SIMPLE MACHINES

How simple are they?

Six Simple Machines

Mechanical Advantage

is the ratio of output force divided by input force

Mechanical Advantage = Load/Eff

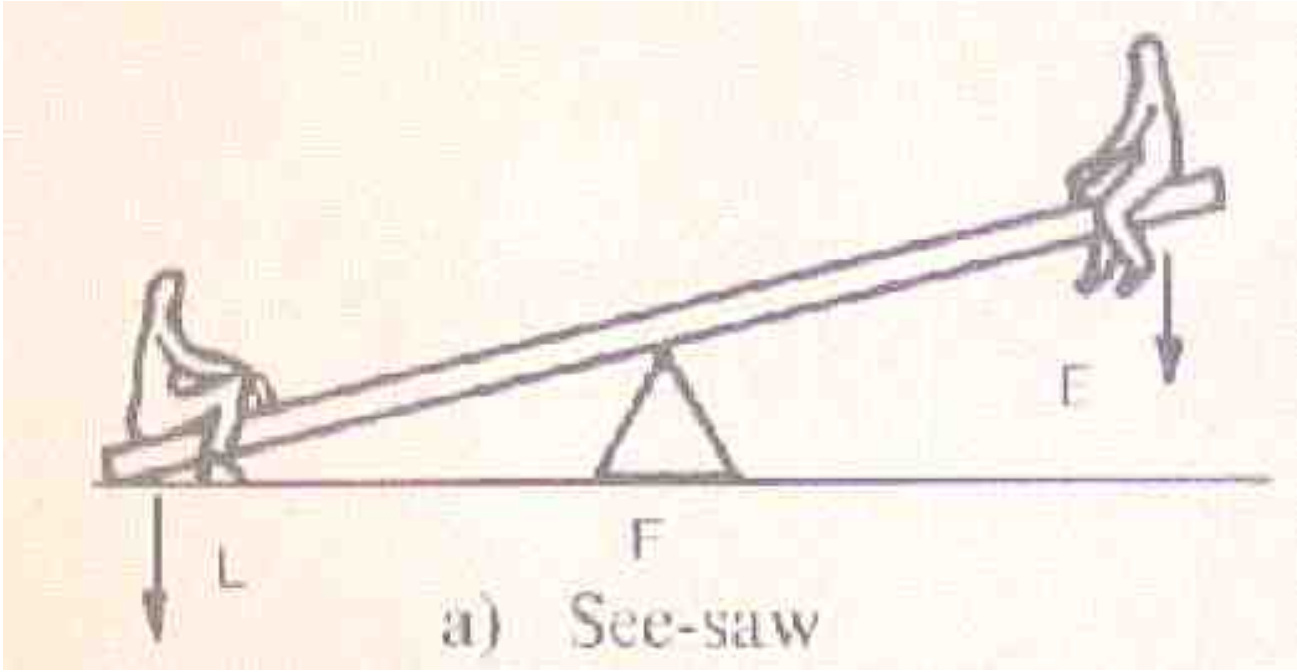
*Each simple machine has a specifi formula for calculating mechanical advantage

- There are 3 Classes (types) of Levers.
- Each class has the fulcrum, effort and load arranged in a different way.

$$\text{Mechanical Advantage (M.A.)} = \frac{\text{Length from Fulcrum to Effort}}{\text{Length from Fulcrum to Load (R)}} = \frac{LE}{LR}$$

