

NAME _____

DATE _____

Scenario

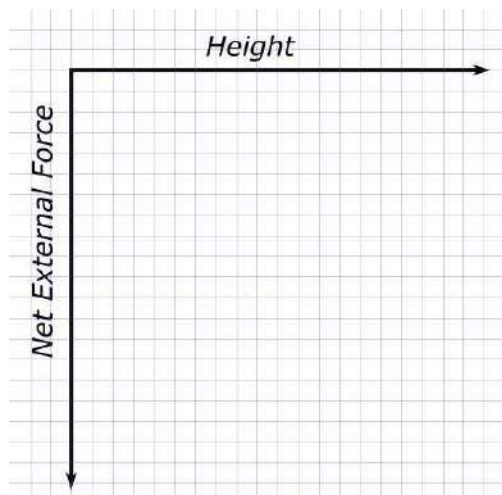
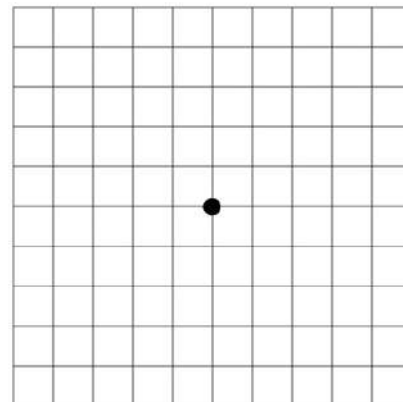
A ball falls from rest from a height h . Consider the ball to be the system.

Using Representations

PART A: Draw a dotted circle around the system.

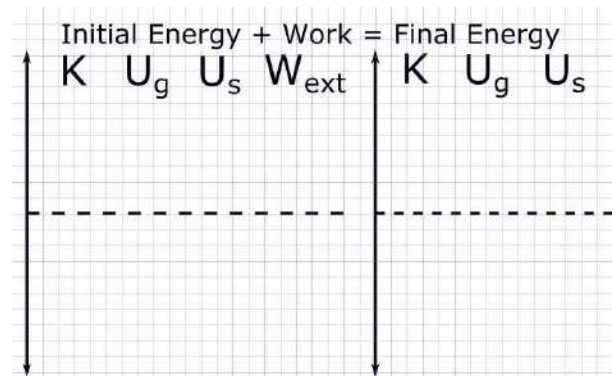
PART B: The dot at right represents the ball. Draw a free-body diagram showing and labeling the forces (not components) exerted on the ball. (This should only include forces exerted on the system.) Draw the relative lengths of all vectors to reflect the relative magnitudes of all the forces. Each force must be represented by a distinct arrow starting on and pointing away from the dot.

PART C: On the grid below, sketch a graph of the net external force on the ball vs. height. What are the units of the area under the curve? What does the area under the curve represent?



4.B Choosing Systems

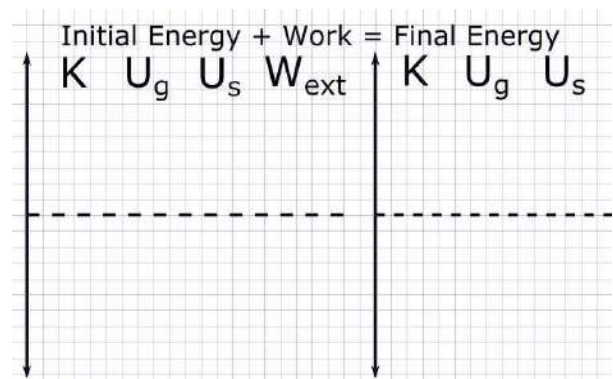
PART D: Fill in the energy bar chart to describe the energy of the system from when the ball is dropped to just before it hits the ground. Use the lines below to explain your reasoning.



Argumentation

PART E: Does the mechanical energy increase, decrease, or stay the same as the ball falls from height h ? Justify your answer by referencing the energy bar chart created in Part D.

PART F: If the system were to include Earth, how would that change the energy bar chart? Sketch a new chart and discuss the changes.



PART G: If the system were to include Earth, would the mechanical energy increase, decrease, or stay the same while the ball was falling? Justify your answer by referencing the energy bar chart created in Part F.
