

Unit	Lesson name	Lesson No.	Learning objective	Expected Standard (EXS)	Greater depth (GDS)	National Curriculum links
Mechanical Systems Pneumatics Project: To make a pneumatic toy Key vocabulary diagram evaluate feedback housing linkage mechanical system mechanism pivot pneumatic system thumbnail sketch	Exploring Pneumatics	1	To explore how pneumatic systems create movement within mechanisms.	<p>I can define a mechanism as a system of parts working together to create movement.</p> <p>I can recall that a pneumatic system can be used as part of a mechanism.</p> <p>I can identify pneumatic systems in a range of everyday objects.</p> <p>I can describe how a pneumatic system forces air over a distance to create movement.</p>	<p>I can explain how a pneumatic system works using accurate technical vocabulary (e.g. pressure, air flow, input, output).</p> <p>I can compare pneumatic systems with other types of mechanisms (e.g. levers or linkages) and explain their advantages and disadvantages.</p> <p>I can analyse how pneumatic systems are used in real-life products and explain why they are suitable for those purposes.</p> <p>I can predict how changing parts of a pneumatic system (e.g. tube length or air volume) will affect movement.</p>	<p>Design</p> <p>Pupils should be taught to:</p> <p>Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.</p> <p>Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.</p> <p>Evaluate</p> <p>Pupils should be taught to:</p> <p>Investigate and analyse a range of existing products.</p> <p>Understand how key events and individuals in design and technology have helped shape the world.</p> <p>Technical knowledge</p> <p>Pupils should be taught to:</p> <p>Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages].</p>
	Drawing Diagrams	2	To use different types of diagrams to summarise information.	<p>I can recall that different types of drawings are used in design to explain ideas clearly.</p> <p>I can describe different types of diagrams.</p> <p>I can explain when one type of diagram may be more useful for a particular situation.</p> <p>I can begin to draw different types of diagrams.</p>	<p>I can select the most appropriate type of diagram for a purpose and justify my choice.</p> <p>I can create clear, labelled diagrams that accurately communicate complex ideas.</p> <p>I can combine different diagram types (e.g. exploded diagrams and annotated sketches) to improve clarity.</p> <p>I can evaluate diagrams (my own and others') and suggest improvements for precision and effectiveness.</p>	<p>Design</p> <p>Pupils should be taught to:</p> <p>Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.</p> <p>Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.</p> <p>Evaluate</p> <p>Pupils should be taught to:</p> <p>Investigate and analyse a range of existing products.</p> <p>Understand how key events and individuals in design and technology have helped shape the world.</p> <p>Technical knowledge</p> <p>Pupils should be taught to:</p> <p>Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages].</p>

