W1.04

Physics "Counting" Worksheet

(9/24/04)

By using counting techniques, compute (or estimate where computation by counting is difficult) the answers to the following questions:

1. A stone is dropped from rest from the edge of a very high cliff.
   a. What is its speed 12 seconds later? **120 m/s**
   b. What is its acceleration 4 seconds later? **10 m/s/s**
   c. How far will it fall in 8 seconds? **320 m**
   d. How far does it fall in its third second of flight? **25 m**
   e. How far does it fall in 7.3 seconds? **About 250 meters**

2. A car accelerates at 6 m/s/s from rest. How long does it take to reach 27 m/s (approximate highway speed)? **4.5 sec** How far does it travel in that time? **About 60-65 meters**

3. A runner travelling at 10 m/s begins to slow at a constant rate of –1 m/s/s. How far will he travel while slowing to rest? **50 meters**

4. A car slows from 30 m/s to 20 m/s in 5 seconds. How far does it travel during that time? **125 meters** What is its constant acceleration? **–2 m/s/s**

5. A ball is dropped on a planet with an acceleration of gravity of 4 m/s/s. Fill in the chart below showing the speed of the ball and the total distance the ball has fallen versus time for the first 8 seconds of its fall.

Time (seconds)	Speed (m/s)	Position (meters)
0	0	0
1	4	2
2	8	8
3	12	18
4	16	32
5	20	50
6	24	72
7	28	98
8	32	128