

# Energy on the Move

Trace how energy enters, moves through, and changes on Earth.

**6.4** "The student will investigate and understand that there are basic sources of energy and that energy can be transformed. Key ideas include the sun is important in the formation of most energy sources on Earth..."

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## 1 READ AND MARK \_\_\_\_\_ Read it twice

**YOUR JOB** Circle the three named ways that energy is transferred. Then underline sentences that show energy moving from one thing to another or changing from one form to another, so you can trace an energy pathway.

### A Day of Moving Energy

- ① On a clear morning, sunlight reaches a school garden as radiation, energy that travels through space. Green plants use some of that light energy to make sugars from water and carbon dioxide during photosynthesis. A caterpillar eats a leaf, and a bird later eats the caterpillar. Energy stored in the plants' food moves through this food chain and helps organisms grow, move, and stay warm. Coal, oil, and natural gas also hold energy that originally came from sunlight captured by ancient plants and other organisms.
- ② Earth also receives energy and sends energy back to space. Some incoming solar radiation is reflected by clouds, ice, and bright surfaces. Land, water, and the atmosphere absorb the rest and become warmer. A warm Earth releases infrared radiation, so the planet does not keep gaining heat forever. This balance, called Earth's energy budget, affects living systems and Earth processes. Uneven heating of land and water helps create winds, ocean currents, and weather. These processes move energy and shape the conditions where organisms live.
- ③ Energy spreads from place to place in several ways. Radiation from the Sun warms a blacktop playground without touching it. Conduction moves thermal energy when a metal pan touches a hot burner. Convection moves thermal energy as warmer water rises and cooler water sinks in a pot. Energy can also change form during use. Sunlight heats Earth's surface, uneven heating helps produce wind, and a wind turbine changes the wind's kinetic energy into electrical energy. A toaster then changes electrical energy into thermal energy.

**2 ANSWER WITH EVIDENCE** \_\_\_\_\_ Use the passage

**1** How does energy from sunlight reach the bird in the garden food chain?

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**2** Name two things that can happen to incoming solar radiation in Earth's energy budget. Why does Earth release infrared radiation?

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**3** Give one example from the passage for each type of energy transfer: radiation, conduction, and convection.

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**4** What two energy transformations occur after wind is produced in the passage?

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**3 YOUR TURN** \_\_\_\_\_ Your own words

Choose a device or situation that uses energy, such as a solar oven, a campfire, or a bicycle light. Write three sentences that name its energy source, describe at least two different ways energy is transferred, and explain one energy transformation.

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**PART 1 • READ AND MARK**

Circle the three named ways that energy is transferred. Then underline sentences that show energy moving from one thing to another or changing from one form to another, so you can trace an energy pathway. Accept any marking that follows this job and points at the right text.

**PART 2 • ANSWERS**

| # | QUESTION                                                                                                                         | ANSWER                                                                                                                                                                                                   |
|---|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | How does energy from sunlight reach the bird in the garden food chain?                                                           | <b>Plants capture sunlight and store it in sugars. A caterpillar eats a leaf, and the bird eats the caterpillar.</b>                                                                                     |
| 2 | Name two things that can happen to incoming solar radiation in Earth's energy budget. Why does Earth release infrared radiation? | <b>Solar radiation can be reflected by clouds, ice, and bright surfaces, or absorbed by land, water, and the atmosphere. Earth releases infrared radiation so it does not keep gaining heat forever.</b> |
| 3 | Give one example from the passage for each type of energy transfer: radiation, conduction, and convection.                       | <b>Radiation: the Sun warms a blacktop playground. Conduction: a metal pan touches a hot burner. Convection: warmer water rises and cooler water sinks in a pot.</b>                                     |
| 4 | What two energy transformations occur after wind is produced in the passage?                                                     | <b>A wind turbine changes the wind's kinetic energy into electrical energy. A toaster changes electrical energy into thermal energy.</b>                                                                 |

**PART 3 • YOUR TURN (SAMPLE ANSWER)**

Sunlight reaches a solar oven by radiation and warms its dark pot. Thermal energy moves by conduction from the pot to the soup, and convection carries warmer soup upward. The radiant energy from sunlight changes to thermal energy as the soup heats.

Accept any accurate energy system that includes a source, two correctly described transfer methods, and one correct transformation. Students may use different examples than the sample if their science vocabulary and energy pathway are accurate.