

WOW sheet

Potential and kinetic energy

Here is what 'energy' means in physical science:

Energy is the ability to do work.

In other words, energy is what causes changes to happen. Every time something moves, warms up, cools down, grows, makes a noise, or changes in any way, it uses energy.

Energy is the work that a certain force can do. Because there are different types of forces, there are many forms of energy.

Here's an example

Some examples of energy include:

- gravitational energy [an object falling down]
- thermal (heat) energy [ice melting]
- electrical energy [a light bulb glowing]

All forms of energy can be grouped into one of two categories: **potential energy** or **kinetic energy**.

Here is what 'potential energy' means in physical science:

Potential energy is stored energy.
It is energy stored in an object.

Here is what 'kinetic energy' means in physical science:

Kinetic energy is energy in motion.

It is energy that a moving object has due to its motion.

All energy is either potential energy or it is kinetic energy.

Conservation of energy

One of the laws of physics is called the **law of conservation of energy**.

In science, the term 'conservation' means something which doesn't change. In other words, the amount of a conserved quantity is the same over time.

The law of conservation of energy tells us that energy is a conserved quantity. This means that energy can neither be created nor destroyed. It can, however, be transformed into a different form.

In other words, energy can change from one form to another form.

In particular, energy changes from potential energy into kinetic energy. All forms of kinetic energy are the result of a previous state of potential energy.



Here's an example

Gravitational potential energy is energy stored in an object due to gravity. In other words, it is the potential for movement in an object because of gravity.

Imagine a rock at the top of a cliff. The rock has gravitational potential energy. Basically, the rock has the potential to fall because of gravity.



If the rock does fall, that potential energy transforms. It becomes kinetic energy – energy due to the motion of the rock.

Kinetic energy can also become potential energy.

Here's an example

When you jump on a trampoline, you are continuously using the transition of potential and kinetic energy.

Trampolines use springs to hold the tarp you jump on. Pushing down on the trampoline stretches out the springs, giving them elastic potential energy. As the springs move back into shape, that potential energy is converted into kinetic energy. This transformation of potential energy into kinetic energy sends you flying up. When you land, you stretch out the trampoline's springs again. Your kinetic energy is transformed back into potential energy!

The amount of energy something has depends on the object and the force.

Here's an example

Think back to the rock on the cliff.

The amount of gravitational potential energy an object has depends on the object's mass and the object's location relative to the centre of gravity, in this case, the centre of the Earth.



If the rock has a lot of mass and if the cliff is very tall, then the rock will have a lot of gravitational potential energy. But if the rock doesn't have much mass or if the cliff isn't very high, then the rock will have less gravitational energy.

Once the rock falls, the potential energy is transformed into kinetic energy. The more potential energy, the more kinetic energy. In this case, the bigger the rock, or the taller the cliff, the more kinetic energy!