	Designing a Pneumatic Toy	3	To design a toy that uses a pneumatic system.	<p>I can develop design criteria from a design brief.</p> <p>I can generate suitable ideas using different types of diagrams.</p> <p>I can recall different types of pneumatic systems I can use to design my toy.</p> <p>I can consider sustainable resources when designing my toy.</p>	<p>I can develop detailed and specific design criteria that fully reflect the design brief and user needs.</p> <p>I can generate a range of innovative design ideas and explain how each meets the criteria.</p> <p>I can justify my final design choice by comparing alternatives and explaining trade-offs.</p> <p>I can consider sustainability in depth, explaining the environmental impact of materials and suggesting improvements.</p>	<p>Design</p> <p>Pupils should be taught to:</p> <p>Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.</p> <p>Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.</p> <p>Evaluate</p> <p>Pupils should be taught to:</p> <p>Investigate and analyse a range of existing products.</p> <p>Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.</p> <p>Technical knowledge</p> <p>Pupils should be taught to:</p> <p>Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages].</p>
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	Making a pneumatic toy	4	To create a pneumatic system for a moving toy.	<p>can create a pneumatic system to create a chosen movement.</p> <p>I can build secure housing for a pneumatic system.</p> <p>I can recall that syringes and balloons can create different pneumatic systems.</p> <p>I can recall how to use these components to make a functional and appealing pneumatic toy.</p>	<p>I can accurately construct a reliable pneumatic system that produces controlled and consistent movement.</p> <p>I can independently solve problems that arise during making and refine my design as I work.</p> <p>I can select and use tools and materials with precision to ensure a high-quality finish.</p> <p>I can explain how my pneumatic system works and how the components interact within the toy</p>	<p>Design</p> <p>Pupils should be taught to:</p> <p>Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.</p> <p>Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.</p> <p>Make</p> <p>Pupils should be taught to:</p> <p>Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.</p> <p>Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.</p> <p>Evaluate</p> <p>Pupils should be taught to:</p> <p>Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.</p> <p>Technical knowledge</p> <p>Pupils should be taught to:</p> <p>Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.</p> <p>Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages].</p>
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	Finishing a toy	5	To test and finalise ideas against design criteria.	<p>I can describe why materials are chosen due to how they work and look.</p> <p>I can recall how to work with materials to create different effects by cutting, creasing, folding, etc.</p> <p>I can evaluate how well the design, materials and equipment help to achieve the design brief.</p>	<p>I can critically evaluate my product against all design criteria, giving detailed reasons for success and areas for improvement.</p> <p>I can suggest realistic modifications to improve function, appearance, and durability.</p> <p>I can explain how my choice of materials and techniques impacted the final product.</p> <p>I can reflect on the whole design and making process, identifying what I would do differently in future projects.</p>	<p>Design</p> <p>Pupils should be taught to:</p> <p>Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.</p> <p>Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.</p> <p>Make</p> <p>Pupils should be taught to:</p> <p>Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.</p> <p>Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.</p> <p>Evaluate</p> <p>Pupils should be taught to:</p> <p>Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.</p> <p>Technical knowledge</p> <p>Pupils should be taught to:</p> <p>Apply their understanding of how to strengthen, stiffen and reinforce more complex structures.</p> <p>Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages].</p>
Cooking and nutrition - adapting a recipe Key vocabulary adapt addition appearance budget buttery combine comment compare construct cream crunchy cuboid cut design evaluate fold	Existing biscuits	1	To evaluate existing biscuit products.	<p>I can describe different types of biscuits and their packaging.</p> <p>I can identify the taste and texture of existing biscuits.</p> <p>I can explain how I know a biscuit is made for a certain target audience.</p>	<p>Could be asked to think about times when special biscuits might be needed; could think about reasons why people buy biscuits.</p>	<p>Evaluate</p> <p>Pupils should be taught to:</p> <p>Investigate and analyse a range of existing products.</p>
	Basic biscuits	2	To prepare and cook a dish.	<p>I can follow simple food safety and hygiene rules.</p> <p>I can follow a recipe and use a cooking technique.</p> <p>I can discuss how a recipe can be changed.</p>	<p>Could be given opportunities to explain the need to mix ingredients or to sift the flour.</p>	<p>Design</p> <p>Pupils should be taught to:</p> <p>Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.</p> <p>Cooking and nutrition</p> <p>Pupils should be taught to:</p> <p>Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.</p>

hygiene ingredients layout market research modify multiplication opinion pounds sieve sift target audience taste texture unique wooden spoon	Budgeting	3	To select ingredients and follow a budget.	I can select ingredients for a target audience. I can calculate the cost of extra ingredients. I can create a design for the final product.	Could be asked to think about how budget setting influenced their choices and, if they are over budget, which ingredients they would remove and why.	Design Pupils should be taught to: Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups. Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.
	Packaging	4	To take inspiration from existing products.	I can describe the packaging of different biscuits. I can create a design for a biscuit box. I can fold and construct a cuboid template.	Could use the examples in the Pupil video: Creating 3D shapes to create a 3D shape without using the net template.	Design Pupils should be taught to: Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design. Make Pupils should be taught to: Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.
	Testing a new recipe	5	To make and test a prototype biscuit.	I can follow a recipe. I can modify the recipe using my design ideas and budget. I can collect feedback from a member of my target audience.	Could answer why it is important to measure and mix ingredients correctly; could answer how they think adding additional ingredients will change the appearance of the mixture or biscuit; could use the Activity: Feedback template, which allows the children to dive deeper with their questioning.	Design Pupils should be taught to: Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design. Make Pupils should be taught to: Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities. Cooking and nutrition Pupils should be taught to: Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques.
	Evaluating biscuits	6	To evaluate a final product.	I can create criteria for evaluation. I can present my design for evaluation. I can evaluate the designs of others using criteria.	Could be asked to use their market research when explaining their product to the other groups.	Evaluate Pupils should be taught to: Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.

