Graphing Motion: the 100m Sprint.   Name: _____

Aim: To record information on displacement and time for a sprinter running a 100m sprint.

Equipment: Stopwatch, trundle wheel, chalk

Method:

Set up 10-metre intervals on a 100m running track.

When the starter says "go", the timers start timing and the sprinter run towards the finish.

The timers stop their stopwatches when the sprinter runs past them.

Ideally, 2 students will be placed at each interval and the average time that they measure can then be recorded.

Collect data for at least three sprinters. Your teacher will choose 2 sets of data that have the least errors. (If a bike is available you might like to collect data for a 100m bike sprint as well.)

A	B	C	D
Displacement (m)	**Split Times** (s)		
	Subject 1	Subject 2	Subject 3
0	0	0	0
10			
20			
30			
40			
50			
60			
70			
80			
90			
100			

Q1. Draw **Displacement vs Time graphs** (Column A vs Columns B, C, and D) for your three subjects and for Usain Bolt) on one set of axes with **displacement on the y-axis** and **time on the x-axis**. Draw a "line-of-best-fit".

Q2. How far did each subject run in 1 second?
   (i) _____   (ii) _____   (iii) _____

Q3. How far did each subject run in 2 seconds?
   (i) _____   (ii) _____   (iii) _____

Q4. How far did each subject run in 3 seconds?
   (i) _____   (ii) _____   (iii) _____

Q5. How much time did it take for each subject to run 35 metres?
   (ii) _____   (ii) _____   (iii) _____

(Note: the answers to Qs 6-8 below are not necessarily the same as the answers to Qs 2-4)

Q6. How far did each subject run in the first second?
   (i) _____   (ii) _____   (iii) _____

Q7. How far did each subject run in the second second?
   (i) _____   (ii) _____   (iii) _____

Q8. How far did each subject run in the third second?
   (i) _____   (ii) _____   (iii) _____

Q9. What do you notice about the distances in questions 6, 7 and 8? _____
_____
_____

Q10. How can you judge a runner's velocity from a Displacement vs Time graph? _____
_____
_____

Q11. How did the runners' velocities change during their sprints? _____
_____
_____
_____