Name: _____   Date: _____

Lab: The Running Man – Speed and Acceleration

Learning Goals
1. Collect data during an experiment.
2. Create distance-time and speed-time graphs from collected data
3. Calculate average acceleration from collected data

Materials
- Timers
- Track and field tape

Procedure
1. Measure out 15 metres.
2. Mark the following distances: 0, 1, 2, 3, 4, 5, 7, 10 and 15 m.
3. Two students will be at each position with a stopwatch or timer, one on each side of the track.
4. One student, the runner, will wait at the start line. At the countdown, the runner will begin to run and all students will stop their stopwatches. As the runner passes each point, the timers should stop their stopwatches.
5. The time at each point will be recorded. Three trials will be done.

Results

A	B			C
Distance (m)	Time from Start (s)			Average Time (s)
	Trial 1	Trial 2	Trial 3	
0	0.00	0.00	0.00	0.00
1				
2				
3				
4				
5				
7				
10				
15				

D	E	F	G	H
Interval	Interval Distance (m)	Interval Time (s) Column C (high – low)	Average Speed (m/s) Column E ÷ Column F	Mid-Interval Time (s) Column F/2 + C (low)
0-1 m	1.00			
1-2 m				
2-3 m				
3-4 m				
4-5 m				
5-7 m				
7-10 m				
10-15 m				

1. Plot data from Column A (*distance from start)* and Column C (*average time from start*) to make a distance-time graph. (8 marks)
2. Plot data from Column G (*average speed*) and Column H (*mid-interval time*) to make a speed-time graph. (8 marks)

Discussion
1. Use your distance-time graph.
    a. Is the data in a straight line? Explain why or why not. (2 marks)
    b. Determine the average speed over the whole run. (2 marks)
    c. What do you think would happen to the data points if the runner ran for a longer distance? Why? (2 marks)
2. Use your velocity-time graph.
    a. Describe the shape of the data points. (1 mark)
    b. What is the average acceleration over the whole run? (2 marks)