

# Design and Technology

# Year 2

# Mechanisms - Wheels and Axles

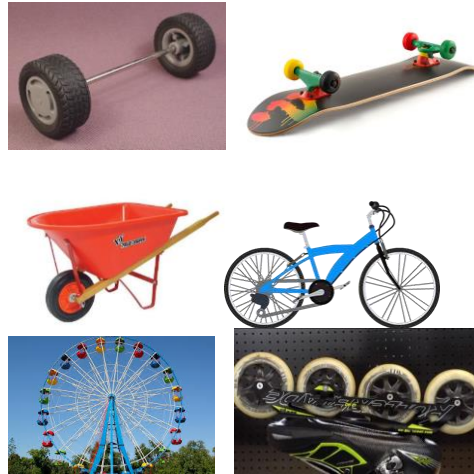
## Prior Learning

In EYFS and Year 1 the children have assembled vehicles with moving wheels using construction kits. In addition they will have explored moving vehicles through play.

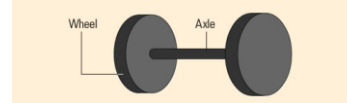
In year 1 DT they developed an understanding of basic mechanisms including levers and sliders and will have some basic understanding of simple forces including push and pull.

They will have some understanding of how to design, make and evaluate a product for a target audience. Alongside this their technical knowledge of structure and strength will have developed.

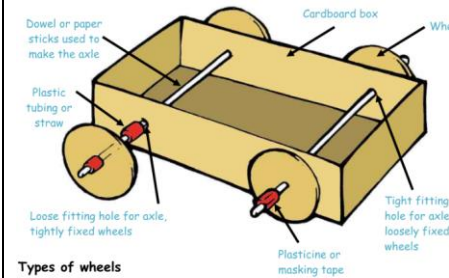
## Wheels and Axles in the real world



## Wheel and Axles



This is a simple machine with two circular wheels joined at the centre by a cylinder/rod (axle).



### Types of wheels



## Key Vocabulary

- mechanism:** a system of parts working together in a machine.
- wheel:** a circular object that revolves on an axle and is fixed below a vehicle or other object to so it can move easily over the ground.
- axle:** a rod that enables a wheel to rotate. The wheel can rotate freely on the axle or be fixed to, and turn with, the axle.
- chassis:** the frame or base on which a vehicle is built.
- axle holder:** the component through which an axle fits and rotates.
- fixed axle:** an axle which is fixed to the chassis. The wheels move alone.
- friction:** a force which is created when two things rub together.

## Intended Outcomes

1. To identify wheels and axles in the real world.
2. To explain that when a wheel and axles are joined they form a simple mechanism that provides movement.
3. To know and use technical vocabulary relating to wheels and axles.
4. To create simple wheels and axles and explore the different ways these can be made and move.
5. To evaluate how effective their moving product is and explain why the strengths/ weaknesses of their wheel/axle mechanism.

## Exploration

- Explore different size wheels
- How wheels move when the axle is not in the center of the wheel.
- Experiment with horizontal and diagonal axles to see how the wheels move.
- Learn about fixed and free axles.

Free axles- The axles move with the wheels. Loose fitting axle holder with tight fixed wheels.

Fixed axles- The axles are fixed to the chassis. The wheels move alone. Tight fitting axle holder with loose fitting wheels.

## Mechanisms

### Ways to hold free moving axles

Use pairs of clothes pegs glued with PVA to the underside of a box. Check the peg holes are large enough to allow axles to move freely. Make sure they are aligned carefully so the vehicle moves in a straight line when the wheel and axle mechanism is added.



Use card triangles with holes for the axle. Check the holes are large enough to allow the axle to move freely. Make sure opposite triangles are aligned carefully so the vehicle moves in a straight line when the wheel and axle mechanism is added.



Use large paper/plastic straws fixed with masking tape to the underside of a box. Check straws are positioned carefully so the vehicle will move in a straight line when the wheel and axle mechanisms are added. Make sure the straw hole is large enough to allow the axle to move freely. The wheels must be fixed tightly to the axle.



## Helpful Videos and Tips

- <https://www.youtube.com/watch?v=vYoWCn5r3rQ>
- <https://www.youtube.com/watch?v=ndT35agDfAQ>
- [https://www.youtube.com/watch?v=Lpey\\_cCqS\\_I](https://www.youtube.com/watch?v=Lpey_cCqS_I)

