

Energy on the Move

Trace how energy moves between parts and changes form.

PS.5.b "energy is transferred and transformed; and"

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each phrase that shows energy moving from one place or part to another. Circle each phrase that shows energy changing form, then number the circled changes in the order they happen.

Powering an Emergency Radio

- ① During a power outage, Maya turns the handle on an emergency radio. Her muscles use chemical energy stored from food to move the handle. The moving handle transfers mechanical energy to a small generator inside the radio. In the generator, mechanical energy transforms into electrical energy. Wires transfer electrical energy to the radio's speaker. The speaker transforms electrical energy into sound energy, which transfers through the air to Maya's ears. Some energy also becomes thermal energy as parts rub or electrical current meets resistance.
- ② Later, Maya connects a flashlight to the radio's USB port. Electrical energy transfers from the generator to the flashlight's rechargeable battery. While charging, the battery changes some electrical energy into chemical energy stored in its materials. When Maya switches on the flashlight, chemical energy in the battery transforms back into electrical energy. The bulb then transforms much of that electrical energy into light. It also produces thermal energy, so the bulb can feel warm. Energy is not created by the flashlight. It changes form and moves among parts of the system.
- ③ Not every energy change is equally useful for Maya's goal. If the radio handle turns easily, more of the mechanical energy can reach the generator. If gears rub strongly, a larger share transforms into thermal energy in the gears instead. The radio still follows conservation of energy, because the total energy is accounted for as energy moves or changes form. Engineers reduce unwanted heating by choosing materials and designs that lower friction and electrical resistance. They cannot eliminate every energy transfer or transformation, but they can direct more energy toward sound or light.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Trace the energy pathway from Maya's food to the sound that reaches her ears.

2 What energy transformation occurs while the flashlight battery is charging?

3 Name the two energy forms produced by the flashlight bulb when it is switched on.

4 How does strong rubbing in the radio's gears affect where the energy goes?

3 YOUR TURN _____ Your own words

Choose a device you use, such as a fan, toaster, or game controller. In 4 or 5 sentences, trace its energy pathway, including at least two energy transfers, two energy transformations, one useful output, and one less useful output.

PART 1 • READ AND MARK

Underline each phrase that shows energy moving from one place or part to another. Circle each phrase that shows energy changing form, then number the circled changes in the order they happen. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Trace the energy pathway from Maya's food to the sound that reaches her ears.	Chemical energy in food transforms to mechanical energy in Maya's moving handle, then to electrical energy in the generator, then to sound energy in the speaker. Sound energy transfers through air to her ears.
2	What energy transformation occurs while the flashlight battery is charging?	Electrical energy transforms into chemical energy stored in the battery.
3	Name the two energy forms produced by the flashlight bulb when it is switched on.	Light energy and thermal energy.
4	How does strong rubbing in the radio's gears affect where the energy goes?	A larger share of the energy transforms into thermal energy in the gears, leaving less mechanical energy to reach the generator.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Electrical energy transfers from an outlet through a cord to a fan's motor. The motor transforms electrical energy into mechanical energy that spins the blades. The spinning blades transfer mechanical energy to the air, giving the air kinetic energy. Some energy transforms into sound and thermal energy in the motor. Moving air is the useful output, while sound and unwanted heating are less useful outputs.

Accept equivalent energy pathways when the direction of transfer and the energy forms are scientifically accurate. For the open response, accept different devices and outputs if the student clearly distinguishes energy transfer from transformation.