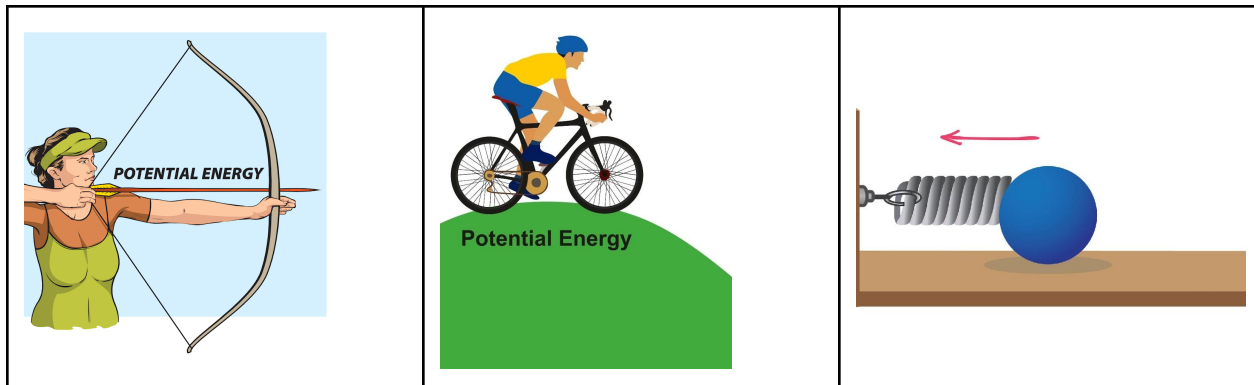


Science V12/S3 - Potential and Kinetic Energy

We define energy as the ability to cause change or “do work”. It takes energy to walk or run, drive a car, or cook an egg. The law of conservation of energy states that energy is never created or destroyed; it is only changed from one state to another.

There are different states (types) of energy, and energy can change from one state to another. Solar energy becomes electrical energy when solar panels are used to power a computer, which then changes to heat energy as your computer gets warm. Energy is not used up, only changed. Two of the various states of energy are potential energy and kinetic energy.



Potential energy is the stored energy an object has because of its position. A bow and arrow pulled back, a bicycle on top of a hill, and a compressed spring all have potential energy.



Kinetic energy is the energy of motion, like an arrow shooting through the air, a bike rolling down a hill, or a spring launching a pinball.

When potential energy is used, it is converted into kinetic energy. You can think of potential energy as kinetic energy waiting to happen. One way to think of potential and kinetic energy is a roller coaster. As it travels up hill, it is gaining potential energy. It has the most potential energy at the top of the coaster. As it



travels down the coaster, it gains speed and kinetic energy. As it is gaining kinetic energy, it is losing potential energy.

One type of potential energy comes from the Earth's gravity. This is called gravitational potential energy (GPE). Gravitational potential energy is the energy stored in an object based on its height and mass. If you hold a book above your head, it has GPE. If you hold a bigger, heavier book from higher up, it will have more potential energy because it has more mass and more height.

The kinetic energy of an object is calculated from the velocity and the mass of the object. A small golf ball rolling down a hill will not have as much kinetic energy as a large boulder. Additionally, the faster the object is moving, the more kinetic energy it has. In fact, if you double the speed of an object, the kinetic energy increases by four times.