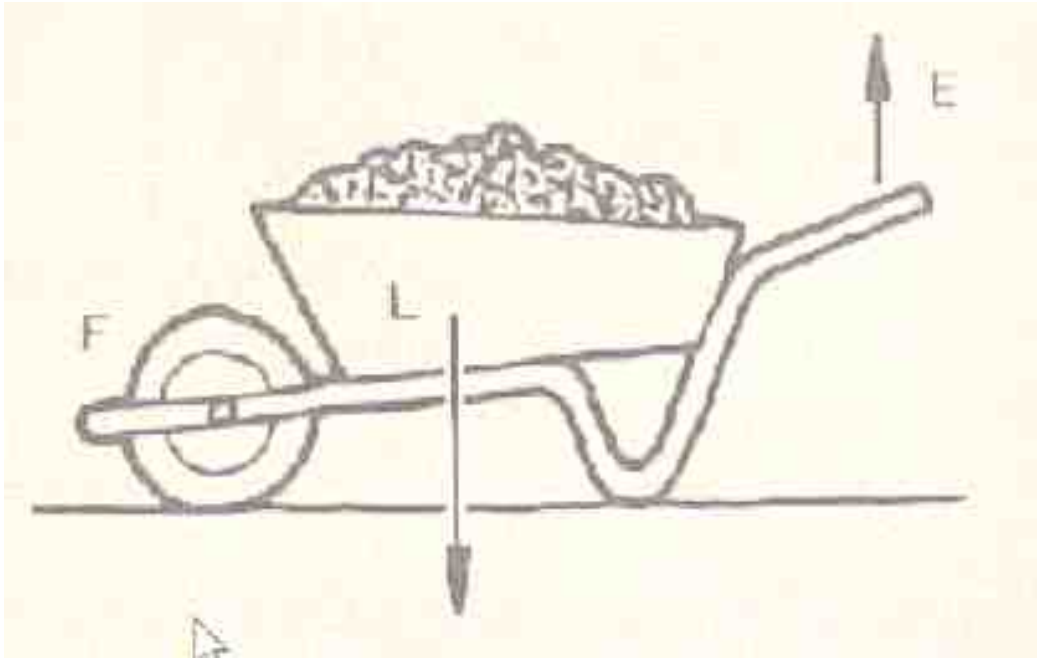
Class 1 Lever

Fulcrum between the load and the effort



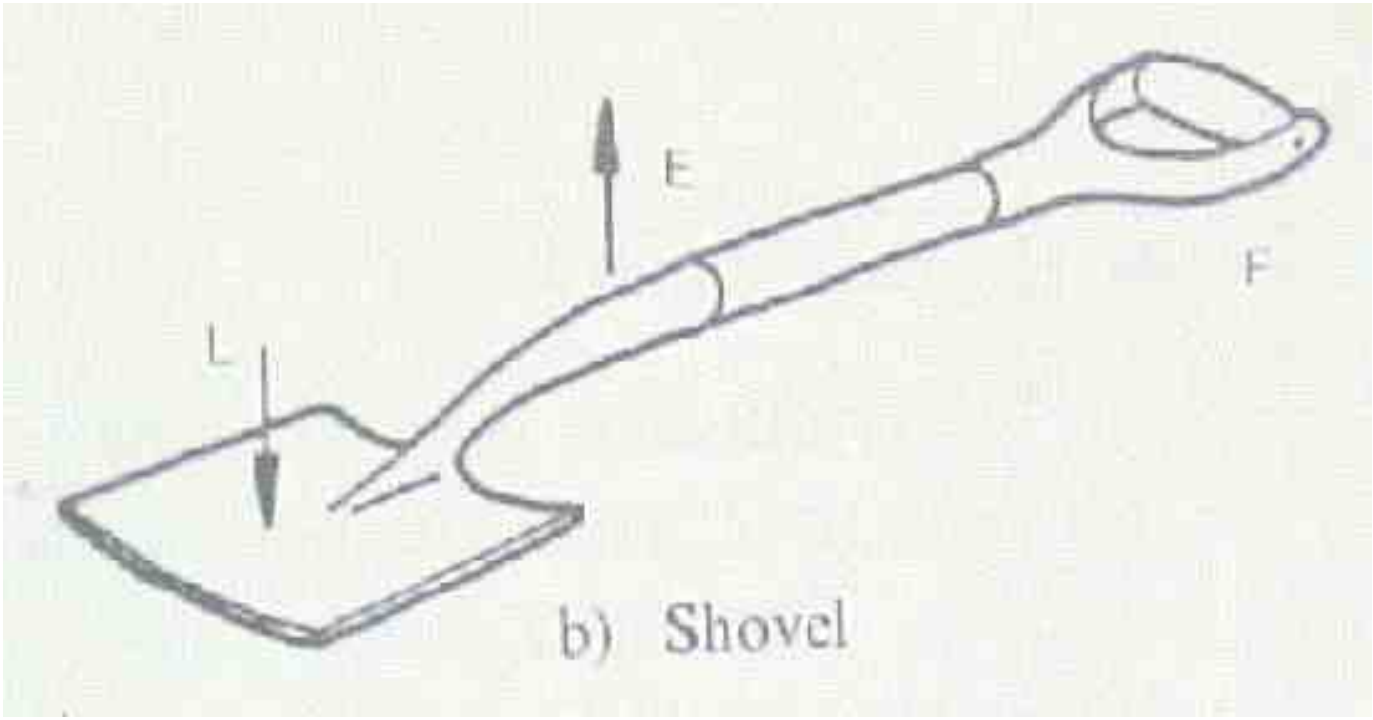
