. A fixed pulley changes the direction of effort but does not remove the need for force. Wheels and axles reduce the difficulty of moving loads across a surface. An inclined plane allows a load to be moved gradually over a longer distance. Strong machines require secure joints, stable bases and reinforced frames.
Technical Knowledge and Skills	Identify and compare simple machines. Construct and test first-, second- and third-class lever arrangements at an introductory level, while focusing primarily on the relationship between load, effort and fulcrum. Make fixed pulleys and investigate rope direction. Construct parallel axles and stable wheeled platforms. Investigate the effect of slope on an inclined plane. Build reinforced frames using braces and gussets. Measure, mark, cut and join with increasing accuracy. Produce annotated and exploded diagrams. Select mechanisms according to the task. Conduct repeatable tests, record results and refine the final machine.
Substantive Concepts	User • Purpose • Force • Machine • Mechanism • Load • Structure • Movement • Safety • Efficiency
Disciplinary Concepts	Research • Investigate • Model • Design • Construct • Test • Analyse • Evaluate • Refine
Core Vocabulary	simple machine, mechanism, force, effort, load, lever, fulcrum, pivot, mechanical advantage, pulley, fixed pulley, wheel, axle, inclined plane, ramp, friction, frame, brace, gusset, stability, reinforce, component, prototype, efficiency, control, evaluate
Designers, Engineers and Product Examples	Pupils investigate cranes, hoists, lifting frames, ramps, sack trucks, wheelbarrows, pulleys, loading systems and ancient construction hypotheses. The aim is not to claim certainty about one method used to build every ancient monument, but to investigate how simple mechanical principles could help people lift, pull and transport heavy materials.
Cross-Curricular Links	**History:** retrieve Ancient Egyptian monumental building from **Ancient Civilisations**; compare with Greek architecture, engineering and building achievements in **Groundbreaking Greeks**. **Science:** forces, pushes and pulls, friction, gravity and magnets where relevant. **Mathematics:** length, mass, ratio at an introductory practical level, angles, perimeter, data collection and comparison. **English:** technical explanations, instructions, design specifications and oral presentations. **Computing:** photograph tests, record slow-motion movement or create a digital annotated design.
Beach School & Outdoor Learning	Investigate real examples of ramps, rollers, winches, pulleys and lifting systems used around school or in outdoor environments. Move safe loads using ropes, poles and inclined planes under controlled conditions. Explore how sand, grass and hard surfaces affect movement and friction. Larger outdoor engineering challenges require separate risk assessment and must use manageable loads.
Greatstone & Kent Links	Explore how coastal communities move boats, equipment and materials using rollers, wheels, ramps, ropes and pulleys. Investigate systems used around beaches, harbours, lifeboat stations and construction sites. Pupils can design their machine for transporting a block across a model Greatstone beach or lifting materials for a community structure.
Memorable Hook	**The Ancient Builder's Emergency** – A model stone block, broken lifting device and urgent architect's message arrive in the classroom. The builders cannot complete their monument because the block is too heavy to lift safely. Pupils are commissioned as junior engineers to investigate simple machines and develop a reliable solution.
Authentic Outcome / Showcase	**The Greatstone Ancient Engineering Trials** – Pupils present prototypes, diagrams, testing data and completed machines. Each design must complete a controlled lifting or transportation challenge. Pupils explain the mechanism, identify where forces act and demonstrate how testing improved safety, stability or performance.
Assessment End Point	Pupils independently select and construct an appropriate simple mechanical system to lift or move a specified load. They explain how the mechanism changes or transfers force, integrate it into a stable reinforced structure, test its performance systematically and use evidence to evaluate and refine the final product.

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to Be Secured	Design Enquiry Question	Example Learning Activities	Weekly Resources	Beach School / Outdoor Learning	Assessment Opportunity	Online Example / Teacher Support
1	Launching the Ancient Builder's Emergency	Engineering products are designed to solve real problems for users. Ancient builders needed safe ways to move heavy materials.	**How could people move heavy loads without modern engines?**	Investigate the model block and damaged machine. Examine images of ramps, rollers, levers, pulleys, cranes and sledges. Generate hypotheses and record initial designs without first being taught the solutions. Begin an engineering journal.	Model stone blocks; commission letter; construction images; machine photographs; engineering journals; sticky notes; vocabulary cards	Attempt to move a safe weighted box using only a rope, then discuss effort, surface and control.	Can pupils identify the problem, user and required function without jumping immediately to decoration?	Cornerstones: Tomb Builders
2	Understanding forces and simple machines	Forces are pushes and pulls. Simple machines can change the direction or effect of an applied force.	**What makes a machine simple but useful?**	Rotate through demonstration stations for levers, wheels and axles, pulleys and inclined planes. Identify input force, movement and output. Produce labelled mechanism diagrams.	Lever models; pulleys; wheels and axles; ramps; ropes; small loads; force arrows; diagrams	Find examples of ramps, wheels, hinges, handles and pulley-like systems around the site.	Can pupils identify the force, load and resulting movement in each example?	GOV.UK: KS2 Design and Technology
3	Investigating levers	A lever rotates around a fulcrum. Moving the fulcrum changes the effort and movement produced.	**How does the position of the fulcrum affect lifting?**	Build lever systems using rulers or wooden strips, blocks and model loads. Change the fulcrum position while keeping the load similar. Record ease of lifting and distance moved. Relate findings to crowbars, seesaws and wheelbarrows.	Rulers; wooden strips; triangular blocks; model loads; spring scales if available; test grids; cameras	Use planks and safe supports to investigate large levers with carefully controlled light loads.	Can pupils explain how changing the fulcrum affects the effort needed?	BBC Bitesize: Levers and Mechanisms

4	Investigating inclined planes	An inclined plane spreads movement over a longer distance and can reduce the force required to raise a load. Surface texture and slope affect performance.	**Is a longer ramp always better?**	Pull identical loads up ramps of different lengths or gradients. Use a spring scale where available or compare perceived effort consistently. Test smooth and rough surfaces. Record results in tables and charts.	Boards; blocks; model loads; spring scales; protractors; books or supports; smooth and textured coverings; data sheets	Compare moving loads across level ground, compact sand and a gentle slope.	Can pupils connect slope, distance, friction and effort using test evidence?	Exploratorium: Inclined Plane Activities
5	Investigating wheels, axles and rollers	Wheels, axles and rollers can make horizontal transportation easier, but they require alignment and suitable surfaces.	**How can wheels and rollers help move a stone block?**	Compare dragging, rolling over loose dowels and using a wheeled chassis. Investigate axle alignment, wheel size and load security. Record advantages and limitations.	Model blocks; dowel rollers; wheeled platforms; card chassis; wheels; axles; textured surfaces; test sheets	Conduct controlled transport trials over paving, grass and compact sand.	Can pupils explain when rollers or wheels are useful and identify alignment problems?	Oak National Academy: Wheels and Axles
6	Investigating pulleys	A pulley uses a wheel and rope. A fixed pulley changes the direction in which effort is applied. Secure support and controlled rope movement are essential.	**How can a pulley help us lift safely?**	Construct simple fixed-pulley rigs. Compare lifting directly upward with pulling downward through the pulley. Investigate load attachment, rope guides and frame stability. Avoid claiming that a single fixed pulley reduces the force itself.	Classroom pulleys; cord; model loads; frames; dowel; hooks; spring scales; safety mats; test sheets	Observe flagpoles, blinds, washing lines or safe pulley systems where available.	Can pupils accurately explain what a fixed pulley changes and what it does not change?	Science Museum Group: Simple Machines
7	Constructing stable lifting frames	A mechanism must be supported by a strong, stiff and stable structure. Triangulation, bracing and gussets reduce unwanted movement.	**How can we stop a lifting machine collapsing or tipping?**	Build small lifting frames from straws, craft sticks or construction timber. Compare unbraced and braced versions. Investigate base width, height, anchoring and load position. Develop a reference board of effective joints.	Paper straws; craft sticks; dowel; square-section wood; card gussets; masking tape; PVA; reusable connectors; small loads	Build and test temporary tripod or A-frame structures using canes and rope.	Can pupils diagnose why a frame twists, leans or tips and select a suitable reinforcement?	GOV.UK: Technical Knowledge—Strengthening Structures
8	Researching users and developing a specification	Engineers convert the task, user needs and safety requirements into measurable design criteria.	**What must our ancient lifting or transport machine achieve?**	Select a specific movement challenge. Define the starting point, destination, load, permitted user action and available materials. Develop criteria covering mechanism, capacity, control, stability, repeatability, safety and size. Plan a fair test.	Challenge cards; model loads; user profiles; specification templates; measuring equipment; safety prompts	Inspect the planned test route or lifting location and identify practical constraints.	Are the criteria specific, technically relevant and testable?	
9	Generating ideas and making prototypes	Engineers compare alternative mechanisms and prototype high-risk parts before committing to a final design.	**Which simple machine or combination best solves our problem?**	Produce several annotated designs. Use decision matrices to compare a lever, ramp, wheeled transporter or pulley system. Make rapid prototypes of the chosen mechanism. Test and refine before drawing a final exploded diagram.	Engineering journals; pencils; rulers; graph paper; mechanism kits; card; straws; dowel; string; split pins; decision matrix	Mark the route or lifting height at larger scale using chalk, rope or cones.	Does the selected mechanism respond logically to the challenge and prototype evidence?	Design and Technology Association
10	Constructing the final machine	Accurate measuring, secure joins and systematic assembly improve performance. Mechanism and structure must be developed together.	**How can we build a reliable machine from our tested design?**	Construct the base and frame before installing the mechanism. Check squareness, alignment and reinforcement. Add axles, pulleys, levers, ramps or guides. Test each subsystem before full assembly. Record adaptations.	Selected wood, dowel, corrugated card, wheels, axles, pulleys, string, card gussets, rulers, bench hooks, junior hacksaws where permitted, PVA, adult-operated glue gun	Complete selected construction or testing outdoors if conditions and risk assessment allow.	Can pupils work from a design while adapting intelligently when technical problems arise?	
11	Testing, analysing and refining	Fair tests compare performance against the specification. Useful evidence may include load moved, distance, height, time, stability and number of successful repetitions.	**How well does our machine work, and what is causing any weakness?**	Conduct repeated engineering trials. Record quantitative and qualitative results. Identify whether problems arise from the mechanism, structure, joint, friction, alignment or user control. Make one or more targeted improvements and retest.	Finished machines; standard loads; rulers; timers; spring scales; test tracks; checklists; cameras; repair materials	Run controlled trials on the intended surface or outdoor course.	Can pupils diagnose causes rather than merely state that the machine “did not work”?	Science Museum Group: Simple Machines
12	Greatstone Ancient Engineering Trials	Engineers communicate how research, scientific principles and iterative testing informed their solution.	**Which engineering choices made our machine successful?**	Present research, prototypes, diagrams, test data and final machines. Complete the standard lifting or transportation challenge for visitors. Explain the simple machine,	Finished machines; standard test loads; display boards; journals; diagrams; result cards; visitor-feedback forms; certificates	Hold an outdoor engineering course where surfaces and weather are suitable.	Final assessment of technical understanding, design communication, construction, testing, analysis, refinement and presentation.	British Museum: Ancient Egypt Resources

				force direction, structural reinforcements and refinements.				

Suggested Design Challenges

Challenge	Likely Mechanism	Technical Emphasis
Lift a model block vertically onto a platform	Fixed pulley within an A-frame or gantry	Strong frame, secure load, controlled rope
Raise one side of a heavy block	Lever and fulcrum	Fulcrum position, effort and control
Move a block horizontally across a site	Rollers or wheeled axle system	Alignment, friction, load security
Raise a block gradually to a higher level	Inclined plane	Gradient, surface and distance
Load a block onto a transporter	Lever combined with wheels and axles	Combining mechanisms
Move a block and then lift it	Wheeled platform and pulley	Sequence, structural integration and control

Whole-Project Resource List

Existing Products and Reference Materials

- Images or models of cranes, hoists, ramps, wheelbarrows, sack trucks and loading systems
- Ancient Egyptian monument and construction images
- Diagrams of levers, pulleys, wheels and axles, and inclined planes
- Construction-site and coastal-lifting photographs
- Model blocks of standard mass
- User and engineering challenge cards
- Force-arrow cards

Mechanism Components

- Classroom pulleys
- Wooden or plastic wheels
- Wooden dowel and axle rods
- Cotton reels
- Paper or plastic straws
- Strong cord or smooth string
- Hooks, eyelets or secure load loops
- Split pins
- Construction kits
- Rulers or wooden strips for levers
- Triangular fulcrum blocks
- Smooth boards for ramps
- Dowels for rollers

Structural Materials

- Corrugated card
- Mount board
- Square-section wood
- Wooden craft sticks
- Paper straws
- Bamboo canes with safe ends
- Card tubes
- Triangular card gussets
- Corner blocks
- Reclaimed materials checked for safety

Tools and Joining Equipment

- Rulers and metre sticks
- Set squares
- Pencils
- Child-safe scissors
- Hole punches
- Masking tape
- PVA glue
- Clips and pegs
- Bench hooks and junior hacksaws where school policy permits
- Safety glasses where sawing is undertaken
- Low-temperature glue gun for trained adult use
- Cutting mats
- Screwdrivers and hand drills only where specifically risk assessed and supervised

Testing Equipment

- Standard model loads
- Spring scales or force meters
- Digital scales
- Rulers and tape measures
- Timers
- Protractors or angle guides
- Smooth and textured surfaces
- Test ramps
- Cameras or tablets
- Test grids and result tables
- Cones or markers for transportation routes

Planning and Assessment Materials

- Engineering journals
- Product-analysis sheets
- Simple-machine knowledge organisers
- Investigation grids
- Design-specification templates
- Decision matrices
- Annotated and exploded-diagram frames
- Prototype-evaluation sheets
- Testing and refinement records
- Visitor-feedback forms
- Display boards

Safety and Preparation Notes

- Complete a project-specific risk assessment for cutting, woodwork, pulleys, suspended loads, cords, testing and outdoor engineering.
- Use only light, manageable model loads. Pupils must not stand beneath suspended objects.
- Create a marked exclusion area around lifting tests.
- Inspect all pulley supports, cords, knots and load attachments before use.
- Avoid creating neck-height or looped cords that could present an entanglement risk.
- Adults should pre-cut materials unless pupils have been taught and are authorised to use junior hacksaws with bench hooks and direct supervision.
- Safety glasses should be worn where sawing or drilling presents a risk.
- Remove or cover sharp ends on dowels, canes, wire and hooks.
- Glue guns are for trained adult use unless school policy explicitly states otherwise.
- Ramps and levers must use stable supports and manageable gradients.
- Pupils should release moving loads only when the test area is clear.
- Do not allow heavy outdoor lifting. Large-scale tasks should use lightweight boxes, foam blocks or empty crates.
- Test all mechanism components before teaching to ensure wheels, axles, cords and pulleys are compatible.

Adaptive Teaching

Area	Support and Adaptation
Conceptual understanding	Use large working models and colour-code effort, load, fulcrum, axle and rope direction. Allow pupils to physically manipulate each machine.
Vocabulary	Provide labelled diagrams, action gestures and repeated oral rehearsal before written recording.
Investigation	Change one variable at a time and provide partially completed result tables. Use photographs to support recall.
Force measurement	Allow comparison through standard language such as more effort and less effort before introducing force-meter readings.
Designing	Provide component stickers, mechanism cards, exploded-diagram templates and physical modelling pieces.
Measuring and construction	Use pre-marked materials, cutting jigs, corner guides and pre-cut gussets.
Motor access	Provide larger components, construction kits and meaningful roles in positioning, testing, photographing, recording or directing assembly.
Sequencing	Use the staged process: base → frame → reinforce → mechanism → load holder → test → refine.
Greater depth	Ask pupils to combine mechanisms, compare mechanical advantage, analyse force-meter data, optimise frame-to-load ratios or design a controlled braking system.
Evaluation	Use cause-and-effect stems: “The frame tipped because…”, “Moving the fulcrum…”, “The pulley changed…”, “Our retest showed…”.

Common Misconception	Teaching Response
Simple machines remove the need for force.	Explain that machines change the size, direction or distance of force; they do not create energy.
A fixed pulley makes a load weightless.	Demonstrate that it mainly changes the direction of the pull, although practical friction may affect the test.
Every pulley system works in the same way.	Compare a single fixed pulley with images or demonstrations of movable and compound arrangements, while keeping the pupil build appropriately simple.
A longer ramp makes the journey shorter.	Show that a gentler ramp increases the distance travelled while potentially reducing the required force.
Wheels work equally well on every surface.	Compare hard, soft, uneven and sandy surfaces.
A lever's fulcrum should always be in the centre.	Test different fulcrum positions and link the choice to the task.
A larger machine is automatically stronger.	Compare bracing, material choice, joint quality, base width and load position.
More tape or glue creates a stronger frame.	Compare overloaded joins with accurate joints reinforced by gussets or braces.
The ancient Egyptians definitely used one particular pyramid-building method.	Present ramps, levers, rollers and lifting systems as evidence-informed possibilities rather than established certainty.
Testing means trying the product once.	Require repeated trials using the same load, route and starting conditions.

Key Online Examples and Teacher Resources

- Cornerstones: Tomb Builders
- GOV.UK: National Curriculum for Design and Technology
- British Museum: Ancient Egypt School Resources
- British Museum: Ancient Egypt Timeline
- Science Museum Group: Simple Machines
- Exploratorium: Inclined Plane Investigation
- BBC Bitesize: Forces and Mechanisms
- Oak National Academy: Wheels and Axles
- Design and Technology Association

YEAR 5 – MOVING MECHANISMS - Autumn Term

How can air be used to power a machine that performs a useful function?

