

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

Diagram evaluate feedback housing linkage mechanical system mechanism pivot pneumatic system thumbnail sketch

Knowledge	Skills
- How mechanisms work. - A mechanical system can allow us to move something more easily. - Mechanical systems can have more than one mechanism that moves to make them work. - Mechanical systems are often hidden in products to make them look more appealing. - Pneumatic systems can be found in everyday objects. - Pushing air can be used to move a mechanism. - Pivots can be used to create more movement in a mechanical system. - A combination of mechanisms can improve a product.	<u>Design</u> - Creating simple design criteria that outline basic functionality and appeal. - Developing drawing and sketching skills with a focus on clarity and simplicity. - Developing designs by adding details and justifications about materials, tools and methods. <u>Make</u> - Cutting out more complex shapes accurately. - Making facades from a range of materials. - Creating different textural effects with a variety of materials. <u>Evaluate</u> - Evaluating their designs by comparing them against design criteria and considering feedback from peers to suggest improvements.

Learning Objectives/End Points

Lesson 1: Exploring pneumatics	Lesson 2: Drawing diagrams	Lesson 3: Designing a pneumatic toy	Lesson 4: Making a pneumatic toy	Lesson 5: Finishing the toy
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To explore how pneumatic systems create movement within mechanisms.	To use different types of diagrams to summarise information.	To design a toy that uses a pneumatic system.	To create a pneumatic system for a moving toy.	To test and finalise ideas against design criteria.
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Materials	Cautions
- sandwich bags - large book/ balloons - plastic tubing - masking tape, glue - box with a hinged lid - Ball pump, balloon pump or bottle with a small nozzle, such as a washing-up liquid or sports cap bottle, syringes - card or paper in various colours - pipe cleaners, lolly sticks, elastic bands, split pins. - materials to decorate the pneumatic toys (card, straws, cotton wool, buttons, socks, plastic bags, stuffing, etc.).	- Be careful with the sizes of syringes; large syringes can pop smaller syringes out with force. - Wear safety glasses if possible. - Avoid blowing directly into the tubing to keep it clean. - Pierce holes using a sharp pencil pushed into a piece of modelling dough. Ensure the pencil tip is not placed over the fingers. - Always use sterile syringes that have not been used for medical purposes.

Cross-Curricular Links

Mathematics - Geometry - properties of shapes

- Identify and describe the properties of 2-D shapes, including the number of sides, and line of symmetry in a vertical line.

Science - Forces and magnets

- Compare how things move on different surfaces.

Art and design

- To create sketch books to record their observations and use them to review and revisit ideas.
- To improve their mastery of art and design techniques, including drawing, painting and sculpture with a range of materials. About great artists, architects and designers in history.

Careers

Linking Curriculum Learning to Careers

Discuss how the skills developed in this unit are used in a range of careers, including:

- Mechanical Engineer
- Toy Designer
- Robotics Engineer
- Automotive Engineer
- Design Engineer
- Manufacturing Engineer
- Animator (using mechanical principles for movement)

Transferable skills such as Designing and creating products for a purpose, Understanding how systems work, Problem-solving and innovation, Creating and interpreting diagrams, Planning and developing ideas, Selecting appropriate materials and tools, Testing and improving designs, Working accurately and safely, Using feedback to refine outcomes

Learning from Career and Labour Market Information

- Explore how engineers and designers use science, creativity and problem-solving to develop products that move and work effectively.
- Learn that pneumatic systems and mechanical mechanisms are used in many real-world products, including toys, vehicles, medical equipment, tools and machines.

Encounters with Employers and Employees

- Explore how engineers and product designers develop ideas through research, sketches, prototypes and testing.
- Explore how toy designers combine creativity with engineering principles to create engaging and effective products.

Experiences of Workplaces

- Visit a science museum, engineering exhibition or design centre (or explore virtual examples) to see how inventions and mechanisms are developed.