

Outdoor Activity: Measuring Speed

Objective: to measure in a real-world situation the fundamental kinematic properties of elapsed time, average speed, displacement, and average velocity

Procedure

Find a partner and a one stopwatch for the two of you.

- When the teacher asks you to head down to the football field, bring the stopwatch, a pencil, this document, and a notebook.
- Determine first the time that it takes your partner to complete each of the tasks listed in the table below. **This is all you need to measure outdoors.** We can do the calculations indoors.
- After recording all the times, head back in to the classroom and calculate the necessary quantities to complete the table.
- Note that 1 mile (mi) = 5280 ft, 1 yard (yd) = 3 ft, and 1 meter (m) = 1.094 yd. Do you know how to find this information in your textbook?

Method	Distance d (yd)	Measure Outdoors Elapsed Time Δt (s)	Calculate Indoors				
			Average Speed $d/\Delta t$			Total Displacement Δx (m)	Average Velocity $\Delta x/\Delta t$ (m/s)
			(yd/sec)	(mi/hr)	(m/s)		
Running	20 yd						
Running	40 yd						
Running	2 yd						
Skipping	30 yd total: 15 yd out, 15 yd back						
Spinning	15 yd						
Goofing off and/or being silly	50 yd total: 20 yds out, 10 yds back, 20 yds out						

Answer in complete sentences:

1. What was the point of this exercise?
2. What were the greatest sources of experimental error in this experiment? (Note: if you wish to include 'human error,' please include the specific type of error the human made, and why the human involved didn't simply correct the error he or she made.)
3. What part of this exercise did you find the most difficult? What specific steps can you take to make sure that you understand these difficulties by the time of the next exam?