

Making Work Easier

- People have always looked for ways to make work easier
- If you remember, the amount of Work done is equal to the Force used times the Distance traveled
- It will always take the same amount of work to do a task
 - We can change the way that work is done
- We use different machines to do this

Machines

- A **machine** is a device that changes the way the work is done
- The machine is usually between us and the object of our work
 - **Input force** is the force that you put into the machine
 - **Output force** is the force that the machine puts on the object
 - So it works like this: Input force -> Machine -> Output force
- Different machines do work in different ways remember that $Work = Force \times Distance$
 - So if you have a Force of 10N and a distance of 10m, you can do 100J of work
- How do machines help us?
 - Machines change the output force by changing the distance over which the work is done
 - Look back at our 100J of work
 - If we increase the Distance to 20m, it only requires 5N of Force to do 100J of work
 - This means that it will be easier for us to do the work, but we have to do it over a much longer distance
 - If we increase the Distance to 100m, it only require 1N of Force to do 100J of work
 - If we decrease the Distance to 5m, it will require 20N of Force to do 100J of work
 - This means that it will be harder for us to do the work, but we have to do it over much less distance
 - If we decrease the Distance to 1m, it will require 100N of force to do the 100J of work
 - Some machines change the direction of the force that we use
 - Think about window blinds, we pull DOWN on the cord to move the blinds UP
 - These types of machines do not change the force or distance, but they can make it easier to do the work because of the change in direction