**Physics Introductory Lab Activity**
**Motorized Cars**

**Purpose:** To determine the mathematical relationship between distance and time for a battery-powered car and to see how the relationships differ for cars moving at different speeds.

independent variable _____
dependent variable _____

**Hypothesis:** *This should be an educated guess so give your reasoning. Also you should watch the cars move before making your hypothesis. Make sure your hypothesis addresses both parts of the purpose statement.*

The shape of the graph for **distance vs. time** or **time vs. distance** (circle which one applies to you – this depends on how you do your experiment and which is the independent and dependent variable, *dependent vs independent*) will be:

because:

Explain how the graphs of your two cars will be different (don't forget to explain why).

**Materials:** *List what you used in this lab.*

**Procedure:** *Write a step-by-step explanation of how you gathered your data (i.e. 1, 2, 3, etc.). This should be clear enough so that someone else could duplicate your experiment.*

1.

2.

3.

**Data:** *Put your data into an organized table. Record the value of any constants. Make sure you include units (i.e. centimeters or seconds).*

*Take at least 6 data points and several trials per data point.*

*Note: When recording measurement, you should keep all digits you are sure of and then estimate one more digit. For example, if you are using a meter stick to measure distance, and recorded 104.25 cm, this means that you were sure of the distance to the millimeter mark (you know it was 104.2 and not 104.1 or 104.3) and were able to estimate between the millimeter marks. If the distance were exactly on the centimeter mark, you would record the measurement as 104.00 cm to show that you could have estimated between millimeter marks with the equipment you were using.*

**Data Analysis:** *Graph your data using proper graphing techniques as listed on the handout. Graph the data for both cars on the same graph. Find the equation for each car that fits your best fit curve (a line is a special kind of 'curve'). See the handout "Unit 1 Reading – Graphical Methods" for help with this. Make sure your slope and y-intercept have units and that rather than using* ***x*** *and* ***y*** *as variables, you choose something that better fits your experiment (i.e.* ***t*** *for time).*

*Show all calculations and your final equations here.*

**Conclusion:** *Use these questions as a guide for writing your conclusion. What were your results (describe the relationship between the independent and dependent variables in a clear, English sentence and restate your equations or mathematical models). What is the physical meaning of your slope and y-intercept in terms of the car's motion or starting place? Does this agree with both parts of your hypothesis? How accurate do you think your results are and why? While you were collecting data, what were places experimental error occurred and how did this affect your results? How could you improve the accuracy of this experiment if you were to do it again?*