

# Work and Kinetic Energy

Starting with the 2<sup>nd</sup> Newton's Law:

$$F = ma$$

One can derive another important result:

“Change in **kinetic energy** is equal to the **mechanical work** done by all forces”

$$\Delta K = W$$

$$K = \frac{mv^2}{2},$$

is called Kinetic Energy of an object

$$W = F\Delta x,$$

is called Mechanical Work

**(Work = Force x Displacement)**

# Homework

a) A car of mass  $m=2000\text{ kg}$  moves at speed  $v=30\text{m/s}$  when suddenly the driver applies breaks. Find the distance the car will travel before coming to a complete stop, if friction coefficient is  $\mu=0.5$ .

Please use the Kinetic Energy theorem ( $\Delta K=W$ ) to solve it. Remember that friction force is  $F=\mu N$ , where  $N$  is normal reaction.

b) Similar to part (a), the driver applies breaks when speed of the car is  $v=30\text{m/s}$ . But after travelling 10 m, the car gets to icy road where the friction is very low. What will be the speed of the car at that moment?