MiSP Motion Lab L1

Name: _____   Date: _____

A Race Against Time

Problem:

Which toy car has the fastest speed?

Gather information:

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Formula:
    Speed = _____
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Prediction: **If** *I time the* _____ *car,* **then** *it will go the* _____ *to win the race.*

Materials:

- 3 toy cars
- 3 metersticks
- 1 stopwatch
- 1 calculator

Procedure:

Check off each step as you complete it.

☐ Assign roles within the group. You will need one timer, at least one official, and one driver. Write names in spaces provided.

     o Timer: This student will use the stopwatch to monitor the times: _____

     o 1 or 2 officials: These students will be responsible for determining the distance the car traveled in a given time: _____ / _____

     o Driver: This student will be responsible for letting the car go at the start line: _____
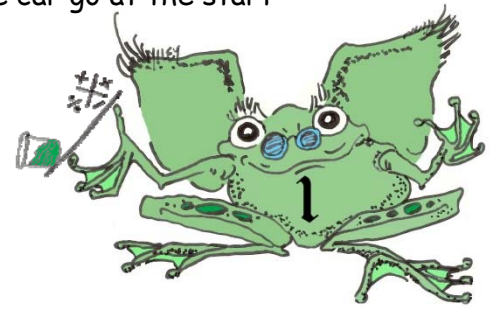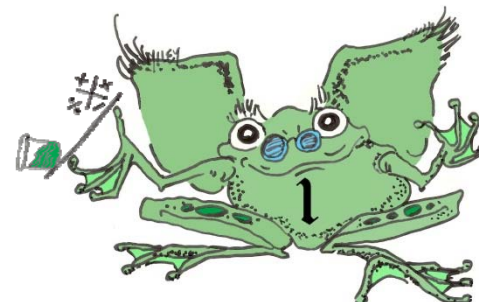
- ☐ Line up the metersticks on the floor and turn on the car.
- ☐ When the timer says "go," the driver should release the car on the start line.
- ☐ Time the car for 4 seconds.
- ☐ At the end of 4 seconds, the timer will say "stop." The official will determine the distance the car traveled by using the metersticks. Record data.
- ☐ Repeat steps 3–5 for two more trials.
- ☐ Calculate the average distance the car traveled in 4 seconds.
- ☐ Repeat steps 3–7 for 6 seconds and again for 8 seconds. Rotate to the next two lab tables to complete the experiment for the remaining cars.

Record Data:

1. Calculating Average Distance: To find the average distance, your group must find the mean of three trials for each car. After finishing all trials, **add** the three distances for each time point and **divide** by **three**.

Car 1	Distance small car moved (cm)			Calculate (show formulas and substitutions)
Time (sec)	Trial 1	Trial 2	Trial 3	Average distance
4 sec				
6 sec				
8 sec				

Car 2	Distance small car moved (cm)			Calculate (show formulas and substitutions)
Time (sec)	Trial 1	Trial 2	Trial 3	Average distance
4 sec				
6 sec				
8 sec				

Car 3	Distance small car moved (cm)			Calculate (show formulas and substitutions)
Time (sec)	Trial 1	Trial 2	Trial 3	Average distance
4 sec				
6 sec				
8 sec				

2. Calculating Speed: Use the average distances that you just calculated for each car to fill in the tables below:

Car 1		Calculate (Show formulas and substitutions)
Time (sec)	Average distance (cm)	Speed

Car 2		Calculate (Show formulas and substitutions)
Time (sec)	Average distance (cm)	Speed

Car 3		Calculate (Show formulas and substitutions)
Time (sec)	Average distance (cm)	Speed

Graph your data:

Graph the data. Use the data for each of the cars to graph the relationship between time and distance. The relationships will all be linear.
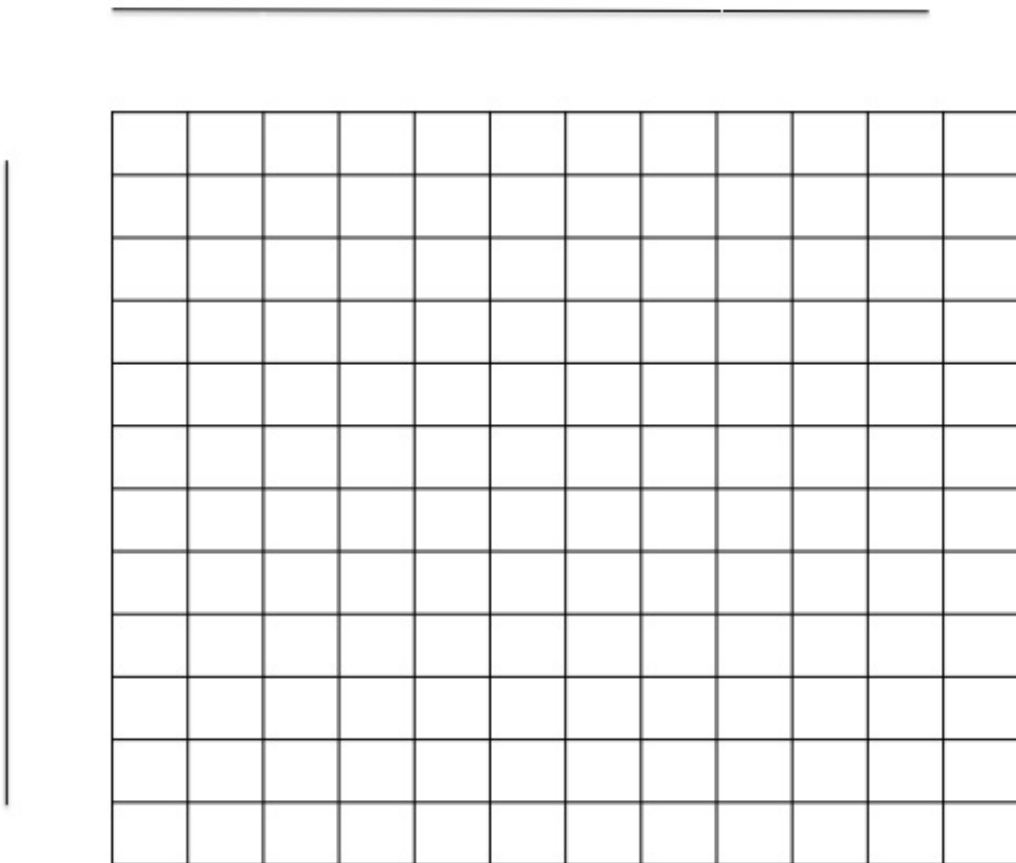
Conclusion:
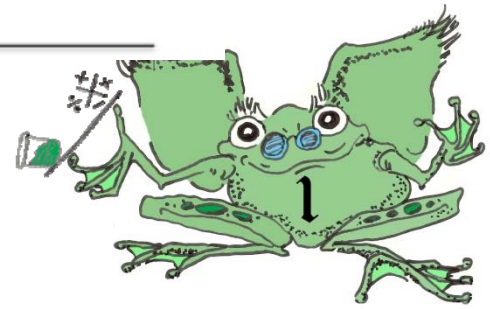
1. Which car travels the fastest? _____

2. What do you notice about the slope of the line of the fastest car?

   _____

   _____

3. Approximately how far had car 1 traveled at 5 seconds? _____

4. On a graph, how do you know if the car is traveling at a constant speed?

   _____

   _____