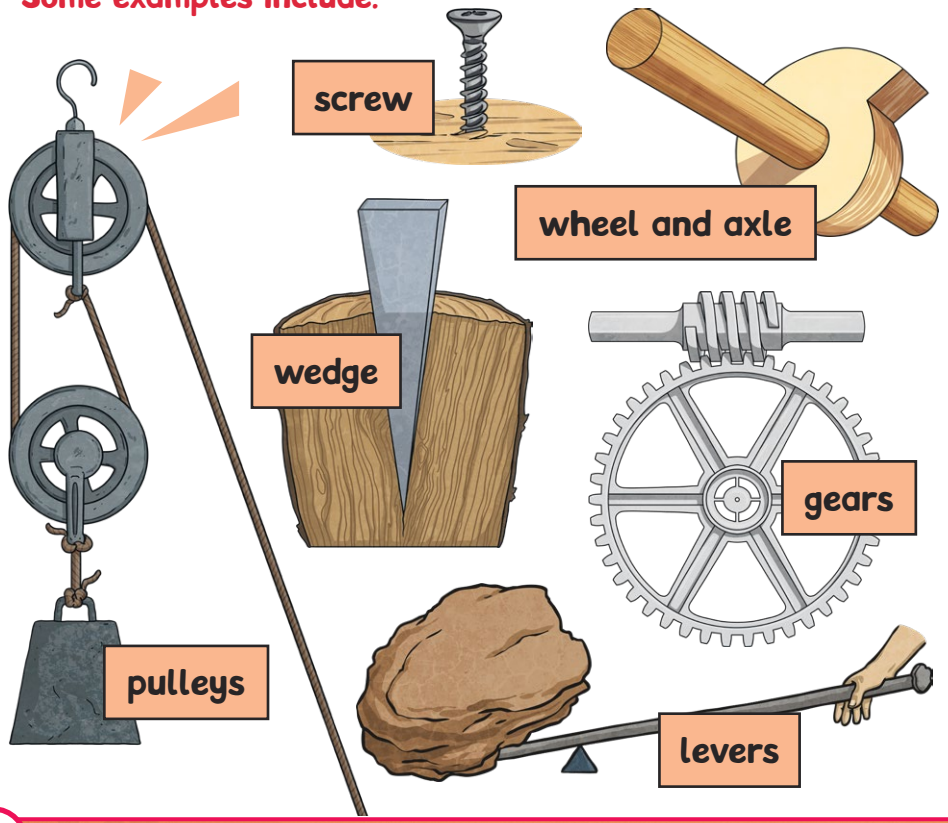
# What Are Mechanisms?

**Mechanisms** are tools or devices that are designed to help us by reducing the amount of effort or **force** required to achieve a greater **force** or movement.

There are various types of **mechanism** that help reduce the effort needed to produce a strong **force**.

