

THE ESSAY AND ITS STRUCTURE

- 1. Read the instructions** for the assignment carefully. A large part of the grade for some assignments is for precisely following instructions, whether it is the content, cover page, length, line spacing, or margins. Severe penalties may result for not following instructions properly.
- Give your writing assignment an interesting, engaging, and informative **title**. Unless specified in the instructions, avoid “Critical Literature Review”, “Essay”, or other nondescriptive titles. Make the title about the content of your assignment. See chapter 3 of *Eloquent Science*.
- 3. Introductions** should consist of three things: background information, problem statement, and response to the problem. The problem statement is some kind of conflict or tension that attracts the reader to the paper. Motivate the problem statement in your introduction. The response should contain the purpose statement. The purpose statement tells the reader what you are going to discuss in your paper. For guidance on writing an introduction, see chapter 4.6 of *Eloquent Science*.
 - For Critical Literature Reviews, dissertations, and other research papers, rather than just mentioning in passing the lack of consensus in the literature or the gap in the literature, **motivate** it in the introduction by describing how the lack of consensus is affecting the science. If there is a debate, provide enough evidence for and against to motivate your reader. The reader should understand your concerns. Can you provide an example? Can you quantify what the failure to address this issue is doing? Otherwise, readers may not get the sense from what you've written what the debate is all about and why they should care.
 - Your problem statement would be stronger if you are going to **address a scientific question**, not just review the literature. Saying that you are “going to discuss X” or you are “going to review the literature” is a lecture or a Wikipedia page, not a Critical Literature Review. It potentially misses the “critical” part of the Critical Literature Review. You need that tension that comes from a well-motivated problem statement.
- Student essays often need **better organization**. To improve, think of the story that you want to tell with your essay. Start off with an introductory paragraph or two that says explicitly what the purpose of your essay is and how your paper will be organized. You may also want to discuss the scope of your paper: what it will cover and what it won't cover. Write a clear purpose statement: “The purpose of this essay is to” Then, lay out your plan for what you will discuss: “First, I will describe how.... This will lead to a discussion about... Finally,” Alternatively, as the last paragraph of the introduction, perhaps some outline of what the body of the report will contain would be helpful: “In section 2, In section 3, In section 4,” This approach of telling the readers how the upcoming writing is structured is sometimes called signposting. Organizing your essay like this will provide a clear roadmap for your audience about where you are going. There are more elegant ways to open your paper, but following this suggestion will help make you a better writer.
- Remember that the purpose of a **data and methods section** is to provide enough information to the readers so that they are able to reproduce your work. Therefore, be as specific as you can in describing the data and methods. For Critical Literature Reviews, what do you need to tell the reader so that they could follow those instructions and arrive at the same literature as you? Provide more details about what limited your focus for the Critical Literature Review: limits on geographic locations considered, range in years of published literature considered, languages considered, how you narrowed down thousands of returns in a search engine to 30 of the most relevant articles. For research projects, the data and methods needs to include everything on how you collected, manipulated, quality-controlled, processed, and filtered the data. Explain and justify the smallest steps in the methods. What is familiar and natural to you will not be to your readers.
- 6. Conclusions** need to be clear (“Installation of additional earthquake monitoring stations around the Pacific Rim is one contribution toward an improved warning system for tsunamis.”), not vague and weak (“More data is needed to better understand tsunamis.”). This is your last impression on the reader. Make it powerful, informative, and effective. Introduce the concluding paragraph with something such as “In conclusion” or “To summarize”. It sounds trite, but it is an important signal to the reader that you are wrapping up.
<http://www.monash.edu.au/lls/llonline/writing/business-economics/marketing/2.2.3.xml>
<http://www.phrasebank.manchester.ac.uk/writing-conclusions/>
- Make sure to **include page numbers** in multi-page documents. Microsoft Word, for example, does not automatically generate page numbers.

CHARACTERISTICS OF STRONG WRITING

- 8. Unity** is the concept that every unit of discourse (i.e., sentences, paragraphs, sections, chapters) should focus on one topic. If you're trying to discuss too many concepts in one paragraph, break it up into multiple paragraphs. If you are trying to do too much in one sentence, break it up into multiple sentences. The concept of unity is closely related to coherence (next item).

