Hopton C of E Primary Academy
DT Subject Overviews
UKS2

Title	**Structures - Bridges** Greek Philosopher- fallen bridge
Overview of Unit	Children explore how bridges are designed and constructed to be strong, stable, and able to span gaps. They investigate different types of bridge structures such as beam, arch, and truss bridges, learning how shape and structure affect strength. Children develop their understanding of forces and stability by testing and evaluating different bridge designs. They design their own bridge based on a set of criteria, using sketches and models to plan their ideas. Children then build a bridge structure, learning to measure, cut, and join materials accurately, including wood and other construction materials. They test the strength of their final bridge and evaluate its effectiveness against the design brief, suggesting improvements to strengthen their design. The unit develops technical knowledge of structures, engineering principles, and practical construction skills.
Key Vocabulary	accuracy, arch bridge, assemble, beam bridge, bench hook/vice, corrugation, factors, hardwood, joints, lamination, mark out, material properties, quality of finish, reinforce, rigid, sandpaper, softwood, tenon saw/coping saw, truss bridge
Key Learning Objectives	- I am learning to explore how to reinforce a beam (structure) to improve it's strength. - I am learning to build a spaghetti truss bridge. - I am learning to measure, mark out and cut materials ready to build a truss bridge. - I am learning to complete, reinforce and evaluate my truss bridge.
Key Knowledge	1. Bridges need strong structures and reinforcement to support weight safely. 2. Triangles are often used in truss bridges because they improve stability and strength. 3. Different bridge types, such as beam, arch and truss bridges, are designed for different purposes. 4. Accurate measuring, marking and cutting are important when constructing structures. 5. Materials have different properties, such as flexibility, rigidity and strength. 6. Testing and evaluating structures helps identify weaknesses and improve designs.
Skills to be Covered	Design: ● Designing a stable structure that is able to support weight. ● Creating a frame structure with a focus on triangulation. ● Designing a playground featuring a variety of different structures, giving careful consideration to how the structures will be used, considering effective and ineffective designs.

	Make: ● Making a range of different shaped beam bridges. ● Using triangles to create truss bridges that span a given distance and support a load. ● Building a wooden bridge structure. ● Independently measuring and marking wood accurately. ● Selecting appropriate tools and equipment for particular tasks. ● Using the correct techniques to saws safely. ● Identifying where a structure needs reinforcement and using card corners for support. ● Explaining why selecting appropriating materials is an important part of the design process. ● Understanding basic wood functional properties. ● Building a range of play apparatus structures drawing upon new and prior knowledge of structures. ● Measuring, marking and cutting wood to create a range of structures. ● Using a range of materials to reinforce and add decoration to structures. Evaluation: ● Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary. ● Suggesting points for improvements for own bridges and those designed by others. ● Improving a design plan based on peer evaluation. ● Testing and adapting a design to improve it as it is developed. ● Identifying what makes a successful structure.
End of assessment quiz	*Each quiz should also revisit two questions from previous units* 1. Why are triangles used in truss bridges? 2. What is the difference between a beam bridge and an arch bridge? 3. Why is reinforcement important in structures? 4. Which material property helps a bridge stay strong and stable? 5. How can testing help improve a bridge design? 6. Why is accurate measuring important when building structures?

Title	**<u>Mechanism: Gears and Pulleys</u>** Eco Gadget Bike
Overview of Unit	Children explore how mechanical systems using gears and pulleys can transfer movement and change the direction, speed, and force of motion. They investigate how these systems are used in real-world products, including bicycles and other machines, to make work easier and more efficient. Children apply their understanding by designing and creating an eco-gadget bike based on a design brief. They conduct market research, generate ideas, and develop annotated sketches to plan their design. Using knowledge of gears and pulleys, they build a model that demonstrates movement and function.