**Some examples include:**

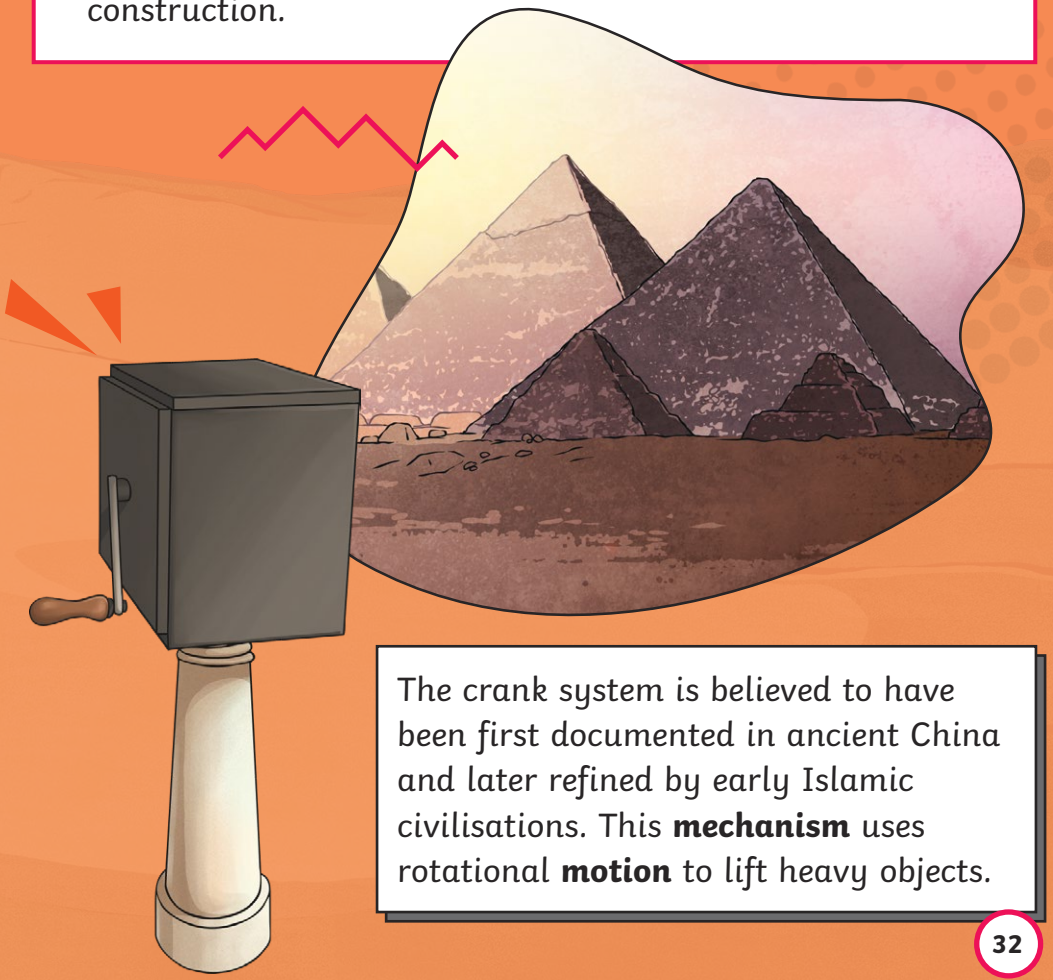





## Mechanisms Through History

**Mechanisms** have been used throughout history, including by some of the earliest civilisations.

It's believed that the workers who built the pyramids in ancient Egypt may have used **mechanisms** such as **levers** and **pulleys** to move the massive stones used in their construction.



The crank system is believed to have been first documented in ancient China and later refined by early Islamic civilisations. This **mechanism** uses rotational **motion** to lift heavy objects.

# Levers

**Levers** are **mechanisms** consisting of a rigid bar that **pivots** around a fixed point, allowing a smaller **force** to lift a larger load.

The three main parts of a **lever** are the **pivot** point around which the **lever** rotates, the **force** applied to one end of the **lever** and the load (object or resistance) being moved or lifted at the other end.

When **force** is applied to one end of the **lever**, it rotates around the **pivot** point, allowing the load at the other end to be moved or lifted. The position of the **pivot** point affects how much **force** is needed to move the load. The greater the distance, the easier it is to lift the load.