Section	Curriculum Overview
Curriculum Rationale	This project develops pupils' understanding of pneumatic systems through the purposeful challenge of designing and making a machine that uses compressed air to create controlled movement. Building on wheels and axles in **Taxi!**, cams and followers in **Making It Move**, and simple machines in **Tomb Builders**, pupils now investigate a different way of transmitting force and movement. They experiment with syringes, tubing and air pressure before combining a pneumatic system with a secure, reinforced structure. Pupils research a user and practical need, model alternative ideas, construct and test prototypes and refine a final pneumatic machine. The official Cornerstones project focuses specifically on understanding pneumatics and designing, making and evaluating a pneumatic machine that performs a useful function.
The Greatstone Way	**ROOTS → SURVIVORS – Who are we and where do we belong? How do people overcome challenges and adapt?** Pupils investigate how engineers create machines that make demanding, repetitive or hazardous tasks safer and more manageable. They develop the autumn value of **Care** by designing around the needs and safety of a particular user. Through repeated testing and improvement, they learn that resilient designers respond constructively when mechanisms leak, structures flex or initial ideas fail.
National Curriculum Coverage	At Key Stage 2, pupils should research user needs, develop design criteria, communicate ideas through annotated sketches, exploded diagrams, prototypes and computer-aided design where appropriate, select suitable tools and materials, work accurately, evaluate existing products and refine their own designs. They should also understand and use mechanical systems and strengthen, stiffen and reinforce more complex structures. Pneumatics are not named in the statutory examples, but provide an appropriate mechanical-system context through which these statutory designing, making, evaluating and technical expectations can be taught.
Curriculum Journey	**Previous learning:** Year 1 **Taxi!** introduced components and rotary movement; Year 3 **Making It Move** developed mechanical movement through cams and followers; Year 4 **Tomb Builders** explored force, levers, pulleys, inclined planes and stable lifting frames. **Current learning:** Pupils investigate how air pressure can transfer force through a sealed pneumatic system and apply this to a useful machine. **Future learning:** Year 6 **Engineer** requires pupils to select and combine increasingly sophisticated structures, mechanisms and systems with greater independence.
Design Brief	Research, design and make a pneumatic machine that performs a useful function for an identified user. The machine must use a sealed system of syringes and flexible tubing to produce controlled movement and must be housed within a stable, reinforced structure.
Possible Outcomes	A pneumatic litter picker; lifting platform; model excavator arm; opening bridge; rescue device; grabber; sorting machine; accessibility aid; stage prop; animal-care device; or Beach School equipment mover. Pupils should respond to a genuine user and purpose rather than all reproducing one identical model.
Design Criteria	The machine must have a clearly identified user and useful function; contain a working pneumatic system; create controlled movement; minimise air leakage; include secure connections; be supported by a strong and stable structure; operate repeatedly; keep moving components clear of the user's hands; use materials responsibly; and be evaluated through systematic testing.
Sticky Knowledge	Pneumatics use compressed air to create movement or transfer force. Air occupies space and can be compressed. A closed pneumatic system commonly includes an input syringe, flexible tubing and an output syringe. Pushing the input syringe forces air through the tube and moves the output plunger. Pulling the input can reverse the movement when the system remains sealed. Larger and smaller syringes can affect the distance and force of movement. Air leaks reduce performance. A mechanism must be securely connected to a reinforced structure if it is to work reliably. Prototypes help designers test risky or uncertain parts before constructing the final product.
Technical Knowledge and Skills	Identify input, process and output within a pneumatic system. Connect syringes and tubing to create a sealed circuit. Investigate compression, force, movement direction and travel distance. Compare syringe sizes and arrangements. Develop pivots, linkages and guided moving components that can be actuated by an output syringe. Construct reinforced frames using braces, gussets and accurately fitted joints. Use annotated sketches, exploded diagrams and prototypes to communicate systems. Measure, mark, cut, join and assemble materials with increasing precision. Conduct repeatable tests, diagnose faults and refine both mechanism and structure.
Substantive Concepts	User • Purpose • Pneumatics • Pressure • Force • Movement • Mechanism • Structure • Control • Safety

Disciplinary Concepts	Research • Investigate • Model • Design • Prototype • Construct • Test • Analyse • Evaluate • Refine
Core Vocabulary	pneumatic, compressed air, air pressure, input, process, output, syringe, plunger, barrel, tubing, sealed system, air leak, force, movement, linear motion, pivot, linkage, actuator, mechanism, component, prototype, frame, brace, gusset, reinforce, specification, diagnose, evaluate
Designers, Engineers and Product Examples	Pupils investigate pneumatic systems used in vehicle doors, workshop tools, production machinery, refuse and recycling systems, lifting and gripping equipment and interactive products. Comparisons may also be made with hydraulics, but pupils should understand that hydraulic systems use liquids whereas this project uses air. The main designer study should focus on how engineers respond to users, safety and functional problems rather than on copying the appearance of an existing machine.
Cross-Curricular Links	**History – Through the Ages:** connect the project to the development of tools and technologies that helped people adapt, work and survive, while making clear that modern pneumatic systems are not prehistoric technologies. **Science:** forces, air resistance, gases, pressure and the properties of materials. **Mathematics:** measurement, angles, scale, ratio through practical comparison and data presentation. **English:** research notes, technical explanations, design specifications and evaluation. **Computing:** digital diagrams, slow-motion recording and, where available, simple CAD modelling. **Art:** colour and style choices that communicate function and user identity without compromising operation.
Beach School & Outdoor Learning	Investigate tasks around Greatstone that involve lifting, gripping, opening, sorting or moving objects. Pupils can observe litter pickers, gates, pumps, boat equipment and maintenance tools before defining useful design problems. Outdoor pneumatic demonstrations should use clean, dry equipment and lightweight loads. Final machines can be tested in a controlled outdoor engineering area where wind and uneven surfaces form part of the design context.
Greatstone & Kent Links	Pupils can design machines responding to Greatstone's coastal needs, such as collecting litter without direct handling, moving lightweight Beach School equipment, opening a model flood barrier or sorting recyclable materials. The local context gives the pneumatic system an authentic purpose while connecting engineering with community care and environmental responsibility.
Memorable Hook	**The Greatstone Pneumatic Engineering Commission** – A broken prototype and a collection of syringes, tubes and machine photographs arrive with an urgent message. A community task is proving difficult or unsafe to complete by hand. Pupils are commissioned to discover how air can transmit force and then design a machine that solves the problem.
Authentic Outcome / Showcase	**The Greatstone Pneumatic Engineering Expo** – Pupils present user research, pneumatic investigations, prototypes, technical diagrams, testing evidence and completed machines. Each product must complete a standard functional challenge while pupils explain the path from input to output and how testing improved reliability, control and safety.
Assessment End Point	Pupils independently research a user, develop a testable specification and construct a pneumatic machine that performs a useful function. They accurately explain how air pressure transfers force through the system, integrate the mechanism into a stable reinforced structure, diagnose faults such as leakage or misalignment and use testing evidence to evaluate and refine the final product.

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to Be Secured	Design Enquiry Question	Example Learning Activities	Weekly Resources	Beach School / Outdoor Learning	Assessment Opportunity	Online Example / Teacher Support
1	Launching the pneumatic commission	Engineers begin with a user, problem and required function. Pneumatic systems use air to produce movement.	**What useful tasks could a pneumatic machine perform?**	Examine the broken prototype and commission. Explore photographs or videos of pneumatic machines. Identify users, functions, inputs, movements and safety features. Generate possible Greatstone problems that could be solved. Begin engineering journals.	Commission letter; broken or incomplete model; pneumatic product images; engineering journals; user and problem cards; sticky notes; vocabulary cards	Audit tasks around school or Beach School involving lifting, gripping, opening, sorting or controlled movement.	Can pupils identify a genuine user, problem and useful function?	Cornerstones: Moving Mechanisms
2	Understanding air and pressure	Air occupies space and can be compressed. Applying force to trapped air increases pressure.	**How can invisible air push an object?**	Conduct safe demonstrations using sealed syringes, balloons and plastic bags. Compare an open syringe with one whose nozzle is blocked. Record observations using force arrows and annotated diagrams. Do not aim syringes or tubing at faces.	Needle-free plastic syringes; balloons; resealable bags; tubing; force-arrow cards; investigation sheets; safety glasses for demonstrations where appropriate	Investigate air moving flags, wind socks or lightweight objects, distinguishing moving air from compressed air in a sealed system.	Can pupils explain that air takes up space and resists compression?	Science Museum Group: Forces resources
3	Constructing a simple pneumatic system	A closed system can transfer force from an input syringe to an output syringe. Connections must be sealed.	**How can one syringe make another syringe move?**	Connect two syringes with flexible tubing. Label input, tubing and output. Push and pull the input and observe the output direction and distance. Compare working and deliberately leaking systems.	10–20 ml needle-free syringes; flexible tubing matched to syringe nozzles; cable ties or connectors if needed; trays; labels; test sheets	Demonstrate systems outdoors with lightweight flags or moving markers attached to the output plunger.	Can pupils assemble and explain a functioning closed pneumatic system?	Cornerstones project scope: Understanding pneumatics
4	Investigating syringe size and movement	Syringe size and system arrangement affect travel distance, resistance and output force. Variables must be controlled to compare systems fairly.	**How does syringe size change the output?**	Compare equal-sized syringes, a small input with a larger output and a larger input with a smaller output. Measure output travel and describe resistance. Repeat tests and record results in tables. Avoid oversimplified claims: practical outcomes depend on syringe areas, travel and friction.	Syringes in several compatible sizes; tubing; rulers; small standard loads; investigation grids; cameras; labels	Test systems attached to lightweight outdoor indicators, keeping the apparatus clean and dry.	Can pupils conduct repeatable tests and identify a pattern using evidence?	GOV.UK: KS2 D&T design, test and refine expectations
5	Translating plunger movement into useful action	Output-syringe movement can push or pull a component directly or operate a pivoted lever or linkage.	**How can linear movement operate a machine?**	Build small mechanism rigs in which the output syringe lifts a flap, turns a pivoted arm, operates jaws or moves a platform. Compare attachment points and angles. Label pivots, links and movement directions.	Syringe systems; card or wooden levers; split pins; dowel pivots; craft sticks; construction kits; clips; prototype bases	Observe moving gates, grabbers, lifting arms or hinged structures and identify pivots and links.	Can pupils convert syringe travel into a controlled useful movement?	Oak: KS2 mechanical systems resources

6	Building stable supporting structures	A mechanism needs a strong frame. Bracing, gussets and secure bases reduce twisting and movement.	**How can we stop the machine moving when the mechanism operates?**	Build and compare unbraced and braced frames. Attach a pneumatic system and observe forces on the structure. Reinforce weak joints using triangles and gussets. Create a technical reference page.	Corrugated card; square-section wood or dowel; craft sticks; card gussets; masking tape; PVA; construction kits; syringes; small loads	Construct temporary A-frames or tripods using canes and ties, then apply a gentle operating force.	Can pupils diagnose and reinforce a structural weakness?	GOV.UK: Strengthen, stiffen and reinforce structures
7	Researching users and developing a specification	A design specification should convert research into clear, measurable requirements for function, movement, safety and use.	**What exactly must our pneumatic machine achieve?**	Select a Greatstone or classroom design problem. Interview a user or analyse a detailed profile. Define required movement, load, operating range, size, safety, materials and repeated use. Decide how each criterion will be tested.	User profiles; interview questions; design-problem cards; specification templates; pneumatic components; measuring tools; test-planning prompts	Visit the intended use location to identify space, surfaces, weather and accessibility requirements.	Are pupils' criteria user-centred, technical and testable?	GOV.UK: National Curriculum for Design and Technology
8	Generating ideas and developing prototypes	Engineers model uncertain parts and compare alternative mechanisms before making a final product. Technical drawings must show how components connect.	**Which pneumatic arrangement best solves our user's problem?**	Generate at least two annotated ideas. Produce system diagrams showing input, tube, output, pivot and moving part. Use decision matrices against the specification. Make a focused prototype of the mechanism and refine it before finalising an exploded diagram or CAD model.	Engineering journals; pencils; rulers; graph or isometric paper; syringes; tubing; card; split pins; dowel; craft sticks; prototype materials; optional CAD software	Mark the intended operating space using chalk or cones and test whether the proposed movement range is suitable.	Does the chosen design follow logically from research and prototype evidence?	Cornerstones: Designing, making and evaluating pneumatic prototypes
9	Constructing the frame and mounting the system	Accurate measurement, secure joints and correct alignment are essential. Syringes must be mounted without obstructing plunger movement.	**How can we construct a reliable base and frame?**	Construct the main framework from selected materials. Check squareness, base stability and reinforcement. Trial the position of the input and output syringes before securing them with removable ties, clips or purpose-made holders.	Selected card, wood or dowel; rulers; set squares; bench hooks and junior hacksaws where permitted; PVA; card gussets; cable ties; clips; syringe holders; tubing	Construct or test in a controlled outdoor engineering area where appropriate.	Is the structure stable and are components mounted accurately without restricting movement?	
10	Completing the moving mechanism and product	The mechanism, structure and user interface must operate together. Tubing should remain unkinked and moving parts should avoid collision.	**How can we make the movement controlled, safe and useful?**	Attach output plunger to the moving component. Add guides, pivots, jaws, platforms or linkages. Route tubing safely. Add handles, labels, guards or surfaces required by the user. Test after every major addition.	Ongoing structures; syringes; tubing; pivots; linkages; fasteners; card; wood; clips; safe adhesives; finishing materials; lightweight test objects	Carry out functional trials in the intended location where conditions permit.	Does the product perform its useful function repeatedly and safely?	
11	Systematic testing, fault diagnosis and refinement	Weak performance may be caused by air leakage, kinked tubing, poor alignment, excessive load, friction or an unstable frame. Evaluation should identify causes and target improvements.	**Why is our machine not yet working as well as it could?**	Complete repeated tests using the same load and starting conditions. Measure movement range, successful repetitions, control and stability. Use a fault-diagnosis checklist. Repair seals, reposition components, reduce friction or strengthen structures before retesting.	Completed machines; standard test loads; rulers; timers; success counters; leak-detection checklist; cameras; repair materials; user-feedback forms	Run controlled outdoor functional tests if the machine was designed for an outdoor context.	Can pupils diagnose causes and demonstrate measurable improvement after refinement?	GOV.UK: Test, evaluate and refine against a specification
12	Greatstone Pneumatic Engineering Expo	Engineers communicate how research, scientific understanding, design and iterative testing produced a functional solution.	**How successfully does our machine solve the user's problem?**	Present user research, investigations, system diagrams, prototypes, final machines and testing data. Demonstrate the product through a standard challenge. Explain input, force transfer, output movement, structural decisions and refinements. Gather visitor feedback and complete a final evaluation.	Finished machines; standard challenge equipment; journals; diagrams; display boards; visitor-feedback cards; certificates; evaluation sheets	Host an outdoor engineering trail where machines and conditions make this appropriate.	Final assessment of research, pneumatic understanding, technical communication, construction, testing, refinement and presentation.	Cornerstones: Moving Mechanisms

Possible Design Challenges

Challenge	Pneumatic Action	Technical Emphasis
Greatstone litter grabber	Output syringe opens, closes or lifts a gripping mechanism	Pivot position, grip, safe handling and user reach
Model flood-barrier gate	Output lifts or lowers a hinged barrier	Controlled travel, stable frame and secure pivot
Beach equipment lifting platform	Syringe raises a lightweight platform	Vertical guidance, load balance and reinforcement
Recycling sorting machine	Output moves a flap or pusher to direct objects	Repeatability, alignment and user control
Rescue or animal-care device	Output operates a gate, arm or platform	Gentle movement, accessibility and safe containment

Model excavator arm	One or more pneumatic systems operate arm sections	Linkages, pivots and coordinated movement
Stage or museum mechanism	Output reveals, lifts or moves a display element	Smooth movement, concealment and audience experience
A single pneumatic circuit is sufficient for the core expectation. Multiple independently controlled circuits should be reserved for pupils who have secured the fundamental knowledge and can manage the additional construction complexity.		

Whole-Project Resource List

Pneumatic Components

- Needle-free plastic syringes in compatible sizes
- Flexible plastic or silicone tubing that fits syringe nozzles securely
- T-connectors only for carefully planned extensions
- Cable ties, small clamps or reusable fasteners
- Spare syringes and tubing for replacement
- Balloon pumps or bellows for teacher demonstration if useful
- Commercial pneumatic construction kits where available

Existing Products and Visual References

- Photographs or videos of pneumatic tools and machines
- Model excavators, grabbers, lifting devices and barriers
- Diagrams showing input, process and output
- User and problem cards
- Examples of safe and unsafe machine layouts
- Cornerstones pneumatic project materials where licensed

Prototype Materials

- Corrugated card
- Mount board
- Paper straws
- Wooden craft sticks
- Card tubes
- Dowel
- Split pins
- Elastic bands
- String
- Reusable construction kits
- Clips and pegs
- Modelling clay for temporary supports

Final Structural Materials

- Corrugated card and mount board
- Square-section wood
- Wooden dowel
- Craft sticks
- Card or plywood bases where available
- Triangular card gussets
- Corner blocks
- Reclaimed materials checked for suitability and safety
- Acetate for guards or windows where appropriate

Tools and Joining Equipment

- Rulers and metre sticks
- Set squares
- Pencils
- Child-safe scissors
- Hole punches
- PVA glue
- Masking tape
- Clips and pegs
- Bench hooks and junior hacksaws where school procedures permit
- Safety glasses where cutting wood
- Adult-operated low-temperature glue gun where required
- Cutting mats
- Hand drills or bradawls only under direct supervision and risk assessment
- Cable-tie cutters for adult use

Testing Equipment

- Standard lightweight loads
- Rulers and tape measures
- Timers
- Counting devices for repeated operations
- Small digital scales
- Force meters where useful
- User-feedback forms
- Fault-diagnosis cards
- Cameras or tablets
- Slow-motion video where available
- Test grids and specification checklists

Planning, Recording and Display

- Engineering journals
- Product-analysis grids
- Pneumatic investigation sheets
- User-research templates
- Design specifications
- System-diagram frames
- Annotated and exploded-drawing templates
- Decision matrices
- Prototype-evaluation sheets
- Testing and refinement records
- Display boards and technical labels

Safety and Preparation Notes

- Use only needle-free syringes. Medical needles must never be present.
- Check that all syringes and tubing are clean, unused for medical purposes and suitable for classroom activity.
- Do not allow pupils to aim syringes, tubing or expelled air at faces, eyes or ears.
- Do not place liquids inside the system; that would create a hydraulic rather than pneumatic system and introduce leakage and hygiene risks.
- Avoid sealing blocked syringes and applying excessive force that could cause tubing to detach suddenly.
- Inspect tubing and syringe connections before every practical session.
- Secure components so that loose tubing cannot create a trip or entanglement hazard.
- Use lightweight loads only. Pupils should not create machines that lift body parts, heavy objects or living animals.
- Keep fingers clear of pinch points around pivots, jaws and linkages.
- Complete a project-specific risk assessment for wood cutting, drilling, adhesives and moving mechanisms.
- Junior hacksaws and hand drills require bench hooks, clamps, safety glasses and direct supervision according to school policy.
- Low-temperature glue guns should be used by trained adults unless school procedures explicitly permit supervised pupil use.
- Store pneumatic components separately from sharp tools and adhesives.
- Test all syringe-and-tube combinations before the project to confirm a reliable fit.
- Do not permanently glue syringes during early construction; removable mounts allow repair and repositioning.

Adaptive Teaching

Area	Support and Adaptation
Understanding pneumatics	Use oversized working models and colour-code the input syringe, tube and output syringe. Encourage pupils to trace the path of the air physically.
Vocabulary	Use labelled diagrams, gesture and oral rehearsal for input, output, pressure, plunger, sealed system and actuator.
Practical assembly	Provide matched syringe-and-tube sets, pre-cut tubing, connector guides and trays containing one complete system.
Measuring movement	Use marked strips beside the plunger or output component before introducing independent ruler measurements.
Designing	Offer system-component stickers, exploded-diagram templates, pivot cards and physical mock-up pieces.
Construction	Provide pre-cut structural members, corner jigs, card gussets and temporary clips to hold components while adhesive sets.
Motor access	Use larger syringes, broad handles, stable bases and meaningful roles in testing, recording, photographing and directing assembly.
Sequencing	Use the staged process: investigate → system prototype → moving component → frame → mount → connect → test → diagnose → refine.
Communication	Permit video explanation, oral annotation or photographed models alongside written technical recording.
Greater depth	Ask pupils to compare syringe-area combinations, coordinate two pneumatic circuits, optimise linkage position or quantify movement and reliability over repeated trials.
Evaluation	Use a fault tree: leak, kink, friction, alignment, load, frame or user control. Require pupils to name the likely cause before choosing a repair.