	Children evaluate their finished product against design criteria, considering how effectively their mechanism works and how it could be improved. The unit develops understanding of mechanical systems, problem-solving, and how design can be used to create sustainable and functional products. It links strongly to real-world engineering and product design contexts such as energy-efficient transport systems.
Key Vocabulary	annotate, axle, force, gear, gear system, input, machine, market research, mechanism, output, problem statement, pulley, pulley system, renewable energy, research, sustainability, teeth
Key Learning Objectives	- I am learning to create a working gear system and explain its function. - I am learning to improve a working gear system and suggest some applications. - I can learning to create a working pulley system and explain its function. - I am learning to conduct market research to discover useful tasks an eco gadget bike could perform. - I am learning to design and evaluate an eco-gadget bike using design criteria.
Key Knowledge	1. Gears transfer movement and can change the speed, direction or force of motion. 2. Pulleys use wheels and ropes to help lift or move loads more easily. 3. Market research helps designers understand what users need from a product. 4. Annotated sketches explain how a design will work and what materials will be used. 5. Prototypes are used to test and improve ideas before creating a final product. 6. Sustainable products consider environmental impact and energy use.
Skills to be Covered	Design: ● Noticing wider-reaching problems or needs in the community. ● Identifying a wide range of needs and potential barriers through market research. ● Writing more complex problem statements that consider multiple factors and constraints. ● Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. ● Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about their ideas' practicality and originality. ● Beginning to use more complex annotated sketches, such as cross-sectional and exploded diagrams and pattern pieces in design. ● Using a series of prototypes to refine and improve their designs. Make: ● Consistently apply safety instructions. ● Select appropriate scissors to handle delicate cutting tasks and challenging materials. ● Cutting patterns and drawings accurately. ● In supervised groups, using hot glue guns safely. ● Recognising that hot glue is useful for joining materials that need a strong bond that sets quickly. ● Choosing PVA glue over hot glue for its safety when joining materials in less intensive projects.

	Evaluate: ● Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. ● Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. ● Considering alternative materials, tools or techniques that could enhance the product. ● Providing feedback that is helpful, specific, and encouraging.
End of assessment quiz	*Each quiz should also revisit two questions from previous units* 1. What can gears change in a mechanism? 2. How do pulleys make work easier? 3. Why is market research important in design? 4. What is the purpose of a prototype? 5. Why should designers think about sustainability? 6. What is the purpose of reinforcement in a bridge structure?

Title	**Cooking and Nutrition: Come Dine With Me**
Overview of Unit	Children plan, design, and prepare a three-course meal inspired by a "Come Dine With Me" style challenge. They research and select suitable recipes, considering flavour combinations, seasonality, and balance across courses. Children develop their understanding of ingredients, nutrition, and food provenance while creating a structured meal plan. They prepare and cook their chosen dishes, applying a range of food preparation skills safely and hygienically. Children follow recipes accurately, working with increasing independence and managing time effectively. They also consider presentation and how food is served for a specific audience. Finally, children evaluate their meal against design criteria, reflecting on taste, appearance, and overall success. They suggest improvements and explain their choices using food vocabulary and knowledge gained throughout the unit. The unit builds independence, creativity, and understanding of healthy, balanced meals in a real-world context.
Key Vocabulary	balance, bitter, bridge method, complement, cookbook, cross-contamination, enhance, equipment, farm to fork, flavours, ingredients, method, pairing, preparation, recipe, research, salty, sour, storyboard, sweet, umami
Key Learning Objectives	- I am learning to explain the use of complementary flavours. - I am learning to research and design a three course meal. - I am learning to apply culinary skills and knowledge for a starter. - I am learning to apply culinary skills and knowledge for a main course. - I am learning to apply culinary skills and knowledge for a dessert.
Key Knowledge	1. Complementary flavours work well together to improve the taste of a dish. 2. A balanced meal includes foods from different food groups. 3. Recipes provide ingredients, quantities and methods to follow when cooking.

	4. Working hygienically helps prevent cross-contamination. 5. Time management is important when preparing several dishes. 6. Evaluating food includes considering taste, texture, smell and appearance.
Skills to be Covered	Design: ● Writing a recipe, explaining the key steps, method and ingredients. ● Including facts and drawings from research undertaken. Make: ● Following a recipe, including using the correct quantities of each ingredient. ● Adapting a recipe based on research. ● Working to a given timescale. ● Work safely and hygienically with independence. Evaluation: ● Evaluating a recipe, considering: taste, smell, texture and origin of the food group. ● Taste testing and scoring final products. ● Suggesting and writing up points of improvements when scoring others' dishes, and when evaluating their own throughout the planning, preparation and cooking process. ● Evaluating health and safety in production to minimise cross contamination.
End of assessment quiz	*Each quiz should also revisit two questions from previous units* 1. What are complementary flavours? 2. Why is hygiene important when cooking? 3. What information does a recipe include? 4. Why is time management important in cooking? 5. What should you think about when evaluating food? 6. Why should designers test and improve products?

