SCIENCE 10  
12.L: Motion (p. 300)

**Overview**:

The motion of an object can be observed and its distance and time recorded during this observation. We can talk about how this object moves using words, a data table, or a graph. In this lab we will use all three to explore a form of motion that you choose!

**Materials**:

* Recording timer (black box)
* Tickertape

**Safety**:

* Don’t stab yourself on the recording timer or get a paper cut on the tickertape.

**Procedure**:

1. Copy down Table 1 into your notebook. Make sure to give a title to your table! Leave lots of space so that you can add as many rows as you need.

Table 1

|  |  |
| --- | --- |
| **Time (s)** | **Distance (m)** |
| 0 | 0 |
|  |  |
|  |  |
|  |  |

2. Thread 1-2 m of tickertape into the recording timer. Make sure that there is a carbon disc between the metal screw and the tickertape.

3. Turn on the recording timer and pull the tape through at a constant speed. Halfway through, double the speed (it doesn’t need to be exact.)

4. Using a convenient time interval mark your tape into data points that you can record easily.

5. Add your data to Table 1.

6. Draw a distance-time graph of your data.

When you draw your graph, make sure you...

* Use grid paper and draw it using a ruler.
* Label the title and axes.
* Include units for the axes and decide on an appropriate scale to fill the page.
* Draw a line of best fit through your data points.
  + It will not be straight! Make sure you draw a curve.

**Report**:

When you are finished, write up your findings into a neatly typed or written lab report with the following sections as headings:

* Name, Date, & Block
* Title (Motion)
* Purpose (Why? What did you do and what did you hope to learn from it?)
* Methods (Write: “See lab procedures.”)
* Results (Table 1 and Graph)
* Discussion (Answer the questions below.)
  1. Draw two lines of best fit on your graph. One for the first half and one for the second half, after you sped up.
  2. What are the slopes of the two lines of best fit? What do these lines and the slopes represent?
  3. Draw a line joining the first dot on your graph to the last dot. Find the slope of that line. What does this slope represent?
  4. How are constant speeds shown on a distance-time graph?
  5. How are different constant speeds shown on a distance-time graph? What separates them?
  6. Draw a line of best fit for all of the data on your graph. How is it similar or different from the line you drew in question 3?
  7. What happened to the slope of the line when you increased the speed of tape? Why did that happen?
  8. If you repeated the experiment and pulled the tickertape at the same speed at first, but then slowed down, what would change on your graph? Draw a rough sketch of what this graph would look like (no need for graph paper or straight lines, just give a general idea.)

**Marking Checklist**:

|  |  |
| --- | --- |
| Content  (20 points) | Title, Purpose, Methods, Results, and Discussion sections present (2)  Table 1 is present, labelled, and filled in completely (3)  One graphs are present and made according to instructions (5) Discussion questions answered thoughtfully in complete sentences (10) |
| Presentation  (10 points) | Report is typed or written neatly in pen (3) Formatting clearly separates sections [i.e. Title, Purpose, etc.] (2) Table 1 and the graph are neat and data easily readable (3) Report is (mostly) free of grammatical errors (2) |

Total: 30 points