Common Misconceptions

Misconception	Teaching Response
Pneumatic systems use water.	Clarify that pneumatics use gases, usually air; hydraulic systems use liquids.
Air is empty or has no substance.	Use blocked-syringe investigations to show that air occupies space and resists compression.
The tubing creates the force.	Trace how force applied to the input plunger increases air pressure, which acts on the output plunger.
Air disappears inside the tube.	Emphasise the closed system and track the same trapped air as it transfers pressure.
A larger syringe is always more powerful.	Compare different input-output combinations and discuss the trade-off between force, resistance and movement distance.
More pressure should always be applied when a machine sticks.	Teach pupils to stop and diagnose leakage, blockage, friction, alignment or overload rather than forcing components.
The mechanism can be added after decorating the model.	Require mechanism testing before enclosure and finishing.
A moving output means the product is automatically successful.	Return to user, purpose, control, repeatability, safety and the complete specification.
Tape around every component makes the system airtight.	Distinguish tube connections from structural mounting and compare neat secure connections with excessive tape.
A prototype should look like a finished product.	Explain that focused prototypes test uncertain functions and may be rough, partial or temporary.
Pneumatics are the same as pulleys or cams.	Compare how each system transmits movement: air pressure, flexible cords and wheels, or rotating shaped components.

Key Online Examples and Teacher Resources

- Cornerstones: Moving Mechanisms
- GOV.UK: National Curriculum for Design and Technology
- Oak National Academy: Primary KS2 Design and Technology Units
- Oak: Pulleys and Gears – Electric Vehicles
- Science Museum Group Learning Resources
- Design and Technology Association
- Cornerstones: Year 5 Projects

YEAR 5 – EAT THE SEASONS - Spring Term

How can we use seasonal ingredients to design and cook a healthy savoury dish for a particular user?

Section	Curriculum Overview
Curriculum Rationale	This project develops pupils' understanding of seasonality, food provenance, nutrition and recipe development through the purposeful challenge of designing and cooking a predominantly savoury seasonal dish. Building on **Cook Well, Eatwell** in Year 3 and **Fresh Food, Good Food** in Year 4, pupils investigate how the availability, quality, cost and environmental impact of ingredients can vary across the year. They research seasonal produce, compare food journeys and explore increasingly sophisticated preparation and cooking techniques before adapting a recipe for an identified user. The Cornerstones project focuses on the meaning and benefits of seasonal eating, alongside food-preparation and cooking techniques.
The Greatstone Way	**EXPLORERS → INVENTORS – How does curiosity help us discover more? How do ideas change the world?** Pupils explore where ingredients come from, how growing conditions affect availability and how cooks adapt dishes according to the season. They develop the spring value of **Dream** by experimenting with flavour combinations, imagining new uses for familiar produce and recognising that creative food design can support healthier and more sustainable choices.
National Curriculum Coverage	Pupils use research to understand the needs of users; develop design criteria; generate, model and communicate ideas; select and use appropriate tools, ingredients and equipment accurately; evaluate existing products; and refine their work through testing and feedback. In cooking and nutrition, Key Stage 2 pupils should understand and apply the principles of a healthy and varied diet, prepare and cook a range of predominantly savoury dishes using different techniques, understand seasonality and know where and how ingredients are grown, reared, caught and processed.
Curriculum Journey	**Previous learning:** Year 1 introduced food origins and basic preparation; Year 2 developed recipe reading and adaptation; Year 3 extended nutrition, savoury cooking and user research; Year 4 examined freshness, preservation and food packaging. **Current learning:** Pupils investigate seasonality in greater depth and independently develop a healthy savoury dish around ingredients available during a selected season. **Future learning:** Year 6 **Food for Life** develops greater nutritional analysis, increasingly independent cooking and informed decision-making about food choices across a lifetime.
Design Brief	Research, design and cook a healthy predominantly savoury dish for a specified user using ingredients that are seasonally available in the United Kingdom during the chosen part of the year. The dish should demonstrate appropriate preparation and cooking techniques, minimise avoidable waste and communicate clearly how seasonality informed the design.
Possible Users	A Greatstone family; pupils attending Beach School; an older or younger pupil; a school staff member; a vegetarian user; a user requiring an adapted texture; a family seeking an affordable meal; or visitors attending a Greatstone spring showcase.
Possible Final Outcomes	Seasonal vegetable soup; roasted vegetable and couscous dish; vegetable and pasta bake; seasonal savoury tart or turnover; seasonal salad with grains or pulses; vegetable curry; seasonal pizza or flatbread; vegetable frittata; or another predominantly savoury dish suited to the school's facilities and risk assessment.
Design Criteria	The dish must suit its intended user; use at least two ingredients that are seasonally appropriate in the United Kingdom; be predominantly savoury; contribute to a healthy and varied diet; demonstrate several preparation techniques; involve a suitable cooking method; balance flavour, texture, colour and aroma; meet dietary and allergy requirements; minimise food and packaging waste; be affordable and practical to reproduce; and be evaluated using user feedback.
Sticky Knowledge	Seasonal food is grown and harvested naturally at a particular time of year in a particular place. Seasonal availability varies according to climate and location. Food grown locally is not automatically seasonal, and seasonal food is not always locally produced. Ingredients may be grown, reared, caught or processed. Eating seasonally can provide opportunities to use produce when it is plentiful, but designers must also consider nutrition, cost, storage, transport and user needs. Recipes can be adapted by substituting ingredients while retaining a workable balance of quantity, flavour, texture and cooking method. A healthy diet depends on variety and balance over time.
Technical Knowledge and Skills	Interpret seasonal food calendars and ingredient labels. Research ingredient origins and production methods. Compare fresh, frozen, canned and preserved versions of ingredients. Conduct structured sensory evaluations. Adapt recipes according to user needs, seasonal availability and dietary requirements. Weigh and measure ingredients accurately. Wash, peel, chop, slice, dice, grate, crush, mix, knead, shape, sauté, simmer, boil, steam, roast or bake as appropriate. Use heat safely under the school's agreed procedures. Develop an annotated recipe specification, calculate quantities, plan a practical sequence, prepare and cook a finished dish, gather user feedback and refine the recipe.
Substantive Concepts	User • Purpose • Seasonality • Provenance • Ingredient • Nutrition • Recipe • Cooking • Sustainability • Value
Disciplinary Concepts	Research • Investigate • Taste • Analyse • Design • Adapt • Prepare • Cook • Test • Evaluate • Refine

Core Vocabulary	seasonality, seasonal, local, imported, provenance, origin, grown, reared, caught, processed, harvested, ingredient, recipe, specification, nutrition, balanced, varied, savoury, sensory, aroma, flavour, texture, substitution, quantity, portion, cost, food miles, waste, sauté, simmer, boil, steam, roast, bake, evaluate, refine
Chefs, Growers and Product Examples	Pupils investigate seasonal menus, farm-shop products, vegetable boxes, supermarket seasonal ranges and dishes from different cultures that make effective use of locally or seasonally available produce. They consider how growers, farmers, cooks, chefs and food manufacturers respond to changes in availability, price, quality and customer demand.
Cross-Curricular Links	**Geography – One Planet, Our World and Rocks, Relics & Rumbles:** climate zones, land use, food production, global trade, sustainability and the environmental impact of transporting food. **Science:** properties and changes of materials through cooking; plant reproduction and life cycles where relevant; nutritional needs. **Mathematics:** ratio, scaling, mass, capacity, cost, fractions and time. **English:** research summaries, recipes, persuasive menu descriptions and critical evaluations. **Computing:** digital recipe presentation, spreadsheets for cost comparison and photography of practical processes.
Beach School & Outdoor Learning	Investigate which ingredients are available locally in different seasons and how an outdoor meal differs from one prepared for the dining hall. Consider portability, safe storage, packaging and waste. Pupils can plan a seasonal Beach School meal or warm spring dish, but outdoor cooking should occur only where suitable facilities, trained adults and a separate risk assessment are in place.
Greatstone & Kent Links	Kent's orchards, farms and horticultural traditions provide a strong context for studying seasonality. Pupils investigate seasonal fruit, vegetables, cereals and herbs grown in Kent and compare these with imported ingredients. Local farm shops, markets, packaging and menus can provide authentic research material. The final recipe may be designed for a Greatstone family café, school lunch, Beach School event or community showcase.
Memorable Hook	**The Empty Seasonal Menu** – A local Greatstone café sends an unfinished spring menu explaining that several chosen ingredients are unavailable, expensive or out of season. Pupils are commissioned as seasonal food designers to investigate what is currently available and create a healthy dish that celebrates the season.
Authentic Outcome / Showcase	**The Greatstone Seasonal Kitchen** – Pupils present seasonal research, user profiles, sensory evaluations, adapted recipes, costings, practical photographs and finished dishes to families, kitchen staff or local food producers. Visitors provide structured feedback and pupils explain how seasonal availability shaped their decisions.
Assessment End Point	Pupils independently research seasonality and ingredient provenance, develop a user-centred specification and adapt a predominantly savoury recipe using seasonally appropriate ingredients. They measure and prepare food accurately, apply suitable cooking techniques, work safely and hygienically, explain their nutritional and sustainability decisions and refine the final dish using sensory testing and user feedback.

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to Be Secured	Design Enquiry Question	Example Learning Activities	Weekly Resources	Beach School / Outdoor Learning	Assessment Opportunity	Online Example / Recipe Support
1	Launching the seasonal food commission	Food products are designed for particular users, occasions and contexts. Availability changes throughout the year.	**Why might a menu need to change with the seasons?**	Open the incomplete café menu and commission. Compare menus from different seasons. Identify unavailable or unsuitable ingredients and generate questions about provenance, nutrition, cost and user needs. Begin food-design journals.	Commission letter; seasonal menus; ingredient photographs; user cards; food-design journals; sticky notes; vocabulary cards	Survey signs of the current season and discuss how weather affects local growing.	Can pupils explain why designers may adapt menus during the year?	Cornerstones: Eat the Seasons
2	Understanding seasonality	Seasonal food is harvested naturally at a particular time and place. Availability differs across climates and regions.	**What does seasonal food actually mean?**	Use seasonal calendars to sort UK produce by season. Distinguish seasonal, local and imported. Investigate examples that can be grown in Britain during one season but imported at other times.	UK seasonal food calendars; ingredient cards; hoops; maps; packaging; research sheets	Observe what is growing in the school grounds, gardens or local environment.	Can pupils accurately distinguish seasonal from local?	Food – a fact of life
3	Investigating provenance and food journeys	Ingredients may be grown, reared, caught or processed before reaching consumers. Longer journeys may require storage, refrigeration or packaging.	**How does food travel from source to plate?**	Trace selected seasonal and imported ingredients using packaging, maps and supply-chain diagrams. Compare a Kent-grown ingredient with an imported alternative. Discuss transport without assuming that distance alone determines environmental impact.	Ingredient packaging; world and UK maps; atlases; journey cards; food-chain diagrams; string; comparison sheets	Identify local food outlets, farms or growing spaces from maps or fieldwork.	Can pupils explain a food journey using precise provenance vocabulary?	GOV.UK: KS2 cooking and nutrition requirements
4	Seasonal food, nutrition and value	Seasonal ingredients must be considered alongside nutrition, cost, availability, user preference and practicality.	**Is seasonal food always the best choice?**	Compare fresh, frozen, canned and preserved versions of selected ingredients. Consider cost per usable portion, waste, storage, nutrition and availability. Discuss balanced conclusions rather than presenting one format as universally superior.	Fresh, frozen, canned and dried examples or packaging; price information; scales; comparison grids; Eatwell Guide	Discuss which formats would be practical for an outdoor meal and why.	Can pupils justify a choice using more than one factor?	NHS Healthier Families recipes
5	Sensory evaluation of seasonal ingredients	Designers use appearance, aroma, flavour and texture to compare ingredients and identify effective combinations.	**Which seasonal ingredients work well together?**	Conduct a structured tasting of current seasonal produce in raw and safely cooked forms. Compare sweetness, acidity, bitterness, texture and aroma. Record combinations that might suit savoury dishes.	Seasonal ingredients; allergy records; tasting plates; water; sensory vocabulary mats; evaluation grids	Visit a market, farm shop or school growing area where possible, or study photographs and packaging.	Can pupils use specific sensory language and identify compatible combinations?	NHS Healthier Families recipe collection

6	Developing preparation and cooking techniques	Different ingredients and outcomes require different tools, cuts and cooking methods. Accuracy affects cooking time and final texture.	**How do technique and cooking method change an ingredient?**	Rotate through skill stations involving weighing, peeling, slicing, dicing, grating, crushing and measuring. Compare steamed, simmered, roasted or sautéed samples prepared under adult control. Record how each method changes colour, flavour and texture.	Scales; measuring jugs and spoons; boards; appropriate knives; graters; peelers; bowls; cooked samples; technique cards	Investigate which cooking methods would be realistic and safe for Beach School.	Can pupils select an appropriate preparation and cooking technique and justify it?	NHS vegetable mix with cheese sauce
7	Investigating existing seasonal dishes	Existing dishes reveal how ingredients, techniques and proportions work together.	**What makes a successful seasonal savoury dish?**	Analyse and taste small samples of suitable dishes, such as harvest soup, vegetable pasta, seasonal coleslaw or roasted vegetables. Compare user suitability, nutrition, colour, texture, cost and practical preparation.	Teacher-prepared samples; recipes; ingredient cards; sensory grids; cost information; cameras	Decide which products would travel or serve most effectively outdoors.	Can pupils identify transferable features for their own product?	NHS Harvest vegetable soup
8	Researching users and writing a specification	Design criteria should arise from user research and be precise enough to test.	**What must our seasonal dish achieve for its user?**	Select or interview an intended user. Record dietary needs, preferred flavours, disliked textures, portion needs, budget and serving context. Develop a specification covering seasonality, nutrition, techniques, sensory qualities, cost, waste and presentation.	User profiles; interview sheets; allergy and dietary records; specification templates; seasonal calendars; cost prompts	Visit or study the intended serving location and identify practical constraints.	Are the criteria user-centred, seasonally informed and testable?	GOV.UK: Design and Technology programme
9	Adapting and developing recipes	Recipe adaptation requires purposeful substitutions and balanced quantities rather than random changes.	**How can we turn a base recipe into our own seasonal dish?**	Compare possible base recipes. Identify which ingredients can be substituted according to season, user and availability. Produce at least two recipe concepts, calculate approximate quantities and select one against the specification. Conduct a small component trial where possible.	Base recipes; ingredient cards; seasonal calendars; calculators; scales; recipe-development sheets; specification checklist	Consider an alternative version suitable for an outdoor Greatstone event.	Can pupils justify substitutions and explain their likely effect on flavour, texture and cooking?	NHS pasta ratatouille bake
10	Planning and cooking the final dish	Successful practical work requires an organised sequence, accurate quantities, safe technique and coordinated teamwork.	**How can we produce our dish safely and consistently?**	Write or finalise an annotated recipe with quantities, equipment, timings and division of tasks. Set up hygienic workstations. Prepare and cook the final dish in groups. Photograph stages and annotate any necessary adaptations.	Selected ingredients; recipe plans; scales; measuring equipment; knives and boards; bowls; cooking equipment; aprons; cleaning materials; cameras	Outdoor service only where food can remain covered, temperature controlled and hygienically managed.	Can pupils follow their plan with appropriate independence and technical control?	NHS Herby pasta with veg
11	User testing, costing and refinement	Evaluation should consider specification, sensory evidence, user response, cost, seasonality, waste and practicality.	**How successfully does our dish meet the seasonal design brief?**	Conduct a structured tasting with intended users. Calculate approximate cost per portion and review avoidable waste. Compare outcomes with the specification. Produce a revised recipe showing one or more evidence-based changes.	Fresh samples; user-feedback forms; sensory grids; cost calculators; waste-recording sheets; original specifications; revised recipe templates	Evaluate whether the product would remain suitable for a Greatstone outdoor event.	Can pupils distinguish evidence-based evaluation from personal preference?	NHS Healthier Families dinner recipes
12	Greatstone Seasonal Kitchen	Food designers communicate how research, seasonality, nutrition and testing informed the final product.	**Why should our dish appear on a Greatstone seasonal menu?**	Present seasonal research, food journeys, user specification, recipe development, practical photographs, costing and evaluations. Deliver a persuasive menu pitch. Compile final recipes into a Greatstone seasonal cookbook.	Finished displays; recipe cards; journals; photographs; costing summaries; visitor-feedback forms; certificates	Hold a seasonal café or tasting outdoors only where school food procedures permit.	Final assessment of seasonality, research, specification, preparation, cooking, adaptation, evaluation and communication.	Cornerstones: Eat the Seasons

Suggested Recipe Starting Points

The final outcome should remain pupil-designed and adapted to the selected season and user. These examples provide starting points rather than a fixed whole-class recipe.

Recipe Starting Point	Seasonal Adaptation Opportunities	Likely Pupil Techniques	Online Example
Seasonal vegetable soup	Substitute roots, leeks, squash, peas, tomatoes or courgettes according to season	Peel, dice, measure, combine and season	NHS Harvest vegetable soup
Vegetable and lentil soup	Alter vegetables and herbs to suit current availability	Weigh, chop, measure, combine and evaluate texture	NHS Vegetable and lentil soup
Seasonal vegetable pasta	Use spring greens, peas, broccoli, tomatoes, courgettes or beans according to season	Chop, weigh, boil, sauté and combine	NHS Herby pasta with veg
Vegetable pasta bake	Adapt the vegetable mixture and herbs to seasonal availability	Slice, chop, simmer, boil, combine and bake	NHS Pasta ratatouille bake
Seasonal coleslaw or pitta filling	Use cabbage, carrots, apples, beetroot, herbs or salad leaves as available	Shred, grate, chop, mix and fill	NHS Ham and fresh coleslaw pittas
Winter vegetable salad	Use cabbage, apple, carrot, onion, citrus or beetroot	Grate, chop, mix and prepare dressing	NHS Fruity winter salad

Steamed seasonal vegetables with sauce	Select vegetables at their seasonal best	Trim, slice, grate, steam and make sauce under supervision	NHS Veg mix with cheese sauce
Seasonal beans on toast	Add current vegetables, herbs or leaves	Chop, slice, simmer and toast	NHS Brainy beans on toast

The NHS pasta-ratatouille recipe explicitly suggests making the dish in summer when tomatoes, courgettes and green beans are at their seasonal best, making it a useful example of adapting a recipe to ingredient availability.

Whole-Project Resource List

Research and Product-Analysis Resources

- UK seasonal food calendars
- Kent produce and growing information
- Current school or local café menus
- Farm-shop, supermarket and market photographs
- Ingredient packaging and origin labels
- UK and world maps
- Eatwell Guide visuals
- Fresh, frozen, canned and dried food examples
- User, allergy and dietary profile cards
- Base recipes and recipe collections
- Sensory vocabulary mats

Possible Ingredients

Final ingredients should follow pupils' designs, the chosen season and current allergy information.

