

Name _____

Factors Influencing Kinetic Energy: What Makes Things Move?

Open-Ended Response Answer Key

1. Both mass and speed influence an object's kinetic energy, but they have different effects. Mass directly affects kinetic energy, with greater mass leading to higher kinetic energy. Speed, on the other hand, has a quadratic relationship with kinetic energy, meaning that a small increase in speed can result in a significant increase in kinetic energy. When both factors are considered together, an object with greater mass and higher speed will have the highest kinetic energy.
2. Real-world applications of kinetic energy include transportation (cars, trains), sports (balls, athletes), and amusement park rides (roller coasters). In transportation, the kinetic energy of a moving vehicle must be controlled to ensure safety. In sports, kinetic energy determines the speed and force of the game. In amusement park rides, the design relies on kinetic energy to create thrilling experiences for riders.
3. To create an exciting car racecourse that highlights kinetic energy, I would design various sections with different masses and speeds. For example, I might include a downhill section where cars gain speed, demonstrating the impact of speed on kinetic energy. There could also be sections with sharp turns that showcase changes in direction and their effect on kinetic energy.
4. Understanding kinetic energy is crucial for safety in various activities. In sports, protective gear and safety measures are designed considering the kinetic energy involved in collisions. In transportation, seatbelts and airbags are essential for managing kinetic energy during accidents. In construction, safety measures are in place to prevent objects with significant kinetic energy, such as heavy machinery, from causing accidents.