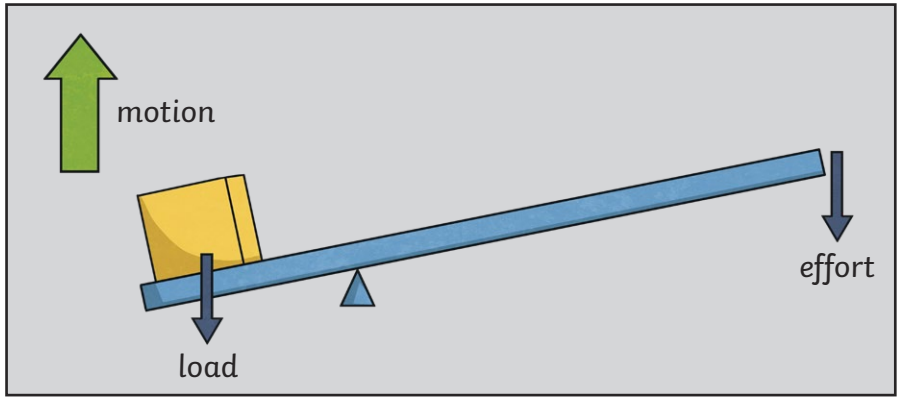


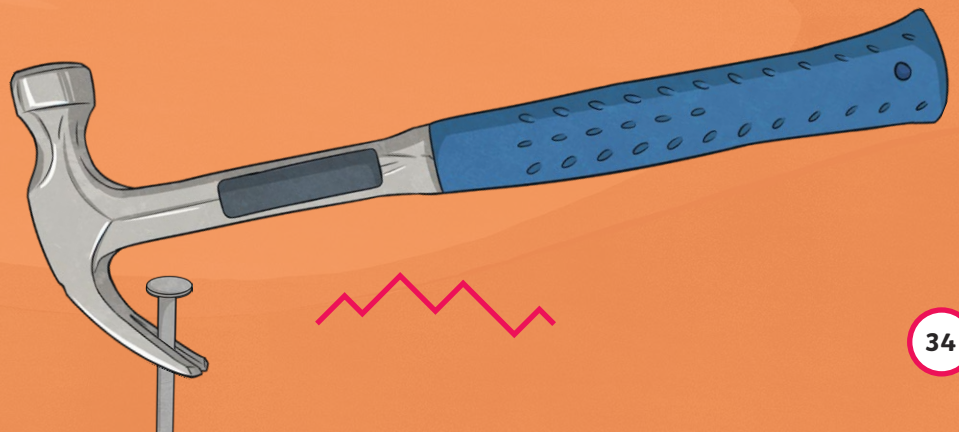


## Types of Lever

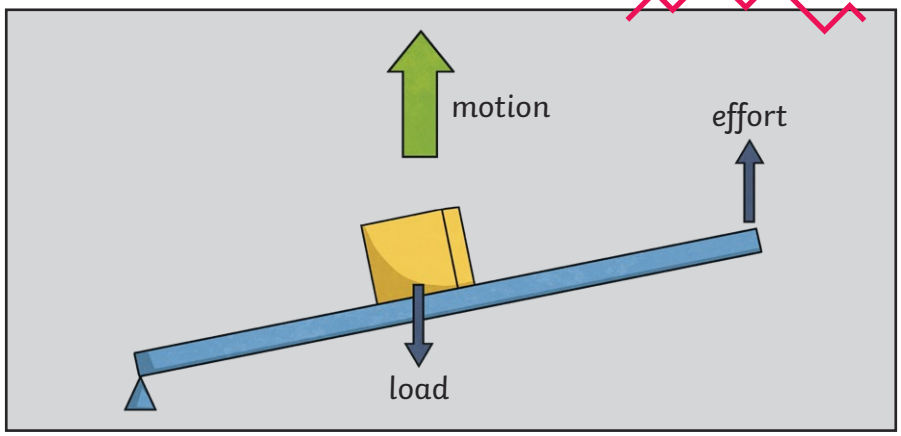
**Levers** can be classified into three different types based on where the **pivot** point, effort and load are placed.

1. In a first-class lever, the **pivot** point is positioned between the effort and the load. A common example is using a hammer's claw to **pull** out a nail, where the hammer **pivots** around a central point to lift the load.