- Seasonal root vegetables
- Leeks, onions and spring onions
- Cabbage and leafy vegetables
- Peas, beans and lentils
- Broccoli and cauliflower
- Tomatoes, peppers and courgettes
- Apples, pears or other Kent produce where appropriate
- Potatoes and sweet potatoes
- Pasta, rice, couscous or other grains
- Wholemeal bread, pittas or wraps
- Fresh and dried herbs
- Mild spices
- Reduced-salt stock
- Natural yoghurt, milk or cheese and suitable alternatives
- Eggs where appropriate
- Citrus juice for dressings or flavouring
- Vegetable oils in measured quantities

Preparation and Measuring Equipment

- Colour-coded chopping boards
- Appropriate knives
- Peelers
- Graters
- Garlic crushers
- Mixing bowls
- Measuring jugs
- Measuring spoons
- Digital and balance scales
- Colanders and sieves
- Wooden spoons
- Spatulas
- Whisks
- Forks and mashers
- Non-slip mats
- Aprons
- Recipe stands or wipe-clean visual instructions
- Tasting dishes and utensils

Cooking Equipment

Used according to school policy and risk assessment:

- Hobs or induction units
- Ovens or microwaves
- Saucepans and frying pans
- Baking trays and dishes
- Steamers
- Kettle
- Oven gloves
- Heatproof mats
- Timers
- Food thermometer where required
- Stick blender or food processor operated by an adult unless procedures specify otherwise

Planning, Assessment and Presentation

- Food-design journals
- Seasonal research sheets
- Ingredient-journey maps
- Product-analysis grids
- User interview templates
- Design specifications
- Recipe-development sheets
- Costing templates
- Practical-skills checklists
- Sensory and user-feedback forms
- Waste-audit sheets
- Cameras or tablets
- Display boards and cookbook templates

Safety, Allergy and Preparation Notes

- Complete a project-specific food risk assessment and follow current school hygiene and allergy procedures.
- Obtain up-to-date allergy, intolerance, medical, religious and cultural dietary information before finalising ingredients.
- Check every ingredient label immediately before use and prevent cross-contamination.
- Ensure hands, surfaces, utensils and ingredients are cleaned appropriately.
- Tie back long hair and wear clean aprons.
- Use age-appropriate knives and teach bridge and claw techniques according to school policy and pupil readiness.
- Closely supervise graters, peelers and other sharp tools.
- Adults should control boiling liquids, hot trays, draining, blending and other high-risk processes unless the risk assessment explicitly permits supervised pupil involvement.
- Establish clearly marked hot zones and ensure pan handles face safely.
- Check that cooked products reach safe temperatures and are stored, cooled and served appropriately.
- Never require pupils to taste food. Appearance, aroma and texture can provide valid sensory evidence.
- Avoid using foraged food unless identification and preparation are led by an appropriately qualified adult and separately risk assessed.
- Use photographs rather than storing leftover food for later assessment.
- Outdoor service requires suitable handwashing, covering, temperature control and protection from contamination.
- The National Curriculum requires pupils to prepare and cook predominantly savoury dishes, but schools retain responsibility for selecting techniques and levels of independence appropriate to their facilities and safety procedures.

Adaptive Teaching

Area	Support and Adaptation
Understanding seasonality	Use physical ingredient baskets, picture calendars and colour-coded seasons. Revisit the distinction between local and seasonal repeatedly.
Research	Provide curated packaging, short information cards and simplified food-journey diagrams rather than relying on open internet research.
Recipe reading	Use pictorial recipes, numbered steps, highlighted verbs and colour-coded ingredients and equipment.
Measuring	Provide pre-zeroed scales, measuring cups, visual fill lines and paired checking.
Preparation skills	Use non-slip mats, adapted handles, suitable softer ingredients and pre-prepared hard ingredients where needed.
Sensory access	Allow pupils to keep foods separate, observe without tasting and choose predictable alternatives where mixed textures cause distress.
Sequencing	Provide individual task cards and assign meaningful group roles such as hygiene lead, measurer, preparer, timer or recorder.
Language	Supply vocabulary organised by provenance, flavour, texture, cooking method and evaluation. Rehearse explanations orally.
Greater depth	Ask pupils to scale recipes, compare cost per portion, analyse waste, justify substitutions nutritionally or compare the implications of fresh, frozen and canned produce.
Evaluation	Require every judgement to connect with a criterion, test result, sensory observation or user comment.

Common Misconception	Teaching Response
Seasonal food is whatever is sold in shops during that season.	Explain that shops can stock imported or stored produce throughout the year; seasonal refers to natural growing and harvesting periods in a place.

Local and seasonal mean the same thing.	Compare a locally grown ingredient produced out of season under controlled conditions with an imported ingredient naturally in season elsewhere.
Seasonal food is always healthier.	Explain that nutritional value depends on the complete ingredient, storage, preparation and overall diet.
Imported food is automatically environmentally harmful.	Explore transport, storage, growing methods, refrigeration and waste, avoiding simplistic conclusions based only on distance.
Frozen or canned food is never nutritious.	Compare labels, ingredients, storage and waste; explain that these formats can retain nutrients and increase availability.
A seasonal dish must contain only vegetables.	Include seasonal fruit, grains, herbs, fish, dairy or other ingredients where suitable.
Adapting a recipe means changing as many ingredients as possible.	Emphasise maintaining workable quantities, texture, flavour and cooking method.
Healthy food cannot include sauces, pastry, bread or cheese.	Discuss balance, portion, frequency and recipe composition rather than banning ingredients.
Seasonal ingredients do not need to be measured accurately.	Demonstrate how proportions affect consistency, cooking time and flavour.
The most popular dish is automatically the best design.	Evaluate against the full specification, including user, nutrition, seasonality, cost, waste and practicality.
Food miles alone measure sustainability.	Explain that production methods, storage, packaging, refrigeration and waste also matter.
Spring produce is identical every year.	Discuss how weather and growing conditions can affect harvest time and availability.

Key Online Examples and Teacher Resources

- Cornerstones: Eat the Seasons
- GOV.UK: National Curriculum for Design and Technology
- Food – a fact of life
- NHS Healthier Families Recipes
- NHS Healthier Families Dinner Recipes
- NHS 5 A Day Recipes and Guidance
- NHS Harvest Vegetable Soup
- NHS Vegetable and Lentil Soup
- NHS Herby Pasta with Vegetables
- NHS Pasta Ratatouille Bake
- NHS Ham and Fresh Coleslaw Pittas
- NHS Fruity Winter Salad
- NHS Vegetable Mix with Cheese Sauce

YEAR 5 – ARCHITECTURE: ENGINEERING AND STRUCTURES - Summer Term

How can we design a strong, sustainable structure that improves life in our community?

Subject distinction: This is the Year 5 **Design and Technology** Architecture project. It focuses on engineering, structural systems, materials, function and model construction. The Year 5 Spring **Art: Architecture** project focuses on architectural drawing, visual style, perspective and artistic response.

Section	Curriculum Overview
Curriculum Rationale	This project develops pupils' structural engineering and architectural design knowledge through the purposeful challenge of designing a building or public structure for Greatstone. Building on the framed structures developed in **Greenhouse**, the simple machines and reinforced lifting frames explored in **Tomb Builders**, and the precision and prototyping required in **Moving Mechanisms**, pupils investigate how architects and structural engineers work together to create safe, stable and useful buildings. They examine how architectural style and construction technology have changed over time before applying knowledge of frameworks, loads, triangulation, bracing, foundations and material properties to a detailed structural model. The official Cornerstones **Architecture** project teaches how architectural style and technology have developed over time before pupils use this knowledge to design a building with specified features.
The Greatstone Way	**PROTECTORS → LEGACY – How can we care for people, places and our planet? What difference will we leave behind?** Pupils explore how buildings protect people, support communities and respond to environmental conditions. They develop the summer value of **Dare** by tackling a complex design problem, making ambitious structural decisions and learning from testing. Their final design considers the long-term legacy of architecture: how a building can improve Greatstone while respecting its coastal location, heritage and environment.
National Curriculum Coverage	Pupils use research and exploration to understand user needs and develop design criteria; generate, model and communicate ideas through annotated sketches, cross-sectional and exploded diagrams, prototypes and computer-aided design where appropriate; select tools and materials according to functional properties and aesthetic qualities; work with increasing accuracy; investigate and analyse existing products and influential designers; evaluate ideas against their specification; and apply knowledge of strengthening, stiffening and reinforcing more complex structures. These are statutory Key Stage 2 Design and Technology expectations.
Curriculum Journey	**Previous learning:** Year 1 **Shade and Shelter** introduced freestanding structures and stability. Year 2 **Beach Hut** developed accurate card construction and reinforcement. Year 3 **Greenhouse** introduced frameworks, triangulation and cladding. Year 4 **Tomb Builders** combined stable frames with mechanical systems. Year 5 **Moving Mechanisms** required precise prototyping and reinforced structures. **Current learning:** Pupils integrate this knowledge into an architectural response involving a user, site, structural system, material selection and sustainability. **Future learning:** Year 6 **Engineer** develops greater independence in selecting and combining structures, mechanisms and systems to solve complex problems.
Design Brief	Research, design and construct a scale model of a building or public structure that improves life for a specified group within the Greatstone community. It must respond to its coastal location, meet clearly defined user needs and demonstrate an appropriately strong and reinforced structural system.
Possible Outcomes	A Beach School learning pavilion; coastal visitor shelter; community exhibition space; wildlife observation hide; sustainable classroom; covered performance area; beach equipment centre; coastal heritage pavilion; accessible viewing platform; or another purposeful community structure agreed through user research.
Design Criteria	The structure must meet the needs of an identified user; have a clear function; suit its proposed Greatstone site; include a stable base or foundation; demonstrate a recognisable structural system; use reinforcement such as bracing, triangulation, arches, columns or beams; provide appropriate access and internal space; respond to wind, weather and light; make responsible use of materials; communicate its design clearly; and withstand agreed structural tests.
Sticky Knowledge	Architects design buildings and spaces around people, place, purpose and appearance. Structural engineers ensure that buildings can safely support loads and resist forces. A load is a force carried by a structure. Dead loads come from the structure itself, while imposed or live loads come from people, furniture and use. Compression pushes material together; tension pulls material apart. Beams span spaces and transfer loads to columns or walls. Triangles, braces, arches, folds and corrugation can strengthen structures. Foundations spread loads and connect

	buildings to the ground. A strong model depends on accurate components, secure joints and a clear load path rather than simply using more material. Sustainable architecture considers energy, materials, waste, adaptability and impact on the environment.
Technical Knowledge and Skills	Investigate buildings and structural systems. Identify columns, beams, frames, walls, roofs, foundations, arches, trusses, braces and cladding. Explore compression, tension and load paths through practical models. Test how section shape affects stiffness. Construct frames using wood, dowel, card or paper tubes. Produce strong joints using gussets, corner blocks, tabs, lap joints or suitable adhesives. Apply triangulation and cross-bracing. Develop floor plans, elevations, cross-sections, exploded diagrams and scale models. Research user and site requirements. Select materials according to strength, stiffness, weight, durability, finish and sustainability. Conduct load, lateral-force, stability, access and user tests. Evaluate and refine the final model.
Substantive Concepts	User • Purpose • Architecture • Structure • Load • Force • Material • Site • Sustainability • Community
Disciplinary Concepts	Research • Analyse • Specify • Model • Design • Calculate • Construct • Test • Evaluate • Refine
Core Vocabulary	architecture, architect, structural engineer, client, user, brief, site, structure, frame, beam, column, foundation, arch, truss, brace, triangulation, cantilever, cladding, façade, load, dead load, live load, compression, tension, span, load path, joint, gusset, scale, plan, elevation, cross-section, prototype, sustainable, evaluate
Architects, Engineers and Product Examples	Pupils investigate structures from different historical periods and cultures, including Roman arches and aqueducts, framed buildings, bridges, pavilions and contemporary sustainable architecture. Suitable studies include Zaha Hadid for innovative form, Antoni Gaudí for nature-inspired structures, Norman Foster for engineering and sustainable technology, and civil or structural engineers responsible for bridges and public infrastructure. The focus is how design, technology, culture and user needs shape a building—not simply copying an architect's visual style.
Cross-Curricular Links	**History – Emperors & Empires:** Roman roads, arches, bridges, aqueducts, amphitheatres and durable public architecture. **Art – Mosaic Masters:** decorative surfaces, pattern and cultural identity within buildings. **Science:** forces, properties and changes of materials. **Mathematics:** scale, ratio, measurement, perimeter, area, angles, geometry and data. **Geography:** settlements, sustainability, land use and coastal environments. **English:** client briefs, design proposals, technical explanations and persuasive presentations. **Computing:** CAD, digital floor plans, presentation and photographic testing records.
Beach School & Outdoor Learning	Survey a potential site and record exposure, wind direction, sunlight, access, views, ground conditions and nearby features. Investigate local shelters, platforms, beach huts, fences, bridges and sea defences. Construct temporary full-scale frame sections from paper tubes, canes or lightweight materials to explore space and stability. Any larger structure must be separately risk assessed and use lightweight, manageable components.
Greatstone & Kent Links	Pupils investigate Greatstone's exposed coastal setting, local beach architecture, Dungeness structures, Romney Marsh buildings and historic Kent architecture. Designs should respond to local needs such as outdoor learning, tourism, wildlife observation, accessibility, community gathering or coastal heritage. The project also connects to the Roman legacy across Kent through roads, villas, forts and engineered public structures.
Memorable Hook	**The Greatstone Community Architecture Commission** – Pupils receive a map of a proposed site, photographs of the local area and a letter from a fictional community client. The site needs a new structure, but the building must withstand coastal weather, serve a clear community purpose and leave a positive legacy. Pupils become architectural and structural design teams.
Authentic Outcome / Showcase	**The Greatstone Architecture and Engineering Exhibition** – Pupils present client research, site surveys, structural investigations, technical drawings, prototypes and final models to families, governors or a community panel. Models undergo controlled load and lateral-force tests, and pupils pitch how their proposal would improve Greatstone.
Assessment End Point	Pupils independently research a client and site, write a testable design specification and design a purposeful community structure. They demonstrate how loads travel through the structure, apply appropriate reinforcement, select materials according to technical and environmental considerations, construct an accurate scale model and use systematic testing to evaluate and refine their solution.

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to Be Secured	Design Enquiry Question	Example Learning Activities	Weekly Resources	Beach School / Outdoor Learning	Assessment Opportunity	Online Example / Teacher Support
1	Launching the community commission	Architecture begins with a client, users, purpose and site. Architects and engineers have distinct but connected roles.	**What does Greatstone need from a new structure?**	Open the client commission and study the proposed site. Compare architects' and structural engineers' roles. Analyse examples of shelters, pavilions, community buildings and viewing platforms. Generate questions about users, function, access, weather and legacy.	Client letter; site map; local photographs; architectural images; design journals; role cards; sticky notes; vocabulary cards	Walk the proposed site and record current uses, users, access and environmental features.	Can pupils identify the client, users, purpose and key constraints?	Cornerstones: Architecture
2	Architecture through time and culture	Buildings reflect available technology, materials, beliefs, climate and social needs. Architectural development is not simply a sequence from "primitive" to "better".	**Why do buildings from different periods and places look and work differently?**	Compare Roman, medieval, industrial and contemporary structures. Identify arches, columns, frames, domes, trusses and modern engineered forms. Link examples to materials, purpose and cultural context.	Building timelines; photographs; material samples; comparison grids; atlases; design journals	Identify different ages, materials and construction styles within the local built environment.	Can pupils explain how technology, materials and purpose influenced a building?	Cornerstones project overview
3	Investigating structural systems	Buildings may rely primarily on load-bearing walls, frames, arches, shells or combined systems. Structural elements work together to transfer loads.	**How does a building remain standing?**	Build and compare simple wall, post-and-beam, frame and arch models. Label foundations, columns, beams, walls and roof. Trace load paths using arrows from roof to ground.	Blocks; construction kits; card; wooden strips; arch formers; model loads; force arrows; structural diagrams	Observe posts, beams, frames, walls, roofs and foundations around school or the local area.	Can pupils identify structural components and trace a simple load path?	Institution of Civil Engineers: Bridge Engineering Exhibition
4	Compression, tension and material behaviour	Forces act differently on structural components. Shape and material affect strength and stiffness.	**How do forces act inside a structure?**	Investigate compression using columns and tension using cord. Bend paper strips, fold them into channels, tubes or corrugations and	Paper; card; string; elastic; weights; supports; rulers; force arrows; investigation sheets	Identify tension and compression in ropes, poles, fences, shelters or play equipment.	Can pupils distinguish compression from tension and relate each to a structural component?	STEM Learning: Bridge Building

				compare stiffness. Explore which parts of a simple beam bend or stretch under load.				
5	Strengthening frames	Triangulation, bracing, gussets and accurate joints reduce distortion. Extra material is only useful when positioned effectively.	**How can we strengthen a frame without making it unnecessarily heavy?**	Construct identical rectangular frames. Add diagonal braces, cross-bracing and gussets to different models. Apply lateral forces and record deformation. Compare strength against material use.	Paper straws; wooden sticks; card strips; gussets; reusable connectors; PVA; masking tape; weights; test grids	Construct full-size lightweight frames from canes or rolled-paper tubes and test sideways force.	Can pupils explain why a selected reinforcement works and compare efficiency?	STEM Learning: Structures Challenge
6	Investigating arches, beams and spans	Different structural forms allow designers to span openings. Performance depends on shape, support, material and load position.	**Which structural form creates the most effective span?**	Compare flat paper beams, folded beams, box beams, arches and simple trusses. Use standard spans and loads. Record maximum load and failure location. Link findings to Roman arches, bridges and aqueducts.	Paper; card; blocks; arch formers; weights; rulers; digital scales; result tables; cameras	Observe bridges, gateways, sea defences or covered spaces and identify how openings are spanned.	Can pupils conduct a fair structural comparison and explain where failure occurred?	ICE: Building and Testing a LEGO Bridge
7	Site and user research	Architectural design must respond to access, orientation, weather, ground, views, existing surroundings and diverse user needs.	**What must our design respond to at Greatstone?**	Conduct or review a detailed site survey. Interview users or analyse profiles. Map wind, sunlight, routes, views and constraints. Consider accessibility, shelter, internal activity, maintenance and environmental impact.	Site maps; compasses; wind indicators; light observations; tape measures; cameras; user profiles; interview sheets; survey templates	Complete the site survey and record measurements, photographs and annotated sketches.	Can pupils connect site or user evidence to a specific design requirement?	RIBA: Architecture resources and building case studies
8	Writing the specification and generating concepts	A design specification converts research into precise and testable requirements. Concept ideas should explore genuinely different solutions.	**What exactly must our community structure achieve?**	Develop criteria for function, users, access, dimensions, structural system, weather response, sustainability and appearance. Produce several concept sketches and basic massing models. Compare ideas using a decision matrix.	Specification templates; sketching materials; modelling card; clay or blocks; site maps; decision matrices; criteria prompts	Mark proposed footprints at full size using chalk, cones or rope to test circulation and scale.	Are specifications evidence-based, technical and testable? Do concepts offer different solutions?	GOV.UK: National Curriculum for Design and Technology
9	Developing technical drawings and a structural prototype	Plans, elevations, sections and exploded diagrams communicate different information. Focused prototypes test uncertain structural details.	**How can we show how our building will look, work and stand up?**	Produce a scaled floor plan, elevation and cross-section. Add dimensions and material labels. Develop an exploded or structural frame diagram. Build and test a focused prototype of a joint, roof, span or frame. Refine drawings from evidence.	Graph paper; scale rulers; pencils; set squares; tracing paper; isometric paper; CAD where available; prototype materials; structural components	Recheck key site dimensions and viewpoints before finalising plans.	Do drawings communicate form, internal organisation, dimensions and structural system accurately?	RIBA: Step Inside Homes Through History—ages 8–11
10	Constructing the final model	Construction should follow a planned sequence. Accuracy, alignment, joint quality and reinforcement affect structural performance.	**How can we construct an accurate and reliable structural model?**	Construct the base or foundation, primary frame and structural spans. Use jigs, guides and temporary supports to maintain alignment. Install braces before cladding. Test subsystems throughout rather than waiting until completion.	Baseboards; square-section wood; dowel; card; craft sticks; paper tubes; rulers; set squares; bench hooks and junior hacksaws where permitted; PVA; clips; gussets; adult-operated glue gun	Construct selected larger-scale frame components outdoors where this supports safe working.	Can pupils follow drawings, work accurately and adapt construction without losing the design intention?	
11	Completing, testing and refining	Cladding and architectural details must not conceal structural weakness. Testing should examine loads, sideways forces, stability, access and user requirements.	**How successfully does our model meet the client's specification?**	Add cladding, roof, openings and purposeful details. Conduct standard load, wind or lateral-force, stability, access and user tests. Record quantitative and qualitative results. Strengthen or modify the model and retest.	Ongoing models; cladding materials; acetate; card; weights; desk fan; force meter if available; figures; accessibility templates; test checklists; cameras; repair materials	Test the model in its proposed setting or against outdoor wind under controlled conditions.	Can pupils identify the cause of structural or functional weakness and demonstrate improvement?	STEM Learning: Stable Structures
12	Greatstone Architecture and Engineering Exhibition	Architects and engineers justify decisions through evidence, drawings, models and communication with clients.	**How could our design improve Greatstone and leave a positive legacy?**	Present client research, site surveys, specifications, technical drawings, prototypes, test evidence and models. Deliver a design pitch. Demonstrate a controlled structural test and respond to questions from a	Completed models; journals; technical drawings; display boards; test equipment; visitor-feedback forms; presentation cards; certificates	Display models near the proposed site or create a photographed architectural trail.	Final assessment of research, specification, structural understanding, technical communication, construction, testing,	Cornerstones: Architecture

				client panel. Complete a final evaluation.			refinement and presentation.	

