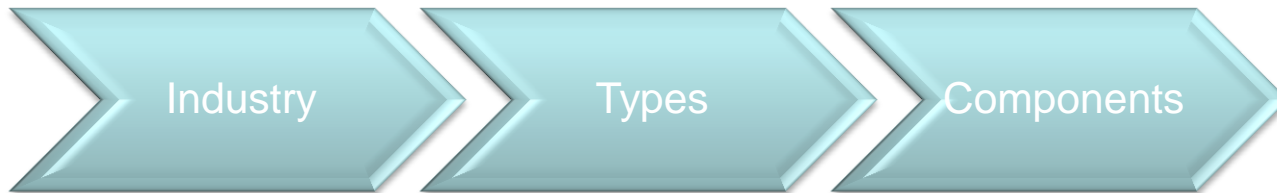


Mechanical Systems

Simple Machines

Machines



- _____
 - _____
 - _____
 - _____
- _____
 - _____
 - _____
 - _____
- _____
 - _____
 - _____
 - _____

Machines

Definitions

Machine

Mechanical Advantage

Machines

Classification of Machines



SIMPLE

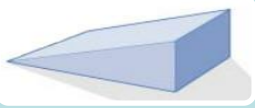
Does the work in one movement.



COMPOUND

Does the work in multiple movements.

Simple Machines



Inclined Plane



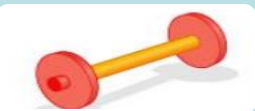
Wedge



Screw



Lever

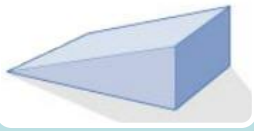


Wheel and Axle



Pulley

Simple Machines



Inclined Plane

- A machine that does not move.

Types:

- _____
- _____
- _____

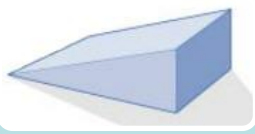
Benefit:

- _____
- _____
- _____

Applications:

- _____
- _____
- _____

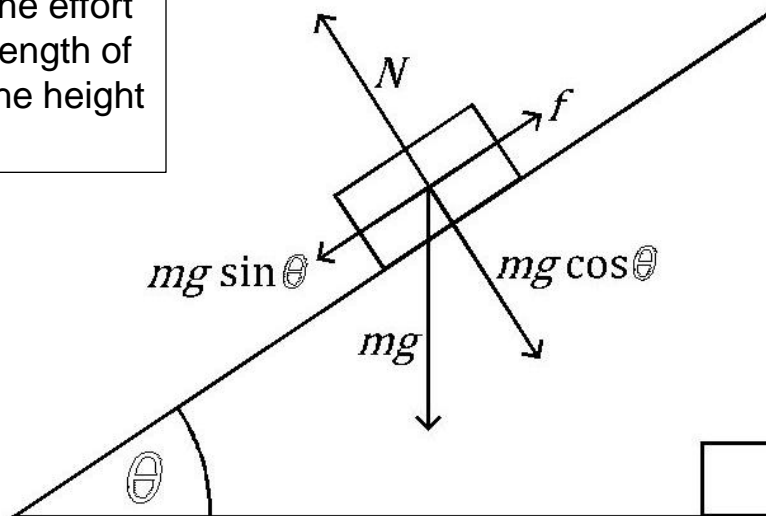
Simple Machines



Inclined Plane

- A machine that does not move.

MA= load over the effort force equals to length of the plane over the height of the plane.



N = Normal force that is perpendicular to the plane

m = Mass of object

g = Acceleration due to gravity

θ (theta) = Angle of elevation of the plane, measured from the horizontal

f = frictional force of the inclined plane

Simple Machines



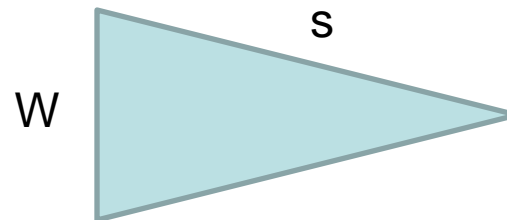
Wedge

- Converts a force applied to the blunt end into forces perpendicular to its inclined surfaces.

Applications:

- _____
- _____
- _____

MA= Ratio of Length of its slope to its width.



$$MA = S / W$$

Simple Machines



Screw

- Converts rotational force (torque) to a linear force.

Types:

- _____
- _____
- _____

Applications:

- _____
- _____
- _____

MA= Ratio of threads.

Simple Machines



Lever

- A solid object which is used with a fulcrum to multiply a mechanical force that can be applied to another object.

Types:

- Class 1
- Class 2
- Class 3

Applications:

- Crowbar, Scissors
- Wheelbarrow, nutcracker
- Tweezers, shovel

MA is Load Arm x Load Force = Effort Arm x effort Force

Simple Machines



Wheel & Axle

- A lever that rotates in a circle around a centre point or fulcrum.

