Constant Velocity Lab: Buggy Cars

Record names of your group members according to their jobs during the lab:

Time Keeper: ______________________________

Data Recorder:______________________________

Tape Marker:______________________________

Measurer & Car Operator: ______________________________

Purpose

The purpose of the lab is to examine the motion of the buggy. Students should be able to:

- Measure the position of the buggy with respect to time
- Create a position vs. time graph for the buggy
- Develop a mathematical model for the motion of the buggy

Materials

- Dune buggy
- Meter stick
- Stop watch
- Pennies (6)

Procedure

Part 1

1. Mark the starting point on the floor using a piece of masking tape. (This is the 0 cm point.) When you begin, the front of the car should be at the starting point.
2. Turn the car on and the Car Operator should release the car from behind the starting point (make sure it is pointing straight ahead!).
3. When the front of the car reaches the starting line, the timer says “MARK!” every 2 seconds. Each time “MARK” is called, the marker should mark the position of the front of the car with a penny. Take 6 data points.
4. Measure the displacement of all the marks **from the starting point** and record the data in data table 1 and repeat two more times WITH THE SAME BUGGY.

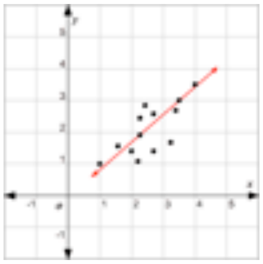
Part 2

5. Repeat Steps 1-4 of Part One WITH A BUGGY OF A DIFFERENT COLOR!
6. Clean up your lab area and return to your tables to begin the lab analysis

Data: Include the data tables in your lab report. WRITE ON THEM IN PENCIL!!!

Graphing

1. Put your name at the top of the graph paper.
2. Create one graph and plot all your data points (you should have two separate data sets). PLOT IN PENCIL UNTIL YOU ARE SURE YOUR GRAPH IS CORRECT!
3. Trace over your data points with different colored pencils/highlighters for each of the two parts.
4. Draw a line of best fit for each of your data sets.
5. A complete graph includes:
    a) title
    b) LABELED axis, with the variable and units (time on the x-axis and average distance traveled on the y-axis)
    c) line(s) of best fit (see example at right)



    d) key which tells a reader which color went with which dune buggy
6. Calculate the slope of each line using the equation:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

where (x_1, y_1) and (x_2, y_2) are points ALONG THE LINE OF BEST FIT! (Not necessarily actual data points!)

7. Record the slope of both parts using the coordinating colored pencil/highlighter from your graph.

Analysis Questions

Refer to your graphs to answer the following questions IN COMPLETE SENTENCES.

1. Do your data points fall in a somewhat-straight line? YES / NO
2. What physical quantity is represented by the slope of the line?
3. How does the slope of graph 1 and graph 2 compare? What does that really mean?
4. Is the velocity of the car constant or not constant? ______________________ How do you know?
5. How would you recognize a graph of an object traveling at a constant velocity?

Conclusion

Write a conclusion paragraph that includes the following items at a minimum:

- the purpose of the lab
- what you did in this lab (summarize your procedures)
- how your data compares for both parts
- what you determined was the physical meaning of the slope
- what a constant speed graph looks like
- any possible sources of error (human or otherwise)

Buggy # ______				
Time (s)	TRIAL 1	TRIAL 2	TRIAL 3	AVERAGE DISTANCE (cm)
	Position (cm)	Position (cm)	Position (cm)	
0	0	0	0	0
2				
4				
6				
8				
10				

Buggy # ______				
Time (s)	TRIAL 1	TRIAL 2	TRIAL 3	AVERAGE DISTANCE (cm)
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