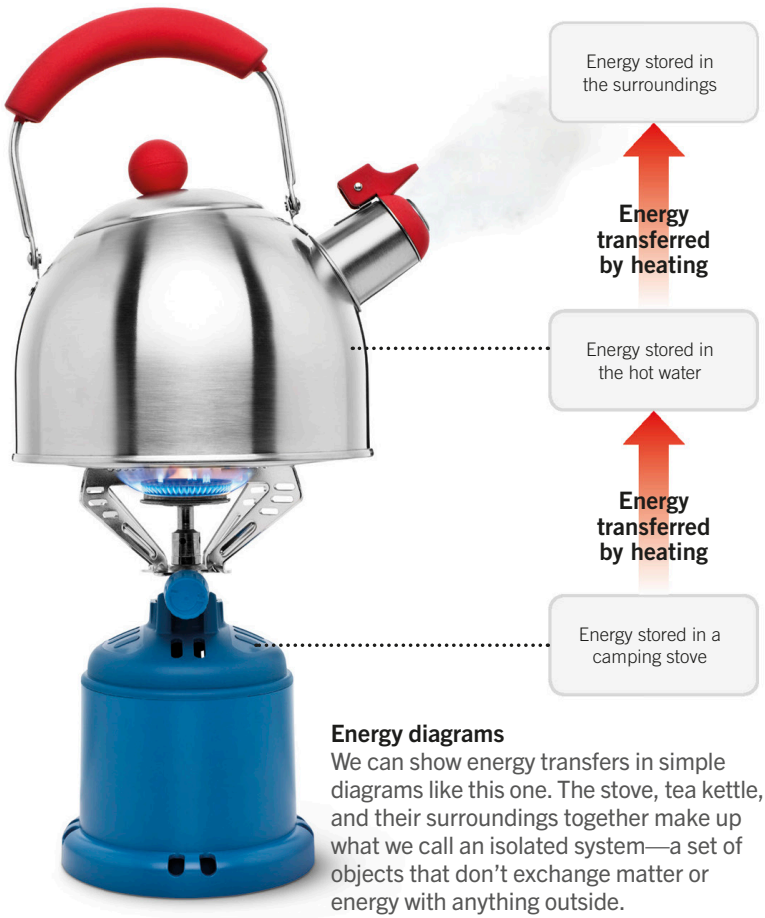
Energy transfers

When you turn on a light, ride a bike, cook a meal, or do anything at all, you transfer energy from one energy store to another. Energy transfers make everything happen.

Energy transfer by heating

Heating an object transfers energy to its thermal energy store. This either makes the object warmer or causes a change of state to happen. Here, chemical energy stored in fuel is transferred by heating to water in a tea kettle. The hot water will eventually cool down as energy escapes, but the total amount of energy shared by the fuel, stove, tea kettle, water, and their surroundings remains constant. This is called the law of conservation of energy.



Energy diagrams

We can show energy transfers in simple diagrams like this one. The stove, tea kettle, and their surroundings together make up what we call an isolated system—a set of objects that don't exchange matter or energy with anything outside.

Key facts

- ✓ **Energy can be transferred from one energy store to another.**
- ✓ **The total amount of energy in an isolated system is not changed by an energy transfer. This is known as the law of conservation of energy.**
- ✓ **Energy can be transferred in many ways: by heat, forces, electricity, radiation, and sound.**

Other energy transfers

Heating isn't the only way to transfer energy. Energy can also be transferred by forces, electricity, radiation, and sound.

By forces
If a force acts on an object—for example, by moving it—it transfers energy to the object. We call the energy transferred in this way work.

By electricity
Whenever you turn on an electric device, energy is transferred along the wires by electricity.

By radiation
Different forms of radiation—such as visible light, X-rays, and microwaves—transfer energy at incredible speeds. Our planet gets most of its energy in this way from the Sun.

By sound
Like all types of wave, sound waves transfer energy as they travel. When sound waves reach your ears, the energy is transferred to your eardrums, which vibrate.