

**Design & Technology Year 6/5 Even Year- Leadership, Power and Influence**

*Design and make a modern day machine to move rocks in Ancient Egypt*



**Famous Inventor: JCB**

The company **JCB** takes its name from the founder **Joseph Cyril Bamford**. It began in 1945 in Staffordshire, UK and manufactures construction, agricultural, waste handling and demolition machinery.



**Being Safe**

**Earliest Civilisations- The Egyptians**

Remove any jewellery and tie back long hair.	Walk safely and slowly around the classroom.	Wear an apron and safety goggles when cutting wood.	Use scissors correctly. Make sure the blades are closed and facing down when moving around the room.	Use equipment carefully and safely. Report any accidents immediately.	Follow cutting instructions carefully. <b>Measure twice and cut once.</b>	Keep your work area clean and tidy up after yourself.
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**Key Learning: Mechanical Systems- Pulleys or Gears**

A set of related mechanisms used to create movement is called a **Mechanical system**. Like **Electrical systems**, Mechanical systems have an **input** and **output**.

**What are Gears and Pulleys?**

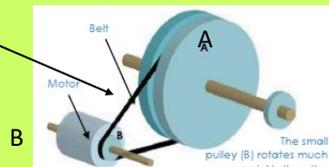
**Gears** are toothed wheels (cogs) that lock together (mesh). When one gear is turned, the other one turns as well. If the gears are different sizes, they can be used to increase the power of a turning force.

Turns slowly more force



Turns quickly less force

**Pulleys** are like gears but the wheels do not lock together. The wheels are instead joined by a looping rope (**drive belt**) over one or more wheels.



The small pulley (B) rotates much more quickly than the large pulley (A).

**Technical Knowledge and Understanding:**

**How can Gears and Pulleys speed up, slow down or change direction of movement?**

Where there are two gears or pulleys, the smaller wheel turns more quickly but with less force while the bigger wheel turns more slowly with more force.

**The follower gear turns from the force of the driver gear. This provides the output.**

**Gears A Transmission**

**The driver gear provides the power (input), it's attached to the motor. When it turns, the force makes the follower gears turn too.**

**Pulleys**

Vehicles can run using either a gear or pulley mechanical system. Understanding the **ratio** (how often the large wheel turns in relation to the smaller wheel), in gears, this can be done by counting the number of teeth. By understanding ratio, this will help to make decisions about the amount of force and power needed.

**Pulleys rotate in the same direction.**

**Pulleys rotate in different directions.**

No. teeth	Ratio
8, 16	2:1
8, 40	5:1
8, 24	3:1
40, 40	1:1

**Key Vocabulary:**

<b>axle</b>	The rods which help the wheels rotate
<b>driver</b>	The gear or pulley that provides the input movement to the system
<b>drive belt</b>	The belt which connects and transfers movement between two pulleys
<b>gear</b>	A wheel with teeth around it's circumference
<b>gear ratio</b>	The difference in the amount of teeth between 2 gears eg, 8 teeth and 16 teeth is a ratio of 2:1. The gear with 8 teeth will spin twice for 1 full rotation of the 16 teeth gear
<b>follower</b>	The gear or pulley which provides the output to the system
<b>motor</b>	The component which gives motion or power
<b>pulley</b>	A grooved wheel over which a drive belt can run
<b>spindle</b>	The rod at the end of a motor onto which the gear or pulley are attached
<b>transmit</b>	To make or send force and power.

