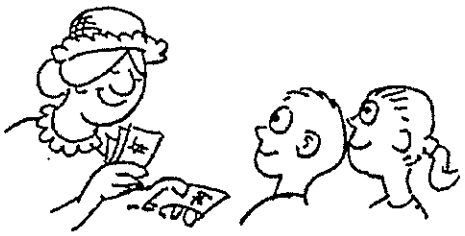
Name _____ Date _____

CONCEPTUAL Physics PRACTICE PAGE

Chapter 3 Linear Motion

Free Fall Speed



1. Aunt Minnie gives you $10 per second for 4 seconds. How much money do you have after 4 seconds?
   _____

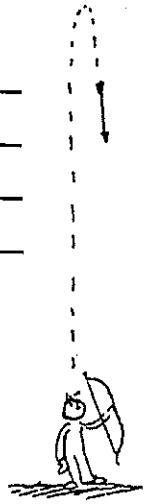
2. A ball dropped from rest picks up speed at 10 m/s per second. After it falls for 4 seconds, how fast is it going? _____

3. You have $20, and Uncle Harry gives you $10 each second for 3 seconds. How much money do you have after 3 seconds? _____

4. A ball is thrown straight down with an initial speed of 20 m/s. After 3 seconds, how fast is it going? _____

5. You have $50, and you pay Aunt Minnie $10/second. When will your money run out? _____

6. You shoot an arrow straight up at 50 m/s.
   a. In how many seconds will it run out of speed? _____
   b. What will be the arrow's speed 5 seconds after you shoot it? _____
   c. What will be the arrow's speed 6 seconds after you shoot it? _____
   d. What will be the arrow's speed 7 seconds after you shoot it? _____



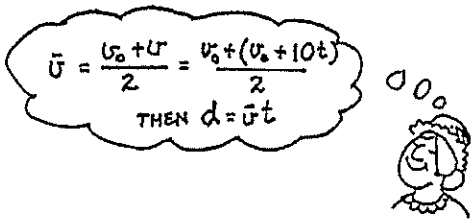
Free Fall Distance

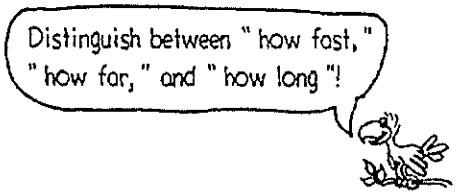
1. Speed is one thing; distance is another. How high is the arrow that you shoot up at 50 m/s when it runs out of speed? _____

2. How high will the arrow be 7 seconds after being shot up at 50 m/s? _____

3. Aunt Minnie drops a penny into a wishing well, and it falls for 3 seconds before hitting the water.
   a. How fast is it going when it hits? _____
   b. What is the penny's average speed during its 3-second drop? _____
   c. How far down is the water surface? _____

4. Aunt Minnie didn't get her wish, so she goes to a deeper wishing well and throws a penny straight down into it at 10 m/s. How far does this penny go in 3 seconds? _____





Chapter 3 Linear Motion

Acceleration of Free Fall

A rock dropped from the top of a cliff picks up speed as it falls. Pretend that a speedometer and odometer are attached to the rock to show readings of speed and distance at 1-second intervals. Both speed and distance are zero at time = zero (see sketch). Note that after falling 1 second, the speed reading is 10 m/s and the distance fallen is 5 m. The readings for succeeding seconds of fall are not shown and are left for you to complete.
Draw the position of the speedometer pointer and write in the correct odometer reading for each time. Use $g = 10\ m/s^2$ and neglect air resistance.

YOU NEED TO KNOW:

Instantaneous speed of fall from rest:

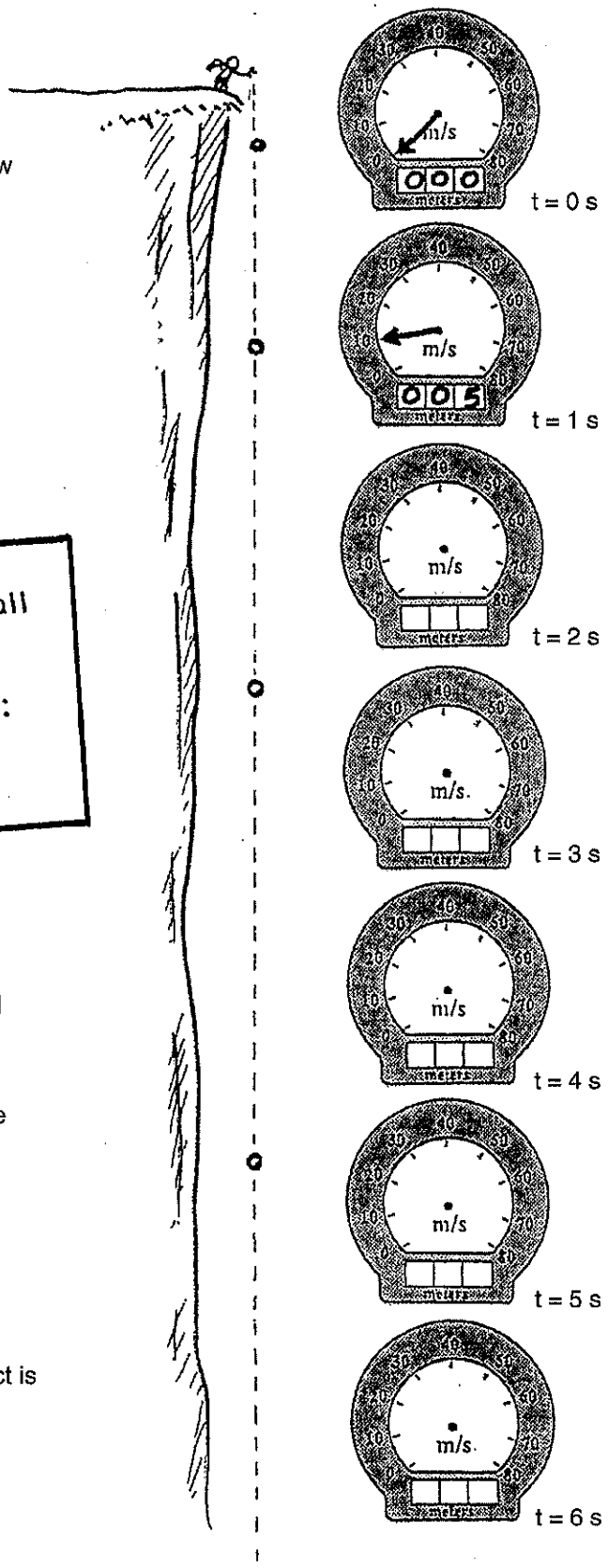
$$v = gt$$

Distance fallen from rest:

$$d = v_{average}t$$

or

$$d = \tfrac{1}{2}gt^2$$



1. The speedometer reading increased by the same amount, _____ m/s, each second. This increase in speed per second is called _____.

2. The distance fallen increases as the square of the _____.

3. If it takes 7 seconds to reach the ground, then its speed at impact is _____ m/s, the total distance fallen is _____ m, and its acceleration of fall just before impact is _____ m/s^2.