Kinetic Energy

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In the last segment, we learnt about **mechanical energy.** In this segment we are going to learn about the kinetic energy and also try to derive its formula.

What is Kinetic Energy?

The kinetic energy (KE) of an object is the energy that it possesses due to its motion. It is defined as the work needed to accelerate a body of a given mass from rest to its stated velocity.

Kinetic energy depends on the velocity and mass of the body. If the velocity of an object is zero then its kinetic energy is also zero.

Let us try to derive the expression for kinetic energy.

Derivation: Formula of Kinetic Energy

Consider an object of mass '**m**' at rest. Suppose a force '**F**' is applied to this body such that it is displaced by a distance '**s**' and reaches a velocity '**v**'. The work done on the body '**W**' will be given as,

$W = F \times s$

Force 'F' can be written as,

$F = m \times a$

Thus, the work done will be equal to,

$W = ma \times s$

We also know the equations of motion and according to the third equation of motion,

$v^2 - u^2 = 2a$ Or $as = \frac{v^2-u^2}{2}$

Now, on substituting the value of '**as**' in the equation of work done, we get,

$W = m(\frac{v^2-u^2}{2})$

Since, the body was at rest, 'u' will be zero. Also the work done is nothing but equal to the change in kinetic energy we can substitute 'W' by 'K.E.'

K.E = $\frac{mv^2}{2}$

Hence an object of mass m moving with uniform velocity v possess Kinetic energy equals to,

K.E = $\frac{mv^2}{2}$

Summary

Kinetic Energy	• The kinetic energy (KE) of an object is the energy that it possesses due to its motion • **K.E =** $\frac{mv^2}{2}$

What's next?

In our next Class 9 Science segment, we shall learn more about the numerical problems on **kinetic energy** with the help of a few examples.