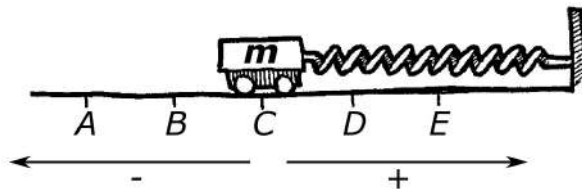


NAME _____

DATE _____

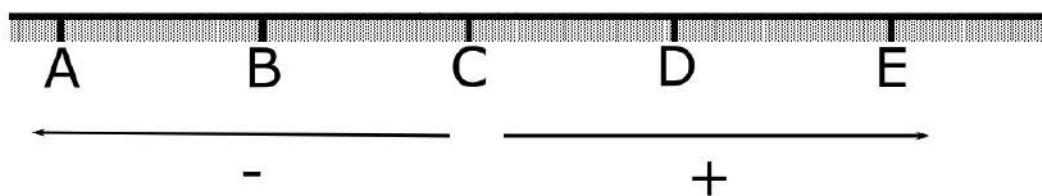
Scenario

A cart of mass m is attached to an ideal spring that can stretch and compress equally well. The cart and spring rest on a smooth horizontal 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: Show with a sketch of a position diagram how the velocity of the cart changes between the points indicated.

Position Diagram for motion between points A and E



PART B: The dots below represent the cart at the different labeled positions. Draw free-body diagrams showing and labeling all the forces (not components) exerted on the cart at each labeled position. Draw the relative lengths of all vectors to reflect the relative magnitudes of all forces. You will create one set of sketches for when the cart is moving to the right and a second set for when the cart is moving to the left.

	FBD of Cart at Point A	FBD of Cart at Point B	FBD of Cart at Point C	FBD of Cart at Point D	FBD of Cart at Point E
Moving Right					
Moving Left					

Argumentation

PART C: Claim and Evidence: Do the diagrams above indicate whether the cart is moving left or right? Justify your claim with evidence.

PART D: Reasoning: At each position, compare the direction of the net force exerted by the spring on the cart and the cart’s displacement from equilibrium when at that position. Note that this question IS NOT asking whether the cart is moving right or left. Use these results to briefly explain why your claim in Part C makes sense.

	Position A	Position B	Position C	Position D	Position E
Direction of the Net Force					
Direction of Displacement from Equilibrium					