

NC Purpose of Study

Design and technology is an inspiring, rigorous and practical subject. Using creativity and imagination, pupils design and make products that solve real and relevant problems within a variety of contexts, considering their own and others' needs, wants and values. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art. Pupils learn how to take risks, becoming resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world. High-quality design and technology education makes an essential contribution to the creativity, culture, wealth and well-being of the nation.

Intent	Implementation	Impact
At Broadway Junior School, Design and Technology inspires pupils to become creative, innovative and reflective problem-solvers. Through a progressive curriculum, children develop the knowledge, skills and confidence to design, make and evaluate purposeful products while considering the needs of others and the wider world. Pupils learn to take risks, think critically and apply technical knowledge across a range of contexts, including structures, mechanisms, textiles, electrical systems, the digital world and cooking and nutrition. We aim to foster resilience, resourcefulness and curiosity, enabling children to understand the impact of design and technology on everyday life and prepare them for future learning and careers.	Design and Technology is taught through the Kapow Primary scheme, which provides a carefully sequenced and progressive curriculum from Year 3 to Year 6. Learning follows the design process of design, make and evaluate, underpinned by the development of technical knowledge. Pupils revisit key areas throughout Key Stage 2, building on prior learning through a spiral curriculum approach. Lessons are taught over three half-terms each academic year and include practical, hands-on experiences, collaborative learning and opportunities for independent thinking. Knowledge organisers support vocabulary and knowledge retention, while differentiated activities ensure all pupils can access and achieve within the curriculum. Teachers are supported through high-quality planning and subject-specific professional development resources.	The impact of our Design and Technology curriculum is evident in pupils who are confident, creative and capable designers. Children develop a secure understanding of materials, tools, processes and healthy nutrition, applying their knowledge to create purposeful and innovative outcomes. They demonstrate increasing independence when designing, making and evaluating products and can reflect thoughtfully on how their work could be improved. Assessment is ongoing through observation, questioning and review of completed projects, enabling teachers to identify and address gaps in learning. By the end of Key Stage 2, pupils have the skills, knowledge and understanding required to meet National Curriculum expectations and succeed in the next stage of their education.

Key Vocabulary

Accuracy arch bridge assemble beam bridge corrugation hardwood joints lamination mark out material properties reinforce rigid sandpaper softwood saw truss bridge

Knowledge	Skills
- Some different ways to reinforce structures. - Triangles can be used to reinforce bridges. - Material selection is important based on properties. - The material (functional and aesthetic) properties of wood. - The difference between arch, beam, truss and suspension bridges. - How to carry and use a saw safely. - Properties are words that describe the form and function of materials.	<u>Design</u> - Designing a stable structure that is able to support weight <u>Make</u> - 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 saw safely. - Identifying where a structure needs reinforcement and using card corners for support - Explaining why selecting appropriate materials is an important part of the design process. <u>Evaluate</u> - 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.

Learning Objectives/End Points

Lesson 1: Arch and beam bridges	Lesson 2: Spaghetti truss bridges	Lesson 3: Building bridges	Lesson 4: Finalising bridges
To explore how to reinforce a beam (structure) to improve its strength.	To build a spaghetti truss bridge.	To measure, mark out and cut materials ready to build a truss bridge.	To complete, reinforce and evaluate my truss bridge.

Materials	Cautions
- Rulers / Glue / Scissors / Sticky tape or masking tape / PVA glue or glue guns - Paper straws or paper tubes - Piles of books/bricks/blocks set up at the same height - Sheets of A4 card - Weights that can be placed on the card - Spaghetti - Square rod wood pieces - 10 x 10 mm - Lolly sticks or match sticks - Set squares	- If using glue guns - Set them up where they can be accessed under close staff supervision. - Supervision required if saws are needed

Cross-Curricular Links
Mathematics Number - multiplication and division - Multiply and divide numbers mentally drawing upon known facts. Geometry - properties of shapes - Draw given angles, and measure them in degrees (°). Science - Working scientifically - Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

Careers	
Linking Curriculum Learning to Careers Discuss how the skills developed in this unit are used in a range of careers, including: • Civil Engineer • Structural Engineer • Bridge Engineer • Architect • Construction Manager • Surveyor • Design Engineer • Carpenter • Engineering Technician • Model Maker Transferable skills such as Designing for a real-world purpose, Accurate measuring and marking out Selecting suitable materials, Understanding strength and stability, Safe use of tools and equipment Problem-solving and resilience, Testing and improving designs, Evaluating products against criteria Teamwork and communication	Learning from Career and Labour Market Information • Explore how engineers, architects and construction professionals design bridges and structures that are safe, strong and fit for purpose. • Learn that different bridge designs are used depending on the environment, materials, distance to span and the weight they need to support. Encounters with Employers and Employees • Explore how civil and structural engineers design bridges by considering strength, safety, cost and environmental impact. • Discuss how architects and engineers work together to create structures that are both functional and visually appealing. Experiences of Workplaces • Visit a science museum, engineering centre or construction exhibition to investigate how bridges are planned, tested and built. • Explore how engineers work in design offices and construction sites to solve real-world problems. • Investigate famous bridges from around the world and compare their designs, materials and purposes.