



Design and Technology Medium Term Plan Year 2: Mechanisms – Vehicles with Wheels and Axles

Problem-Solving Planning Production

Design and Technology National Curriculum

- Design purposeful, functional, appealing products for themselves and other users based on design criteria
- Generate, develop, model and communicate their ideas through talking and drawing
- Select from and use a wide range of materials and components including construction materials
- Explore and evaluate a range of existing products
- Evaluate their ideas and products against design criteria
- Explore and use mechanisms [for example wheels and axles], in their products

Lesson	Prior Knowledge (Retrieval)	Learning Objective	New Knowledge	Vocabulary
1		<p>To know what wheels, axles and axle holders are.</p> <p>To know simple commercial products that use wheels and axles to move.</p>	<p>Wheel = a circular object that revolves on an axle and is fixed below an object to enable it to move easily over the ground.</p> <p>Axle = a rod or spindle (either fixed or rotating) passing through the centre of a wheel or group of wheels</p> <p>Axle holder = the component through which an axle fits and rotates</p> <p>Toy cars as well as real cars use wheels and axles so that they can move.</p>	<p>Wheel, axle, axle-holder, product</p>



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			<p>On toy cars, if a wheel isn't directly attached to an axle, it will need to be secured in place so it doesn't move from side to side.</p> <p>Wheels and axles are also used in other products to lift heavy objects or move parts of machinery.</p> <p>Wheels and axles can be found in bicycles, ferris wheels, electric fans and winches.</p>	
2	<p>All prior plus:</p> <p>Knowledge of what wheels, axles and axle holders are and where they are found in commercial products.</p>	<p>To know the difference between fixed and free moving axles.</p> <p>To know simple methods to fix wheels and axles to a product</p>	<p>Fixed axles = not steerable</p> <p>Free moving axles = steerable</p> <p>If we use a small hole for the axle (fixed axle), the vehicle will not be steerable. If the hole for the axle is larger (free-moving) then we will be able to steer our vehicles.</p> <p>There are some different ways of attaching free-moving axles to a toy vehicle including using a clothes peg, card triangle or straw.</p> <p>The wheel needs to be securely attached to the axle in order for the mechanism to work.</p>	<p>Wheel, axle, fixed, free, design, joining, dowel, body, cab</p>



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3	<p>All prior plus:</p> <p>The difference between fixed and free-moving axles and different ways to attach axles to a toy vehicle.</p>	<p>Make simple drawings and label parts.</p> <p>Identify a purpose for what they intend to design and make.</p>	<p>Designers and makers always plan what they are going to make before they make it.</p> <p>They use a design specification to decide what the important parts of their product are.</p> <p>Designers and makers look at pre-existing products to help them decide their design specifications.</p>	Design, make
4	<p>All prior plus:</p> <p>Knowledge of how and why designers create design specifications.</p>	Assemble, join and combine materials in order to make a product	<p>Different tools are good for different purposes.</p> <p>Saws should be used to cut wood but cardboard and paper can be cut with scissors.</p> <p>Different materials need to be used for securing/sticking different materials together.</p> <p>Materials like sellotape are not strong enough to stick materials like wood together, although they do work well for materials like paper.</p>	Design, make, cutting, joining, hacksaw, dowel
5	<p>All prior plus:</p> <p>Knowledge of best tools for cutting materials – wood and card/cardboard</p> <p>Knowledge of best materials for attaching materials</p>	With teacher guidance, use simple finishing techniques to improve the appearance of their product	<p>It is important to make sure that end products are appealing as well as functional.</p> <p>There are different ways that we can finish our products to make sure that they look appealing.</p>	Design, body, cab, evaluate



	together – sellotape and glue are fine for paper, stronger glue needed for cardboard, blue tack or very strong glue for wood.			
6	All prior plus: Methods for making an end-product more appealing	Evaluate products after making, identifying strengths and weaknesses and identifying what they have learned that they will use in future work	Once product-makers have finished making their product, they evaluate it against their design criteria. It is important to test each criteria on the design criteria to see how well it performs, so that adjustments can be made to future versions so that they can function as well as possible.	Wheel, axel, fixed, free, design, make, evaluate

Unit of Work End Points

- Pupils know what wheels, axles and axle holders are and where they be found in commercial products.
- Pupils know the difference between fixed and free-moving axles and different ways to attach axles to a toy vehicle.
- Pupils can design a simple, functional product which meets a class-agreed design criteria.
- Pupils can draw their design and add simple labels to communicate their ideas.
- Pupils can choose some appropriate materials for their product and ways of cutting and attaching them together which are appropriate to the material they are using.
- Pupils can conduct simple tests to check the suitability of their final product and identify some strengths and weaknesses.