**Lab – Constant Velocity Car Lab**

**Materials:** Masking tape, large and small car, meter stick, stopwatch

**Procedure:** DO NOT PLAY AROUND WITH EITHER OF THE CARS. FOLLOW INSTRUCTIONS CLOSELY!

* 1. Find a spot on the hallway for your group and mark one-meter intervals on the floor with masking tape from zero to five meters.
  2. Set the car at the zero mark (the starting line)
  3. Run the car for 2 seconds and place the paper clip at the spot on the floor where the car is when you reach the 2-second time limit. Measure the distance from the starting line to the paperclip, using the 1-meter intervals to help you. Record the data in your table.
  4. Return the car to start, but this time run the car for 4 seconds.
  5. Repeat for 6 sec, 8 sec, 10 sec, and 12 sec.
  6. Repeat all of these steps two more times so that you have a total of three trials
  7. Repeat all of these steps for the other car

**Data:**

1. From reading the procedure, identify each of the following (there may be more than one):

|  |  |  |
| --- | --- | --- |
| Independent Variables | Dependent Variables | Control Variables |

1. Make two data tables for the two cars

*Motion of the Red Car*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time  (sec) | Distance traveled (meters) | | | |
| Trial #1 | Trial #2 | Trial #3 | Average |
| 2 |  |  |  |  |
| 4 |  |  |  |  |
| 6 |  |  |  |  |
| 8 |  |  |  |  |
| 10 |  |  |  |  |
| 12 |  |  |  |  |

*Motion of the Blue Car*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time  (sec) | Distance traveled (meters) | | | |
| Trial #1 | Trial #2 | Trial #3 | Average |
| 2 |  |  |  |  |
| 4 |  |  |  |  |
| 6 |  |  |  |  |
| 8 |  |  |  |  |
| 10 |  |  |  |  |
| 12 |  |  |  |  |

1. Write a short set of observations of how the experiment went.

[type here]

1. Go to [www.desmos.com/calculator](http://www.desmos.com/calculator) to graph your data.
   1. Make sure the range of your graph fills the page
   2. Make sure it has axis labels
   3. Don’t forget, independent variable on the *x*-axis; dependent variable on the *y*-axis
   4. Put both cars on the same graph, but use different colors to indicate the difference between the two cars.

Copy a **picture** of your graph and the **url**:

**Legend/Key:**

Make a key for your graph. What do the colors represent?

**Best Fit Lines:**

What are the best fit lines?

Line 1:

Line 2:

**Analysis:** Answer the following questions

1. What do you suppose is the physical meaning of the slope of the two lines?

[type]

1. How does this graph show that these cars have a constant velocity?

[type]

1. Explain why it makes sense that the slope of the graph corresponds to the velocity of the car.

[type]

1. Can you tell anything about the accuracy and precision of your graphs? (*Hint: for accuracy, think about where the graphs are supposed to start…*)

[type]

1. What were some aspects that limited the accuracy of our graphs and our precision? What could be done to mitigate these in future experiments?

[type]