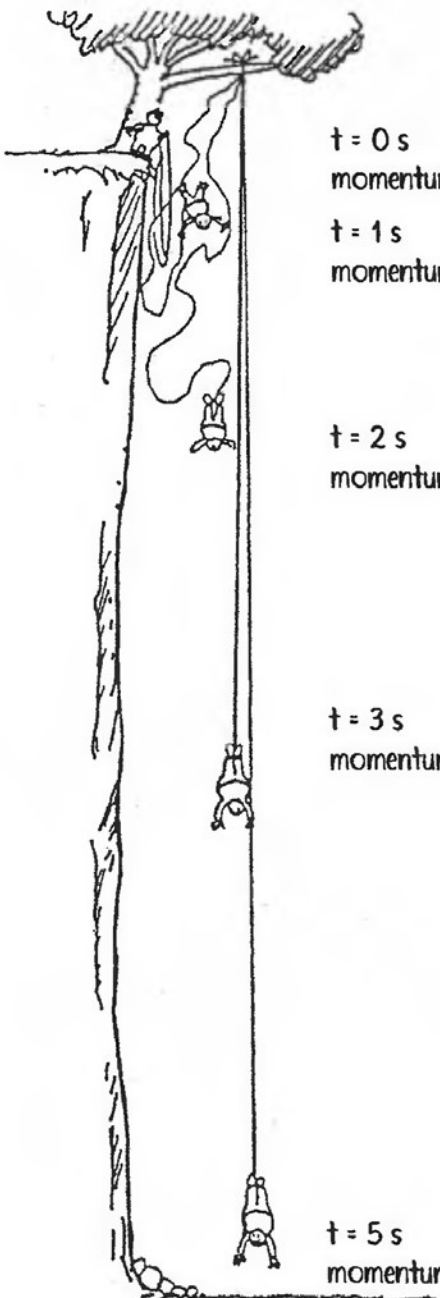
Name ________________________________ Date ____________

CONCEPTUAL Physics PRACTICE PAGE

Chapter 7 Energy

Momentum and Energy

Bronco Brown wants to put $Ft = \Delta mv$ to the test and try bungee jumping. Bronco leaps from a high cliff and experiences 3 s of free fall. Then the bungee cord begins to stretch, reducing his speed to zero in 2 s. Fortunately, the cord stretches to its maximum length just short of the ground below.



t = 0 s v = ______ momentum = ______

t = 1 s v = ______ momentum = ______

t = 2 s v = ______ momentum = ______

t = 3 s v = ______ momentum = ______

t = 5 s v = ______ momentum = ______

Fill in the blanks:

Bronco's mass is 100 kg.
Acceleration of free fall is 10 m/s^2.

Express values in SI units (*distance* in m, *velocity* in m/s, *momentum* in kg•m/s, *impulse* in N•s, and *deceleration* in m/s^2).

The 3-s free-fall distance of Bronco just before the bungee cord begins to stretch
= ______________

Δmv during the 3 to 5-s interval of free fall
= ______________

Δmv during the 3 to 5-s of slowing down
= ______________

Impulse during the 3 to 5-s of slowing down
= ______________

Average force exerted by the cord during the 3 to 5-s interval of slowing down
= ______________

How about *work* and *energy*? How much KE does Bronco have 3 s after he first jumps?

____

How much does gravitational PE decrease during this 3 s?

____

What two kinds of PE are changing during the 3 to 5-s slowing-down interval?

____

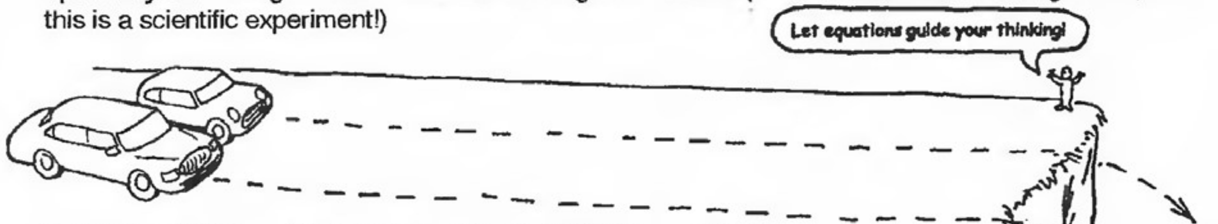
____

Hewitt Drew it!

CONCEPTUAL Physics PRACTICE PAGE

Chapter 7 Energy
Energy and Momentum

A MiniCooper and a Lincoln Town Car are initially at rest on a horizontal parking lot at the edge of a steep cliff. For simplicity, we assume that the Town Car has twice as much mass as the MiniCooper. Equal constant forces are applied to each car and they accelerate across equal distances (we ignore the effects of friction). When they reach the far end of the lot, the force is suddenly removed, whereupon they sail through the air and crash to the ground below. (The cars are wrecks to begin with, and this is a scientific experiment!)



1. Which vehicle has the greater acceleration? (Think $a = F/m$.)

____

2. Which vehicle spends more time along the surface of the lot? (The faster or slower one?)

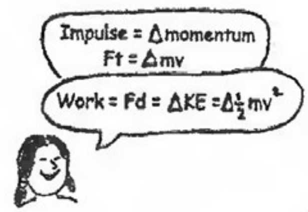
____

3. Which vehicle has the larger impulse imparted to it by the applied force? (Think Impulse = Ft.) Defend your answer.

____

4. Which vehicle has the greater momentum at the cliff's edge? (Think $Ft = \Delta\, mv$.) Defend your answer.

____



5. Which vehicle has the greater work done on it by the applied force? (Think $W = Fd$.) Defend your answer in terms of the distance traveled.

____

6. Which vehicle has the greater kinetic energy at the edge of the cliff? (Think $W = \Delta\, KE$.) Does your answer follow from your explanation of Question 5? Does it contradict your answer to Question 3? Why or why not?

____

____

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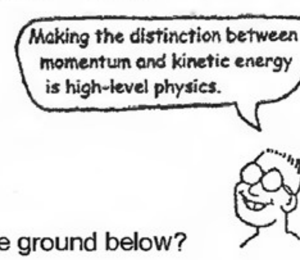

7. Which vehicle spends more time in the air, from the edge of the cliff to the ground below?

____

8. Which vehicle lands farther horizontally from the edge of the cliff onto the ground below?

____

Challenge: Suppose the slower vehicle crashes a horizontal distance of 10 m from the ledge. Then at what horizontal distance does the faster car hit? ____________________

____

____