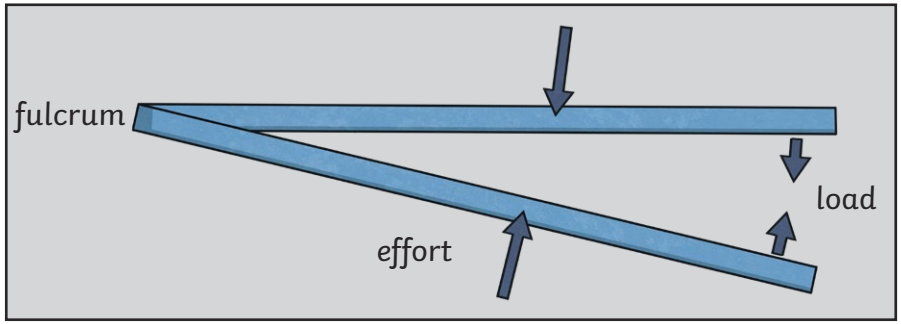


2 In a second-class lever, the load is located between the **pivot** point and the effort. Examples of this can be seen in tools such as a wheelbarrow, where the effort applied lifts the load with the pivot at the opposite end.




3 In a third-class lever, the effort is applied between the **pivot** point and the load. Tweezers are a good example of this, where the squeezing action (effort) occurs between the **pivot** at one end and the object being gripped (the load) at the other end.





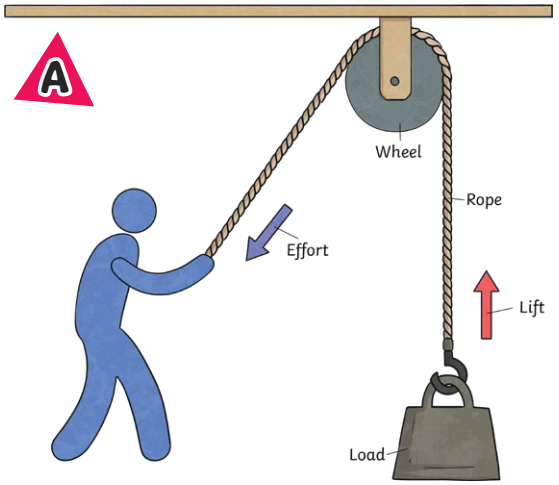



## Examples of Levers

Below are some everyday examples of **levers**.

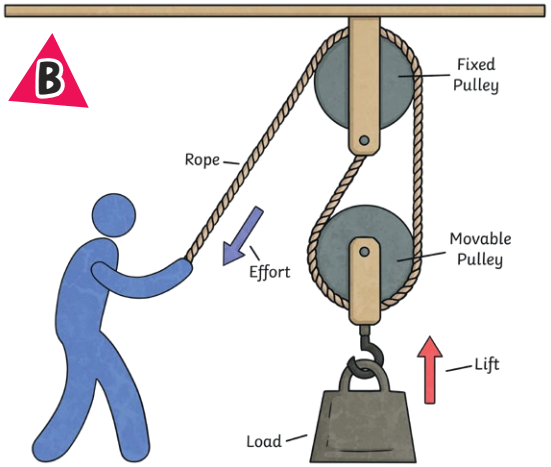
# Pulleys

**Pulleys** are simple **mechanisms** that allow a smaller **force** to lift a larger load. They work by using a wheel or series of wheels with a rope looped around them.




A **pulley** with a single wheel allows you to change the direction of the force, so you can lift a load by **pulling** the rope downwards.

The more wheels that are added to a **pulley** system, the less **force** is required to lift the load. For example, adding a second wheel would halve the amount of **force** required to lift the load.

