Name: _____ Date: _____

PHYSICS
Activity: My Average Speed & Average Velocity

Purpose: Students will determine their personal average speed and average velocity.

Calculations

Average Speed = total distance divided by total time
- Distance in meters
- Time in seconds

$$v_{avg} = \frac{\text{Total distance}}{\text{Total time}}$$

Average Velocity = displacement divided by total time
- Displacement in meters
- Time in seconds

$$\vec{v}_{avg} = \frac{\text{Displacement}}{\text{Total time}}$$

- Distance = the total path of travel. "How far" you move.
- Displacement = the "change in position". It is the straight-line length between the start position and the current or final position.

Part 1: Motion in a straight line.
(move slow pace, move medium pace, and move very fast pace)

1. Move slow: You will walk very slowly through the corridor from start to finish. Record the time (in seconds).
2. Return to start.
3. Move medium: You will walk faster (medium pace) through the corridor from start to finish. Record the time (in seconds).
4. Return to start.
5. Move very fast: You will jog or do a very fast walk through the corridor from start to finish. Record the time in seconds.
6. The length of the corridor is 32 meters

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	Total Distance (m)	Displacement (m)	Total time Time (s)	Avg Speed (m/s)	Avg Velocity (m/s)
Move slow					
Move medium					
Move very fast					

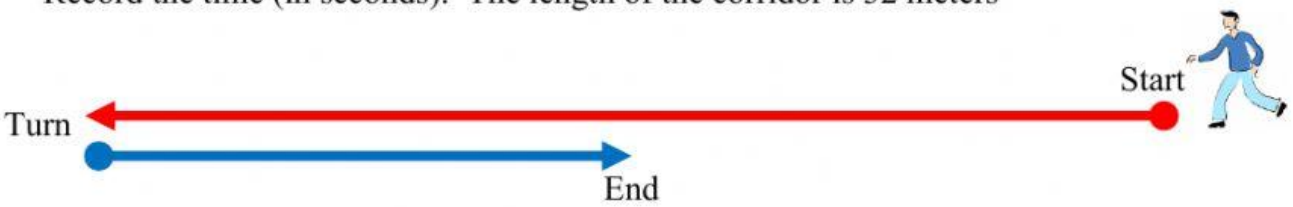
Part 2: Motion in two directions.
From start-to the opposite side-back to start.

You will walk at a moderate pace through the corridor from start to the opposite side, turn without stopping, then walk back to start. Record the time (in seconds). The length of the corridor is 32 meters.

	Total Distance (m)	Displacement (m)	Total time Time (s)	Avg Speed (m/s)	Avg Velocity (m/s)
Move medium					

Part 3: Motion in two directions
From start-to the opposite side-to midpoint between start and turn.

Move faster: You will walk at a fast pace through the corridor from start to the opposite end, turn without stopping, then walk back to the midpoint between the start and the turn. Record the time (in seconds). The length of the corridor is 32 meters



	Total Distance (m)	Displacement (m)	Total time Time (s)	Avg Speed (m/s)	Avg Velocity (m/s)
Move medium					

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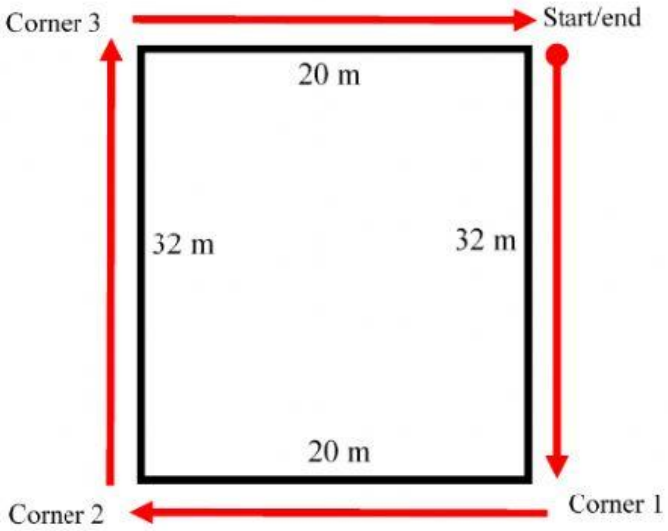
Part 4: Walking in a complete circuit (around the block).

A person will walk around a rectangular corridor system. The lengths of the block's sides are provided on the diagram below. The person will begin at Start (NE corner). He will walk around the block in order from Start → Corner 1 → Corner 2 → Corner 3 → back to start.

Starting from start at time = 0, you will record the time for the person to arrive at each corner. Record the walk times in seconds to the nearest whole second (no decimals are needed). The time from start to each corner will be progressive.

- Record walk time from Start to Corner 1
- Record walk time from Start to Corner 2
- Record walk time from Start to Corner 3
- Record walk time from Start to Corner 4



	Total Distance d (m)	Displacement Δx (m)	Total Time t (s)	Avg. Speed v (m/s)	Avg. Velocity $\vec{v}$ (m/s)
Start → corner 1					
Start → corner 2					
Start → corner 3					
Start → Start					

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Part 3: Riding the Rollercoaster. CoasterForce is a group of amusement park enthusiasts that travel all over the world to record video footage of roller coasters from the rider's perspective. Using their video footage, determine the average speed of the four rollercoasters.

	Rollercoaster	Park	Location
Video 1	Leap the Dips	Lakemont Park	Altoona, PA
Video 2	Cannonball	Lake Winnipesauke	Rossville, GA
Video 3	The Voyage	Holiday World	Santa Claus, IN
Video 4	Fury 325	Carowinds	Charlotte, NC

Watch the videos. Using the stopwatch feature on your smart phone, record the times for the roller coasters to move from the top of the lift hill (very first, tallest hill) and the end of the run (read instructions). Round time to the nearest whole second. Times must be in seconds, convert minutes to seconds if needed. Determine the average speed of the roller coasters.

	Leap the Dips	Cannonball	The Voyage	Fury 325
Length of track (m)	420 m	610 m	1780 m	1790 m
Time (s)				
Average Speed (m/s)				

- Leap the Dips: From top of lift hill to the blue shirt brake operator.
- Cannonball: From top of lift hill to the green shirt brake operator.
- The Voyage: From top of lift hill to the air brakes start (train is inside mesh fencing, 3:56 in video).
- Fury 325: From top of lift hill to when it comes to "almost stop" on the downward sloping brake hill (1:59 in video).

Leap the Dips: https://www.yout-ube.com/watch?v=zm0CiPtqwS8
Cannonball: https://www.yout-ube.com/watch?v=5fvyx3nRn7E
The Voyage: https://www.yout-ube.com/watch?v=b61CWb96BOQ
Fury 325: https://www.yout-ube.com/watch?v=mCBZBXKfUQA

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