Energized!

This girl is swooshing down the waterslide into the pool. She is also proving a point: Energy plus work can add up to fun!

By now you might guess that energy and motion are related. There is a connection. Energy is the ability to move or change something. When a force—a push or a pull—moves or changes something, work is done. So energy is the ability to do work.

The girl in the picture is using energy to do work. This is the kind of work that’s fun. The force of gravity pulls her down the long waterslide. She’s using this energy for a wild ride!

Energy of Motion

The girl going down the slide and the avalanche have energy of motion. All moving things have this type of energy. Take a look outside. What has energy of motion right now? Are cars zipping by? Is a flag blowing in the breeze? Are birds flying among the trees? They all have energy of motion.
Even things you can’t see have energy of motion. Your pumping heart pushes blood through your body. Parts of all the cells that make up your body are moving, too. Gases in the air are in constant motion. As you can tell, energy of motion is all around.

An object can have stored energy because of its position or shape. The girl on the waterslide had stored energy when she sat at the top of the slide. The higher she was, the more stored energy she had.

**Stored Energy**

An object doesn’t have to be moving to have energy. Think of a box of cereal. If you store the cereal in your kitchen cabinet, you can use it later. Energy can also be stored. **Stored energy** is energy that can be used later to do work. Gasoline has stored energy that makes a car move later on. Your body has stored energy, too. It comes from the food you eat.

1. This airplane is at rest.

2. The girl is storing energy by turning the propeller and twisting the attached rubber band.

3. When she lets the airplane go, the stored energy changes into motion energy.

How did the model airplane gain stored energy? The rubber band was twisted and twisted. With each twist, more energy was stored. When the girl let the plane go, the rubber band started to unwind. All that stored energy changed into energy of motion. The same thing happened when the girl went down the slide. Her stored energy changed to energy of motion.

*Which has more stored energy—a book placed on a bottom shelf or a book placed on a top shelf?*
Pass It On
Have you ever gone bowling? It’s a lot of fun. Without energy, however, it wouldn’t be much of a game.

Bowling shows that energy doesn’t stay in one place. It passes from object to object. As you approach the bowling lane with the ball, you swing your arm back. Then you swing it forward and release the ball. You give the energy of your swinging arm to the ball. Now the ball has the energy it needs to roll down the lane.

When the ball hits the pins, its energy is passed on, or transferred, to the pins. That energy makes the pins move. The pins transfer their energy to other pins as they hit one another. Pretty soon pins are bouncing and falling all over the place!

What transfers of energy take place in a game you like to play?

All Kinds of Energy
Stored energy and energy of motion take many different forms. You may have used each form of energy today even if you never thought of it as energy.

Switch on a light or turn on a computer. You are using electrical energy, or electricity. The energy from batteries and the energy that travels through power lines is electrical energy.

Did you ever wonder...
...what lightning is?

Lightning is electrical energy. So is the spark you sometimes get when you touch a metal doorknob. In fact, lightning is a giant spark. Lightning happens when electrons—tiny particles in atoms—suddenly jump between the ground and a cloud, or between two clouds.
Chemical Energy
Right now your body is using a form of stored energy called *chemical energy*. This energy comes from the foods you eat. The chemicals in the foods change to provide your body with the materials it needs to work well.

Chemical energy also is stored in fuels such as gasoline, oil, coal, wood, and wax. When these substances burn, the energy is released as heat.

The picture shows an exciting example of chemical energy—fireworks. When a burning wick reaches powdered chemicals inside a skyrocket, the chemicals explode in a dazzling display. Different chemicals produce different colors.

Energy You Can See, Hear, and Feel
Most of the time, energy seems invisible. But there's one form of energy that you can see. It's called light. This form of energy travels in waves from its source.

A jackal's vocal cords vibrate and form sound waves.

The light waves bounce off objects and reach your eyes. Then you can see the objects. The sun is the source of most light. Other sources include lightbulbs and fire.

Another form of energy—sound—travels in waves. Sound begins when matter vibrates, or moves back and forth quickly. Try this. Place your fingers lightly on your throat. Then hum or talk. Do you feel your vocal cords vibrate? Those vibrations make sound waves that travel to your ears. Then you hear the sounds.

On a cold winter day, nothing warms you up like a bowl of hot soup. The soup warms you because it has heat energy, or heat. Where did the soup get its heat? Most heat comes from the sun. What are some other heat sources?
Energy Changes

Energy can change from one form to another. Here are some ways energy changes form. Can you think of others?

1. The sun provides light and heat energy. Plants change light from the sun into chemical energy. Plants use this energy as food for their own growth.

2. Your food comes from plants or from animals that eat plants.

3. Your body changes the chemical energy of food into heat and energy of motion.

1. The tip of a match has chemical energy stored in it.

2. The motion of striking a match makes sound and heat energy.

3. The heat releases the chemical energy stored in the tip. The chemical energy changes to light and more heat.