Title	**<u>Electrical Systems: Wobble Bots</u>** Children will explore the use of motors and designing and making a motorised product.
Overview of Unit	Children explore how electrical systems can be used to create movement by investigating motorised products such as wobble bots. They learn how simple circuits work, including components such as motors, batteries, and switches, and understand how electricity can be changed into movement. Children disassemble and analyse an existing motorised product to understand how it is constructed and functions. They use this knowledge to design and create their own wobble bot for a specific purpose, developing annotated sketches and design criteria. Children build a working model using electrical components, focusing on how changes in design affect movement and performance. Finally, children test and evaluate their wobble bot against their design criteria, making improvements based on feedback. The unit develops understanding of

	electrical systems, mechanisms, and iterative design through investigation, experimentation, and practical making.
Key Vocabulary	annotate, assemble, electrical component, motor, battery (LKS2), circuit (LKS2), electricity (LKS2)
Key Learning Objectives	- I am learning to investigate motors by creating circuits. - I am learning to make a motorised product and test its function. - I am learning to apply knowledge of circuits to experiment with product design. - I am learning to design a motorised product for a specific purpose. - I am learning to make and evaluate the effectiveness of a motorised product.
Key Knowledge	1. Electrical circuits use components such as batteries, wires, motors and switches. 2. Motors change electrical energy into movement. 3. Design criteria help products meet a user's needs and purpose. 4. Prototypes help designers test movement and improve products. 5. Different materials affect how a product moves and performs. 6. Evaluation helps improve the functionality and appearance of a product.
Skills to be Covered	Design ● Creating more complex design criteria that require considering detailed user needs, environmental impact, materials and cost. ● Developing more independence in generating ideas. ● Coming up with a broader range of ideas and deeper innovation, requiring pupils to think critically about the practicality and originality of their ideas. ● Using a series of prototypes to refine and improve their designs. Make ● Producing lists of equipment, materials and tools that they need for a task. ● Creating a step-by-step plan for making. ● Selecting materials, components or ingredients based on research or user needs. ● Explaining their choices, referring to their research. ● Understanding and explaining the importance of each safety rule. ● Applying safety instructions consistently. ● Balancing aesthetics and functionality when creating parts of a design. ● Considering when best to apply finishing effects. Evaluate ● Reflecting on the usability, aesthetics, innovation and sustainability of products and discussing how design choices impact these aspects. ● Assessing their designs against a more complex set of design criteria that includes functionality, aesthetics, user experience, sustainability and cost. ● Considering alternative materials, tools or techniques that could enhance the product. ● Providing feedback that is helpful, specific and encouraging. ● Incorporating feedback from peers or users to improve their product further, explaining the changes they made and the impact they had.

End of assessment quiz	*Each quiz should also revisit two questions from previous units* 1. What does a motor do in a circuit? 2. Which components are needed in a simple electrical circuit? 3. Why are prototypes useful? 4. How can materials affect movement? 5. What is the purpose of design criteria? 6. Why is evaluating a finished meal important?

Title	**Digital World: Navigating the World** Children program a navigation tool to produce a multifunctional device for trekkers.
Overview of Unit	Children explore how digital systems can be used to navigate the world and solve real-life problems. They investigate existing navigation tools and consider how smart technology can combine multiple functions within one product. Children develop a product concept based on a design brief, carrying out research and generating ideas through annotated sketches and computer-aided design (CAD). They learn how digital products can include multiple features such as GPS tracking, data collection, and user feedback. They create a 3D virtual model of their navigation device, considering form, function, and user needs. Children then pitch their design ideas and evaluate their product against design criteria, reflecting on how effectively it meets the needs of a user. The unit develops understanding of digital systems, product design, sustainability, and how technology can be used to solve real-world problems.
Key Vocabulary	application (apps), biodegradable, boolean, cardinal compass, client, corrode, design brief, design criteria, duplicate, environmentally friendly, equipment, function, GPS tracker, if statement, loop, mouldable, navigation, pedometer, product lifecycle, product lifespan, program, recyclable, replica, smart, smartphone, sustainable design, value, variable
Key Learning Objectives	- I am learning to write a design brief and criteria based on a client request. - I am learning to write a program to include multiple functions as part of a navigation device. - I am learning to develop a sustainable product concept. - I am learning to develop 3D CAD skills to produce a virtual model. - I am learning to present a pitch to 'sell' the product to a specified client.
Key Knowledge	1. A design brief explains what a client wants a product to do. 2. CAD software can be used to create and modify 3D models. 3. Navigation devices can include features such as GPS tracking and compasses. 4. Sustainable design considers recyclable and environmentally friendly materials. 5. Programs use instructions such as loops, variables and if statements. 6. Product pitches explain how a design meets a client's needs.