Class 2 Lever

Load between the fulcrum and the effort

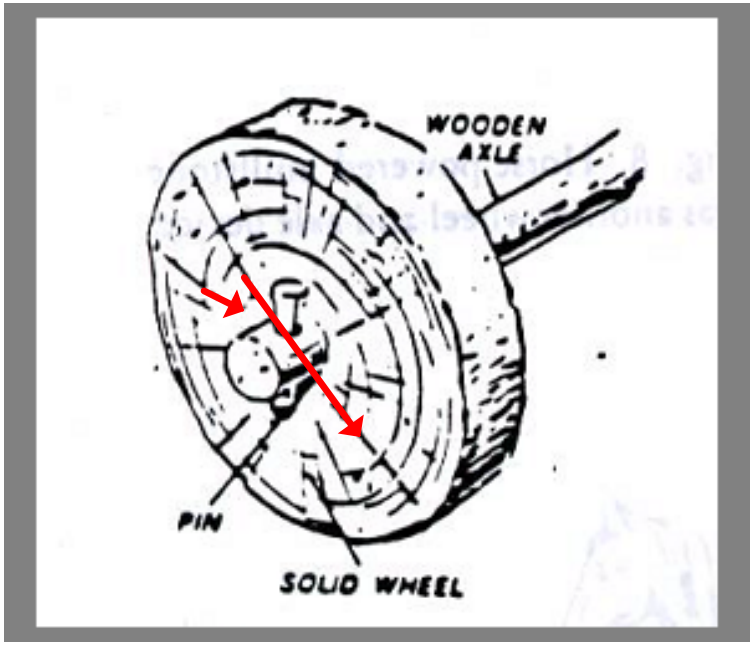


Class 3 Lever

Effort is between load and fulcrum