Suggested Greatstone Design Challenges

Possible Structure	Primary User and Purpose	Structural and Environmental Emphasis
Beach School learning pavilion	Classes learning outdoors in different weather	Wide covered span, wind bracing, access and storage
Coastal wildlife observation hide	Pupils, visitors and birdwatchers	Stable low profile, framed viewing openings and habitat sensitivity
Community exhibition pavilion	Families, school and local groups	Flexible interior, accessible entrance and strong roof span
Accessible viewing platform	Visitors with a range of mobility needs	Stable raised deck, ramp access, guard structures and visibility
Beach equipment centre	Beach School staff and pupils	Storage loads, wide doors, ventilation and coastal durability
Coastal heritage shelter	Visitors learning about Greatstone and Romney Marsh	Weather protection, interpretation space and local identity
Outdoor performance space	Pupils and community audiences	Roof or canopy span, audience sightlines and acoustic consideration
Sustainable classroom prototype	Pupils and teachers	Daylight, ventilation, thermal thinking and efficient material use

Whole-Project Resource List

Existing Products and Reference Materials

- Photographs, plans and models of buildings, bridges, pavilions and shelters
- Examples of Roman arches, aqueducts, amphitheatres and bridges
- Images of contemporary sustainable architecture
- Greatstone, Dungeness and Kent architectural photographs
- Structural diagrams showing frames, beams, columns, foundations and trusses
- Architect and structural engineer role profiles
- Site maps, aerial photographs and user profiles
- Construction material samples

Investigation and Prototype Materials

- Paper and card strips
- A4 paper for tubes and folded sections
- Paper straws
- Wooden craft sticks
- Bamboo skewers with sharp points removed
- Construction kits
- String, elastic and mesh
- Corrugated card
- Modelling clay or reusable adhesive
- Triangular card gussets
- Blocks and arch formers
- Standard test weights

Final Model Materials

Select according to design and risk assessment:

- Foam board
- Corrugated and mount card
- Square-section softwood
- Wooden dowel
- Craft sticks
- Paper tubes
- Thin plywood bases where available
- Acetate or clear recycled plastic
- Card cladding
- Fabric or lightweight mesh
- Reclaimed construction materials checked for safety
- String or cord for tension elements

Tools and Joining Equipment

- Rulers, metre sticks and scale rulers
- Set squares
- Protractors and compasses
- Pencils and fine liners
- Child-safe scissors
- Cutting mats
- Card-scoring tools
- PVA and masking tape
- Clips, pegs and clamps
- Bench hooks and junior hacksaws where school procedures permit
- Safety glasses
- Hand drills, bradawls or hole punches under appropriate supervision
- Low-temperature glue gun for trained adult use
- Construction jigs and right-angle guides

Site Survey Equipment

- Clipboards
- Maps and aerial photographs
- Compasses
- Tape measures
- Wind ribbons or simple wind indicators
- Cameras or tablets
- Light and shadow recording sheets
- Chalk, cones or rope for marking footprints
- Accessibility and user-observation prompts

Testing Equipment

- Standard weights
- Digital scales
- Rulers and tape measures
- Force meters where available
- Desk fan on controlled settings
- Model people and furniture
- Accessibility templates
- Test checklists
- Cameras or tablets
- Failure-analysis and repair cards

Planning and Presentation Materials

- Design journals
- Product-analysis sheets
- Site-survey templates
- User-interview sheets
- Design specifications
- Concept-selection matrices
- Graph, isometric and tracing paper
- Plan, elevation and section templates
- Exploded-diagram frames
- CAD software where available
- Testing and refinement records
- Display boards and client-feedback forms

Safety and Preparation Notes

- Complete a project-specific risk assessment covering cutting, woodwork, adhesives, testing, outdoor surveying and larger-scale frame activities.
- Remove or cover sharp ends from dowels, skewers, wire and canes.
- Teach and supervise correct use of junior hacksaws, bench hooks, clamps and safety glasses where wood cutting is included.
- Hand drills and bradawls require direct supervision and secure work holding.
- Low-temperature glue guns should be used only by trained adults unless school procedures explicitly permit closely supervised pupil use.
- Check reclaimed materials for contamination, staples, sharp edges and brittleness.
- Do not use glass in pupil models.
- Use lightweight loads for testing and establish a clear exclusion area around models under load.
- Fans must be adult controlled and kept away from hair, clothing and loose components.
- Stop load testing as soon as significant failure begins; pupils should observe failure rather than deliberately destroy models.
- Outdoor structures must use lightweight materials and require a separate risk assessment if children enter or stand beneath them.
- Check that proposed site-survey routes are accessible and safely supervised.
- Pre-test likely materials, joints and adhesives to ensure they are compatible within available lesson and drying times.

Adaptive Teaching

Area	Support and Adaptation
Understanding structure	Use large physical models with colour-coded beams, columns, braces, joints and loads. Trace load paths physically from roof to ground.

Forces vocabulary	Demonstrate compression using foam or sponges and tension using elastic or cord before moving to diagrams.
Site research	Provide focused observation prompts, photo checklists and enlarged maps. Pair pupils strategically for measuring and recording.
Scale and drawing	Use square grids, scale strips, tracing overlays, floor-plan symbols and partially completed views. Allow CAD where it removes a recording barrier without replacing technical thinking.
Idea generation	Provide structural-system cards and removable components that pupils can arrange before sketching.
Measuring and cutting	Use cutting jigs, pre-marked lengths, right-angle guides and pre-cut materials where required.
Joining	Begin with reusable connectors and prototypes before permanent joints. Provide clips and jigs to stabilise work while adhesives set.
Motor access	Use larger components, construction kits and meaningful roles in site research, testing, photography, CAD or directing assembly.
Sequencing	Use the staged process: foundation/base → primary frame → spans → braces → test → cladding → details → final test.
Greater depth	Ask pupils to quantify strength-to-weight performance, compare structural systems, calculate approximate material quantities, introduce a cantilever or tension element, or justify decisions through lifecycle and sustainability considerations.
Evaluation	Use photographs of failure and cause-and-effect prompts: “The load travelled…”, “The frame distorted because…”, “Adding the brace…”, “The user feedback showed…”.

Common Misconceptions

Misconception	Teaching Response
Architects are responsible for every technical calculation and construction decision.	Distinguish the connected roles of architects, structural engineers, civil engineers, surveyors, builders and clients.
A building stands because its materials are heavy.	Trace how loads are transferred through beams, columns, walls and foundations.
More material always makes a structure stronger.	Compare efficient bracing and folded sections with heavy but poorly arranged structures.
Triangles are strong simply because they have three sides.	Demonstrate that connected triangular frames resist shape change more effectively than unbraced rectangles.
Cladding holds the whole building up.	Distinguish the supporting frame from the covering or façade in framed structures.
Columns only carry the roof directly above them.	Trace loads through connected beams and structural systems.
Arches work because the central piece is glued in place.	Demonstrate how compression is transferred through voussoirs to the supports, using an accessible model.
Foundations are only visible bases that stop buildings falling over.	Explain that foundations transfer and spread loads into the ground and help resist movement.
Sustainable architecture is simply adding solar panels.	Consider orientation, daylight, ventilation, material use, durability, adaptability, energy and waste.
A scale model is just a smaller decorative version.	Emphasise that scale models test space, structural arrangement, access, assembly and communication.
A visually impressive model automatically meets the brief.	Return to user needs, site response, structure, testing and specification.
The Art and DT Architecture projects are the same.	Reiterate that Art investigates visual representation and architectural style, while DT applies structural engineering, materials, construction and performance testing.

Key Online Examples and Teacher Resources

- Cornerstones: Architecture
- GOV.UK: National Curriculum for Design and Technology
- Institution of Civil Engineers: Bridge Engineering Exhibition
- Institution of Civil Engineers: What Civil Engineers Do
- STEM Learning: Bridge Building Activity
- STEM Learning: Stable Structures
- RIBA Architecture
- RIBA: Architecture Books for Children Aged 8–11
- Design and Technology Association
- Cornerstones Primary Design and Technology Curriculum

YEAR 6 – FOOD FOR LIFE - Autumn Term

How can we design and cook a healthy daily menu that supports a particular person’s needs?

Section	Curriculum Overview
Curriculum Rationale	This project develops pupils’ ability to make informed, independent decisions about food, nutrition and healthy lifestyles. Building on the food preparation, cooking, seasonality and product-evaluation knowledge developed from Year 1 to Year 5, pupils investigate the difference between whole, minimally processed and highly processed foods. They consider how processing can affect a food’s ingredients, nutritional composition, storage, convenience and sensory qualities without treating all processed foods as automatically unhealthy. Pupils learn to make bread and develop a pasta sauce before applying their knowledge to plan, cook and evaluate meals as part of a healthy daily menu. This reflects the Cornerstones **Food for Life** project, which focuses on processed food, healthy choices, whole foods, bread, pasta sauces and planning meals within a daily menu.
The Greatstone Way	**ROOTS → SURVIVORS – Who are we and where do we belong? How do people overcome challenges and adapt?** Pupils explore how food choices are influenced by family, culture, tradition, availability, health, time and cost. They develop the autumn value of **Care** by designing meals that respond responsibly to another person’s nutritional, cultural and practical needs. They also consider how access to affordable food and cooking knowledge can support individuals and communities during challenge and change.
National Curriculum Coverage	Pupils use research to understand user needs; develop design criteria; generate and communicate ideas; select suitable tools, equipment and ingredients; prepare and cook predominantly savoury dishes using a range of techniques; investigate existing products; and evaluate and refine their work. They apply the principles of a healthy and varied diet and consolidate their understanding of where and how ingredients are grown, reared, caught and processed. These are statutory Key Stage 2 expectations.
Curriculum Journey	**Previous learning:** Year 1 **Chop, Slice and Mash** introduced safe preparation and food origins. Year 2 **Remarkable Recipes** developed recipe reading and adaptation. Year 3 **Cook Well, Eatwell** introduced balanced savoury meals and cooking methods. Year 4 **Fresh Food, Good Food** developed knowledge of preservation, packaging and freshness. Year 5 **Eat the Seasons** deepened seasonality, provenance and independent recipe development. **Current learning:** Pupils synthesise this knowledge to analyse food processing, make bread and sauces

	and plan a healthy daily menu for a particular user. **Future learning:** This project prepares pupils for Key Stage 3 cooking and nutrition, where they will develop a wider repertoire of dishes and increasing independence in adapting and using recipes.
Design Brief	Research the dietary and practical needs of a specified user, then design, prepare and cook a healthy daily menu. The menu must include a breakfast, lunch and evening meal or equivalent culturally appropriate meal pattern. Pupils will make and evaluate selected components, including bread and a predominantly savoury pasta sauce or another agreed whole-food-based dish.
Possible Users	A Year 6 pupil with a busy school day; a younger child; an older adult; an athlete; a vegetarian or vegan user; a user with a medically confirmed dietary requirement supported by school information; a Beach School participant; a family working within an agreed budget; or a fictional historical or geographical user linked to the wider curriculum.
Design Criteria	The daily menu must suit its identified user; provide appropriate variety and balance across the day; include fruit and vegetables; include suitable sources of carbohydrate, protein and other nutrients; contain predominantly savoury dishes; use whole or minimally processed ingredients where appropriate; meet all allergy, cultural and dietary requirements; demonstrate a range of preparation and cooking techniques; consider cost, time and food waste; and be evaluated using nutritional reasoning, sensory evidence and user feedback.
Sticky Knowledge	Food processing means changing food from its original state. Processing includes simple actions such as chopping, freezing, cooking, fermenting and canning as well as more complex industrial manufacture. Not all processed food has the same nutritional value. Whole and minimally processed foods are generally close to their original form. A healthy diet depends on balance, variety, appropriate portions and patterns over time rather than on one meal or ingredient. Bread dough requires flour, liquid and usually yeast; kneading develops the dough structure, while fermentation allows gas to form and the dough to rise. A pasta sauce can combine vegetables, herbs, pulses, protein foods and other ingredients to create flavour, texture and nutritional value. A menu must be designed around the user's whole day rather than treating each meal in isolation.
Technical Knowledge and Skills	Interpret food labels and ingredient lists. Compare whole, minimally processed and more highly processed food products. Analyse nutrition information at an age-appropriate level. Conduct sensory evaluations. Research a user's nutritional and practical needs. Weigh and measure accurately. Use bridge and claw cutting techniques where appropriate. Peel, chop, dice, slice, grate, crush, mix, whisk, knead, shape and portion ingredients. Use yeast and understand proving. Simmer, boil, sauté, bake and roast under the school's agreed safety procedures. Develop and adapt bread and sauce recipes. Calculate quantities, timings and approximate costs. Plan a daily menu and practical workflow. Evaluate food against a specification and refine recipes using evidence.
Substantive Concepts	User • Purpose • Nutrition • Processing • Whole Food • Ingredient • Recipe • Menu • Health • Lifestyle • Value
Disciplinary Concepts	Research • Analyse • Compare • Design • Adapt • Prepare • Cook • Test • Evaluate • Refine
Core Vocabulary	nutrition, nutrient, carbohydrate, protein, fibre, fat, vitamins, minerals, whole food, minimally processed, highly processed, ingredient list, nutrition label, portion, menu, meal pattern, recipe, fermentation, yeast, dough, knead, prove, gluten, sauce, reduce, simmer, sauté, texture, consistency, seasoning, substitution, budget, cost, evaluate, refine
Chefs, Bakers, Producers and Product Examples	Pupils investigate bread, pasta sauces, ready meals, breakfast products, packed lunches and family meals. They consider how bakers, chefs, school cooks and food manufacturers balance nutrition, flavour, consistency, cost, convenience, shelf life and user preference. The emphasis is on critical product analysis rather than assuming that homemade food is always healthier or that all manufactured food is poor quality.
Cross-Curricular Links	**History – Maafa:** food traditions, trade, migration, cultural exchange and the movement of crops and ingredients, handled carefully within the historical enquiry. **Science:** nutrients, digestion, circulation, microorganisms, fermentation and reversible or irreversible changes during cooking. **Mathematics:** ratio, proportion, scaling recipes, mass, capacity, time, cost and interpretation of tables. **English:** research summaries, recipes, explanation texts, menu descriptions and evaluative writing. **Computing:** spreadsheets for costings, digital menu design, recipe presentations and photographic records. **PSHE:** healthy choices, body image, individual needs, respectful language and recognising that access to food differs between households.
Beach School & Outdoor Learning	Investigate the nutritional and practical needs of a full Beach School day. Consider energy, hydration, portability, food safety, packaging and waste. Pupils may design part of their daily menu for outdoor learning. Outdoor cooking should only be included where staff training, facilities and a separate risk assessment make this appropriate.
Greatstone & Kent Links	Explore Kent-grown cereals, fruit, vegetables and other local produce, alongside the role of local bakeries, farm shops and school catering. Pupils can design menus for a Greatstone family, pupil or community visitor and consider how local ingredients could be incorporated without assuming that local food is always the most affordable or environmentally preferable option.
Memorable Hook	**The Greatstone Menu Audit** – Pupils receive three fictional daily menus belonging to different users. Each menu presents a different problem: limited variety, excessive reliance on convenience products, unsuitable portions, unmet dietary needs or unrealistic preparation demands. Pupils are commissioned as senior food designers to analyse the evidence and produce a healthier, practical alternative.
Authentic Outcome / Showcase	**The Greatstone Food for Life Kitchen** – Pupils present user research, food-processing investigations, bread and sauce trials, final daily menus, costings, recipe cards and evaluations. Selected dishes are prepared for a supervised tasting panel of families, kitchen staff or pupils. Each design team explains how its menu supports the user across the whole day.
Assessment End Point	Pupils independently research a user and develop a detailed food-design specification. They distinguish between different forms of food processing, apply healthy-eating principles across a daily menu, prepare and cook predominantly savoury dishes using a range of techniques, adapt recipes purposefully, work safely and hygienically and evaluate nutritional, sensory, practical and financial aspects of their final outcomes.

The Cornerstones overview confirms that this project includes examining processed and whole foods, making bread and pasta sauces and planning meals as part of a healthy daily menu.

