

Knowledge Organiser AQA Design & Technology 8552

1: Mechanical Devices - Motion

There are four types of motion:

Linear Motion is movement in one direction along a straight line.



Oscillating Motion

This motion is similar to reciprocating motion, but the constant movement is from side to side along a curved path.



Rotary Motion

Examples of circular motion include a ball tied to a rope and being swung round in a circle

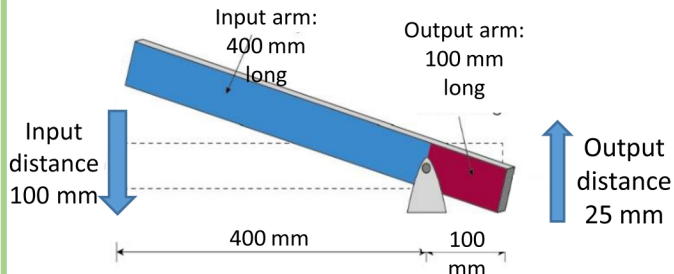


Reciprocating Motion

this is repetitive up-and-down or back-and-forth linear motion



4: How to work out a levers distance of travel



$$\text{Output} \div \text{Input} \times \text{Input distance} = \text{Output distance}$$

$$100 \div 400 \times 100 = 25 \text{ mm}$$

2: Mechanical Devices – Levers

There are three classes of levers.

Class One

A class one lever has its input on one side of the fulcrum and its output on the other.



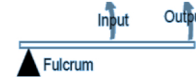
Class Two

A class two lever has its input at one end of the lever, its output in the middle and fulcrum at the other end.



Class Three

A class three lever has its output at one end of the lever, its fulcrum at the other with its input in the middle.

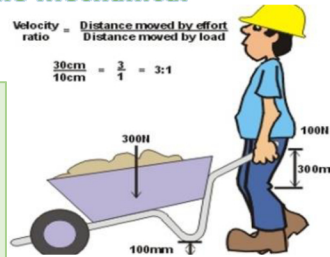


5: How to work out the Mechanical Advantage

Or use the following formula:

$$\text{MA} = \frac{\text{Load}}{\text{Effort}} = \frac{300\text{N}}{100\text{N}} = 3$$

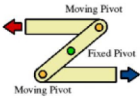
This is written as 3:1 or just MA of 3



3: Mechanical Devices – Linkages

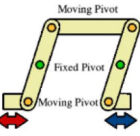
Reverse motion linkage

The reverse motion linkage changes the direction of the input motion so that the output travels in the opposite direction. If the input is pulled the output pushes and vice versa. It uses a central bar held in position with a fixed pivot (fulcrum) that forces the change in direction and two moving pivots which are connected to the input and output bars.



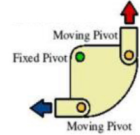
Parallel motion or push/pull linkage

The push/pull linkage maintains the direction of the input motion so that the output travels in the same direction. If the input is pulled the output is pulled and so on. It uses three linking bars, four moving pivots and two fixed pivots.



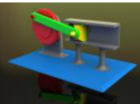
Bell crank linkage

The bell crank linkage changes the direction of the input motion through 90 degrees. It can be used to change horizontal motion into vertical motion or vice versa. It uses a fixed pivot and two moving pivots.



Crank and slider

The crank and slider linkage changes rotary motion into reciprocating motion or vice versa. It uses a crank which is held with a fixed pivot. A connecting rod uses two moving pivots to push and pull a slider along a set path.



Treadle linkage

The treadle linkage changes rotary motion into oscillating motion or vice versa. It uses a crank which is held with a fixed pivot. A connecting rod uses two moving pivots and a further fixed pivot to create a windscreen wiper motion.

