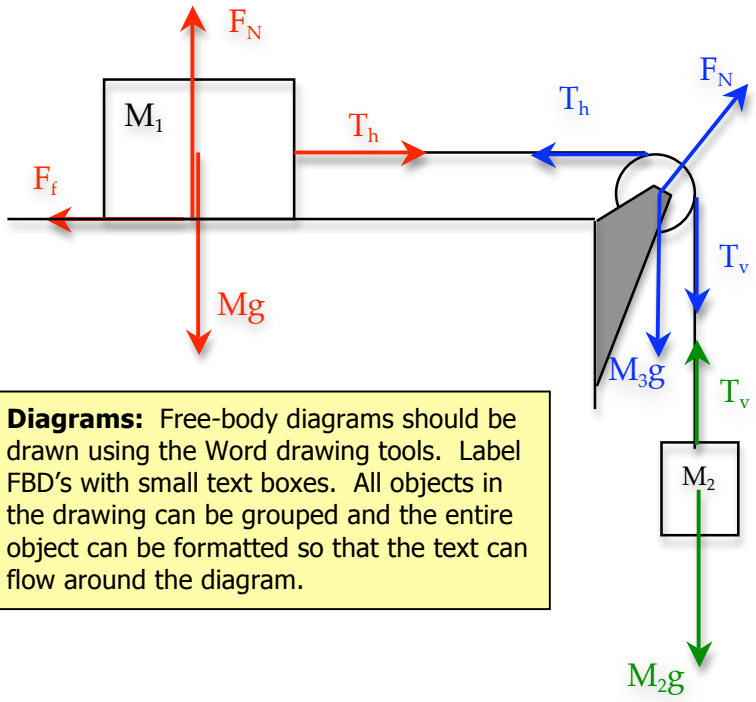
Below is a portion of a sample lab procedure and analysis sections. This is intended to give you a sense of how these sections can be formatted and what information should be included.

Procedure – Accelerations and Tensions of Half-Atwood

In order to analyze accelerations and forces involved in a half-Atwood, it is necessary to first draw the appropriate free-body diagrams that represent the forces acting on the objects that comprise this system.

From the free-body diagrams, one can derive the appropriate second law relationships that represent the acceleration of each object in the system.



Diagrams: Free-body diagrams should be drawn using the Word drawing tools. Label FBD's with small text boxes. All objects in the drawing can be grouped and the entire object can be formatted so that the text can flow around the diagram.

Defining acceleration from left to right as positive, the 2nd Law relationship for M_1 is:

$$T_h - F_f = M_1 a$$
$$T_h - \mu F_N = M_1 a$$
$$T_h - \mu M_1 g = M_1 a$$

Similarly for M_2:

$$M_2 g - T_v = M_2 a$$

For the pulley, using the rotational analog of Newton's second law, the net torque produced by the two tensions causes the angular acceleration of the pulley:

