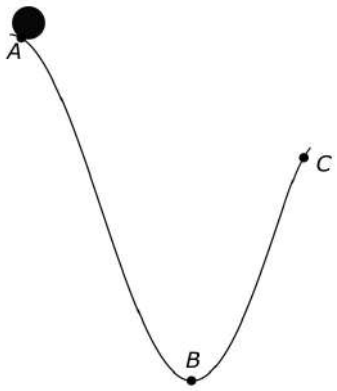
NAME _____ DATE _____

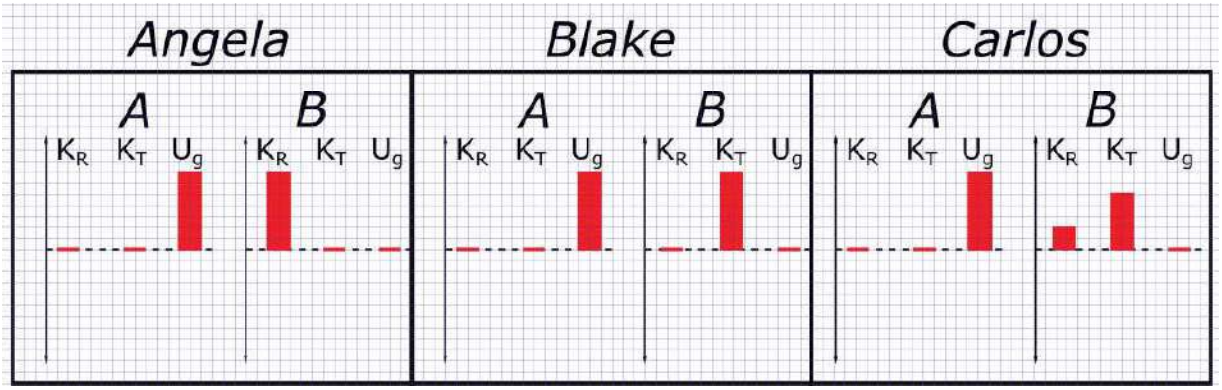
Scenario

A solid sphere is initially at rest at the top of a tall, rough hill. It rolls down the hill and up the next hill.



Using Representations

PART A: Angela, Blake, and Carlos each create an energy bar chart for the sphere-Earth system for the time between when it is released from rest at point A and when it reaches point B. For each graph, explain why it is either correct or incorrect.



© 2019 College Board

PART B: How would each of the bar charts drawn in Part A be different if Earth were not part of the system?

PART C: The sphere continues to roll along the track without slipping and at point C, it leaves the track. At the sphere's highest point, will it be above, below, or at the same height as point A? Explain your reasoning.

_____ Above _____ Below _____ Same Height

PART D: The sphere is then taken to an identically shaped track with negligible friction and released from point A. Is the sphere's maximum height after leaving the track greater than, less than, or the same as the height it reached on the rough track?

_____ Greater than _____ Less than _____ Same as

Explain your reasoning.

© 2019 College Board