

Simple Machines

Machine :

It is device which allow humans to do work with a lesser effort.
Machine are device help us to do our task more efficiently and faster.

Simple Machine:

Simple machines are those machines which help us to perform mechanical work using our stored form of muscular energy.

Basic types of simple machine include: **the lever and inclined plane**

- The wheel and axle is an extension of lever principle which works in windmill, gear pulleys.
- An inclined plane provides mechanical advantage by moving a load or weight up a slope instead of lifting it vertically.

More work can be performed with the help of machines by applying lesser force.

A simple machine is a mechanical device that changes the direction or magnitude of a force, which individual are providing by one end and which further brings about changes.

Simple machines:

A pulley, pair of tongs, pair of scissors etc.

Complex machines:

These are machines which are made up of large number of simple machines.

Examples: A sewing machine, a bicycle, a tractor

Functions of machine:

- (1) Applying force at convenient point to minimise our input force
- (2) Brings changes in the speed of object
- (3) Changing the direction as well as magnitude of applied force

Terms used in simple machines:

1. Effort (E).
It is force applied to carry out mechanical work
2. Load (L):
It is weight or the force to be overcome
3. Fulcrum (F):
It is fixed point about at which the machine can turn while performing mechanical work

Lever:

It is very common simple machine in which rigid , straight or bent , which is capable of turning about a fixed point termed as fulcrum.

It I like see saw

Types of levers:

(A) Type -1 :

In this, they have pivot or fulcrum between the effort force and the load

Examples: crowbar , pliers, see saw.

(B) Type-2 :

In this type of lever , the load is present between the effort and the fulcrum. A small change can bring movement of a large load.

Example: wheel-barrow is a lever, bottle opener, mango cutter.

(C) Type-3:

These kind of levers have the effort between the load and the fulcrum.

The load or weight is smaller than the effort but bring about movement farther.

It multiplies the speed.

Examples: a pair of tongs, fishing rod

Inclined plane:

It is sloping surface which acts like a simple machine but whose mechanical advantage is always greater than one.

$$M. A. = \frac{\text{Length of the slope}}{\text{Height}}$$

Screw:

It is kind of simple machine in which nail with grooves cut on it. It has thread, that is winding edge and which is inclined plane wrapped around the screw.

By help of screw driver it is easy to drive screw into wooden block.

A Screw jack works on the principle of screw and it used to lift cars , trucks etc.

The Wheel:

The wheel is circular object having a capability to rotate along a central rod termed as axle. Less friction is offer as advantage of wheel.

A screw driver is example of wheel and axle arrangement.

As we apply less force at one end of screw driver which creates a greater force at another end of the axle that means small effort on wheel gives large force on the axle.

Wedge:

It is device, which possess two or more sloping surface in form of sharp or pointed edge.

It is used to pierce or split material.

Examples: Knives , chisel , axes , pins etc.

Pulleys:

These are example of simple machine only.

These are used to lift the load vertically, by simply changes the direction of the force.

It consist of the wheel that turns freely about an axis. The wheel is grooved one use along with a rope or a chain. Simply called as single fixed pulley .

It do not multiplies the force but provide us to apply force in a convenient direction.

Care of machines:

This is important in terms of efficiency and longer use of machines.

- Machines should be placed in clean environment away from dust and moisture.
- Lubrication should be done frequently
- As majority of machine are made up of iron , application of paint is necessary to avoid rusting.