$$T_v R - T_h R = I\alpha$$
$$T_v R - T_h R = \beta M_3 \frac{a}{R}$$
$$etc.$$

Microsoft Equation Editor:
Choose Insert menu →Object…→Microsoft Equation

Equation Editor allows you to insert a single equation or series of equations

The sum of these three relationships

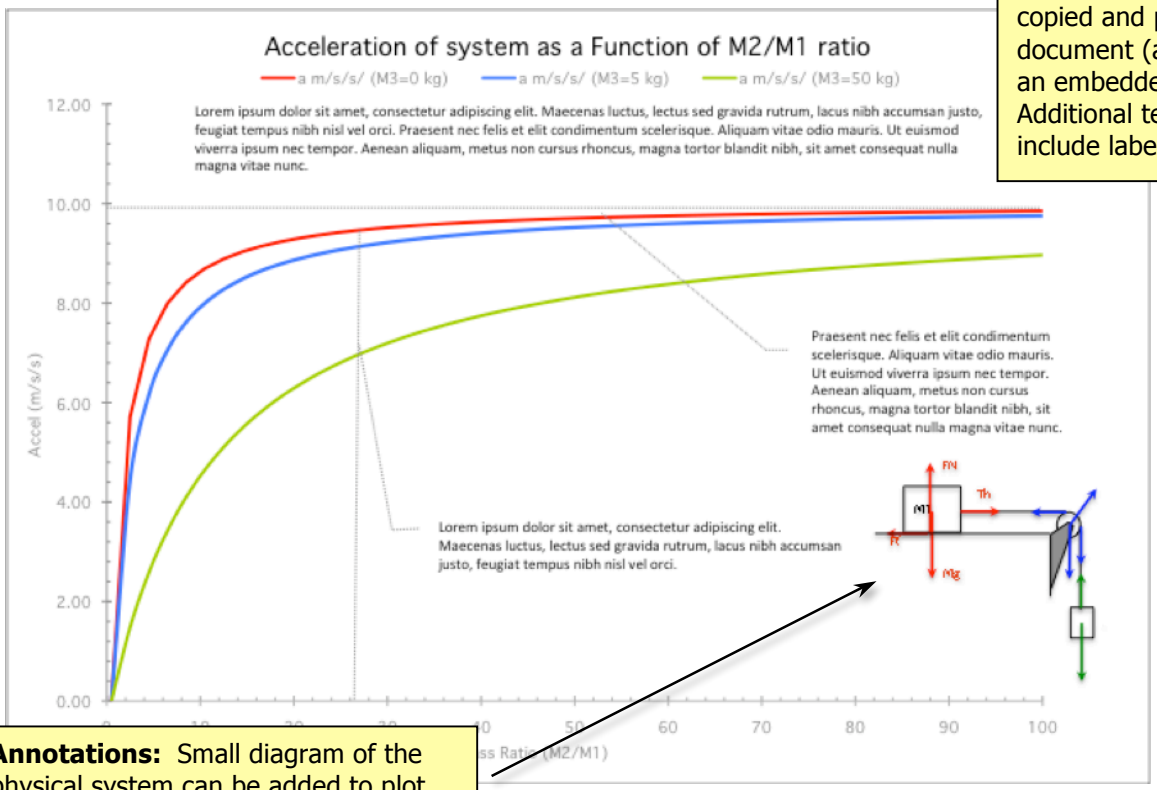
$$T_h - \mu M_1 g = M_1 a$$
$$M_2 g - T_v = M_2 a$$
$$T_v - T_h = \beta M_3 a$$

leads to the relationship for the acceleration of the system…

Be sure to discuss nature of spreadsheet set-up. Feel free to include screenshots if desired.

Analysis of System

Plots: Entire Excel plot can be copied and pasted into Word document (as a picture or even an embedded Excel document). Additional text box can be added include label for diagram.



Annotations: Small diagram of the physical system can be added to plot. Annotations in the plot should highlight data and trends of interest and should be discussed in the analysis.

Figure 1

As seen in the plot above (**Figure 1**, "Acceleration of System as a Function of M2/M1 Ratio"), for any given value of M3, acceleration increases as the mass ratio M2/M1 Though the slopes of all three curves are steep at a low mass ratio, the slopes ultimately become…

Include copies of plots in the analysis section. Use annotations to address/explain trends or to answer particular questions. Be sure to include responses to the general questions found below:

1. Your plot(s) will display all or some of the following significant properties:

- Region(s) of constant slope
- Region(s) of upward concavity
- Region(s) of downward concavity
- Maxima
- Minima
- Inflection points
- Discontinuities
- Horizontal region(s)
- Asymptotes
- Intersection(s) with the x-axis (roots)

For each property exhibited by your graph, discuss the physical reason that property exists (connect the shape or value of the graph to the physical situation that produced it).

2. The lab may have asked you to make multiple plots reflecting different physical situations (where one or more parameter affecting the plot has been changed). Be sure to discuss what aspect(s) of your plots are altered from plot to plot, and why they are so altered (i.e., what physical change is represented?).

3. Explain how you would use your plot to answer specific questions about the physical system you are modeling. Give a couple of examples of questions answered by the plot.

4. How is the plot you produced superior to a data table for conveying information about the physical system you are modeling? Specifically, what can you see by looking at the plot that you couldn't see by looking at a data table?