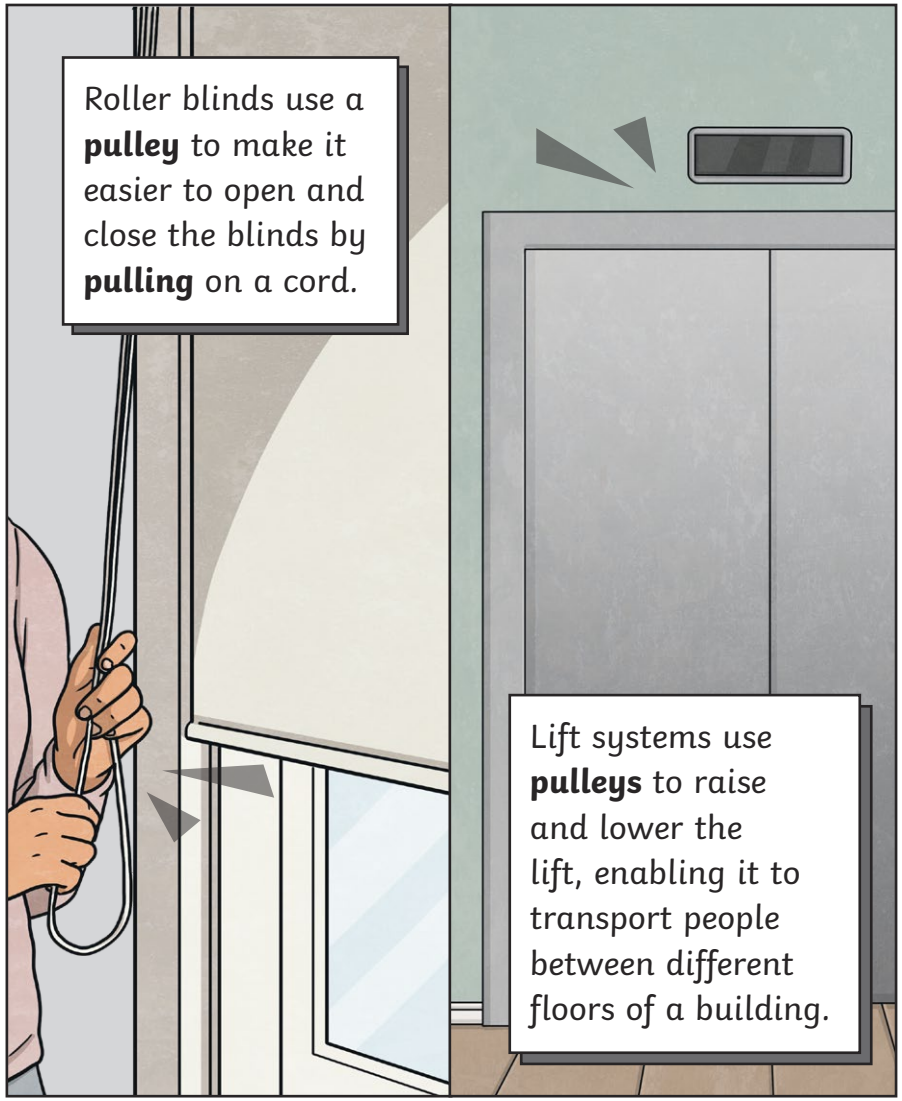







## Examples of Pulleys

Below are some examples of **pulleys** used in everyday objects.



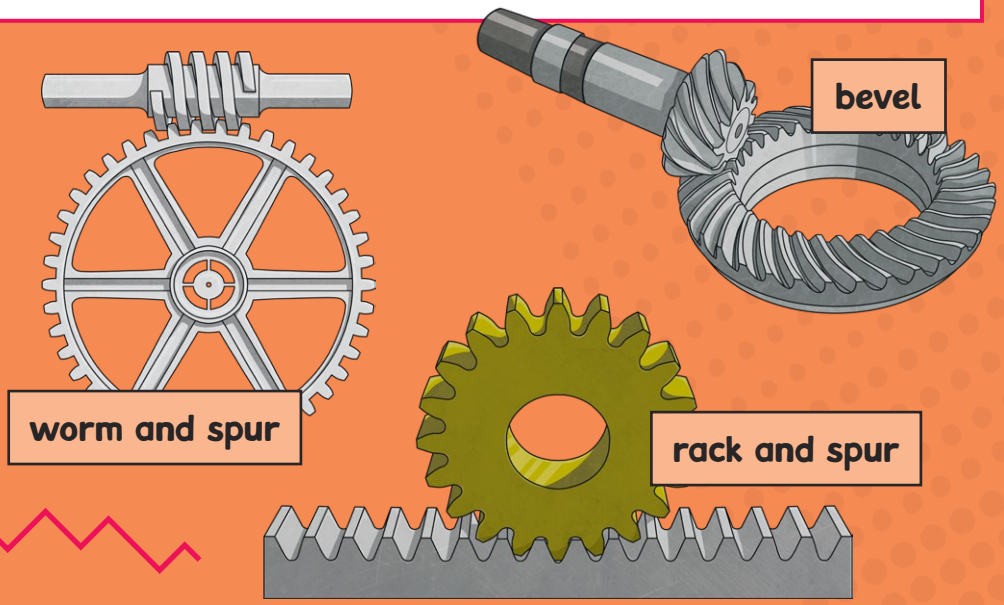
Roller blinds use a **pulley** to make it easier to open and close the blinds by **pulling** on a cord.