Types:

- _____
- _____
- _____

Applications:

- _____
- _____
- _____

Simple Machines



Wheel & Axle

- A lever that rotates in a circle around a centre point or fulcrum.

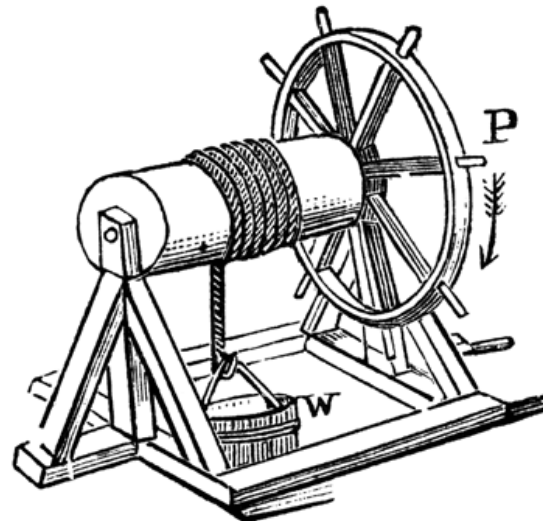
Ideal Mechanical Advantage

$$M.A. = \frac{\text{Radius}_{\text{Wheel}}}{\text{Radius}_{\text{Axle}}}$$

Actual Mechanical Advantage

$$AMA = \frac{R}{E_{\text{actual}}}$$

R = resistance force, i.e. the weight of the bucket
 E_{actual} = actual , the force required to turn the wheel



Simple Machines



Pulley

- A device which uses a wheel on an axle and a cable or rope which runs over the wheel.

Types:

- Fixed
- Movable
- Compound

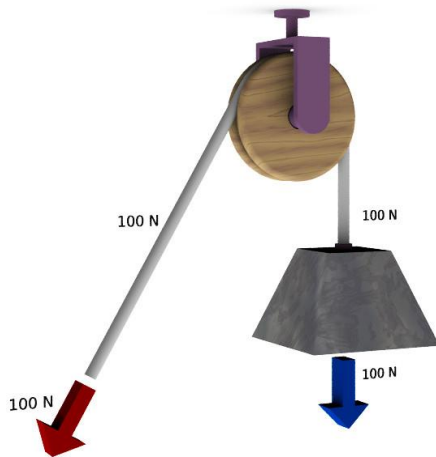
Applications:

- _____
- _____
- _____

Simple Machines



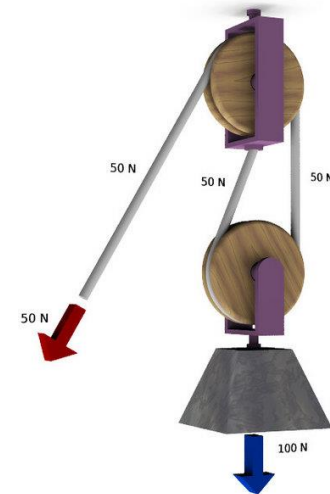
Pulley



Fixed Pulley



Movable Pulley

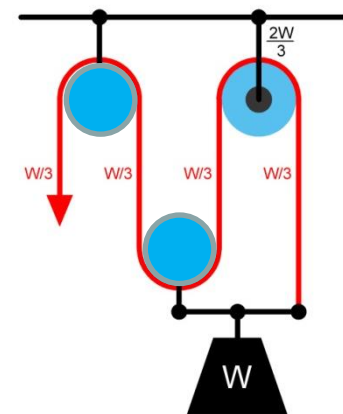
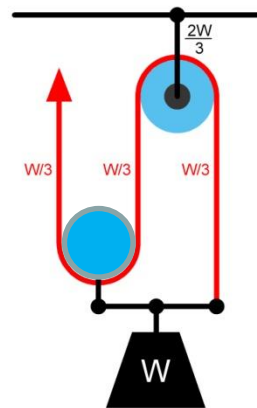
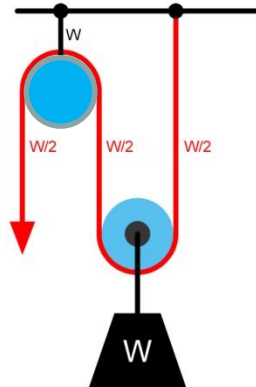
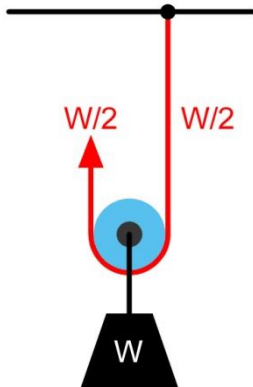


Compound Pulley

Simple Machines



Pulley



Simple Machines



Pulley

