



## ACTIVITY TIPS

## Conservation of Energy—Find the Evidence

This activity appears in the section *How Energy Behaves*. It asks students to describe one or more examples from their daily lives in which energy changes form but does not disappear. Here are a few examples that students may think of:

- *An incandescent light bulb transforming electrical energy into both light and heat*
- *A person's digestion transforming the chemical energy in food into energy the body can use*
- *Wind transferring its energy to rotate the blades of a wind turbine, which in turn drives a generator to produce electricity*

Students who cannot think of their own examples are asked to describe the ways that energy transforms (but is conserved) when someone swings on a rope swing, rides a skateboard in a skate park, or bounces a ball. Here are descriptions of energy transformation and conservation in these three situations. Look for similar analyses in students' explanations.

- **Rope swing:** Assuming the rope swing is anchored at a high point on a slope or above a drop-off, when a person gets onto the swing, they have maximum gravitational potential energy due to their elevated position. As the person swings downward, potential energy is converted into kinetic energy. At the lowest point of the swing, the person has maximum kinetic energy and minimum potential energy. As the swing continues on its arc and moves back upward, kinetic energy is converted back into potential energy. Throughout the motion of the swing, energy is continuously transferred between potential and kinetic forms, but the total amount of energy remains constant.
- **Skateboarder:** A skater who drops into a bowl or pushes off at the top of a ramp at a skate park has maximum gravitational potential energy. As the skateboard rolls downhill, this potential energy is converted into kinetic energy. At the lowest point of the ramp or bowl, the skater and skateboard have maximum kinetic energy and minimum potential energy. After their momentum carries them up the other side of the bowl or up a ramp, kinetic energy is converted back into potential energy.
- **Bouncing ball:** A ball held above the floor possesses gravitational potential energy due to its height above the ground. As the ball falls, this potential energy is converted into kinetic energy. When the ball hits the floor, some of its kinetic energy is transferred to the floor in the form of sound and vibrations, while the rest is retained by the ball. The floor absorbs some of the energy of the impact and then releases it, causing the ball to bounce back upward. As the ball rebounds, the stored energy in the ball is converted back into kinetic energy, and the process repeats.