

Energy On the Move

Trace how energy changes form in everyday systems.

SC.7.P.11.2 "Investigate and describe the transformation of energy from one form to another."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline every phrase that names an energy form. In each paragraph, write 1 beside the starting energy form, then number each new energy form in the main path to the useful output. Do not number a repeated form when the passage says energy is transferred, and circle thermal energy when it is a side output.

Three Energy Pathways

- ① At a campsite, a hand-crank flashlight can shine without a wall outlet. Turning the handle gives the gears mechanical energy. The gears spin a small generator, which transforms mechanical energy into electrical energy. Electric current then reaches the bulb, where electrical energy becomes light energy. The flashlight also becomes slightly warm because some electrical energy changes to thermal energy. The light is the useful output, while thermal energy is a side output. Energy is transformed, not created by the crank.
- ② On a sunny desk, a small solar-powered fan runs when its panel faces the Sun. Radiant energy from sunlight reaches solar cells. In the cells, radiant energy is transformed into electrical energy. The electric current powers the motor, and the motor changes electrical energy into mechanical energy as its blades turn. Moving blades push air, transferring mechanical energy to the air's motion. Some energy also becomes thermal energy in the wires and motor. The useful output is moving air.
- ③ During a bus ride, a phone plays a song through its speaker. Chemical energy stored in the battery is transformed into electrical energy as the battery supplies current. The speaker uses electrical energy to move its cone back and forth, giving it mechanical energy. The vibrating cone makes nearby air vibrate, transferring energy to the air. Those vibrations are heard as sound energy. Some electrical energy also becomes thermal energy, which warms the phone. Sound is the useful output in this example.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Trace the main energy transformation path in the hand-crank flashlight, from the turning handle to the useful output.

2 Trace the main energy transformation path in the solar-powered fan. What is the useful output?

3 In the phone system, what transformation happens in the speaker, and what energy transfer happens next?

4 What side-output energy form appears in all three systems? How is it different from the useful output?

3 YOUR TURN _____ Your own words

Choose two devices or activities that are not named in the passage. Complete both rows to show each main energy path, including one side output.

DEVICE OR ACTIVITY	STARTING ENERGY	ENERGY AFTER FIRST TRANSFORMATION	USEFUL OUTPUT ENERGY	SIDE-OUTPUT ENERGY

PART 1 • READ AND MARK

Underline every phrase that names an energy form. In each paragraph, write 1 beside the starting energy form, then number each new energy form in the main path to the useful output. Do not number a repeated form when the passage says energy is transferred, and circle thermal energy when it is a side output. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Trace the main energy transformation path in the hand-crank flashlight, from the turning handle to the useful output.	Mechanical energy in the gears transforms into electrical energy, which transforms into light energy.
2	Trace the main energy transformation path in the solar-powered fan. What is the useful output?	Radiant energy from sunlight transforms into electrical energy, then into mechanical energy in the turning blades. The useful output is moving air.
3	In the phone system, what transformation happens in the speaker, and what energy transfer happens next?	The speaker transforms electrical energy into mechanical energy as its cone moves. The moving cone transfers mechanical energy to the nearby air, making the air vibrate.
4	What side-output energy form appears in all three systems? How is it different from the useful output?	Thermal energy is a side output in all three systems. It is not the intended useful output, which is light, moving air, or sound.

PART 3 • YOUR TURN (SAMPLE ANSWER)

DEVICE OR ACTIVITY	STARTING ENERGY	ENERGY AFTER FIRST TRANSFORMATION	USEFUL OUTPUT ENERGY	SIDE-OUTPUT ENERGY
Remote-control car	chemical energy in a battery	electrical energy	mechanical energy in moving wheels	thermal energy
Microwave oven	electrical energy	radiant energy in microwaves	thermal energy in food	thermal energy in oven parts

Accept accurate energy paths with at least two transformations and a plausible side output. Accept light energy for radiant energy from sunlight, and accept motion energy for mechanical energy when the student's sequence is scientifically correct.