Skills to be Covered	Design: ● Writing a design brief from information submitted by a client. ● Developing design criteria to fulfil the client's request. ● Developing a product idea through annotated sketches. Make: ● Placing and manoeuvring 3D objects, using CAD. ● Changing the properties of, or combine one or more 3D objects, using CAD. ● Considering materials and their functional properties, especially those that are sustainable and recyclable (for example, cork and bamboo). ● Explaining material choices and why they were chosen as part of a product concept. ● Programming an N,E, S,W cardinal compass. ● Explaining how my program fits the design criteria and how it would be useful as part of a navigation tool. ● Developing an awareness of sustainable design. ● Explaining the key functions and features of my navigation tool to the client as part of a product concept pitch. ● Demonstrating a functional program as part of a product concept. Evaluate: ● Explain how my program fits the design criteria and how it would be useful as part of a navigation tool ● Develop an awareness of sustainable design ● Identify key industries that utilise 3D CAD modelling and explain why ● Describe how the product concept fits the client's request and how it will benefit the customers
End of assessment quiz	*Each quiz should also revisit two questions from previous units* 1. What is the purpose of a design brief? 2. What does CAD stand for? 3. Name one feature a navigation tool might include. 4. Why is sustainable design important? 5. What is an example of an instruction used in programming? 6. Why is evaluating a product important in DT?

Title	**<u>Textiles: A Stuffed Toy</u>** We will be designing and making a soft toy for an Evacuee.
Overview o f Unit	Children design and make a stuffed toy for a specific user and purpose. They begin by researching existing soft toys, exploring how they are constructed and how design choices affect function and appearance. Children generate ideas through sketches and develop clear design criteria to guide their work. They create templates and select appropriate fabrics based on their properties such as strength, texture, and suitability for sewing. Children develop and apply a range of textile skills, including accurate cutting, pinning, stitching, and joining techniques to assemble their final product.

	Throughout the making process, children refine and improve their work, ensuring it meets the design brief. Once completed, they evaluate their stuffed toy against their design criteria, reflecting on effectiveness, appearance, and quality, and suggest improvements for future designs.
Key Vocabulary	accurate, annotate, appendage, blanket-stitch, design criteria, detail, evaluation, fabric, sew, shape, stuffed toy, stuffing, template
Key Learning Objectives	- I am learning to design a stuffed toy. - I am learning to sew a blanket stitch. - I am learning to create and add decorations to fabric. - I am learning to use a blanket stitch to assemble the components of a stuffed toy.
Key Knowledge	1. Templates help ensure fabric pieces are measured and cut accurately. 2. Blanket stitch is a strong stitch used to join fabric pieces together. 3. Appliqué is used to decorate fabric by attaching shapes or patterns. 4. Strong stitches and knots help make textile products durable. 5. Different fabrics have different properties, textures and strengths. 6. Evaluation helps improve the quality and effectiveness of textile products.
Skills to be Covered	Design: ● Design a stuffed toy considering the main component shapes required and creating an appropriate template ● Consider the proportions of individual components ● Annotate designs Make: ● Create a 3D stuffed toy from a 2D design ● Measure, mark and cut fabric accurately and independently ● Create strong and secure blanket stitches when joining fabric Use applique to attach pieces of fabric decoration ● Use a template when pinning panels onto fabric ● Mark and cut fabric accurately, in accordance with a design ● Sew a strong running stitch, making small, neat stitches and following the edge ● Tie strong knots ● Add a strong fastening to your design Evaluation: ● Test and evaluate an end product and giving point for further improvements ● Evaluate work continually as it is created
End of assessment quiz	*Each quiz should also revisit two questions from previous units* 1. What is the purpose of a template in textiles? 2. Why is blanket stitch useful? 3. What is appliqué? 4. Why are strong knots important when sewing? 5. How can fabrics differ from one another? 6. Why is evaluation important when making a textile product?