

Energy On the Move

Trace how energy changes form to do useful work.

6.4.d "energy transformations are important in energy usage."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline every sentence that describes energy changing from one form to another.
Number the transformations in each energy chain to show their order.

Energy Changes at Work

- ① At a community basketball court, players use a solar-powered scoreboard. Sunlight reaches panels on the roof. The panels change light energy into electrical energy. Wires carry the electrical energy to a battery, where some energy is stored chemically. During an evening game, the battery changes chemical energy back into electrical energy. The scoreboard uses that electricity to make light in its numbers and sound in its buzzer. These transformations let stored sunlight be used after dark.
- ② An electric city bus receives electrical energy from a charging station. Its battery stores energy chemically. When the driver starts the bus, the battery supplies electrical energy to a motor. The motor transforms electrical energy into motion, moving the bus forward. Not all input energy becomes useful motion. Some becomes thermal energy because parts of the motor and wheels warm up. A small amount becomes sound energy. Engineers try to reduce these less useful transformations so the bus can travel farther on one charge.
- ③ Energy users make choices based on these changes. A hand-crank flashlight does not need a wall outlet. Turning its handle provides motion energy. Inside, a generator changes that motion energy into electrical energy. The flashlight changes electrical energy into light, which helps a camper see. It also produces some thermal energy as its parts work. The flashlight is useful because each transformation moves energy toward a needed result. Knowing the chain helps people compare devices and identify energy that does not serve the main purpose.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What is the energy transformation chain for the solar-powered scoreboard, starting with sunlight and ending with its outputs?

2 Which energy output is useful for moving the electric bus, and which two outputs are less useful for that purpose?

3 Why do engineers try to reduce thermal and sound energy transformations in the electric bus?

4 Describe the two energy transformations inside the hand-crank flashlight after its handle is turned.

3 YOUR TURN _____ Your own words

Choose a device that is not in the reading. In three sentences, describe at least one energy transformation, explain its useful output, and name one less useful energy output.

PART 1 • READ AND MARK

Underline every sentence that describes energy changing from one form to another. Number the transformations in each energy chain to show their order. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What is the energy transformation chain for the solar-powered scoreboard, starting with sunlight and ending with its outputs?	light energy → electrical energy → chemical energy → electrical energy → light energy and sound energy
2	Which energy output is useful for moving the electric bus, and which two outputs are less useful for that purpose?	Motion energy is useful. Thermal energy and sound energy are less useful for moving the bus.
3	Why do engineers try to reduce thermal and sound energy transformations in the electric bus?	Reducing these less useful transformations helps the bus travel farther on one charge.
4	Describe the two energy transformations inside the hand-crank flashlight after its handle is turned.	The generator changes motion energy into electrical energy. The flashlight changes electrical energy into light, while also producing some thermal energy.

PART 3 • YOUR TURN (SAMPLE ANSWER)

A toaster changes electrical energy into thermal energy that cooks bread. It also changes a small amount of electrical energy into light in its indicator. The thermal energy is useful, while the light is less important for cooking.

Accept equivalent terms such as heat for thermal energy and kinetic or mechanical energy for motion energy. For the open task, accept any accurate device not named in the passage that includes a correct transformation, a useful output, and a less useful output.