NHRA Battery Series

1. **Title, Names, Witness = 3 points.**
2. **Purpose = 8 points**
   - The "assignment" of this lab/project is to apply/practice the concepts of Unit 2. We are to use our current understanding and research 3 topics in depth to develop a top of line racer. The purpose of this labs is to gather data and analyze the relationships between basic DC circuitry, mass, friction, gear ratios, velocity and acceleration.
3. **Background Research = 3 points**
   - research the following topics, record notes in this section that will improve the development of your car.
     - ✓ Gear Ratios
     - ✓ Series vs Parallel circuits (impact on voltage, amps, resistance)
     - ✓ Simple sketch of each type of circuit.
4. **Blueprint = 24 points**
   - You are to draft a blueprint of your racer TO SCALE as best you can. The blueprint should take up 1 whole page, but leave room to add the following data.
     - ✓ Total Expected Mass
     - ✓ Total expected voltage and amperage
     - ✓ Overall 3 dimensional measurements (*l, w, h*)
     - ✓ Each piece used should have dimensional information and mass of object.
     - ✓ Information on how you will secure pieces to the racecar
     - ✓ Wiring Diagram
5. **Materials = 5 points**
   - List of materials you will use.
6. **Procedure = 6 points**
   - You will put your racecar through two trials. One will be a drag race down the hall, and the other will be an inclined plane climb in the classroom. You have to develop a procedure, you can do this in real time, in which you can gather the necessary data needed to fill out the table.
7. **Data & Calculations = 21 points**
   - You MUST SHOW YOUR WORK IN YOUR LAB NOTEBOOK

Drag Racin' in the Hallway

Trial	Time @ 0 m	Time @ 5 m	Time @ 12.5 m	Time @ 20 m	Time @ 25 m
1					
2					
3					
AVG					

Mountain Climber

Ramp ID	Ramp ∡	Time @ 0m	Time @ 6'
1			
2			
3			
AVG			

- **Hole Shot?** What was the average speed at the 5-meter mark?
- **Halfway There!** What was the average speed at the half-way point?
- **Top End ↑** What was the average speed during the last 5-meters?
- **Overall!** What was the Average Speed of the of your racecar through the whole race?
- **Incline Velocity**: Calculate the average velocity achieved on each ramp
  - Ramp 1
  - Ramp 2
  - Ramp 3

8. **Communicating Results = 30 points**
   - Create 2 graphs, one for each data table
     - ✓ You need to use different colors for different trend lines. (provide a key)
     - ✓ You must label the x, y, and title of graphs
     - ✓ Graphs must be to scale.
   - Conclusion: Draft a conclusion in paragraph form, it should cover at least the following topics.
     - ✓ How did your car perform, what difficulties/successes did you face.
     - ✓ Talk about your car on the track, how did it perform coming out of the hole, what happened to it as the hills became steeper, etc…
     - ✓ Graphs tell a story. You have two graphs… what two stories did your graphs tell.