

Astronomy 301 Final Paper Guidelines

Your end product will be a nearly-final-draft paper. Your paper doesn't have to be pretty, but it should be complete. For a nearly-final-rough draft, you want content and a decent organization of the material, but final, absolute refinement would come with the next draft (if there were one). The information can be presented in a number of ways: within the body, as tables, figures, charts, or appendices. One approach is to browse through the professional papers written on your object, and see how they were written. Scientific papers have a fairly rigid format. Do not use familiar, conversation-like writing; avoid colloquialisms.

I prefer to have an electronic submission of your paper as it makes reading and marking very easy using "track changes" under MS Word. However, paper versions will be accepted.

First step: reduce data with partner(s) and/or other classmates. Keep detailed records of what you did, even the mistakes, in a notebook. [A good researcher keeps a complete, accurate, "every twist-and-turn-noted" notebook.] You should have an outline of the steps you took when reducing your data, much like the tutorials have, with your own preferences flavoring the exact method. Any future Astronomy 301 student should be able to totally replicate the reduction process that you followed simply from your paper. If you prefer, this section could go in as an appendix.

Second step: put together the figures, charts, and tables. A good paper is defined by the quality of these 3 items.

- Figures include images of your celestial object both the "raw" image and the fully reduced one, plus flat field and dark frame samples.
- Appropriate charts may be hard for this project; one suggestion would be a "finding" chart using a star map.
- Tables include information about your target: RA, dec, times of observations, filters used, etc.

Third step: write individual paper on results – your name as 1st author, partners' names as additional authors (if desired). The topics of the papers do not all have to be identical. Give your paper a good title!

Some decent references on writing scientific papers:

- "Me Write Pretty One Day: How to Write a Good Scientific Paper," by William Wells, The Journal of Cell Biology, Volume 165, Number 6, June 21, 2004 757–758
- "Writing the Scientific-Format Paper" from Colorado State University
<http://writing.colostate.edu/guides/processes/science/pop2a.cfm>
- "Writing a Scientific Paper," based on Cox, G.W. 1990. Laboratory Manual of General Ecology, sixth edition. Wm. C. Brown Publishers, Dubuque, Iowa
<http://biology.luther.edu/paper.htm>

[Please ask me or work with the writing center here at the U of W if you feel you need additional guidance.]

There are two examples linked from our homepage, those of the two top students from last quarter.

Summary of Project Steps

First step: reduce data with partner and/or other classmates. Keep detailed records of what you did, even the mistakes. Second step: write own paper on results – your name as 1st author, partner's name as second author.

The paper should include the following (100 points total):

<10>Abstract – written such that one knows what is in the paper and wants to keep reading

<15>Introduction

- Give a brief background on your target. What is known about it? What were your goals for observing it? What did you hope to accomplish? ('A passing grade' is not a good answer here.)
- State how the paper is laid out so the reader knows what to expect.

<10>Description of observations

- location
- equipment used (telescope, camera, ccd, etc.)
- weather conditions
- details of observations (exposure times, CCD temp., binning, etc.)

<30>Details on reduction procedures (the goal here is to give your reader enough information to understand the results!)

- initial reduction steps (celestial object, darks, flats)
- why each step was required; that is, why done to improve the final image

<20>Analysis and discussion

- how does your image compare to other ones; why would there be a difference
- figures – could include figures from professional papers
- graphs – with brief explanation and good captions if needed
- tables – if needed
- summary of what you know about your celestial object and what you can tell from **your** image

<10>Summary – One paragraph synopsis; has meaningful content (i.e., do not state things such as, "I'm just a beginner so my image sucked because of human error, but I'm sure I'll do better next time. Besides, the experience was awesome, dude.")

<5>References

2 minimum for background information on your target

Wikipedia can hardly be described as a profoundly scientifically reliable reference site (i.e., you should not use it for this paper)

The above information (requirements) can be presented in a number of ways: as part of the body text, as tables, as appendices.

Name _____ Date _____

Please turn in this sheet along with your paper if you turn in a hard copy.
How the various parts of your report will be scored:

Abstract (10)	Score	Comments
Good summary	5	
Enticing; has substantive content	5	
Introduction (15)		
Brief background	10	
Paper lay-out	5	
Observations (10)		
location	2	
equipment	2	
weather & seeing	2	
details (exp. times, filters, etc.)	3	
Reduction Procedures (30)		
steps described clearly	10	
Reasons why steps needed	10	
"flowchart" of steps with caption	10	
Analysis (20)		
discussion of own results	5	
comparison with other images	5	
discussion about celestial object	5	
appropriate figs/graphs/tables included	5	
Summary (10)		
Overall results could be gathered by reading summary alone.	5	
Has meaningful content	5	
References (5)		
Correct format used	3	
Wikipedia not sole reference	2	