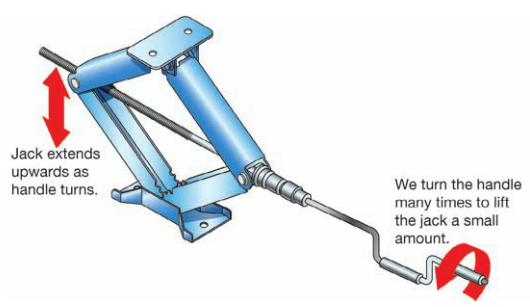
Simple machines change the size, direction or speed of a force to make a job easier. Levers, inclined planes (or ramps), wedges, screws, pulleys, wheels and gears are all simple machines.

**What can machines do?**To get a job done, you apply a force called an effort. The load is the force actually required to do the job.   
A simple machine can make the task easier in three different ways. It can: **Example: A Car Jack** (force multiplier)

* Change the size of a force A small force is used to turn the
* Make things speed up jack handle through a very large
* Change the direction of a force distance, in order to lift the car.

1. **Changing the Size of a Force**Machines that multiply the force you apply to do a job   
   are known as **force multipliers**.
2. **Making Things Speed Up**Machines that make something move faster are known as **speed multipliers**. These are some examples:

* **An Eggbeater** - The blades move much faster than the handle.
* **Gears on a bike** - the different gear combinations can make the wheels spin much faster than the pedals.

**3. Changing The Direction of a Force** A machine that changes the direction in which a force acts is called a pulley. Pulling downwards on a pulley cable  
 changes the direction of the force acting on an object which causes it to move upwards.

**Levers**A lever is a simple machine that is made of a **long, ridgid object** and   
a **pivot or fulcrum** about which it rotates. Most levers increase the   
size of the effort that you can apply or reduce the effort needed. Eg. A crowbar, using a hammer to pull a nail from wood,  
 Using a teaspoon to remove the lid of a coffee tin.

**Mechanical Advantage**

A machine’s mechanical advantage indicates how much easier it is to complete a task.

**Mechanical advantage = load  
 effort**

A machine with a **mechanical advantage of 2** indicates that using this machine allows you to:

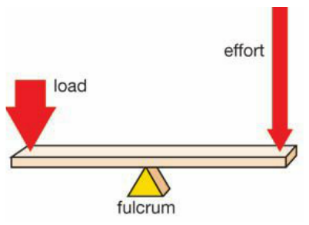
* Lift **twice the load** as normal
* Use **twice the force** as normal

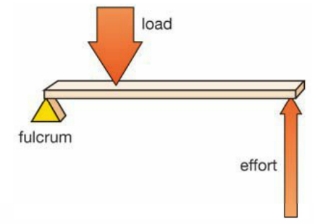
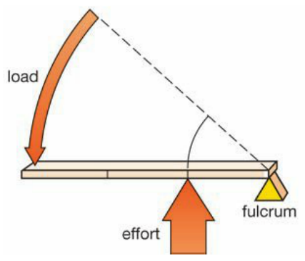
For a lever, mechanical advantage can also be calculated using:

**Mech. Advantage = dist. from effort to fulcrum  
 dist. From load to fulcrum**

The two statements for mechanical advantage can be combined into a rule called the principle of levers. This states that:

**Effort X distance = load X distance** (effort to fulcrum) (load to fulcrum)

**Types of Levers**Levers can be used as a force mulyiplier and as a speed multiplier.  
The way a lever operates depends upon the position of the effort,  
load and fulcrum.

* **First-class Levers**  
  A crowbar ia a first-class lever.   
  The handle moves a larger distance,  
  but the force applied is increased.
* **Second-class Levers**  
  A second-class lever has the load  
  positioned between the fulctim   
  and the effort. This acts as a force  
  multiplier. Eg. Wheelbarrow
* **Third-class Levers**  
  A third-class lever has the effort  
  positioned between the fulcrum  
  and the load. Eg. Cricket bat