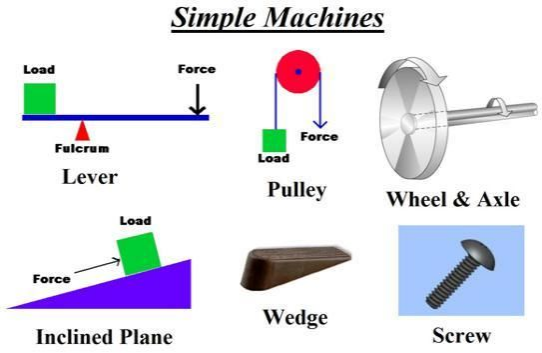
Simple Machine

We use different kinds of machines and tools in our daily life. Simple machines are those instruments in which effort is applied at a more convenient point in a more convenient direction. The work done on a machine is called input and the work done by the machine is called output. Input is the product of force and distance through which force is applied and output is the product of load and distance through which load is moved. A simple machine is a device, which makes our work easier by

1. increasing the force applied
2. changing the direction of force applied
3. transferring the force from one place to another
4. increasing the speed of a force



All machines work on the principle that when the effort is smaller than the load, it has to move a greater distance than the load in order to lift it up. There are six types of simple machines, they are:

1. Lever
2. Pulley
3. Wheel and axle
4. Inclined plane
5. Screw

6. Wedge

Principle of a simple machine

The principle of the machine is Input work = Output work

Or, E x E. d = L x L. d

Where, E = Effort

E. d = Effort distance

L = load

L. d = load distance

A lever is a simple machine. It consists of a rigid bar which is free to turn about a fixed point called fulcrum. The weight to be lifted is the load and the force applied to the bar is called effort. The distance of the load from the fulcrum is called the load arm and the distance of effort from the fulcrum is called the effort arm.

There are three types of lever depending upon the position of the load, effort, and fulcrum. These are

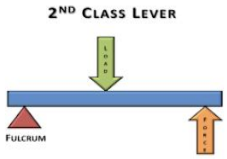
1. First class lever
2. Second class lever
3. Third class lever

First class lever

first-class lever

A first class lever is one in which the fulcrum lies anywhere between the effort and load. Examples: Crowbar, seesaw, scissors, pliers, beam balance, the handle of water pump, etc.

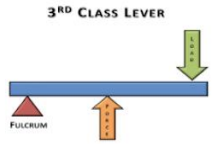
Second class lever



A second-class lever is one in which the load is between the effort and fulcrum.

Examples: Wheelbarrow, nutcracker, bottle opener, oar of a rowboat, etc.

Third class lever



A third class lever is one in which the effort is between the load and the fulcrum

Examples: shovel, sugar tongs, finger nut cutter, tweezers, human forearm, fork, fishing rod, etc.