



# Kids & Energy

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## Energy principles »

### Basic Energy Principles »

Energy is the driving force for the universe. Energy is a quantitative property of a system which may be kinetic, potential, or other in form. There are many different forms of energy. One form of energy can be transferred to another form. The laws of thermodynamics govern how and why energy is transferred. Before the different types of energy resources and their uses are discussed, it is important to understand a little about the basic laws of energy.



### The Three Laws of Thermodynamics »

- **The first law** of thermodynamics, also called conservation of energy, states that the total amount of energy in the universe is constant. This means that all of the energy has to end up somewhere, either in the original form or in a different form. We can use this knowledge to determine the amount of energy in a system, the amount lost as waste heat, and the efficiency of the system.

- **The second law** of thermodynamics states that the disorder in the universe always increases. After cleaning your room, it always has a tendency to become messy again. This is a result of the second law. As the disorder in the universe increases, the energy is transformed into less usable forms. Thus, the efficiency of any process will always be less than 100%.

- **The third law** of thermodynamics tells us that all molecular movement stops at a temperature we call absolute zero, or 0 Kelvin (-273°C). Since temperature is a measure of molecular movement, there can be no temperature lower than absolute zero. At this temperature, a perfect crystal has no disorder.

When put together, these laws state that a concentrated energy supply must be used to accomplish useful work.



### Work »

Many of us commonly think of energy as the ability of a system to do work. Work is a force applied to an object over a certain distance, such as pulling or pushing a wooden block across your desk. Your muscles do work when they facilitate body movement. Units of work and energy are joules (J). One joule equals one Newton meter (N\*m).

By definition, work is an energy requiring process. So, how do you describe energy? Energy is not a substance that can be held, seen, or felt as a separate entity. We cannot create new energy that is not already present in the universe. We can only take different types materials in which energy is stored, change their state, and harness the energy that escapes from the system in order to use it to do work for us. If the released energy is not used, it will escape and be "wasted" usually as heat.

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