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to Be Secured	Design Enquiry Question	Example Learning Activities	Weekly Resources	Beach School / Outdoor Learning	Assessment Opportunity	Online Example / Recipe Support
1	Launching the Greatstone Menu Audit	Menus should be designed around a particular user's nutritional, cultural, practical and financial needs.	**What makes a daily menu suitable for one person but unsuitable for another?**	Analyse the three fictional menus. Identify the user, meal pattern, strengths, unmet needs and practical constraints. Distinguish evidence from assumption. Generate questions about health, culture, preparation time, budget and activity levels. Begin food-design journals.	Menu-audit packs; user profiles; meal photographs; food-design journals; sticky notes; vocabulary cards; Eatwell Guide	Consider the needs of a pupil completing a full Beach School day and compare them with a classroom day.	Can pupils identify the user's needs and explain why a menu must be judged across the whole day?	Cornerstones: Food for Life
2	Understanding processing	Processing includes many ways of changing food. The degree and purpose of	**Does processed always mean unhealthy?**	Classify examples as whole or minimally processed, processed culinary ingredients, processed foods and more highly manufactured foods	Real foods or packaging; classification cards; ingredient lists;	Explore how drying, cooling or heating have historically helped preserve food, without	Can pupils explain that processing is a spectrum rather than a simple	Food – a fact of life

		processing vary significantly.		using age-appropriate categories. Compare oats, flour, bread, apples, apple purée, tomatoes and tomato sauce. Discuss preservation, safety, convenience and nutrition.	magnifiers; sorting grids; food-process diagrams	using foraged ingredients.	healthy/unhealthy division?	
3	Reading labels and making informed choices	Ingredient lists are ordered by weight. Nutrition panels provide information that must be considered alongside portion size and the complete diet.	**What can a food label tell us—and what can it not tell us?**	Compare labels from breads, sauces, cereals and ready meals. Locate serving size, ingredients, allergens, energy, fat, saturates, sugars, fibre, protein and salt where shown. Compare similar products and identify limitations of relying on a single number.	Clean packaging; enlarged labels; highlighters; comparison sheets; calculators; ingredient cards; allergy prompts	Conduct a packaging audit and consider the information needed for food used away from school.	Can pupils use label evidence carefully without making simplistic claims?	NHS Healthier Families recipes
4	Healthy daily patterns	Healthy eating is based on balance and variety over time. Different users may require different quantities, textures and meal patterns.	**How can meals across a day work together?**	Revisit the Eatwell Guide and compare balanced daily-menu examples. Identify duplication, missing variety and unrealistic portions. Build menus for contrasting users and explain adjustments. Avoid calorie targets or weight-focused tasks for individual pupils.	Eatwell Guide; meal cards; user profiles; menu templates; nutrient-function cards; portion visuals	Plan a suitable hydration and meal pattern for an outdoor-learning day.	Can pupils explain how breakfast, lunch, dinner and snacks contribute collectively?	GOV.UK: Design and Technology curriculum
5	Investigating bread	Bread recipes vary according to flour, raising agent, liquid, flavouring, cultural tradition and intended use. Yeast fermentation produces gas that helps dough rise.	**What makes one bread suitable for a particular meal or user?**	Investigate examples such as wholemeal loaves, flatbreads, rolls, wraps and seeded breads. Compare ingredients, texture, flavour, structure and intended use. Conduct a controlled sensory evaluation and identify features to develop.	Bread samples; packaging; ingredient cards; tasting plates; sensory grids; allergy records; photographs	Consider which breads travel, store and serve most effectively during Beach School.	Can pupils relate ingredients and bread type to user and purpose?	NHS Carrot and courgette muffins provides a useful wholemeal baking comparison, though it is not a bread recipe.
6	Making and evaluating bread	Accurate measurement, kneading, proving and baking affect the volume, crumb, crust and texture of bread.	**How do ingredients and technique change dough?**	Make a basic bread or roll recipe. Compare dough before and after kneading and proving. Conduct controlled trials varying flour type, shaping or added herbs rather than changing many variables at once. Adults manage ovens and hot trays. Record time, rise and sensory results.	Strong flour; wholemeal flour; yeast; water; measured oil where used; salt in recipe-appropriate amounts; herbs; scales; jugs; bowls; dough scrapers; trays; aprons; timers	Observe the effect of different temperatures on proving through teacher-controlled samples, avoiding unsafe outdoor food exposure.	Can pupils explain the purpose of kneading, proving and baking and use test evidence to evaluate bread?	Food – a fact of life recipe collection
7	Investigating pasta sauces	A sauce's flavour, consistency, colour and nutrition depend on its ingredients, preparation, cooking time and reduction.	**What makes a successful savoury sauce?**	Compare safe samples of vegetable tomato sauce, lentil sauce and another culturally varied sauce. Analyse aroma, acidity, sweetness, texture, consistency and suitability for different users. Examine ingredient lists and cooking methods.	Teacher-prepared sauce samples; pasta or tasting spoons; sensory grids; ingredient cards; recipes; allergy information	Consider how a sauce-based meal could be stored and transported safely for outdoor use.	Can pupils evaluate sauces using precise sensory and functional vocabulary?	NHS Vegetable jalfrezi demonstrates a vegetable-rich sauce and simmering process.
8	Developing sauce-making skills	Even preparation supports consistent cooking. Simmering, reducing, blending and seasoning change sauce consistency and flavour.	**How can technique improve a sauce?**	Practise chopping, dicing, grating, crushing and measuring. Prepare a base vegetable sauce in groups. Compare coarse, partially blended and smooth textures where safe and useful. Investigate thickening through reduction or suitable ingredients rather than automatically adding sugar or excessive salt.	Vegetables; tinned tomatoes; herbs; pulses where appropriate; boards; knives; graters; crushers; scales; jugs; saucepans; wooden spoons; adult-operated blender; timers	Cooking remains indoors unless separately risk assessed. Pupils can map the origins of sauce ingredients outdoors.	Can pupils work accurately and explain how cooking alters texture, flavour and consistency?	NHS Meatballs and tomato sauce offers an adaptable tomato-sauce method.
9	User research and menu specification	A successful daily menu must address nutrition, dietary requirements, culture, cost, time, preparation skill and lifestyle.	**What must our Food for Life menu achieve?**	Select or interview a user. Record daily routine, meal context, dietary needs, food preferences, budget and available preparation time. Develop a detailed specification for the complete day and for the dish pupils will make. Decide how each criterion will be tested.	User profiles; interview questions; dietary and allergy information; budget cards; menu-specification templates; Eatwell Guide; recipe resources	Include any outdoor, travel or activity requirements relevant to the chosen user.	Are pupils' criteria specific, respectful, evidence-based and testable?	NHS healthier dinner collection contains more than 60 adaptable dinner ideas.

10	Designing the daily menu and adapting recipes	Menu development requires coordination across meals. Recipe substitutions must preserve function, flavour, texture and nutritional purpose.	**How can we create a realistic, varied day of food for our user?**	Develop at least two daily-menu concepts. Map food groups and variety across each day. Select one and justify it against the specification. Adapt a bread, sauce or complete savoury recipe. Calculate quantities, timings, equipment and approximate cost. Produce an annotated practical plan.	Menu planners; recipe collections; calculators; scales; costing sheets; ingredient cards; adaptation prompts; specification checklist	Consider packaging and waste if any part of the menu will be eaten outdoors.	Can pupils justify the complete menu and explain the likely effects of recipe changes?	NHS Vegetable and lentil soup is economical, adaptable and uses vegetables, lentils and reduced-salt stock.
11	Cooking, testing and refining the selected meal	Organised preparation, accurate measurement and safe heat use support consistent outcomes. Evaluation should address the specification, not just preference.	**How successfully does our meal support the daily menu?**	Prepare and cook the selected savoury meal or meal components. Follow assigned roles and hygiene procedures. Conduct a structured user tasting. Evaluate sensory qualities, nutrition, cost, preparation time, waste and suitability within the daily menu. Produce a revised recipe or menu.	Selected ingredients; pupil recipes; scales; utensils; chopping boards; cooking equipment; aprons; cleaning materials; user-feedback sheets; waste record; cameras	Outdoor service only where temperature, covering and hygiene can be controlled safely.	Can pupils cook with appropriate independence and use evidence to make a meaningful refinement?	NHS Sweet and sour chicken provides a balanced family-meal example with vegetables, protein and rice.
12	Greatstone Food for Life Kitchen	Food designers justify choices through user research, nutritional understanding, practical evidence, costing and evaluation.	**How can our menu help our user eat well across the whole day?**	Present the user profile, processing analysis, menu specification, bread and sauce investigations, final daily menu, recipe, cost, practical photographs and evaluation. Offer supervised tasting samples where appropriate. Complete a final reflection on food learning from Year 1 to Year 6.	Finished menus; recipe cards; design journals; displays; photographs; costing information; visitor-feedback cards; certificates; final evaluations	Link menus to realistic Greatstone contexts such as school, home, Beach School or a community event.	Final assessment of food knowledge, research, menu design, practical skill, adaptation, evaluation and communication.	Cornerstones: Food for Life

Suggested Practical Outcomes and Online Recipes

The outcome should remain user-centred and pupil-designed. The examples below provide safe starting points rather than requiring every group to cook the same meal.

Possible Outcome	Curriculum Focus	Likely Pupil Techniques	Online Example
Wholemeal rolls or shaped bread	Flour types, yeast, kneading, proving and baking	Weigh, mix, knead, shape, prove and evaluate	Food – a fact of life recipe collection
Vegetable and lentil sauce or soup	Whole foods, pulses, texture and economical meals	Chop, dice, measure, simmer, blend and season	NHS Vegetable and Lentil Soup
Vegetable pasta sauce	Sauce consistency, reduction and ingredient adaptation	Dice, grate, crush, sauté, simmer and reduce	NHS Meatballs and Tomato Sauce – the sauce can be adapted without meat
Vegetable curry or jalfrezi	Cultural food traditions, pulses, spices and vegetables	Chop, crush, measure, sauté, simmer and combine	NHS Vegetable Jalfrezi
Savoury vegetable muffins	Wholemeal flour, mixing and packed-lunch suitability	Weigh, grate, whisk, fold, portion and bake	NHS Carrot and Courgette Muffins
Vegetable frittata	Eggs, vegetable combinations and balanced meals	Chop, whisk, combine and portion	NHS Dinner Recipes
Vegetable-rich family bake	Batch cooking, pulses, sauce and oven cooking	Chop, combine, simmer, assemble and bake	NHS Sausage, Tomato and Butter Bean Bake – adapt with vegetarian sausages where appropriate
Vegetable-based mash meal	Meal balance, root vegetables and texture	Peel, chop, boil, drain and mash	NHS Sausage and Mash – includes carrot, swede and potato mash

The NHS recipe collection provides step-by-step family meals and offers flexible ingredient substitutions across many recipes, making it useful for recipe-development work.

Whole-Project Resource List

Research and Product-Analysis Resources

- Fictional daily-menu audit packs
- Eatwell Guide visuals
- Whole, minimally processed and manufactured food examples
- Clean food packaging and ingredient labels
- Nutrition-information panels
- Bread and sauce samples
- Culturally varied menus and recipes
- User, lifestyle, allergy and dietary profiles
- Food-origin and processing diagrams
- NHS and Food – a fact of life recipe examples
- Sensory vocabulary mats

Possible Bread Ingredients

Subject to current allergy and dietary information:

- Strong white bread flour
- Strong wholemeal flour
- Dried yeast
- Warm water
- Small measured quantities of oil
- Salt in recipe-appropriate amounts
- Herbs
- Seeds where allergy procedures permit
- Grated vegetables or cheese where suitable
- Dairy-free or gluten-free alternatives only where a tested, workable recipe and contamination controls are available

Possible Sauce and Savoury-Dish Ingredients

- Fresh or canned tomatoes
- Onions, peppers, carrots, celery, courgettes and mushrooms
- Beans, chickpeas and lentils
- Garlic and fresh or dried herbs
- Mild spices
- Reduced-salt stock
- Wholemeal pasta, rice or other grains
- Eggs, cheese, yoghurt or suitable alternatives
- Lean meat, fish or plant-based protein where included
- Seasonal vegetables
- Vegetable oil in measured quantities
- Flour or cornflour where required for thickening

Preparation and Measuring Equipment

- Colour-coded chopping boards
- Age-appropriate knives
- Peelers
- Graters
- Garlic crushers

- Mixing bowls
- Dough bowls
- Dough scrapers
- Digital scales
- Measuring jugs and spoons
- Colanders and sieves
- Whisks
- Wooden spoons and spatulas
- Rolling pins where required
- Baking trays, loaf tins or muffin tins
- Non-slip mats
- Aprons
- Recipe stands
- Tasting dishes and utensils

Cooking Equipment

Used in line with school procedures:

- Ovens
- Hobs or induction units
- Saucepans and frying pans
- Baking dishes and trays
- Kettles
- Timers
- Oven gloves
- Heatproof mats
- Food thermometer where required
- Blender or food processor operated according to the risk assessment
- Cooling racks

Planning and Assessment Resources

- Food-design journals
- Label-analysis sheets
- Processing-classification cards
- Bread and sauce investigation grids
- User interview templates
- Daily-menu specifications
- Menu-planning sheets
- Recipe-adaptation templates
- Costing spreadsheets
- Practical-skills checklists
- Sensory-evaluation forms
- User-feedback forms
- Waste-audit sheets
- Cameras or tablets
- Display boards and recipe-book templates

Safety, Allergy and Preparation Notes

- Complete a project-specific food-activity risk assessment and follow the school's current food hygiene, allergy and medical procedures.
- Obtain up-to-date information concerning allergies, intolerances, medical diets, cultural requirements and religious food practices.
- Check ingredient labels immediately before use, including products used in previous lessons.
- Prevent cross-contamination through separate utensils, preparation areas and storage where required.
- Ensure pupils wash and dry their hands thoroughly, tie back long hair and wear clean aprons.
- Wash fresh produce before use.
- Teach and assess safe bridge and claw cutting techniques before expecting independent use.
- Provide close supervision for graters, peelers, hot equipment and electrical appliances.
- Adults should control ovens, hot trays, boiling liquids, draining, high-temperature pans and blenders unless the school's risk assessment explicitly permits structured pupil involvement.
- Establish clear hot zones and safe routes through the cooking space.
- Bread dough must not be eaten raw.
- Ensure dough and cooked products are stored safely during proving, cooling and transport.
- Check that food is cooked thoroughly and served or cooled according to school procedures.
- Never require pupils to taste food. Sensory evaluation can use appearance, aroma and texture.
- Avoid pupil-level calorie counting, weight-loss menus or tasks requiring children to disclose personal body measurements.
- Use neutral, non-moralising language about food; focus on variety, balance, frequency, user need and context.
- Photograph final food rather than storing leftover samples for later assessment.
- Outdoor serving requires safe temperature control, covering, handwashing and protection from contamination.

Adaptive Teaching

Area	Support and Adaptation
Food processing	Use a physical continuum with familiar products rather than requiring pupils to memorise technical categories. Let pupils sequence the stages from ingredient to product.
Label analysis	Highlight only the relevant information, enlarge labels and use side-by-side comparison frames. Avoid overwhelming pupils with every nutrient value.
Healthy daily menus	Use visual meal cards, plates and user timelines. Allow pupils to arrange and discuss a menu physically before recording it.
User research	Provide picture-supported profiles and structured interviews. Ensure fictional profiles avoid stereotypes about culture, income, disability or body size.
Recipe reading	Use numbered, pictorial methods with highlighted quantities, equipment and safety points.
Measuring	Provide pre-zeroed scales, visual fill lines, colour-coded tools and paired checking.
Bread making	Use dough scrapers, non-slip bowls and smaller dough portions. Provide an adult-prepared comparison where kneading is physically inaccessible.
Cutting and preparation	Offer adapted handles, non-slip mats, softer ingredients and meaningful alternative roles such as measuring, timing, kneading, seasoning or recording.
Sensory needs	Keep ingredients separate where required, allow observation without tasting and avoid unexpected smells or mixed textures.
Greater depth	Ask pupils to compare food labels critically, scale recipes, calculate cost per portion, justify processing choices, analyse waste or adapt a daily menu to a changing routine.
Evaluation	Require judgements to link directly to the specification, nutritional reasoning, sensory evidence, practical outcomes or user feedback.

Common Misconception	Teaching Response
All processed food is unhealthy.	Compare simple processing such as freezing, cooking and fermenting with products containing different ingredient combinations and nutritional profiles.
Whole food means that the food has not been cut.	Explain that whole or minimally processed describes how close food remains to its original form, not whether it is physically intact.
Homemade food is automatically healthier.	Compare recipes, portions, ingredients and cooking methods. Homemade products can still contain unsuitable amounts or lack balance.
A food labelled low-fat or natural is automatically the best choice.	Examine the complete ingredient list, portion, nutrition information and intended user.
A healthy daily menu must be identical for everyone.	Compare age, activity, culture, health, texture, schedule and personal preference without making clinical dietary claims.
Bread rises because it contains baking powder.	Distinguish yeast-fermented bread from chemically raised products.
Kneading simply mixes ingredients.	Demonstrate how kneading develops the dough's structure and elasticity.
Yeast is activated by very hot water.	Show that water that is too hot can damage yeast; follow the tested recipe temperature guidance.
Sauce becomes healthier simply by hiding vegetables in it.	Focus on complete ingredients, portion, flavour, texture and honest communication with the user.
A smooth sauce is always better than a textured sauce.	Link texture to user need, dish, preference and intended function.
One balanced evening meal compensates for an unsuitable menu across the rest of the day.	Evaluate variety and balance across the full menu.
Nutritional information alone proves a menu will work.	Include taste, culture, affordability, preparation skill, time, availability and user feedback.
The user's favourite menu is automatically the strongest design.	Compare it with the complete specification and identify necessary compromises.

Healthy eating requires removing all fat, sugar or salt.	Discuss appropriate quantities, frequency, overall dietary pattern and the functional role of ingredients.

Key Online Examples and Teacher Resources

- Cornerstones: Food for Life
- GOV.UK: National Curriculum for Design and Technology
- Food – a fact of life
- Food – a fact of life Recipes
- NHS Healthier Families Recipes
- NHS Healthier Families Dinner Recipes
- NHS Vegetable and Lentil Soup
- NHS Vegetable Jalfrezi
- NHS Meatballs and Tomato Sauce
- NHS Sweet and Sour Chicken
- NHS Carrot and Courgette Muffins
- NHS Sausage, Tomato and Butter Bean Bake
- NHS Sausage and Mash

YEAR 6 – ENGINEER - Spring Term

How can engineers use structures, mechanisms and systems to solve real-world problems?

