General Guidelines for Astronomy 1 Labs

There are a total of four labs in Astronomy 1. Two of these labs are done indoors, one lab involves night time observing and the final lab involves solar observing and an indoor lab component. The indoor labs meet in Wilder 200. Indoor lab sessions will be run Monday and Thursday afternoons (3:00 – 5:00pm) and Tuesday and Thursday evenings (7:00 – 9:00pm). The night time observing will start at 9:00pm on a clear night. Your TA will send out an e-mail around 7pm to announce if the night time observing lab will occur that night. The night time observing lab will be held twice; if you miss the first observing session, you must attend the second observing session. The solar observing session will occur during class time, on a clear day. You will sign up for a specific indoor lab section at the start of the second week of classes.

Labs will be completed in pairs, and you may choose your partner. There will be at most one group of three in a given lab section. The lab manual for each lab will be posted onto Canvas. All labs have a pre-lab assignment which counts 15% towards your lab grade. The assignment is just to get you familiarized with the material that will be covered. The pre-lab is due at the start of lab. If you come in more than 10 minutes late, or forget your pre-lab, you can hand it in by 9am the next day in your TA’s mailbox, but it will be worth half of what it would otherwise. You are welcome to discuss the pre-lab with your TA or the professor, but you must complete the pre-lab on your own. If you do discuss the answers with your lab partner or another person in the class, you must write down their names on your pre-lab.

The labs will begin promptly with an introduction to the equipment and general guidance for that lab. Being late to lab is an inconvenience to the entire class. If you are more than 15 minutes late, you will not be admitted to the section. You do not have to purchase a lab notebook for this course. You must bring to each lab: a pen, paper, your completed pre-lab assignment and the lab manual for that lab. Record your observations on the paper. Do not white out, or erase your mistakes. Simply cross them out. A working scientist should always keep track of all work. Put your names on your data sheet and have the TA sign your data sheets before you leave the lab. You will hand in your original data sheets with your lab report, and these data sheets must be signed by your TA.

You may hand in an individual, or a group lab report. If you hand in a group lab report, you must divide the workload evenly and each person must contribute substantially to the final report. If you hand in individual reports, each person must write up their lab report separately. You must not copy another student’s work in your lab report. All data in your lab notes must be obtained by you and your lab partner.

Below are the guidelines for what is expected in your lab report. Please read it carefully, and if you have any questions do not hesitate to contact any of the TAs or your Professor.

1. At the top of the report include your name, your lab partner’s name, whether this is a group or individual report, the course number, the lab name and the name of your TA.
2. You must **staple** your report.

3. Always show your work! You can **not** simply state the end result, instead you must include relevant formulas, data, and of course steps that lead to your final answer. **This work must be included in your final, typed write-up.** Leave space when typing it up to write in the relevant work by hand, or type up the steps using an equation editor.

4. Keep everything neat, and make sure that it is easy to read. Typed reports are appreciated and expected. For graphs, you must use a plotting program or graph paper. There are several plotting programs that you can use, including Excel or Mathematica which are freely available to any Dartmouth student.

5. Make sure you do the problems in the order assigned.

6. You must cite your sources. If you look something up on the web, include the full web address and the date you accessed the site. If you look something up in your textbook, include the formula number and page number. Avoid using Wikipedia as much as possible. It has some good information and good links, but also errors. The *Encyclopedia of Astronomy and Astrophysics*: [http://eaa.crcpress.com](http://eaa.crcpress.com) is an excellent resource – the articles are written by professional astronomers and are reliable. A link to this site is posted on Canvas.

7. Precision: students often have problems with this. When doing calculations, you need to truncate your answer and not include too many digits. For instance, saying that the answer is 560.4356787843 nm is wrong! Generally speaking, the number of digits in your answer (ignoring trailing zeros) should be similar to the number of digits in the quantities that you measured that went into the calculation. Although we are not going to be strict with precision in this course, you do need to keep it in mind. A nice explanation of how many digits to include in your calculations/answers can be found on the web: [http://www.physics.uoguelph.ca/tutorials/sig_fig/SIG_digit.htm](http://www.physics.uoguelph.ca/tutorials/sig_fig/SIG_digit.htm)

8. Units: You must use appropriate units for the various numbers you recorded and quantities you need to calculate. Make sure you write down the unit name for the numbers you give in your lab report (including your data sheets).

9. Scientific Notation: In general answers should be in scientific notation. A good rule-of-thumb is that if answers are greater than 10,000, or less than 0.0001 use scientific notation.

10. Late Policy: You will be given plenty of time to finish any given lab, and it is due by 5pm on the due date. Any late lab is penalized 10% per day. Labs more than 4 days late will **NOT** be accepted. You can always hand in a lab early.

11. Your lab report should include:

   - a brief statement describing the purpose of the lab and any broader significance of the work
• The procedure and steps you undertook in the lab, as well as answers to the questions asked in the introduction, theory or procedure sections
• brief summary stating what you have learned in the lab.
• your raw data (stapled to the end of your lab report)

12. Lastly, have fun, and make sure to DO YOUR OWN WORK. You are free to talk to other students, and to work with your lab partner, but your lab report must be your own work, or a group report written only by you and your partner. You cannot copy work. If you have problems, come talk to us.