INFORMATIONAL READING COMPREHENSION:

Physics at Play! ROLLER COASTERS

Answer the following questions about "Physics at Play: Roller Coasters."

1. What is the central idea of the text?

a. Roller coasters do not need engines in order to take the riders through an exciting ride.

b. Thrill-seeking engineers with specialized physics knowledge design roller coasters.

c. Roller coasters utilize a combination of physics concepts to take passengers from start to finish.

d. Roller coasters rely on gravity, potential and kinetic energy, and inertia to keep passengers safe.

2. How does the author develop the central idea over the course of the text?

The author introduces physics concepts and explains how they each play a role in a roller coaster ride. Each concept is introduced chronologically as if the reader is on an actual roller coaster ride, experiencing the physics laws in order.

3. Based on information in paragraph 8, what is inertia?

a. the tendency of an object to remain still or on a constant course unless a force makes it change

b. a law of motion stating that energy can be changed into other forms but never truly lost

c. the tendency of an object to be drawn toward the center when moving along a circular path

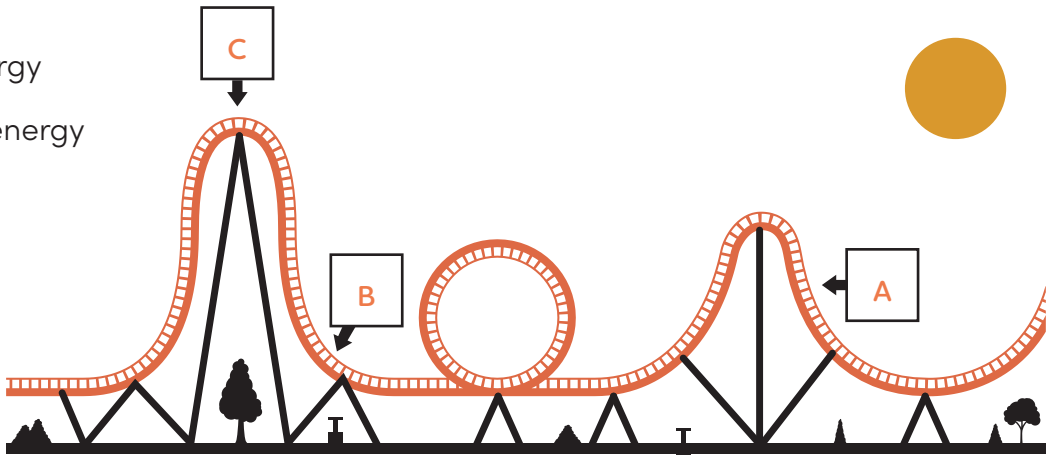
d. a law of motion stating that the higher an object is positioned, the more potential energy it has

4. Label the image of a roller coaster with A, B, and C, based on the associated descriptions below. Then, cite evidence from the passage to support your answers on the lines below the drawing.

A. a mostly even mix of potential and kinetic energy

B. a point of mostly kinetic energy

C. the point of maximum potential energy



EVIDENCE:

A. The diagram in the text shows potential and kinetic energy becoming more equal as the coaster descends.

B. Paragraph 6 says that at the bottom of a hill, most of the potential energy has become kinetic energy.

C. This is the highest hill, and paragraph 4 says that the higher up you go, the more potential energy there is.

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Keep going! Answer the following questions about "Physics at Play: Roller Coasters."

5. What similar effect do **friction** and **air resistance** have on a roller coaster's energy?

They are both forces that convert some of a roller coaster's kinetic energy into thermal energy. This process reduces the stored and moving energy of the roller coaster.

6. Part A. Why must the first hill of a roller coaster be the tallest hill of the ride?

a. so that friction and air resistance do not reduce the coaster's energy
b. so the roller coaster has enough energy left to climb other hills later in the ride
c. so the force of gravity can turn the kinetic energy into potential energy
d. so the roller coaster can use all of its energy before the loop-the-loops and other hills

Part B. Cite evidence from the text that supports your explanation.

Paragraph 4 explains that the roller coaster has more potential energy the higher up it is. This point of maximum potential energy must be earlier in the ride so that the energy can transfer to kinetic energy and take the roller coaster through the rest of its course.

7. What is the most likely reason the author chose to include the section **A Smooth Operation**?

a. to suggest that safety is the top priority for roller coaster engineers
b. to advocate for more research and safety standards in roller coaster design
c. to provide examples of how many engineers control a roller coaster ride
d. to educate about the role that science plays in the design process

8. Summarize the information in the last section of the passage, **A Smooth Operation**.

Engineers use physics to manipulate the energy of roller coasters and minimize the impact of forces like friction and air resistance on the coasters. They also use certain techniques, such as greasing tracks to minimize friction, in order to provide the smoothest and most thrilling ride.