Section	Curriculum Overview
Curriculum Rationale	This final Design and Technology engineering project brings together everything pupils have learned throughout primary school. Pupils apply knowledge of structures, mechanisms, electrical systems, materials and the design process to solve an authentic engineering challenge. Building on **Moving Mechanisms**, **Architecture**, **Greenhouse**, **Making it Move**, **Tomb Builders** and earlier structural projects, pupils investigate how engineers identify problems, develop prototypes, test solutions and refine designs. Rather than learning one new mechanism, this project requires pupils to independently select the most appropriate engineering solution for a particular problem. This reflects the Cornerstones **Engineer** project, where pupils investigate engineering disciplines before designing, constructing and evaluating an engineered product.
The Greatstone Way	**EXPLORERS → INVENTORS – How does curiosity help us discover more? How do ideas change the world?** Pupils investigate how engineers improve lives through innovation, creativity and resilience. They become problem-solvers who test ideas, learn from failure and refine designs. They develop the value of **Dream** by imagining future possibilities and **Dare** by taking informed risks through iterative design.
National Curriculum Coverage	Pupils independently research users, develop design specifications, communicate ideas through sketches, CAD and prototypes, select appropriate materials and components, apply structural, mechanical and electrical knowledge, use tools accurately, evaluate products against criteria and improve designs through testing. They combine knowledge from all Key Stage 2 Design and Technology strands to solve increasingly complex problems.
Curriculum Journey	**Previous learning:** pupils have progressively developed food technology, textiles, mechanisms, structures, electrical systems and product design. They have investigated cams, pneumatics, frameworks, food technology and architectural engineering. **Current learning:** pupils now independently decide which engineering principles and materials best solve a real design challenge. **Future learning:** this project prepares pupils for Key Stage 3 engineering and design technology where independent design decisions become central.
Design Brief	Design, prototype and construct an engineered solution to solve a real-world problem for a specific user. The product should demonstrate structural strength, appropriate mechanisms or systems, sustainability and thoughtful engineering decisions.
Possible Outcomes	Beach wheelchair transporter; wildlife monitoring station; flood warning model; accessible beach equipment trolley; coastal rescue device; automated recycling station; sustainable lighting system; portable learning shelter; bridge; lifting device; community engineering solution.
Design Criteria	The product must solve a clearly identified problem; meet user needs; use appropriate engineering principles; demonstrate accurate construction; safely combine mechanisms or structures where appropriate; withstand testing; be sustainable where possible; and be improved through evaluation.
Sticky Knowledge	Engineers solve practical problems using scientific understanding and design thinking. Engineering solutions often combine structures, mechanisms, electrical systems and materials. Successful engineering requires repeated testing, accurate measurement, evaluation and refinement. Different engineering disciplines solve different types of problems but all follow a systematic design process. Sustainability is an increasingly important consideration in modern engineering.
Technical Knowledge and Skills	Research engineering problems; analyse existing products; produce engineering drawings; develop prototypes; select appropriate materials; accurately measure and construct; combine mechanisms, structures or electrical components where appropriate; strengthen and reinforce products; safely use tools; test performance; record quantitative results; refine products; communicate engineering decisions.
Substantive Concepts	Engineering • User • Purpose • System • Structure • Mechanism • Sustainability • Innovation • Prototype • Evaluation
Disciplinary Concepts	Investigate • Analyse • Prototype • Design • Construct • Test • Evaluate • Refine • Communicate
Core Vocabulary	engineer, engineering, civil, structural, mechanical, electrical, prototype, iteration, specification, efficiency, mechanism, system, structure, load, stability, force, sustainability, innovation, evaluate, refine, performance
Engineers and Inspirations	Brunel, Emily Roebling, Isambard Kingdom Brunel, James Dyson, Sir Alec Issigonis, Dame Ann Dowling, local coastal engineers, Environment Agency engineers, renewable energy engineers. Focus on how engineers identify problems and improve society.
Cross-Curricular Links	**Science:** electricity, forces, materials. **Mathematics:** measurement, scale, geometry, data. **History:** engineering innovation through time. **Geography:** sustainability, coastal engineering. **Computing:** CAD, data logging, programming where appropriate. **English:** presentations, reports and design journals.
Beach School & Outdoor Learning	Survey local engineering problems including erosion, access, transport, storage and outdoor learning. Test prototypes outdoors against realistic conditions such as uneven ground or wind.
Greatstone & Kent Links	Coastal engineering, sea defences, accessibility, tourism, conservation and community infrastructure provide authentic contexts for engineering design.
Memorable Hook	**The Greatstone Engineering Challenge** — Engineers from a fictional consultancy present several real community problems needing innovative engineering solutions. Teams pitch for the contract.

Authentic Outcome	**Greatstone Engineering Expo** — pupils present engineering portfolios, prototypes and final solutions to governors, families and community representatives. Products undergo live engineering testing.
Assessment End Point	Pupils independently research, design, construct and refine an engineered product, selecting suitable structures, mechanisms and systems to solve an authentic problem while explaining and justifying engineering decisions.

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Resources	Outdoor Learning	Online Examples
1	Engineering Challenge Launch. What is engineering? Analyse famous engineering solutions and receive the design brief.	Challenge packs, engineering videos, photographs, design journals	Survey Greatstone for engineering problems	https://www.ice.org.uk
2	Investigating engineering disciplines and existing products. Product analysis.	Existing products, dismantled mechanisms, investigation sheets	Examine local engineering structures	STEM Learning engineering resources
3	User research and defining the problem. Produce design specification.	User profiles, interview sheets	Interview Beach School staff/community	Design Council Double Diamond
4	Investigating engineering principles (structures, mechanisms, electronics depending on project).	Investigation equipment, forces kits	Outdoor investigations	STEM Engineering Challenges
5	Prototype engineering systems and evaluate.	Card, wood, mechanisms, electronics	Test outdoors	Dyson Foundation engineering resources
6	Develop final design ideas and technical drawings.	CAD, graph paper, modelling materials	Site measurements	SketchUp for Schools examples
7	Begin construction. Accurate measuring and making.	Selected materials, tools	Construction space outdoors if appropriate	DT Association resources
8	Continue construction and integrate engineering systems.	Mechanisms, electrical components if used	Prototype testing	Primary Engineer resources
9	Complete construction and initial testing.	Testing equipment, weights, timers	Outdoor testing	STEM Learning
10	Engineering evaluation. Improve, modify and strengthen designs.	Repair materials, testing sheets	Field testing	Engineering UK classroom resources
11	Final engineering testing. Record evidence and complete evaluation.	Cameras, measuring equipment	Final challenge testing	ICE education resources
12	Greatstone Engineering Expo. Present final engineered solution with portfolio and testing evidence.	Display boards, engineering journals	Outdoor demonstrations	Cornerstones Engineer project

Suggested Engineering Challenges

- Greatstone beach wheelchair transporter
- Portable Beach School equipment trolley
- Wildlife observation platform
- Flood warning system model
- Renewable energy powered lighting
- Coastal litter collection device
- Accessible boardwalk bridge
- Emergency shelter
- Water collection system
- Community recycling solution

Whole Project Resource List

Investigation Resources

- Existing engineered products
- Engineering photographs
- Technical drawings
- CAD software
- Product analysis sheets

Construction Materials

- Timber
- Dowel
- Cardboard
- Corrugated card
- MDF bases
- Plastic sheet
- Acrylic
- Nuts and bolts
- Split pins
- Wheels and axles
- Pulleys
- Gears
- Elastic bands
- String
- Electrical components (where appropriate)
- Motors (optional)
- Switches
- LEDs
- Battery holders

Tools

- Junior hacksaws
- Bench hooks
- Hand drills
- Screwdrivers
- Glue guns (adult use)
- PVA
- Hot glue
- Masking tape
- Clamps
- Set squares
- Rulers
- Safety goggles

Testing Equipment

- Weights
- Force meters
- Stopwatches
- Tape measures
- Wind source (fan)
- Water trays if relevant
- Cameras
- Tablets

Safety Notes

- Carry out full project risk assessment.
- Adult supervision for cutting tools and electrical work.
- Use appropriate PPE.
- Test products with controlled loads only.
- Ensure electrical circuits use low-voltage batteries.
- Outdoor testing should be supervised with defined testing areas.
- Do not allow pupils to stand on or ride prototype structures.

Adaptive Teaching

- Provide engineering challenge cards with increasing levels of complexity.
- Offer pre-cut materials where appropriate.
- Use CAD templates and engineering drawing frames.
- Scaffold the design specification.
- Allow collaborative engineering teams with defined roles.
- Greater depth pupils justify engineering choices mathematically and scientifically.

Common Misconceptions

- Engineers only build bridges.
- Engineering is the same as construction.
- Stronger always means heavier.
- One solution fits every problem.
- Testing happens only at the end.
- Failure means the design has failed rather than informing improvement.

- Sustainability only means recycling.
- Technology always needs electricity.

Online Teacher Resources

- Cornerstones **Engineer**
- Primary Engineer
- Institution of Civil Engineers
- STEM Learning

- Engineering UK
- James Dyson Foundation
- Design and Technology Association
- Design Council Double Diamond

YEAR 6 – MAKE DO AND MEND - Summer Term

How can we repair, adapt and redesign products to create a more sustainable future?

Section	Curriculum Overview
Curriculum Rationale	This final Design and Technology project encourages pupils to become thoughtful, responsible designers by investigating sustainability through repair, reuse and redesign. Rather than always creating something new, pupils explore how products can be extended, improved and repurposed. Drawing on knowledge of textiles, structures, mechanisms and materials developed throughout primary school, pupils learn practical repair techniques before redesigning an existing item for a new purpose. Inspired by the historic 'Make Do and Mend' campaign and modern circular design principles, pupils recognise that good design considers environmental impact alongside function, appearance and user needs. The Cornerstones **Make Do and Mend** project focuses on repairing, adapting and upcycling textile products while exploring sustainability and reducing waste.
The Greatstone Way	**PROTECTORS → LEGACY – How can we care for people, places and our planet? What difference will we leave behind?** Pupils become designers who understand that caring for the environment sometimes means repairing rather than replacing. They develop the value of **Care** through sustainable decision-making and **Dare** by transforming unwanted materials into purposeful products. The project leaves pupils with a lasting understanding that small design decisions can have significant environmental impact.
National Curriculum Coverage	Pupils independently research users and existing products, investigate materials, develop design specifications, generate and communicate ideas, select suitable tools and equipment, accurately cut and join textiles, apply a range of sewing techniques, strengthen products where appropriate, evaluate existing products and refine their own designs. They investigate influential designers and understand how products can be adapted to reduce waste and extend useful life.
Curriculum Journey	**Previous learning:** Year 2 **Cut, Stitch and Join** introduced hand sewing and joining fabrics. Year 4 **Functional and Fancy Fabrics** developed stronger stitching, pattern making and functional textile products. Throughout KS2 pupils have selected appropriate materials, evaluated products and designed for users. **Current learning:** pupils now independently repair, adapt and redesign existing textile products for a new purpose using sustainable design principles. **Future learning:** this project prepares pupils for secondary Design and Technology where sustainability, iterative design and responsible material selection become increasingly important.
Design Brief	Repair, redesign or repurpose an unwanted textile product to create a useful item for a new user while reducing waste and improving sustainability.
Possible Outcomes	Beach School equipment bag; waterproof pouch; pencil roll; shopping bag; cushion; picnic blanket organiser; phone holder; gardening apron; beach collection bag; organiser wallet; reusable gift wrap; tablet sleeve; storage basket; outdoor learning resource bag.
Design Criteria	The product must reuse an existing textile item; demonstrate secure sewing techniques; improve or extend the original product's life; suit the intended user; minimise waste; include thoughtful finishing; and be evaluated through user feedback and sustainability considerations.
Sticky Knowledge	Repairing products reduces waste and extends their useful life. Upcycling creates a product with greater value or a different purpose. Recycling breaks materials down into raw materials whereas reuse keeps products in use. Different fabrics have different properties that affect suitability. Strong stitching, reinforcement and careful finishing improve durability. Sustainable design considers materials, manufacturing, transport, lifespan, repairability and disposal. Designers increasingly adopt circular economy principles where products remain useful for as long as possible.
Technical Knowledge and Skills	Investigate textile products. Identify suitable fabrics. Unpick seams safely. Measure and mark accurately. Create simple textile patterns. Pin and tack fabrics. Use running stitch, back stitch, blanket stitch, whip stitch and overstitch appropriately. Attach fastenings including buttons, Velcro, toggles or zips where appropriate. Strengthen seams. Add pockets, straps and reinforcement. Evaluate durability through testing. Produce annotated design drawings and evaluate environmental impact.
Substantive Concepts	Sustainability • Repair • Reuse • Upcycle • Textile • User • Purpose • Durability • Waste • Circular Design
Disciplinary Concepts	Investigate • Analyse • Repair • Adapt • Design • Construct • Test • Evaluate • Refine
Core Vocabulary	sustainability, repair, reuse, recycle, upcycle, circular economy, textile, seam, seam allowance, reinforcement, hem, running stitch, back stitch, blanket stitch, whip stitch, overstitch, fastening, prototype, durability, lifecycle, waste, repurpose, evaluate
Designers and Inspirations	William Morris (quality and longevity), Patagonia's repair philosophy, contemporary sustainable fashion designers, local repair cafés, textile designers and organisations promoting circular design. Focus on how designers reduce waste rather than simply creating new products.
Cross-Curricular Links	**Science:** properties of materials, durability, decomposition. **Geography:** sustainability, global resources, waste management. **History:** wartime Make Do and Mend campaign and changing consumer culture. **Art:** textile design, decorative techniques and surface pattern. **Mathematics:** measuring, pattern making, scale and budgeting. **English:** persuasive sustainability campaigns, evaluations and instructions. **Computing:** digital product promotion and environmental impact presentations.
Beach School & Outdoor Learning	Identify practical textile products that would improve Beach School. Investigate waterproofing, durability and carrying systems. Test products outdoors for strength, weather resistance and functionality.
Greatstone & Kent Links	Connect with beach cleans, plastic reduction initiatives, local charity shops, repair cafés and community sustainability projects. Design products that support outdoor learning, coastal conservation or local community events.
Memorable Hook	**The Greatstone Repair Café** — Pupils discover a collection of damaged or unwanted textile products destined for landfill. They are challenged to redesign them into useful products for the Greatstone community.
Authentic Outcome	**Greatstone Sustainable Design Exhibition** — pupils showcase repaired and redesigned products alongside before-and-after evidence, environmental impact calculations and explanations of how their design reduces waste. Products are displayed during a sustainability event or community exhibition.
Assessment End Point	Pupils independently investigate an existing textile product, identify opportunities for repair or redesign, produce a detailed specification, accurately construct an improved product using appropriate sewing techniques and evaluate how effectively their work extends the product's useful life while reducing waste.

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to be Secured	Learning Activities	Weekly Resources	Outdoor Learning	Online Examples
1	Launch the Greatstone Repair Café	Sustainability includes repairing as well as recycling.	Analyse damaged products, discuss landfill and circular design, introduce project brief.	Damaged clothing, bags, cushions, backpacks, sustainability images, journals	Audit damaged equipment around school	https://cornerstoneseducation.co.uk/projects/make-do-and-mend
2	Investigating textiles	Different fabrics have different properties.	Identify fabrics, investigate strength, waterproofing, flexibility and durability.	Fabric samples, magnifiers, investigation sheets	Compare outdoor textile materials	https://www.bbc.co.uk/bitesize/topics/zj3g87h
3	Investigating repair techniques	Products can often be repaired rather than replaced.	Practise repairing seams, buttons, tears and hems.	Needles, thread, buttons, spare fabrics, embroidery hoops	Repair outdoor equipment where appropriate	https://www.patagonia.com/repair/
4	Advanced sewing techniques	Different stitches perform different functions.	Practise back stitch, blanket stitch, whip stitch and reinforcement.	Sewing kits, stitch cards, samplers	Outdoor sewing challenge	https://www.dta.org.uk
5	Investigating existing upcycled products	Designers create value through adaptation.	Analyse successful upcycled products and identify transferable ideas.	Existing products, photos, evaluation sheets	Visit Beach School equipment store	Pinterest teacher examples
6	User research and writing specifications	Successful products solve user problems.	Interview users, identify needs and write design specifications.	User profiles, interview sheets	Survey outdoor learning needs	Design Council resources
7	Designing redesigned products	Drawings communicate ideas clearly.	Produce annotated designs, patterns and prototypes.	Graph paper, pattern paper, CAD where available	Measure intended products outdoors	SketchUp examples
8	Begin construction	Accurate cutting and sewing improve durability.	Cut, pin and begin sewing redesigned products.	Fabric scissors, pins, thread, sewing kits	Outdoor workspace if suitable	DT Association
9	Continue making	Construction follows planned stages.	Assemble products, attach fastenings and reinforce seams.	Velcro, zips, buttons, webbing, buckles	Practical testing outdoors	Cornerstones examples
10	Finishing techniques	Finishing improves function and appearance.	Add decorative elements, labels and strengthening. Test products.	Decorative fabrics, labels, testing sheets	Weatherproof testing	STEM sustainability resources
11	Evaluation and refinement	Designers improve products through testing.	Carry out user testing, strengthen weak areas and complete evaluations.	Evaluation sheets, repair materials	Outdoor functional testing	Repair Café Foundation
12	Greatstone Sustainable Design Exhibition	Designers communicate environmental impact.	Present before-and-after products, sustainability calculations and design journey.	Displays, journals, certificates	Outdoor showcase	Cornerstones Make Do and Mend

Suggested Product Outcomes

- Beach School resource bag
- Waterproof fieldwork pouch
- Reusable shopping bag
- Tablet or laptop sleeve
- Gardening apron
- Tool organiser
- Beach collection bag
- Cushion from old clothing
- Picnic roll
- First aid organiser
- Storage basket
- Book bag
- Reusable gift wrap
- Lunch bag

Whole Project Resource List

Textile Resources

- Old jeans
- Shirts
- T-shirts
- Waterproof jackets
- Tote bags
- Curtains
- Pillowcases
- Fabric offcuts
- Felt
- Canvas
- Denim
- Cotton
- Fleece
- Webbing
- Ribbon

Sewing Resources

- Needles
- Thread
- Embroidery thread
- Pins
- Pin cushions
- Fabric scissors
- Snips
- Measuring tapes
- Tailor's chalk
- Fabric pencils
- Seam rippers
- Thimbles
- Sewing gauges

Fastenings

- Buttons
- Velcro
- Press studs
- Toggles
- Buckles
- Zips
- Elastic
- Drawstring cord
- D-rings

Finishing Materials

- Labels
- Fabric paint
- Fabric pens
- Appliqué fabrics
- Iron-on interfacing
- Bias binding
- Decorative stitching thread

Testing Equipment

- Weights
- Water spray bottles
- Measuring tapes
- Timers
- Cameras
- User evaluation sheets

Safety Notes

- Carry out a textiles risk assessment.
- Teach safe handling and storage of needles.
- Count needles before and after lessons.
- Use fabric scissors only for fabric.
- Demonstrate safe cutting techniques.
- Store pins safely in pin cushions.
- Supervise use of seam rippers.
- Complete allergy checks where recycled materials are used.
- Wash donated textiles before use.
- Test products using realistic but safe loads.
- Supervise outdoor testing.

Adaptive Teaching

- Provide pre-cut templates where appropriate.
- Use colour-coded sewing guides.
- Offer larger needles and thicker thread for pupils with fine motor difficulties.
- Provide partially completed stitching for continuation.
- Use sewing frames and embroidery hoops.
- Pair pupils strategically.
- Provide video demonstrations via QR codes.
- Greater depth pupils independently adapt patterns and justify sustainability decisions.

Common Misconceptions

- Recycling and upcycling mean the same thing.
- Repairing is always cheaper than replacing.
- All fabrics are equally strong.
- Decorative stitching strengthens seams.
- Sustainable products must look recycled.
- New materials are always better.
- Strong stitching means using more thread.
- Sustainability only concerns the environment.
- Designers always begin with new materials.
- A repaired product is automatically lower quality.

