Lab 2: Drag Racing

by Veronica Davis (Cornell University)

Name: _____

Date: _____

Group Members: _____

_____

Objectives
- Analyze the relationship between velocity and acceleration
- Calculate an object's average acceleration
- Collect data and interpret it
- Create and analyze a graph showing acceleration

A. Pre lab Questions

1. What is acceleration?

Acceleration is a <u>vector quantity,</u> which is defined as "the rate at which an object changes its <u>velocity</u>."

2. How does it relate to velocity?

An object has acceleration if the velocity is changing.

B. Group Lab 1: Gone in 60 Seconds

You will work in pairs to calculate an object's acceleration. We will watch a clip from the movie. Pay close attention to what is happening in the scene. Write down your observations.

1. Observations

There is a drag racing scene at the beginning of the movie *Gone in 60 Seconds*. It is the first action scene of the movie.
> **The Scene: The two characters steal a car and pull up to a traffic light. The driver of the stolen car looks over at the girl in the other car and says "I love you". They race down the street. The end of the scene is when they pass the cop and he says "I have a vehicle traveling West".**

Some observations: The cop says the cars are traveling west at 80 mph.

Note: you may have to show the clip two times.

C. Class Discussion. As a class we will decide on standard procedures to determine the acceleration.

Procedure

The student will time how long it takes the car to travel from the stop light to the point where they reach the cop. At that point we know the car is traveling 80mph. In groups of two the students will guess the remaining velocities and how long it took them to reach that velocity. This should be based on the fact they knew it took a certain amount of time to go 80 mph.

D. Data Collection
We will watch the clip. Record the data for column 1 and 2. Be sure to note the units.

Time	Velocity (mph)	Velocity (m/s)	Acceleration
O seconds	**0 mph**		
	80 mph		

E. Group Lab 2: Fast and Furious

The scene from the Fast and the Furious is the first drag racing scene, which is about 15 minutes into the movie.

You will use the same procedures from the Section C.

Observations

They show the speedometer of the green and red car.

F. Data Collection
We will watch the clip. Record the data for column 1 and 2. Be sure to note the units.

Color of Car: _____
Student should note if they are timing the red or green car

Time	Velocity (mph)	Velocity (m/s)	Acceleration

F. Calculation
1. In column 3 in Section D and F, write down the velocity in meters per second. To convert velocity from miles per hour to meters per second:

Velocity (~~miles/hour~~) X 1/3600 (~~hour~~/seconds) X 1609 (meters/~~miles~~) = Velocity (meters/second)

2. Look in your book to find the formula for acceleration. Record this calculation in column 4.

Acceleration

Analyzing the Results

Graph velocity on the y-axis and time on the x-axis

Velocity (meters/second)

Time (Seconds)
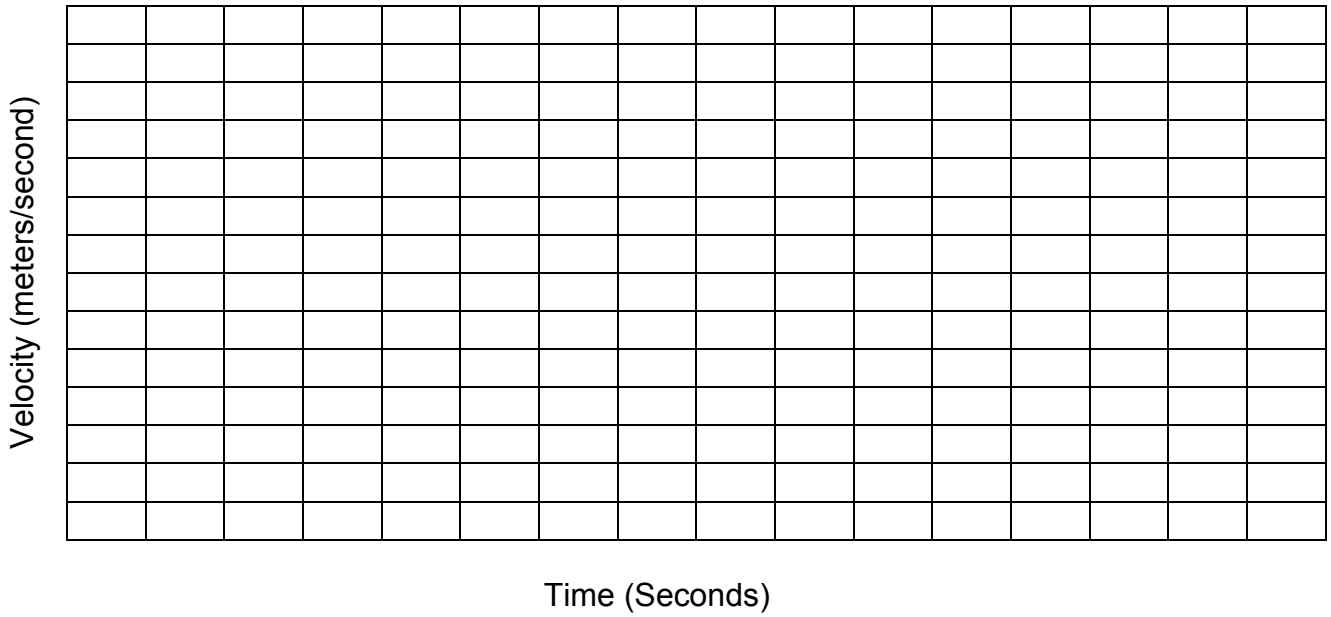
2. Summarize your results in a paragraph.