APPENDIX - FORMAT FOR A LAB REPORT

Name

Section (e.g., Mon, 7:30 P.M., SLN 12345)

Today's date

Lab partner's name(s)

Lab Number & Title of Lab

I. Purpose:

Think carefully. Concisely describe what the lab exercise demonstrates. Identify the type of objects observed and the general method used to derive the result, but don't go into lengthy details describing your procedure. These go in Section III. If more than one technique was used, mention each one. **This should be a brief summary of the goals of the lab.** This should NOT be a single sentence, but a brief paragraph.

II. Observations:

This section should summarize what was observed, how, and under what conditions. You should include enough information that you would be able to assess the quality of the observation conditions if you read the report at a later date. Use outline form, since it makes it easier to read and digest. You should include the following information:

- **Date and time** for all observations, even if they are supplied by the T.A. Quote the time using the 24-hour clock and remember the time zone (MST) – e.g. Monday, February 16, 2005, between 2000 and 2200 hours MST.

- **Location** where the observations were made, even if supplied by the T.A. – e.g. Physical Sciences H-Wing, ASU, Room 563.

- **Equipment** – computers, telescopes, eyepieces, etc…

- **If outdoors**, sky conditions (e.g., clear, partly cloudy, hazy, etc.). Also give information about the phase and location of the Moon, since its brightness or proximity may alter what you observe through the telescope.

- **W**hat objects were observed.

- **I**f you have compiled your observations into a data table, cite here where that data table is located. – e.g. Observations are located in Table 1 at the end of the lab report.

- If observations are supplied by the T.A., cite a reference for the data. If data from another lab group was used, cite that also.

III. Procedure:

Give a description of the lab exercise as if you were instructing a fellow student. If several techniques were used, describe each one. This should include enough information that you would be clear on how you did what you did. Do not rely on the lab script – you may lose it. Be sure to include the following information:

- Describe clearly and concisely how you did the exercise. **What types of observations were made** (e.g., visual observations, photographs, computer simulations, etc.), **which objects were observed, how many observations were made, etc.** You should make a data table to list this information clearly. Clearly listing your observations in an easily accessible manner is the heart of any good lab report. You may need to come back and redo the analysis at a later date. Without clearly recorded data, you would be sunk. Remember to note the units used, and the uncertainty in every measurement made.

- Be clear about how and why each step was done.

- Explain any **assumptions** you made.

- State any **equations** used in deriving your experimental results.

- **Do not give your actual results here; they should be in Section IV**.

You need to include enough information in your lab report that you would be able to reproduce what you did at a later date without the lab script.

IV. Results:

Clearly state your final results. Look back at Section I, as your results should be closely related to your stated purpose. Include both measured and calculated/derived values as appropriate. **There will be a specific set of issues or questions that you are required to answer. Your responses to these matters should be included in this section**. Make sure you give full answers and how you arrived at them based on your observations – tell us how you came to your conclusions, your mental process.

V. Error Analysis:

- Identify measurement errors or other inaccuracies that might be present in your data. Explain what causes them. In general there are two types of errors - random errors of individual measurements and systematic errors that affect all measurements in a similar manner.

- Estimate the sizes of the measurement errors. Normally, a possible range (i.e., $\pm$ something) for your measured values should be stated. (Be quantitative – give a numerical value.)

- When you have a known value which you can compare your experimental quantity to, calculate the percentage error of your results:

$$\% \text{ error} = \left| \frac{(\text{observed value} - \text{known value})}{\text{known value}} \right| \times 100\%$$

- When reporting the percentage error of your results, state them in terms of what you were trying to calculate. That is, say ``The error in determining the mass of the Earth is xxx percent'' instead of ``The results have an error of xxx percent.''

- Describe how you could improve your data or your analysis technique if you were to repeat the lab exercise as written. Be specific.

VI. Conclusion:

- Use the questions in the lab manual as a guide to the important points of the exercise. Do not make the statement ``I have a better understanding of ...''

- Give general conclusions that can be drawn from this lab exercise.

General information of preparing a Lab Report:

- **Never** change any observation **after** you leave the laboratory session. If you think some of your drawings or measurements may be wrong, write a note explaining what you think is incorrect and how you would redo it if you were observing again. The issue of data tampering is a paramount ethical one in the scientific world.

- When your Lab Report is complete it should be possible for someone who has never done the exercise to read it and understand how to do the lab.

- Your Lab Report must be typewritten (Instructor has the option to switch this to handwritten) and approximately 2-3 pages in length (not including tables, graphs, mathematical computations, which may be handwritten).

- Your Lab Report should be attached to the front of the Lab Exercise that you completed, unless directed otherwise by your lab instructor.

- Always include your rough notes, charts and drawings so we know where your results and conclusions came from.

