OUTDOOR ACCELERATION

Devise an experiment that proves, hopefully, that you too can accelerate, and not just in vertical direction. For example, if you were to lay out a forty yard "sprint" course with markers set every 10 yards – a well thought out plan for the running of this straight course could possibly provide some idea of your acceleration rate. Remember we're limited to pens & paper, a stop watch or two, working within our lab group, knowledge of our individual pace length and field markers to layout our course.

(1) One idea would be to have one person with a stop watch, time everyone's last ten yards of a 40 yard sprint, then each person's second to the last ten yards of the sprint, then each person's third to last ten yards of the sprint and so on until all 10 yard increments have been timed for that one person - the "timer" of course would alternate with the other lab members so that every one ran the course and everyone would alternate such that each person ran only one segment at a time until all the other members ran that segment. From this a Δt_1 could be measured for each segment.

(2) Simultaneous with the timing of the ten-yard times as indicated above, another person with a separate stop watch could clock the time it takes for the runner to reach the **center** of each ten yard segment. From this a Δt_2 could be measured for each segment.

(3) From (1) above you would be able to get the average velocity ($v = \Delta d/\Delta t$) of each segment (*where "Δd" in each case is 30 feet*) and thereby be able to calculate the change in velocity (Δv) from segment to segment. From (2) above, you would be able to get the change in time (Δt_2) from segment to segment and thereby be able to calculate the acceleration for each ten yard segment via, $a = \Delta v/\Delta t_2$.

Assuming that the center of each of the segments was about where the acceleration was most representative or where the average velocity was representative for that segment you could plot average velocity (*$\Delta d/\Delta t$ for each segment)* versus time (Δt_2) to the center of the respective segment. Either from the slope of the resulting graph or via direct from the calculations of (3) above, your acceleration, either constant or varying could be calculated.