

Power Pathways

Trace how energy changes form to provide community services.

PS.5.c "energy can be transformed to meet societal needs."

NAME _____

DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline every energy form named in the passage. Number each energy transformation in the order it happens so you can trace how the town meets a need.

Energy for a Coastal Town

- ① On a windy afternoon, a coastal town uses a wind farm to help power homes, schools, and a water-treatment plant. Moving air has kinetic energy. As wind pushes turbine blades, the blades rotate, changing the wind's kinetic energy into mechanical energy. Inside each turbine, a generator changes mechanical energy into electrical energy. Power lines carry the electrical energy to places where people need it. The town does not create energy. It transforms energy from one form into other useful forms.
- ② At the treatment plant, electric motors run pumps that move water through filters. The motors transform electrical energy into mechanical energy, and some energy also becomes thermal energy and sound. At night, the plant's lights transform electrical energy mostly into light and some thermal energy. Engineers choose efficient pumps and LED lights because these devices provide needed motion or light while wasting less energy as unwanted heat. Careful choices help the town meet needs while using less fuel and money.
- ③ Wind speed changes, so the town also stores some electricity in large batteries. When electricity enters a battery, chemical reactions store energy as chemical energy. Later, the battery transforms chemical energy back into electrical energy for the treatment plant or nearby buildings. The battery does not make extra energy, and each transfer releases some energy as heat. By combining wind turbines, efficient devices, and stored energy, the town can supply important services more reliably during calm periods and emergencies.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What energy pathway occurs from moving wind until a turbine generator produces electricity?

2 At the treatment plant, what useful energy transformation happens in an electric motor, and what need does it meet?

3 Why do engineers choose efficient pumps and LED lights for the town's services?

4 How does a battery help when wind speed changes? Include the energy forms involved.

3 YOUR TURN _____ Your own words

Choose one community need, such as safer sidewalks, food storage, or transportation. In 2 or 3 sentences, describe a device or system that uses at least two energy transformations to meet that need, and identify one form of unwanted energy it releases.

PART 1 • READ AND MARK

Underline every energy form named in the passage. Number each energy transformation in the order it happens so you can trace how the town meets a need. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What energy pathway occurs from moving wind until a turbine generator produces electricity?	Kinetic energy in moving wind transforms into mechanical energy in the rotating blades, then into electrical energy in the generator.
2	At the treatment plant, what useful energy transformation happens in an electric motor, and what need does it meet?	The motor transforms electrical energy into mechanical energy to run pumps that move water through filters.
3	Why do engineers choose efficient pumps and LED lights for the town's services?	They provide needed motion or light while wasting less energy as unwanted heat, which can reduce fuel use and cost.
4	How does a battery help when wind speed changes? Include the energy forms involved.	A battery stores incoming electrical energy as chemical energy. Later, it transforms chemical energy back into electrical energy for the treatment plant or buildings, although some energy is released as heat.

PART 3 • YOUR TURN (SAMPLE ANSWER)

A solar streetlight captures radiant energy from sunlight and transforms it into electrical energy, which charges a battery by becoming chemical energy. After dark, the battery changes chemical energy to electrical energy, and the lamp changes it to light for safer sidewalks, while some energy becomes unwanted thermal energy.

Accept equivalent wording for energy forms and transformations when the pathway is scientifically accurate. For the open response, accept any realistic community application with at least two correct transformations and one identified unwanted energy form.