Coaster Energy Trail

Trace how energy moves and changes in a roller coaster system.

6.8.B "describe how energy is conserved through transfers and transformations in systems such as electrical circuits, food webs, amusement park rides, or photosynthesis; and"

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline every named form of energy. Then number each sentence that describes an energy transfer or transformation, so you can trace how energy is conserved.

Where Does the Coaster's Energy Go?

1. At an amusement park, a roller coaster begins with an electric motor pulling a train up a hill. Electrical energy from the power source transfers through wires to the motor. The motor transforms much of that energy into kinetic energy that lifts the train. As the train rises, its gravitational potential energy increases. Some energy also transfers to the motor and wires as thermal energy because of electrical resistance and friction. Energy is not created when the train reaches the top.

2. After the chain releases the train, gravitational potential energy transforms into kinetic energy as the train speeds downhill. On a climb, kinetic energy transforms back into gravitational potential energy. The wheels, track, and air rub against one another. This transfers part of the train's energy to the surroundings as thermal energy. Riders also hear sound, which carries a small amount of energy away. The train slows because energy has spread into these forms, not because energy disappeared.

3. At the end of the ride, brakes press against the train's wheels. Friction transforms most of the train's kinetic energy into thermal energy in the brake pads, wheels, and nearby air. A small amount becomes sound. The train stops, but the total energy of the train, brakes, and surroundings is conserved. To track energy in a system, name the starting form, each transformation, and where energy transfers. Including thermal and sound energy makes the explanation complete.

2 ANSWER WITH EVIDENCE

Use the passage

1. Describe the energy transfers and transformations that happen while the motor lifts the train up the first hill.

2. What energy transformation happens as the train travels downhill after the chain releases it?

3. Why does the train slow down without energy disappearing?

4. When the brakes stop the train, where does most of its kinetic energy go, and which system has conserved total energy?

3 YOUR TURN

Your own words

Write exactly 3 sentences explaining energy changes in a playground swing. Include an energy transfer from the rider, one transformation as the swing moves, and thermal energy or sound energy.

ANSWER KEY

Coaster Energy Trail

GRADE 6 · TEKS 6.8.B

PART 1 · READ AND MARK

Underline every named form of energy. Then number each sentence that describes an energy transfer or transformation, so you can trace how energy is conserved. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Describe the energy transfers and transformations that happen while the motor lifts the train up the first hill.	**Electrical energy transfers through the wires to the motor. The motor transforms much of it into kinetic energy that lifts the train, increasing gravitational potential energy. Some energy transfers to the motor and wires as thermal energy.**
2	What energy transformation happens as the train travels downhill after the chain releases it?	**Gravitational potential energy transforms into kinetic energy as the train speeds downhill.**
3	Why does the train slow down without energy disappearing?	**Friction and air resistance transfer energy to the surroundings as thermal energy, and some energy leaves as sound.**
4	When the brakes stop the train, where does most of its kinetic energy go, and which system has conserved total energy?	**Most kinetic energy transforms into thermal energy in the brake pads, wheels, and nearby air. Total energy is conserved in the system of the train, brakes, and surroundings.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

A rider uses chemical energy from food to push the swing, transferring energy to the swing as kinetic energy. As the swing rises, kinetic energy transforms into gravitational potential energy, and as it falls, that potential energy transforms back into kinetic energy. Air resistance and friction transfer some energy as thermal energy and sound, so the total energy of the rider, swing, and surroundings is conserved.

Accept equivalent descriptions that correctly trace energy through the coaster and include thermal energy or sound where the passage identifies it. For the open response, accept another accurate three-sentence swing explanation that includes the required transfer, transformation, and energy spread to the surroundings.