# How to solve mechanical energy

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Explain how the general definition of energy as the ability to do work makes perfect sense in terms of either form of mechanical energy. Discuss the law of conservation of energy and dispel any misconceptions related to this law, such is the idea that moving objects just slow down naturally.

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Mechanical energy is the energy of an object due to its position or motion. It is the basis of physics, as everything around us is driven by mechanical energy. From picking up objects to throwing them, mechanical energy can be seen in action every day. For example, an apple falling from a tree has mechanical energy.

An object possessing mechanical energy can do work by applying force. The change in mechanical energy is the work done. For example, when a bow is pulled, it stores energy. When released, the bow uses its stored energy and pushes the arrow to its trajectory. Thus, the bow works on the arrow at the expense of its mechanical energy. A bowling ball rolls on the alley and has mechanical energy. It does work by applying force and knocking down the pins.

1. Potential Energy: It is the energy stored in an object due to its position. Gravitational potential energy due to Earth"s gravity is a common type of potential energy. It depends on the object"s height from the Earth"s surface. For example, an apple in an apple tree has the maximum potential energy. When it falls, its potential energy reduces and becomes zero upon reaching the surface.

Apart from gravitational potential energy, other forms are elastic potential energy, electric potential energy, magnetic potential energy, and nuclear potential energy.

2. Kinetic Energy: It is the energy possessed by an object due to its motion. The movement of an object is manifested by its speed. Consider the above example. When the apple is in the tree, it is at rest with zero kinetic energy. When it falls, it gains speed owing to acceleration due to gravity. The kinetic energy increases and reaches a maximum when the apple hits the ground.

According to the law of conservation of energy, energy can neither be created nor destroyed. It transforms from one form to another. In the above example, the potential energy of the apple transforms into kinetic energy. Therefore, the sum of potential and kinetic energy remains constant throughout its path. This sum is known as the total mechanical energy. The initial total mechanical energy is the same as the final total mechanical energy.

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Mechanical energy is conserved only when the force acting on an object is conservative. A conservative force does not depend on the path taken to do work. On the other hand, non-conservative and dissipative forces depend on the path taken. In the apple example, gravitational potential energy acts on it, which is a conservative force. If non-conservative forces like friction or air resistance are present, the mechanical energy will get converted into heat energy. In this way, although the mechanical energy is not conserved, the total energy is conserved.

Suppose an object of mass m is at a height h above the surface of the Earth. Then, the potential energy can be found by the following equation.