WHEEL & AXLE

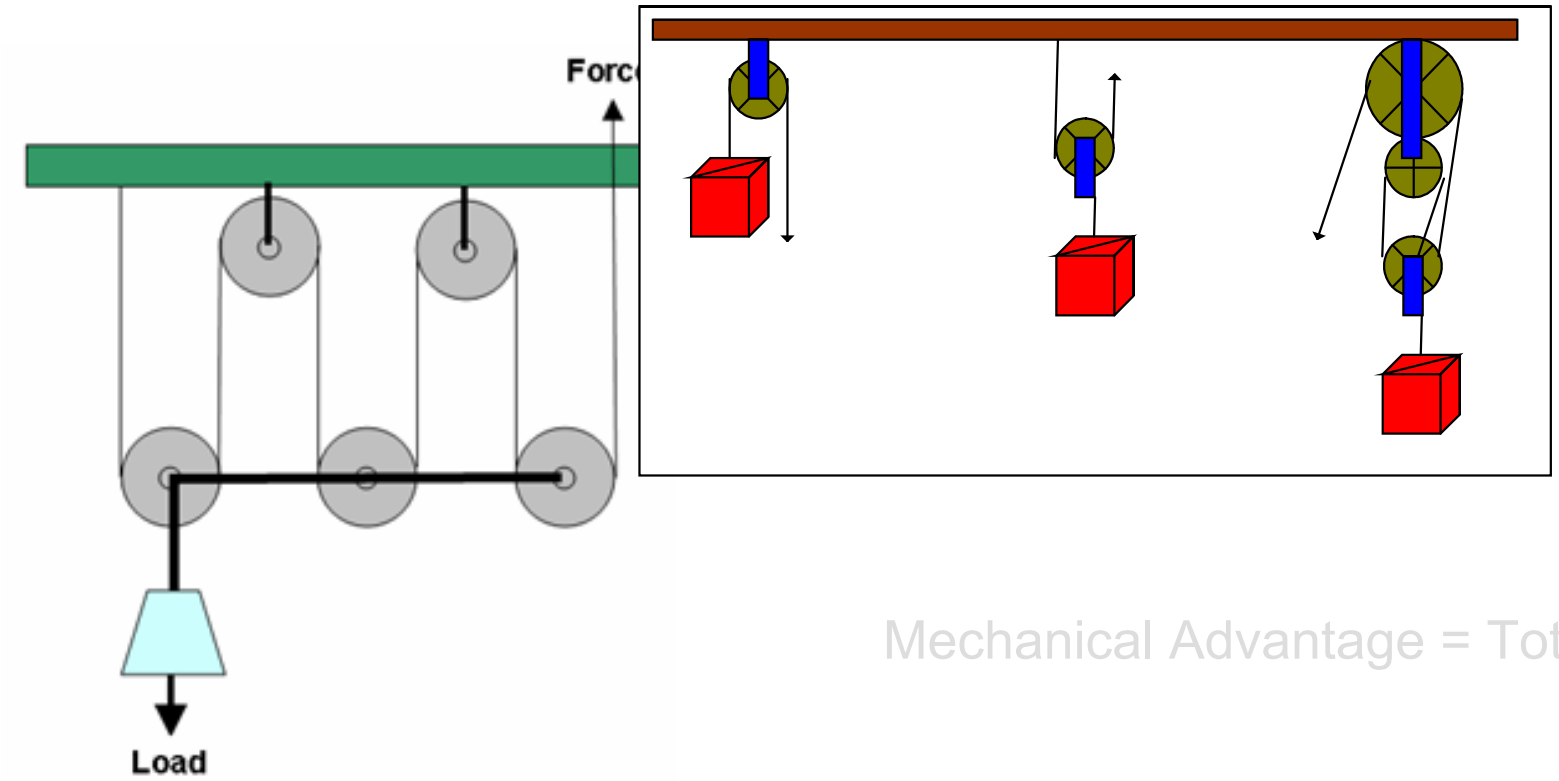


$$\text{M.A.} = \frac{\text{Radius to Effort}}{\text{Radius to Load}} = \frac{RE}{RL}$$

