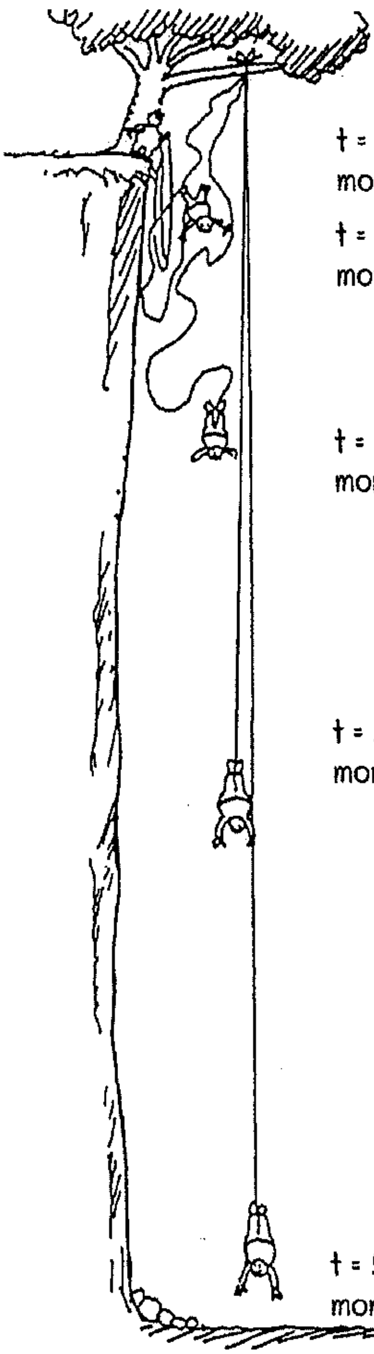
Name ______________________ Date __________

CONCEPTUAL **Physics** PRACTICE PAGE

Chapter 7 Energy
Momentum and Energy



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 = ________

Bronco Brown wants to put $Ft = \Delta mv$ to the test and try bungee jumping. Bronco leaps from a high cliff and experiences free fall for 3 seconds. 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.

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-second free-fall distance of Bronco just before the bungee cord begins to stretch
= ________

Δmv during the 3-s interval of free fall
= ________

Δmv during the 2-s interval of slowing down
= ________

Impulse during the 2-s interval of slowing down
= ________

Average force exerted by the cord during the 2-s interval of slowing down
= ________

How about *work* and *energy?* How much KE does Bronco have 3 seconds after his jump?
= ________

How much does gravitational PE decrease during this 3 seconds?
= ________

What two kinds of PE are changing during the slowing-down interval?

____

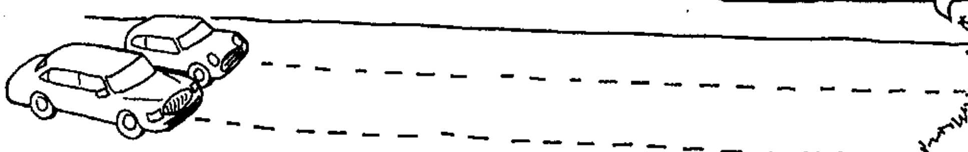
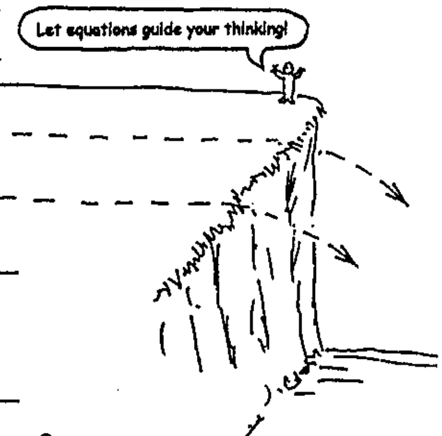
____

Hewitt Drew it!

CONCEPTUAL Physics PRACTICE PAGE

Chapter 7 Energy
Energy and Momentum

A compact car and a full-size sedan are initially at rest on a horizontal parking lot at the edge of a steep cliff. For simplicity, we assume that the sedan has twice as much mass as the compact car. 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 car has the greater acceleration? (Think $a = F/m$.)

____

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

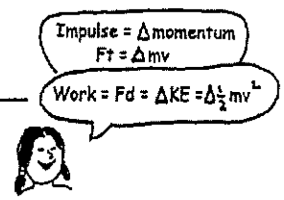
____

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

____

4. Which car has the greater momentum at the edge of the cliff? (Think $Ft = \Delta mv$.) Defend your answer.

____



5. Which car 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 car 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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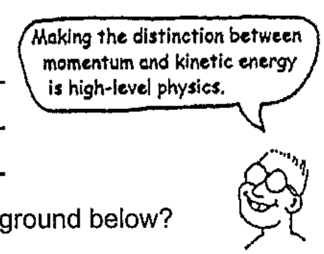

7. Which car spends more time in the air, from the edge of the cliff onto the ground below?

____

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

____

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

____

____

Hewitt Drew it!