

Walking Lab

Walking Lab Part 1:

Purpose:

To understand the relationship between distance and time

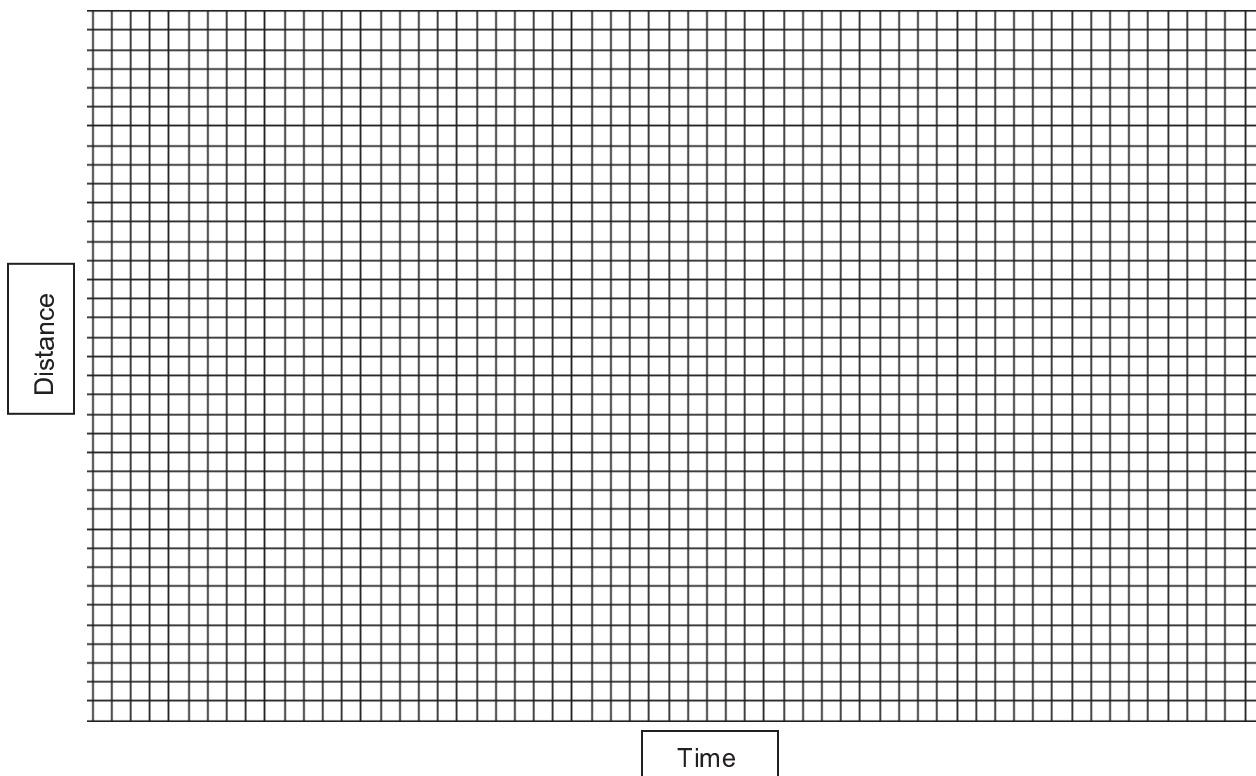
Procedure:

The walkers will start at the 0 m mark. All of the timers will begin timing simultaneously when he/she begins walking. Each walker will be instructed to walk at a different pace.

- One person will walk a constant, normal pace.
- One person will walk a constant, slow pace.
- One person will begin walking at a constant pace and then speed up.
- One person will begin walking a constant pace and then slow down.

After the walker completes the 30 m, he/she will need to get the data from the timers or another student. Record each person's time for each distance walked in the chart below. After you have completed your chart, graph each person's data on one distance vs. time graph. Remember, the x-axis is the independent variable: time and the y-axis is the dependent variable: distance.

Pace Scenario	Time (s) at:					
	5m	10m	15m	20m	25m	30m
Constant, normal pace Red						
Constant, slow pace Blue						
Constant pace, then speed up Orange						
Constant pace, then slow down Green						



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Walking Lab Part 2:

Speed is the rate at which an object changes position. Speed involves two qualities: distance and time.

The formula to calculate average speed is: $s = d_2 - d_1 / t_2 - t_1$

In the formula, d_1 is usually 0 m and t_1 is usually 0s. So, the formula for speed could be simplified to distance divided by time.

Use the data collected in part 1 to calculate the speed. Then, complete the graph plotting speed vs. time.

Example:

Distance (m)	5m	10m	15m	20m	25m	30m
Time (s)	3s	6.4s	9.2s	11.9s	15.1s	18.2s
Speed (m/s)	1.67m/s	1.47m/s				

To find the speed:

1. Use the formula speed = distance / time.
2. Divide the first distance (**5m**) by the first time (**3s**). $5m/3s=1.67m/s$
3. Subtract the first distance from the second distance. $10m - 5m = 5m$
4. Subtract the first time from the second time. $6.4s - 3s = 3.4s$
5. Use the formula speed = distance / time to find the speed for that section of the track.
 $5m/3.4s=1.47m/s$
6. Repeat steps 3–5 for the other sections.

Constant, normal pace (Red):

Distance (m)	5m	10m	15m	20m	25m	30m
Time (s)						
Speed (m/s)						

Constant, slow pace (Blue):

Distance (m)	5m	10m	15m	20m	25m	30m
Time (s)						
Speed (m/s)						

Constant pace, then speed up (Orange):

Distance (m)	5m	10m	15m	20m	25m	30m
Time (s)						
Speed (m/s)						

Constant pace, then slow down (Green):

Distance (m)	5m	10m	15m	20m	25m	30m
Time (s)						
Speed (m/s)						

Part 2 (continued):

1. Put the name of the students in order from first to finish the 30m course to last to complete the course.

1st =

2nd =

3rd =

4th =

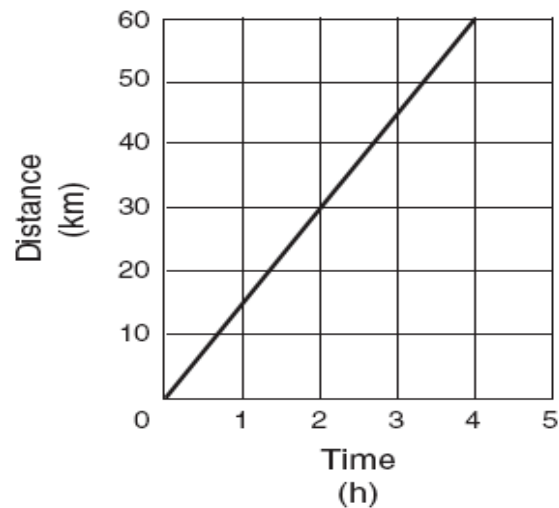
2. Calculate the average speed for each walker by dividing the total distance traveled (30m) by the total time it took to travel the course. Remember to use the formula $S=D/T$.

Walker	Total D (m)	Total T (s)	Avg Speed m/s

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Walking Lab Part 3:

Answer the following questions using the graph below:



What can we tell about the speed of the object by interpreting this graph?

Was there a change in position involved? Support your answer with evidence.

Is the object moving away from or toward the origin? How do you know?

What can be determined about the forces that may be involved in this scenario?

Calculate the average speed of the object. (Show your work.)