







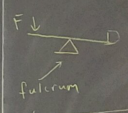
# Machines

A Machine is a device used to multiply forces or simply change the direction of forces. The concept that underlies every machine is work and conservation of energy

## 6 simple machines

- lever 
- wheel & axle 
- Pulley 
- inclined plane 
- wedge 
- screw 

A lever has a pivot point called the fulcrum



$\text{Work input} = \text{Work output}$

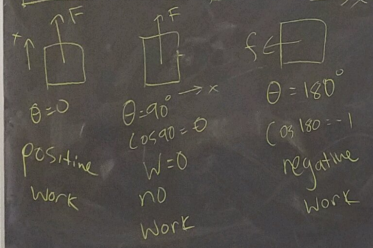
$W = F \cdot d$

$(\text{Force} \times \text{distance})_{\text{input}} = (\text{Force} \times \text{distance})_{\text{output}}$

Review Work, Energy, Power

Work = (Force)  $\times$  (distance)  $\cos\theta$

$W = Fd \cos\theta$



Energy - ability or capacity to do work

Kinetic energy - energy of motion

$KE = \frac{1}{2}mv^2$

Energy measured in Joules (J)

Force measured in Newtons (N)

Power measured in Watts (W)

Potential energy - gravitational potential energy depends on the mass, gravity, & height

$PE = mgh$

Conservation of energy - initial energy = final energy

$E_0 = E_f$

power =  $\frac{\text{work}}{\text{time}}$   $\neq$  (Force)(velocity)

$P = \frac{W}{t}$

$P = F \cdot v$