Lift systems use **pulleys** to raise and lower the lift, enabling it to transport people between different floors of a building.

# Gears

**Gears** are used to change the speed, direction or **force** of **motion** (movement). They consist of wheels with interlocking teeth that engage with one another to transfer **motion**.

When **gears** are connected to each other, they always rotate in opposite directions. This allows the **gears** to change the direction of **motion**.




The size of the **gears** is significant. If the first **gear** is larger than the second, the second **gear** will rotate faster, thus increasing the speed of **motion**. If the first gear is smaller than the second, the second **gear** will rotate more slowly, reducing the speed of **motion**.

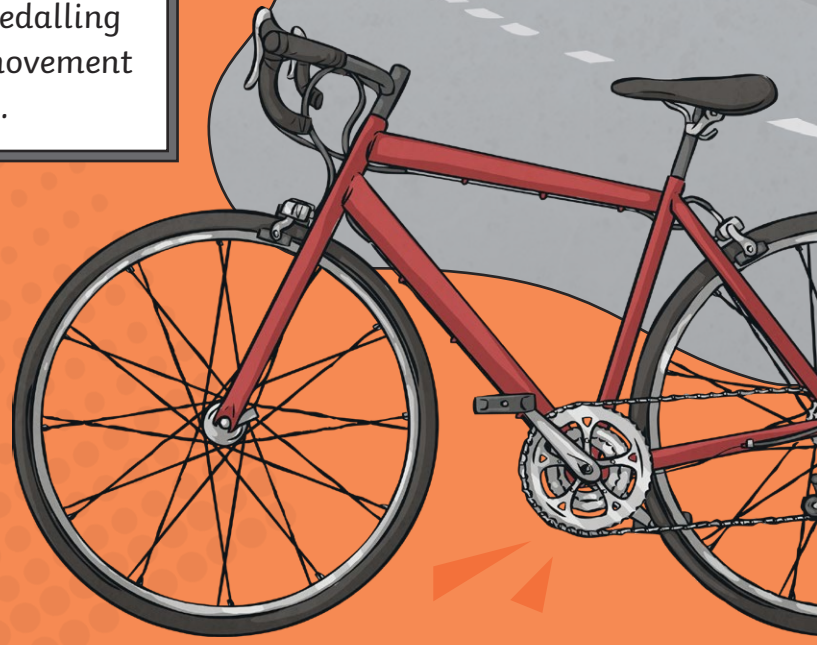


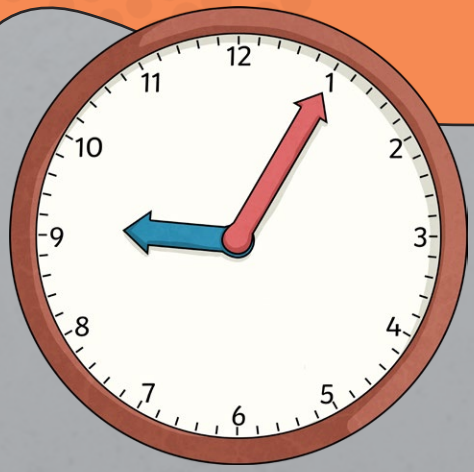


## Examples of Gears

Below are some examples of **gears** used in everyday objects.

A bicycle uses **gears** to convert the pedalling action into movement of the wheels.






A clock uses **gears** to control the movement of its hands, ensuring they turn at the precise speeds needed to accurately display the time.