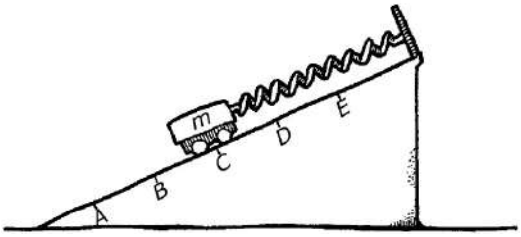
NAME _____ DATE _____

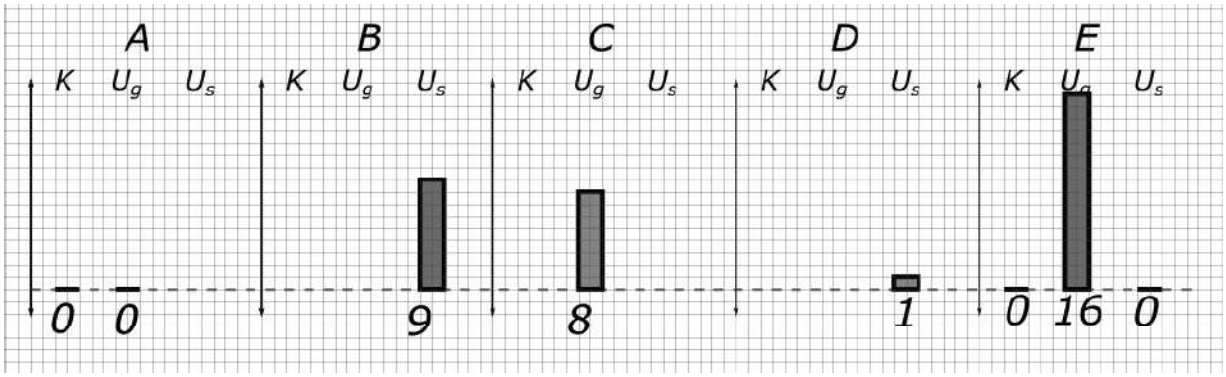
Scenario

A cart of mass m *is attached to an ideal spring that can stretch and compress equally well. The natural length of the spring without the cart is at point* E*. The cart and spring rest on a smooth angled track. The cart is pulled to position* A *and released. The cart then moves toward position* E*, where it reverses direction and returns again to position* A*.*



Using Representations

PART A: Sketch energy bar charts for the cart-spring-Earth system at the five labeled points. Choose point A to be equal to zero height for gravitational potential energy. (Some of the bars have been sketched for you.)



Analyze Data

PART B: Write a short narrative explaining the thought process that allowed you to fill in the bar charts in Part A.

PART C: Do the energy bar charts depend on whether the cart is moving left (down the track) or right (up the track)? Explain.

PART D: As the cart moves from A to E, the total energy of the system should be the same at each labeled point. Explain why this is the case. If your energy bar charts do not show this relationship, then make corrections to your bar charts.

PART E: As the cart moves from A to E, the gravitational potential energy should increase by the same amount between each labeled point. Explain why this is the case. If your energy bar charts do not show this relationship, then make corrections to your bar charts.

PART F: As the cart moves from E to A, the spring potential energy should increase quadratically between each labeled point. Explain why this is the case. If your energy bar charts do not show this relationship, then make corrections to your bar charts.