PULLEY

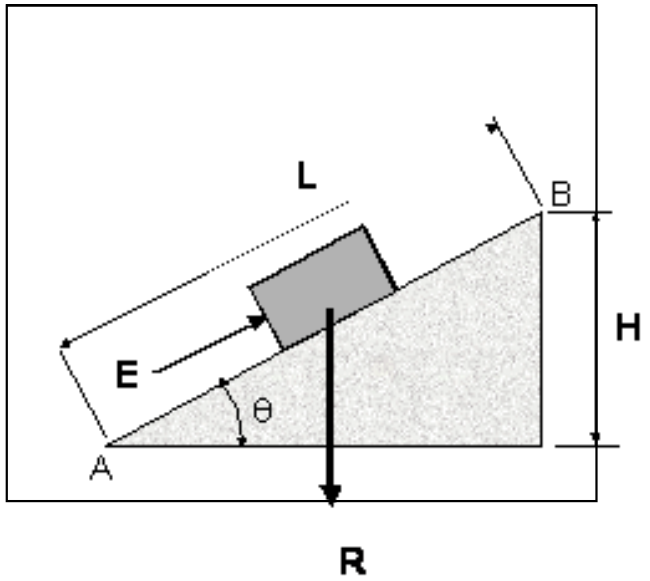
The Three Types of Pulleys

Fixed Pulley Movable Pulley Block and Tackle



Mechanical Advantage = Total num

INCLINED PLANE

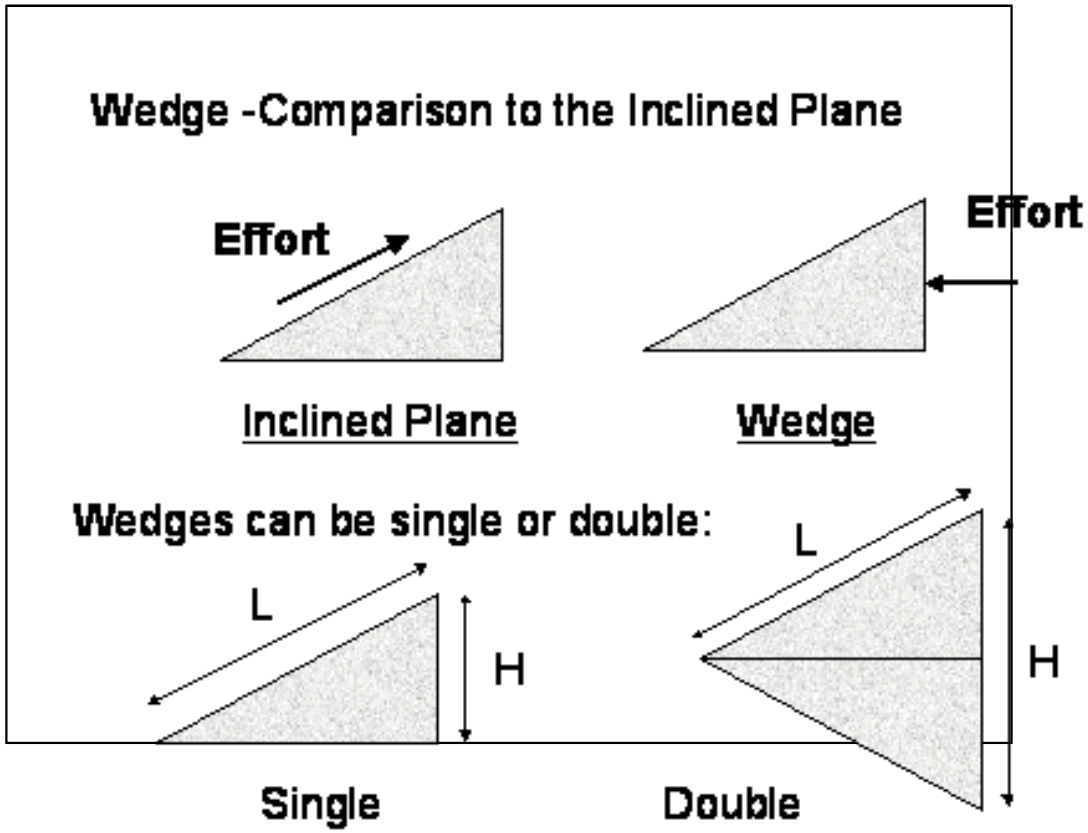


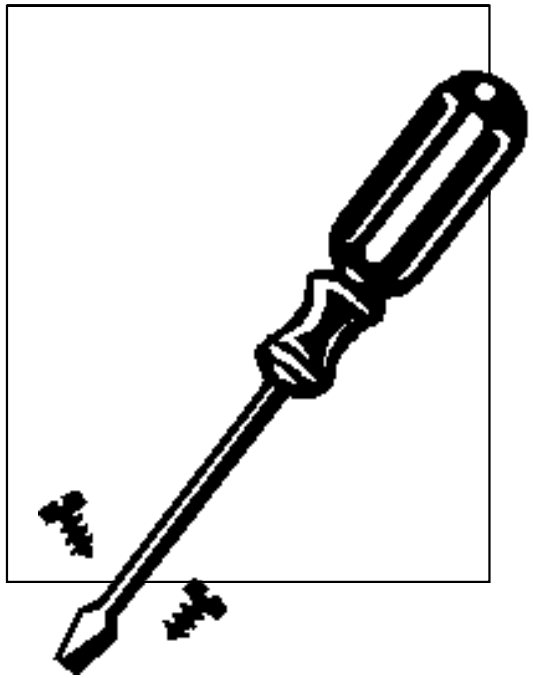
L=length of ramp
H=height of ramp
E=effort
L=load

$$M.A. = \frac{\text{Length}}{\text{Height}} = \frac{L}{H}$$

WEDGE

$$M.A. = \frac{\text{Length}}{\text{Height}} = \frac{L}{H}$$





Screw Pitch is the distance between two adjacent threa
pitch is:

$$\text{Pitch} = \frac{1}{\text{Number of threads per inch of length}}$$

The **Circumference** of the screw is calculated using the
Circumference = Pi * Diameter

The formula for the Mechanical Advantage of a screw is
Circumference = Pi * Diameter

$$\text{Mechanical Advantage} = \frac{\text{Circumference}}{\text{Pitch}}$$