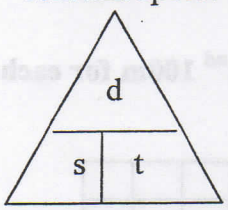
Speed and Acceleration Lab **Name:**_____

Problem: How fast can you accelerate and can you accelerate from a sprinting start for 200 meters?

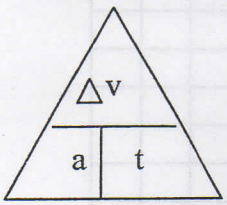
Gathered Data:

- Speed is the distance an object travels per unit of time. Speed can be expressed as kilometers per hour (km/hr), **meters per second** (m/s), and so on. In most cases, objects don't travel at a constant speed. Therefore, the average speed is used to describe the motion.



s = speed, t = time, and d = distance

- Acceleration is the rate at which an object's speed changes. Acceleration can be expressed as meters per second per second (m/s/s or m/s^2). Forces such as gravity, air resistance, and friction can cause an object to decelerate (decrease speed over time).



a = acceleration, Δv = change in velocity or speed, and t = time

Δ v = final velocity or speed – initial velocity or speed

Hypothesis: (answer the questions above)

_____

Experiment:

Materials- 200m track, Stop Watch

Procedure-

1. Students run a 200m from 50yd line to 50yd line.
2. Time is recorded at the 100m mark and finish.

Data:

	0m-100m split	0m-100m speed	0m-100m Accel	100-200m split	100-200m speed	100-200m Accel	0-200m time	0-200m speed
1								
2								
3								
4								
5								
6								

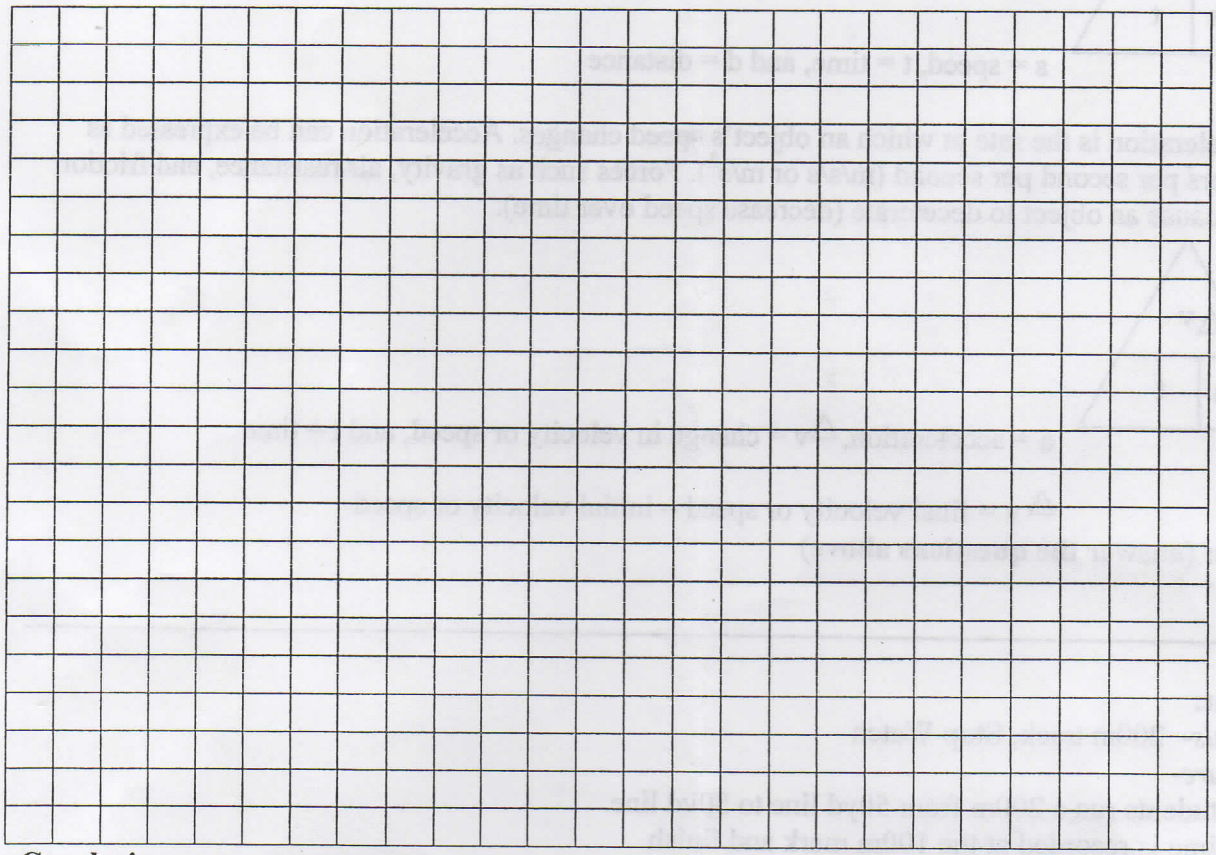
Calculations: All answers should be placed in the data table above.

1. Subtract 0-200m time from 0-100m split to get the 100-200m split.

2. Calculate the speed for the 0-100m, 100-200m and the 0-200m times.

3. Calculate the acceleration for the 0-100m and the 100-200m.

Construct a bar graph showing the acceleration change between the 1st and 2nd 100m for each subject above.



Conclusion:

1. Did any person accelerate for the entire 200m?

2. What was the fastest acceleration?

3. What factors cause you to slow down or decelerate when running?

4. What factors cause a bike to slow down after it has been pedaled?

5. Challenge Convert the 200m speed from m/s to mph. (1609m = 1 mile, 60 sec = 1 min, 60 min = 1 hour)