Report for Laboratory __

Title of the Laboratory

Your Course Name

Name: **Laboratory Section:**

Partners:

Purpose

The purpose in no more than one sentence — typically a laboratory tests a law or a principle, usually in the form of an equation (for example $F = ma$). More rarely the goal of the laboratory is the acquaintance with certain concepts (such as energy, momentum, force, voltage *etc*)

Procedure

The most difficult part — the core of understanding the laboratory. In at most four sentences show how the goal is achieved. For example, if the laboratory tests the law $F = ma$, you briefly describe how you measure (or calculate) the force, and how you measure the acceleration. That is, you are independently experimentally measuring the left– and right–hand sides of the equation, and then checking that they agree with each other. The *results* are not discussed here. Use present tense for your discussion

Observations

Here go the measurements. Data is most efficiently represented in the form of tables. However, before (or sometimes after) each table you need to explain what you were measuring. In doing so, it is also important to reference the data correctly. For instance, if the cart is the only moving object in the experiment, you could think that it would be obvious that v is the speed of the cart, and not of the sleigh of Santa Claus. However, scientifically, you cannot make an assumption that v would necessarily mean the speed

- each *quantity* must come explained — you cannot rely on the laboratory hand–out in assuming that it is obvious that v is the speed of the cart

- each *quantity* must be assigned a *unique* letter — v, a, m, M, R and so on

- note here that, repetitive measurements of the same quantity do not need different letters

- at the same time, if you have velocities of two or more objects, then you can differentiate them by putting subscripts v_1, v_2, v_{avg}, v_{in}, v_{fin} or capitalizing one of them

- each quoted number, besides being assigned a letter, must be accompanied by the appropriate units

- if there is a group of similar measurements, it is recommended to specify the units only once per group, like in the table below

- note, again, that any algebraic *letter* must come defined, *i.e.* do not assume that F is force or P is pressure, unless you specifically say so

- only mathematical and physical constants (π, e, g and so on) do not need explanation, unless a confusion can be made

Deep technical details are not necessary, but it must still be clear how each number was measured

Example of a data table (which must be preceded by explanations),

Trial	F (N)	a (m/s^2)
1	7.88	3.80
2	7.95	4.08
3	8.20	4.14
4	8.12	3.92

For the above measurements, we used the hanging mass $m = 2.0\,\mathrm{kg}$. The heavier mass of the counter–weight was $M = 5.0 \pm 0.01\,\mathrm{kg}$.

Calculations

This is the *Calculations* or *Analysis* section. Short calculations can go into the *Observations* section, if it makes sense. For instance, the calculation of the average speed or mass can be quoted in the *Observations* section. You *do not need* to explain how to calculate the average. However, more involved calculations need an explanation. A formula must be quoted whenever applicable

We calculate the energy of Millenium Falcon according to the Einstein–Palpatine formula,

$$E = \gamma m c^2,$$

where m is the mass of the spacecraft, c is the speed of light and γ is the relativistic factor. Using the values $m = 45\,000\,\mathrm{kg}$, $c = 3.0 \times 10^8\,\mathrm{m/s}$ and $\gamma = 1.4$ we find

$$E = 5.7 \times 10^{21}\,\mathrm{J}.$$

We expect therefore, the gravitational warp drive to be the most effective when the spacecraft has already exited into the hyperspace

Repetitive calculations must be gathered into a result table,

Spacecraft	m ($\times 10^3$ kg)	R (kiloparsec)
Millenium Falcon	45	1.6
Radiant VII	620	2.1
Rogue Shadow	58	1.7
CR90 Corvette	440	2.4

Here m is the gross relativistic mass of the spacecraft, and R is the optimal shot range

Error analysis also belongs here. However, if this analysis is quite short, it can be moved to Conclusion section if this makes more sense

Conclusion

Laboratory evaluation

Please provide feedback on the following areas, comparing this laboratory to your previous labs. Please assign each of the listed categories a value in 1 – 5, with 5 being the best, 1 the worst.

- how much fun you had completing this laboratory?   1   2   3   4   5

- how well the lab preparation period explained this laboratory?   1   2   3   4   5

- the amount of work required compared to the time allotted?   1   2   3   4   5

- your understanding of this laboratory?   1   2   3   4   5

- the difficulty of this laboratory?   1   2   3   4   5

- how well this laboratory tied in with the lecture?   1   2   3   4   5

Comments supporting or elaborating on your assessment can also be very helpful in improving the future laboratories — replace this text with your comments