Electrical Systems: Torches Key vocabulary battery bulb buzzer circuit diagram component conductor electrical item electricity electronic item insulator series circuit switch target audience test torch wire	Electrical Products	1	To learn about electrical items and how they work.	<p>I can identify electrical products.</p> <p>I know what electrical conductors and insulators are.</p> <p>I know that a battery contains stored electricity and can be used to power products.</p>	Should be challenged to suggest other items that could be used in place of a paper clip; could explain entirely new switch design ideas; could be given a blank sheet of paper and the Activity: Circuit symbols to draw their own circuit diagram without visual examples and references.	<p>Evaluate</p> <p>Pupils should be taught to:</p> <p>Investigate and analyse a range of existing products.</p> <p>Technical knowledge</p> <p>Pupils should be taught to:</p> <p>Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors].</p>
	Evaluating torches	2	To analyse and evaluate electrical products.	<p>I can identify the features of a torch.</p> <p>I understand how a torch works.</p> <p>I can say what is good and bad about different torches.</p> <p>I understand what is important in torch design.</p>	Should explain which features are important when making a good torch and which are appealing to the user.	<p>Design</p> <p>Pupils should be taught to:</p> <p>Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.</p> <p>Evaluate</p> <p>Pupils should be taught to:</p> <p>Investigate and analyse a range of existing products.</p> <p>Understand how key events and individuals in design and technology have helped shape the world.</p> <p>Technical knowledge</p> <p>Pupils should be taught to:</p> <p>Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors].</p>
	Torch design	3	To design a product to fit a set of specific user needs.	<p>I can factor in who my product is for in my design criteria.</p> <p>I can design a torch which satisfies both the design and success criteria.</p>	Should apply their findings from their Activity: Torch evaluations (from Lesson 2: Evaluating torches), adding specific features to satisfy their user's needs; could be provided with a blank user profile to investigate and design for a set person of their or the teacher's choice.	<p>Design</p> <p>Pupils should be taught to:</p> <p>Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.</p> <p>Generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.</p> <p>Technical knowledge</p> <p>Pupils should be taught to:</p> <p>Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors].</p>

	Torch Assembly	4	To make and evaluate a torch.	<p>I can make a working circuit with a switch.</p> <p>I can use appropriate equipment to cut and attach materials.</p> <p>I can assemble a torch according to my design criteria.</p> <p>I can assemble a torch which satisfies the success criteria.</p> <p>I can test my torch to evaluate its success.</p>	<p>Could create their housing from scratch; should add special features to suit their client; should extend and stretch their understanding by considering transferable scenarios, such as designing an x (e.g. speaker, lamp, etc.) for x (e.g. firefighter, cyclist, etc.).</p>	<p>Make</p> <p>Pupils should be taught to:</p> <p>Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately.</p> <p>Select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities.</p> <p>Evaluate</p> <p>Pupils should be taught to:</p> <p>Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work.</p> <p>Technical knowledge</p> <p>Pupils should be taught to:</p> <p>Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors].</p>

Project focus

- Brief and existing
- Practising skills
- Design
- Select tools and make
- Evaluate

Skills based LO
 Knowledge based LO