Suggested Online Resources

- Cornerstones **Make Do and Mend**
- Design and Technology Association
- Patagonia Repair Guides
- Repair Café Foundation
- Love Your Clothes
- BBC Bitesize Textiles
- WRAP Sustainability Resources
- Fashion Revolution Education
- Oak National Academy Textiles
- STEM Learning Sustainability Resources

YEAR 6 DESIGN & TECHNOLOGY – MAKE DO AND MEND - Summer Term

How can we repair, adapt and redesign products to create a more sustainable future?

Section	Curriculum Overview
Curriculum Rationale	This final Design and Technology project encourages pupils to become thoughtful, responsible designers by investigating sustainability through repair, reuse and redesign. Rather than always creating something new, pupils explore how products can be extended, improved and repurposed. Drawing on knowledge of textiles, structures, mechanisms and materials developed throughout primary school, pupils learn practical repair techniques before redesigning an existing item for a new purpose. Inspired by the historic 'Make Do and Mend' campaign and modern circular design principles, pupils recognise that good design considers environmental impact alongside function, appearance and user needs. The Cornerstones **Make Do and Mend** project focuses on repairing, adapting and upcycling textile products while exploring sustainability and reducing waste.
The Greatstone Way	**PROTECTORS → LEGACY – How can we care for people, places and our planet? What difference will we leave behind?** Pupils become designers who understand that caring for the environment sometimes means repairing rather than replacing. They develop the value of **Care** through sustainable decision-making and **Dare** by transforming unwanted materials into purposeful products. The project leaves pupils with a lasting understanding that small design decisions can have significant environmental impact.
National Curriculum Coverage	Pupils independently research users and existing products, investigate materials, develop design specifications, generate and communicate ideas, select suitable tools and equipment, accurately cut and join textiles, apply a range of sewing techniques, strengthen products where appropriate, evaluate existing products and refine their own designs. They investigate influential designers and understand how products can be adapted to reduce waste and extend useful life.
Curriculum Journey	**Previous learning:** Year 2 **Cut, Stitch and Join** introduced hand sewing and joining fabrics. Year 4 **Functional and Fancy Fabrics** developed stronger stitching, pattern making and functional textile products. Throughout KS2 pupils have selected appropriate materials, evaluated products and designed for users. **Current learning:** pupils now independently repair, adapt and redesign existing textile products for a new purpose using sustainable design principles. **Future learning:** this project prepares pupils for secondary Design and Technology where sustainability, iterative design and responsible material selection become increasingly important.
Design Brief	Repair, redesign or repurpose an unwanted textile product to create a useful item for a new user while reducing waste and improving sustainability.
Possible Outcomes	Beach School equipment bag; waterproof pouch; pencil roll; shopping bag; cushion; picnic blanket organiser; phone holder; gardening apron; beach collection bag; organiser wallet; reusable gift wrap; tablet sleeve; storage basket; outdoor learning resource bag.
Design Criteria	The product must reuse an existing textile item; demonstrate secure sewing techniques; improve or extend the original product's life; suit the intended user; minimise waste; include thoughtful finishing; and be evaluated through user feedback and sustainability considerations.
Sticky Knowledge	Repairing products reduces waste and extends their useful life. Upcycling creates a product with greater value or a different purpose. Recycling breaks materials down into raw materials whereas reuse keeps products in use. Different fabrics have different properties that affect suitability. Strong stitching, reinforcement and careful finishing improve durability. Sustainable design considers materials, manufacturing, transport, lifespan, repairability and disposal. Designers increasingly adopt circular economy principles where products remain useful for as long as possible.
Technical Knowledge and Skills	Investigate textile products. Identify suitable fabrics. Unpick seams safely. Measure and mark accurately. Create simple textile patterns. Pin and tack fabrics. Use running stitch, back stitch, blanket stitch, whip stitch and overstitch appropriately. Attach fastenings including buttons, Velcro, toggles or zips where appropriate. Strengthen seams. Add pockets, straps and reinforcement. Evaluate durability through testing. Produce annotated design drawings and evaluate environmental impact.
Substantive Concepts	Sustainability • Repair • Reuse • Upcycle • Textile • User • Purpose • Durability • Waste • Circular Design
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Core Vocabulary	sustainability, repair, reuse, recycle, upcycle, circular economy, textile, seam, seam allowance, reinforcement, hem, running stitch, back stitch, blanket stitch, whip stitch, overstitch, fastening, prototype, durability, lifecycle, waste, repurpose, evaluate
Designers and Inspirations	William Morris (quality and longevity), Patagonia's repair philosophy, contemporary sustainable fashion designers, local repair cafés, textile designers and organisations promoting circular design. Focus on how designers reduce waste rather than simply creating new products.
Cross-Curricular Links	**Science:** properties of materials, durability, decomposition. **Geography:** sustainability, global resources, waste management. **History:** wartime Make Do and Mend campaign and changing consumer culture. **Art:** textile design, decorative techniques and surface pattern. **Mathematics:** measuring, pattern making, scale and budgeting. **English:** persuasive sustainability campaigns, evaluations and instructions. **Computing:** digital product promotion and environmental impact presentations.
Beach School & Outdoor Learning	Identify practical textile products that would improve Beach School. Investigate waterproofing, durability and carrying systems. Test products outdoors for strength, weather resistance and functionality.
Greatstone & Kent Links	Connect with beach cleans, plastic reduction initiatives, local charity shops, repair cafés and community sustainability projects. Design products that support outdoor learning, coastal conservation or local community events.

Memorable Hook	**The Greatstone Repair Café** — Pupils discover a collection of damaged or unwanted textile products destined for landfill. They are challenged to redesign them into useful products for the Greatstone community.
Authentic Outcome	**Greatstone Sustainable Design Exhibition** — pupils showcase repaired and redesigned products alongside before-and-after evidence, environmental impact calculations and explanations of how their design reduces waste. Products are displayed during a sustainability event or community exhibition.
Assessment End Point	Pupils independently investigate an existing textile product, identify opportunities for repair or redesign, produce a detailed specification, accurately construct an improved product using appropriate sewing techniques and evaluate how effectively their work extends the product's useful life while reducing waste.

Suggested 12-Week Teaching Sequence

Week	Learning Focus	Knowledge to be Secured	Learning Activities	Weekly Resources	Outdoor Learning	Online Examples
1	Launch the Greatstone Repair Café	Sustainability includes repairing as well as recycling.	Analyse damaged products, discuss landfill and circular design, introduce project brief.	Damaged clothing, bags, cushions, backpacks, sustainability images, journals	Audit damaged equipment around school	https://cornerstoneseducation.co.uk/projects/make-do-and-mend
2	Investigating textiles	Different fabrics have different properties.	Identify fabrics, investigate strength, waterproofing, flexibility and durability.	Fabric samples, magnifiers, investigation sheets	Compare outdoor textile materials	https://www.bbc.co.uk/bitesize/topics/zj3g87h
3	Investigating repair techniques	Products can often be repaired rather than replaced.	Practise repairing seams, buttons, tears and hems.	Needles, thread, buttons, spare fabrics, embroidery hoops	Repair outdoor equipment where appropriate	https://www.patagonia.com/repair/
4	Advanced sewing techniques	Different stitches perform different functions.	Practise back stitch, blanket stitch, whip stitch and reinforcement.	Sewing kits, stitch cards, samplers	Outdoor sewing challenge	https://www.dta.org.uk
5	Investigating existing upcycled products	Designers create value through adaptation.	Analyse successful upcycled products and identify transferable ideas.	Existing products, photos, evaluation sheets	Visit Beach School equipment store	Pinterest teacher examples
6	User research and writing specifications	Successful products solve user problems.	Interview users, identify needs and write design specifications.	User profiles, interview sheets	Survey outdoor learning needs	Design Council resources
7	Designing redesigned products	Drawings communicate ideas clearly.	Produce annotated designs, patterns and prototypes.	Graph paper, pattern paper, CAD where available	Measure intended products outdoors	SketchUp examples
8	Begin construction	Accurate cutting and sewing improve durability.	Cut, pin and begin sewing redesigned products.	Fabric scissors, pins, thread, sewing kits	Outdoor workspace if suitable	DT Association
9	Continue making	Construction follows planned stages.	Assemble products, attach fastenings and reinforce seams.	Velcro, zips, buttons, webbing, buckles	Practical testing outdoors	Cornerstones examples
10	Finishing techniques	Finishing improves function and appearance.	Add decorative elements, labels and strengthening. Test products.	Decorative fabrics, labels, testing sheets	Weatherproof testing	STEM sustainability resources
11	Evaluation and refinement	Designers improve products through testing.	Carry out user testing, strengthen weak areas and complete evaluations.	Evaluation sheets, repair materials	Outdoor functional testing	Repair Café Foundation
12	Greatstone Sustainable Design Exhibition	Designers communicate environmental impact.	Present before-and-after products, sustainability calculations and design journey.	Displays, journals, certificates	Outdoor showcase	Cornerstones Make Do and Mend

Suggested Product Outcomes

- Beach School resource bag
- Waterproof fieldwork pouch
- Reusable shopping bag
- Tablet or laptop sleeve
- Gardening apron
- Tool organiser
- Beach collection bag
- Cushion from old clothing
- Picnic roll
- First aid organiser
- Storage basket
- Book bag
- Reusable gift wrap
- Lunch bag

Whole Project Resource List

Textile Resources

- Old jeans
- Shirts
- T-shirts
- Waterproof jackets
- Tote bags
- Curtains
- Pillowcases
- Fabric offcuts
- Felt
- Canvas
- Denim
- Cotton
- Fleece
- Webbing
- Ribbon

Sewing Resources

- Needles
- Thread
- Embroidery thread
- Pins
- Pin cushions
- Fabric scissors
- Snips
- Measuring tapes
- Tailor's chalk
- Fabric pencils
- Seam rippers
- Thimbles
- Sewing gauges

Fastenings

- Buttons
- Velcro
- Press studs
- Toggles
- Buckles
- Zips
- Elastic
- Drawstring cord
- D-rings

Finishing Materials

- Labels
- Fabric paint
- Fabric pens
- Appliqué fabrics
- Iron-on interfacing
- Bias binding
- Decorative stitching thread

Testing Equipment

- Weights
- Water spray bottles
- Measuring tapes
- Timers
- Cameras
- User evaluation sheets

Adaptive Teaching
- Provide pre-cut templates where appropriate.
- Use colour-coded sewing guides.
- Offer larger needles and thicker thread for pupils with fine motor difficulties.
- Provide partially completed stitching for continuation.
- Use sewing frames and embroidery hoops.
- Pair pupils strategically.
- Provide video demonstrations via QR codes.
- Greater depth pupils independently adapt patterns and justify sustainability decisions.

Safety Notes
- Carry out a textiles risk assessment.
- Teach safe handling and storage of needles.
- Count needles before and after lessons.
- Use fabric scissors only for fabric.
- Demonstrate safe cutting techniques.
- Store pins safely in pin cushions.

Common Misconceptions
- Recycling and upcycling mean the same thing.
- Repairing is always cheaper than replacing.
- All fabrics are equally strong.
- Decorative stitching strengthens seams.
- Sustainable products must look recycled.
- New materials are always better.
- Strong stitching means using more thread.
- Sustainability only concerns the environment.
- Designers always begin with new materials.
- A repaired product is automatically lower quality.

- Supervise use of seam rippers.
- Complete allergy checks where recycled materials are used.
- Wash donated textiles before use.
- Test products using realistic but safe loads.
- Supervise outdoor testing.

Suggested Online Resources
- Cornerstones **Make Do and Mend**
- Design and Technology Association
- Patagonia Repair Guides
- Repair Café Foundation
- Love Your Clothes
- BBC Bitesize Textiles
- WRAP Sustainability Resources
- Fashion Revolution Education
- Oak National Academy Textiles
- STEM Learning Sustainability Resource

Assessment Principles

At Greatstone Primary, assessment in Design and Technology is practical, purposeful and continuous. Pupils are assessed throughout the design process, from identifying needs and generating ideas to making, evaluating and improving products. Assessment focuses on the development of technical knowledge, creativity, problem-solving and resilience, ensuring pupils become increasingly confident designers and makers.
Teachers gather evidence through design journals, practical outcomes, observation, discussion and pupil evaluation. Pupils regularly reflect on how effectively their products meet the design brief, encouraging critical thinking and continual improvement.

End Points by Project

Project	Knowledge End Point	Design & Technology Skills End Point	Authentic Outcome
Shade and Shelter	Understand how shelters provide protection.	Design and build a stable shelter.	Outdoor Shelter Showcase
Taxi!	Understand how wheels and axles enable movement.	Design and build a moving vehicle.	Vehicle Challenge
Chop, Slice and Mash	Understand basic food preparation and healthy eating.	Prepare food safely using simple techniques.	Healthy Café
Remarkable Recipes	Understand the principles of healthy recipes.	Prepare and evaluate a balanced dish.	Recipe Book & Tasting Event
Beach Hut	Understand simple structures and strengthening techniques.	Design and construct a model beach hut.	Coastal Village Display
Cut, Stitch and Join	Understand basic textile construction.	Join fabrics using simple stitches.	Textile Exhibition
Cook Well, Eatwell	Understand healthy diets and balanced meals.	Prepare and evaluate nutritious dishes safely.	Healthy Eating Showcase
Making It Move	Understand how mechanisms create movement.	Design and build moving products using cams or linkages.	Mechanical Toy Exhibition
Greenhouse	Understand how structures support plant growth.	Design and construct a stable greenhouse model.	Garden Centre Showcase
Fresh Food, Good Food	Understand seasonality and food provenance.	Prepare seasonal dishes safely.	Farm Shop Café
Functional and Fancy Fabrics	Understand how fabrics are selected for purpose.	Design and make a functional textile product.	Fashion Showcase
Tomb Builders	Understand how structures are strengthened.	Design and build a stable structure.	Ancient Egypt Engineering Exhibition
Moving Mechanisms	Understand gears, pulleys and mechanical systems.	Design and build complex moving mechanisms.	Mechanical Museum
Eat the Seasons	Understand seasonality and sustainability.	Prepare seasonal recipes and evaluate outcomes.	Seasonal Food Festival
Architecture	Understand how structures combine strength and aesthetics.	Design and build architectural models.	Greatstone Architecture Exhibition
Food for Life	Understand nutrition, food provenance and healthy lifestyles.	Plan and prepare balanced meals independently.	Community Cookery Event
Engineer	Understand mechanical and structural engineering principles.	Design, build and refine engineered products.	Engineering Expo
Make Do and Mend	Understand repair, reuse and sustainable design.	Repair, adapt and improve textile products.	Sustainability Showcase

Art & Design Curriculum Risk Assessment

Activity/Hazard	Risks	Who is at Risk	Control Measures	Further Action	Responsible
Scissors	Cuts	Pupils	Age-appropriate scissors; modelling; supervision	Replace damaged scissors	Teacher
Craft knives	Serious cuts	Staff	Teacher use only unless specialist secondary activity	None	Teacher
Glue	Skin irritation	Pupils	Non-toxic glue only; wash hands	Monitor allergies	Teacher
Paint	Allergic reactions, ingestion	Pupils	Non-toxic paint; aprons worn; handwashing	Check allergies	Teacher
Clay	Dust, slips	Pupils	Damp clean-up; avoid creating dust; wash hands	Monitor	Teacher
Wire	Cuts, eye injury	Pupils	Soft modelling wire only; safety briefing; goggles if appropriate	Supervise carefully	Teacher
Printing tools	Cuts, pinching	Pupils	Age-appropriate tools only	Monitor	Teacher
Natural materials	Allergies	Pupils	Avoid toxic plants; wash hands	Check allergies	Teacher
Found objects	Sharp edges	Pupils	Teacher checks all materials before use	Dispose of unsafe items	Teacher
Sewing needles	Puncture wounds	Pupils	Large blunt needles in KS1/LKS2; supervision	Count equipment	Teacher
Fabric scissors	Cuts	Pupils	Demonstrate correct use	Replace damaged items	Teacher
Hot glue gun	Burns	Staff/older pupils	Teacher only unless specifically risk assessed	Individual RA	Teacher
Ink/charcoal	Staining, dust	Pupils	Aprons; handwashing; ventilation	Monitor	Teacher
Outdoor art	Trips, weather	Pupils	Dynamic assessment; appropriate footwear	Review	Teacher
Beach art	Uneven surfaces, tides	Pupils	Beach School procedures followed	Dynamic assessment	Visit Leader

General Control Measures

- Aprons provided.
- Tables protected.
- Ventilation maintained when required.
- Resources stored safely.
- Handwashing after practical work.
- Allergies checked.
- Appropriate supervision throughout.

Design & Technology Curriculum Risk Assessment

Activity/Hazard	Risks	Who is at Risk	Control Measures	Further Action	Responsible
Scissors	Cuts	Pupils	Age-appropriate equipment; modelling	Replace damaged scissors	Teacher
Junior hacksaws	Cuts	Pupils	KS2 only; one-to-one supervision where appropriate	Review	Teacher
Hand drills	Pinched fingers	Pupils	Teacher demonstration; supervision	Monitor	Teacher
Glue guns	Burns	Pupils, staff	Low-temperature guns; teacher controlled unless upper KS2 and risk assessed	Individual RA	Teacher
Staplers	Finger injuries	Pupils	Demonstrate safe use	Monitor	Teacher
Sewing needles	Punctures	Pupils	Blunt needles where possible; supervised	Count equipment	Teacher
Textiles	Entanglement	Pupils	Tie back long hair; supervise	Reminder	Teacher
Food technology	Allergies, burns, food hygiene	Pupils	Follow allergy records; wash hands; food hygiene procedures; teacher handles hot equipment	Check records before each lesson	Teacher
Small components	Choking	EYFS/KS1	Age-appropriate resources only; close supervision	Store securely	Teacher
Wood	Splinters	Pupils	Sand edges; inspect materials	Monitor	Teacher
Cardboard construction	Paper cuts	Pupils	Safe handling demonstrated	Monitor	Teacher
Electrical components	Electric shock	Pupils	Low-voltage battery circuits only	Equipment inspection	Teacher
CAM mechanisms	Pinched fingers	Pupils	Demonstrate correct use	Monitor	Teacher
Pneumatic systems	Flying tubing	Pupils	Secure connections; supervise testing	Monitor	Teacher
Beach School construction	Trips, lifting	Pupils	Dynamic assessment; safe lifting techniques	Review	Teacher

General Control Measures

- All tools appropriate for pupils' age.
- Teacher demonstrations before practical activities.
- PPE used where appropriate.
- Medical needs considered.
- Food hygiene procedures followed.
- Equipment inspected regularly.
- Damaged tools removed immediately.
- Good housekeeping maintained to reduce trip hazards.

Curriculum-Specific Additional Expectations

These should apply across all three subjects:

Expectation	Requirement
Staff Training	Staff are familiar with school Health & Safety procedures and subject-specific guidance.
Beach School	Outdoor learning follows the separate Beach School risk assessment and dynamic assessment process.
SEND	Adaptive equipment and additional adult support provided where required.
Medical Needs	Allergies, asthma, epilepsy and other medical needs checked before every practical lesson.
First Aid	First aid kit accessible; staff aware of emergency procedures.
Safeguarding	Appropriate supervision ratios maintained at all times.
Equipment	Annual audit of practical resources by subject leaders.
Monitoring	Subject leaders monitor safe practice through learning walks and resource audits.
Review	Risk assessments reviewed annually or following any incident.