

How energy is transferred

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Image 1. Newton's cradle is a device that demonstrates the transfer of kinetic energy. Photo from: Wikimedia Commons

Energy is ability to do work. It cannot be made. It cannot be destroyed. Energy can change form. It can move between things as well.

Moving energy between things is called energy transfer. Something moving has energy. You can transfer its energy to something still. Say a bat hits a ball. Some of the bat's energy transfers to the ball. The energy goes from one thing to another. It stays the same kind of energy.

Thermal energy comes from how hot something is. "Heat" means thermal energy moving from something hotter to something cooler. Thermal energy can transfer in three ways: conduction, convection and radiation.

Conduction is thermal energy moving between molecules that are touching. Place a metal spoon in boiling water. The end not touching the water gets hot. This happens because metal is good at carrying heat. Some things, such as wood, are not good at carrying heat. They are called insulators.

Thermal Energy Comes From The Sun

Convection only happens in liquids and gases. When water boils on a stove, molecules at the bottom are closest to the heat. They move faster. They move apart. Then they rise up. Cooler water goes to the bottom. This makes a current of molecules. They are sinking, heating up, moving up, cooling down and sinking again.

The third kind of heat transfer is called radiation. With radiation, a heat source does not have to touch the thing being heated. Take the sun. Nearly all thermal energy on the planet comes from the sun. It moves as energy waves, such as light.

Energy can change form, too. This is called transformation. Think of a ball on a hill. It has stored energy because of where it is. This energy is called gravitational potential energy. Something with gravitational potential energy can do work because of its position in a gravitational field. Say the ball rolls down the hill. Then its potential energy changes into kinetic, or movement energy.

The ball stops at the bottom of the hill. That's because of friction. Friction is a push or a pull. It pulls on things moving past each other. Friction changes the ball's kinetic energy into heat. The amount of energy stays the same in transformations.

How Energy Moves Around A Sand Dune

Energy transfers and transformations happen all the time. Let's look at sand dunes.

Thermal energy shines from the sun. It heats the land and sea. Water heats more slowly than land. This makes a convection current in the air. The current makes wind.

This wind has kinetic energy. It carries sand a short way. This energy transfers to the sand. If the sand hits something, friction stops it. Sand builds up. Dunes are made.

Plants grow in the dunes. They use light to store energy in sugar. Animals eat the plants. They use the sugar's energy to move and heat their bodies.

Energy transfers and transformations happen constantly. They allow life to exist.