Name _____

Energizing Thermodynamics: Defining Work

Open-Ended Response Answer Key

1. In this scenario, work is done when you lift the suitcase against the force of gravity. The force exerted is upward, opposite to the force of gravity pulling the suitcase down. The direction of motion is also upward, so the angle between the force and the direction of motion is 0 degrees.
2. Engineers and scientists need to understand the different types of work to design efficient machines, such as engines or generators. For example, in designing a car engine, they must consider both mechanical work and expansion work to maximize efficiency and performance.
3. When designing an energy-efficient transportation system, factors like reducing friction, optimizing engine design, and regenerating energy during braking would be considered. Work and energy transfer concepts would help in minimizing energy losses and maximizing efficiency.
4. When pushing a car uphill, the angle between the force exerted and the direction of motion affects the amount of work done. If the force is applied at an angle, less of the force contributes to the motion, and more of it acts perpendicular to the motion, resulting in less work done to move the car uphill.