CONTROLLING COLLISIONS

STUDENT WORKBOOK

ACCELERATE

ACTIVITY 2

ENERGY AND IMPACT

Now that you're thinking about collisions, let's look at all the changes that happen during them. You'll learn what happens to the energy before, during, and after a collision, and how the energy affects the amount of damage that results from a crash.

LEARNING GOALS:

- I can ask questions and predict what happens to energy during a collision.
- I can use evidence to explain energy transfer when there is a change in kinetic energy of an object.
- I can describe the relationships between kinetic energy, mass, and speed of an object.

2 REACHING NEW HEIGHTS

WHAT YOU NEED:

FROM THE KIT:

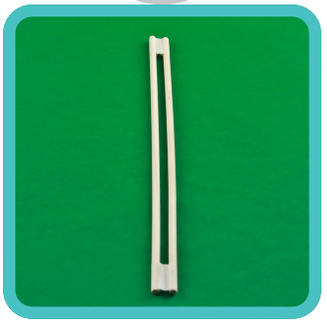
- 2 ¼ inch dowels
- Foam cup
- Masking tape
- Ruler
- Wood ball

OTHER ITEMS:

- Pen or marker

WHAT TO DO:

If you don't have a long, smooth surface, check out the Alternative Experiment on Page 7.

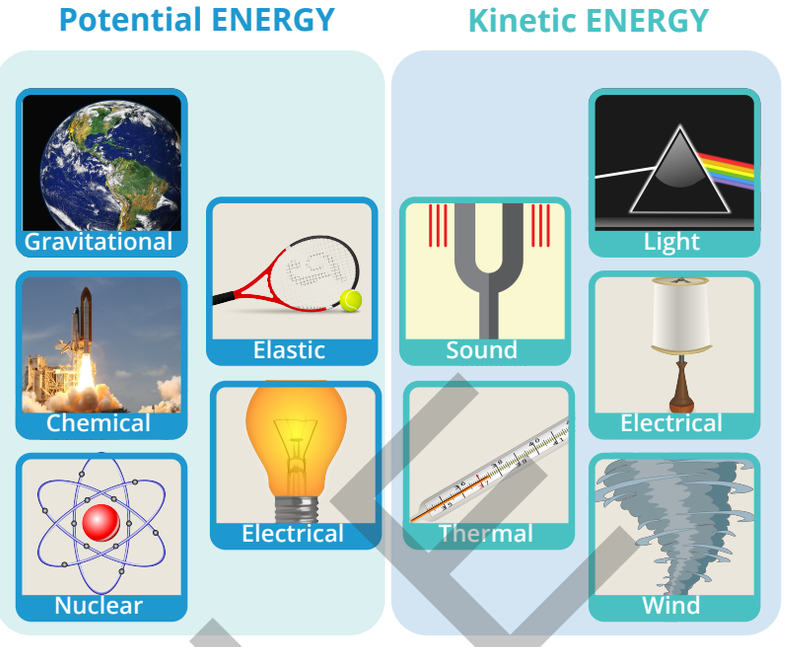


STEP 1

Tape the two dowels together at the ends, side by side, leaving about 1 cm of space between them. You now have your own homemade ramp!

As the ball moves down the ramp, it loses potential energy. But that energy doesn't disappear. Energy can't be destroyed, and it can't be created, either. It can only change from one type to another. This is known as the **Law of Conservation of Energy.**

What type of energy does the potential energy of the ball change to as it moves down the ramp? The energy of movement is called **kinetic energy.** The faster the ball is moving, the more kinetic energy it has.



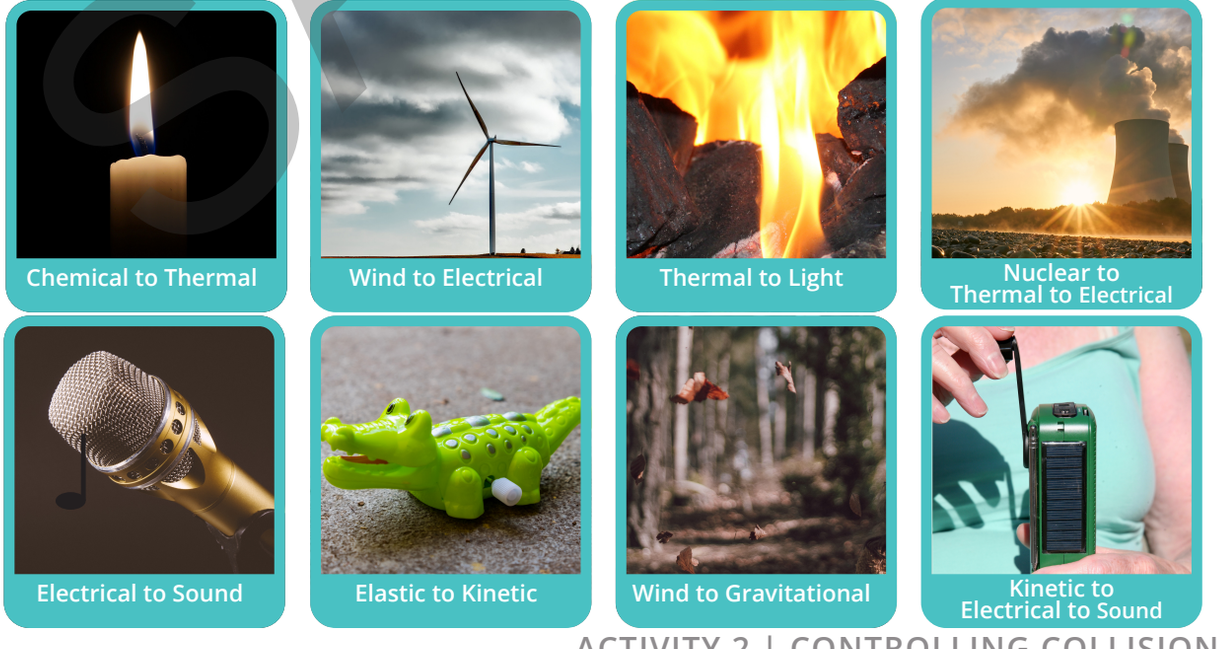
Potential and kinetic are the two main types of energy. There are many examples of each.

Changing Energy

A change in the type of energy is called **energy transfer**. Energy transfer can be from:

- potential energy to kinetic energy, like a ball rolling down a hill
- kinetic energy to potential energy, like a ball rolling up a hill
- one type of potential energy to another, like chemical energy changing to electrical energy in a battery
- one type of kinetic energy to another, like light energy changing to thermal energy as the sun heats up the Earth.

ENERGY TRANSFER EXAMPLES



THINK ABOUT IT!

1. If the first climb is the only motorized climb of a roller coaster, the top of it is the highest point of the ride. Why do you think that is?

The Thunderbolt roller coaster, located in New York City, has an initial climb of 115 feet.

2. A modern gasoline-powered car engine changes about 15 % of the chemical energy stored in gasoline to kinetic energy of the car. What happens to the other 85 % of the energy? Explain using evidence from your experience.

REFLECT

Think about the energy transfers that happen when a golf ball hits a steel plate.

1. Most of the energy before the collision is this type: _____

2. Most of the energy after the collision is _____ energy, but some of it changed to _____ energy, _____ energy, and _____ energy. *Hint: think about what happens during a collision. Could you see/hear/feel any changes in the ball or plate?*

ACCELERATE

Science Unlocked

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Kit	SU-CONCOL
Instructions	IN-CONCOLS
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