Toy Tractor Lab

**Purpose:** To determine the relationship between position and time for a moving toy tractor. (To examine the concept of uniform motion.)

**Materials:** Toy Tractor, Stopwatch, 1m paper strip, marker, meter stick, recording timer, power supply, 2 wires

**Procedures:**

**Part 1: using a Stopwatch to measure the position of a Toy Tractor as a function of time:**

1. Roll out 1.5 m of the ticker tape paper and place it along the counter. Tape it down at each end.
2. Use a pencil or pen to mark the starting point for the toy tractor.
3. Place the tractor at the starting point and turn it on. Every 2 seconds as time on the stopwatch mark where the tractor is on the paper strip.
4. Measure the distance the tractor travelled from the starting point to the end of each 2.0s mark using a meter stick. Record this information in a neat data table.

**Part 2: Using a recording timer to measure the position of a Toy tractor as a function of time.**

1. Roll out about 50 cm of ticker tape.
2. Thread end through the recording timer and attached to your toy tractor as shown by Mr. Z.
3. Turn on the recording timer at the power supply and turn on your toy tractor.
4. After the ticker tape has run through the timer stop both the timer and the tractor.
5. Analyse the results as shown by Mr. Z. Remember every 6 dots = 0.10 s.

**Results/Observations:**

Create two neat and proper data tables. One for **Part 1** and one for **Part 2** (6 marks).
Analysis:

1. Plot 2 graphs of position vs time for the toy tractor on 2 separate pieces of graph paper. One for part 1 and one for part 2. Draw the best-fit line and calculate the slope for each graph. (10 marks)

Questions:

1. Which graph shows the best best-fit line? Why is this? (2 marks)
2. Suppose you had a perfect system of collecting data and the tractor exhibited perfect uniform motion. What would your graph of position vs time look like? (2 mark)
3. The slope of your graph is called speed. What is the speed of your tractor? What are the units for your speed? The normal units for speed are cm/s, or m/s or km/h. What is the speed of your tractor in m/s? (4 marks)
4. Are the speeds the same for the tractor in part 1 and in Part 2? Should they be? (2 marks)
5. If the tractor could move faster and still show uniform motion what would the graph look like? (1 mark)
6. If the tractor could move slower and still show uniform motion what would the graph look like? (1 mark)
7. If the tractor was not moving what would the graph look like? (1 mark)

Conclusion:

(How is uniform motion shown on a Position vs time graph?) (1 mark)