- 9. Coherence** is the orderly transition from one theme to the next in your essay. Whether it is sentence-to-sentence transitions or paragraph-to-paragraph transitions, coherence is what makes a series of facts become a beautiful piece of text. For example, paragraphs need topic sentences (usually the first sentence) and a stress position that leaves the reader with the content to be emphasized. Then, for example, the topic position of the new sentence links back to the stress position of the previous sentence. Another way to have coherence is to enumerate what is going to be discussed in the review, or in the section. Try something like this: “The variation in the weather affects the amount of solar radiation incident at the surface. Three things will be discussed in this section: clouds, stratospheric ozone, and aerosols.” For guidance on coherence, see Gopen and Swan (1990) “The Science of Scientific Writing” or chapter 8 of *Eloquent Science* (free download). The concept of coherence is closely related to transition (next item).
<https://www.americanscientist.org/blog/the-long-view/the-science-of-scientific-writing>
<http://eloquentscience.com/2009/11/chapter-8-constructing-effective-paragraphs/>
- 10. Transition.** Once inside the body of the essay, use transitional devices and coherence to keep the story flowing. Don't just write a list of facts as a series of sentences. This is not a coherent paragraph below.
 “Sandstone, a clastic sedimentary rock, is an important reservoir rock. Sandstone is composed primarily of quartz and feldspar. Sandstone forms through two steps. The first is the accumulation of the sand through deposition. The second step is when the grains are compacted and lithified, cemented by the minerals precipitating within the pores.”
 Search online for “transitional devices” for lists of words and phrases that you can use.
- 11.** A corollary to the last few items is to avoid **one-sentence paragraphs**. The concept of a paragraph is generally built around making a point in the topic sentence, then developing it in the subsequent sentences. A one-sentence paragraph doesn't have this exposition, so generally should be avoided.
- 12.** Another common error that students make is that they provide a nice overview of a topic, but the essay needs **more specifics and more quantitative information**. Strengthen the essay by presenting more evidence and providing more insight into the arguments. Be quantitative wherever possible. It may be a short essay, but try not to speak too broadly about what you've read. Provide some key insights and details that show a deeper appreciation of and more breadth to the topic than something you might just read on the Internet. Rather than saying that Smith et al. (2000) said something, present some of the evidence to support why they might have said it.
- 13.** Apply **higher-level thinking skills**. A good essay is more than just describing what you read in your own words. The best essays apply the higher-level thinking skills of Bloom's taxonomy to create something new and demonstrate that you understand the material at a higher level. For example, how can you apply the knowledge that you're read in a different context? Can you compare or contrast different approaches or hypotheses? Are some ideas in the literature questioned by others, or by your experience? Can you argue your point or critique what you read? Can you extrapolate the work you read to other situations or into the future? Can you design a new hypothesis that resolves the issues raised against existing approaches? Search online for “Bloom's taxonomy” to get a sense of the kinds of questions that you could be asking to demonstrate this depth of thinking and get a higher mark.

GENERAL TIPS ABOUT SCIENTIFIC WRITING

- 14.** Use **scientific words, phrases, and notation** correctly. Because you are writing a scientific essay, do not allow your poor, unscientific word choice to undermine your scientific credibility. For example, rather than the vague and unscientific “methane level”, say “methane concentration”. Rather than say, “3 degrees Celsius”, write “3°C”. Be familiar with how to insert scientific notation and symbols in your word processing program. Put spaces between the numerical values and the units: “3 km”, not “3km”.
- 15.** Remember that this is a scientific essay, so **use appropriate language**. Do not use casual, colloquial or hyperbolic words and phrases that will ruin your scientific credibility (e.g., “novel”, “comprehensive”, “pioneering”). Stick with facts, interpretation of the facts, and synthesis.
- 16.** If you have a problem with **awkward words or phrases or your writing is unclear**, try to speak your point out loud instead. If you understand the concept, then you should be able to explain it clearly out loud. Then, write down your explanation in natural language. Use simple, but scientifically precise, language.
- 17.** A **theory** is a well-tested scientific law like gravity, evolution, and plate tectonics. Some person's scientific idea is called a **hypothesis**. Thus, you should never write, “Smith (1954) theorized”; use “Smith (1954) hypothesized.” http://www.huffingtonpost.com/cara-santa-maria/talk-nerdy-to-me-you-do_b_1033738.html
- 18. Use proper scientific date and time format.**
- BEST: 1200 UTC 12 November 2020
- LESS GOOD: 12:00 November 12, 2020 (don't omit the time-zone designation)
- WORSE: 12:00 on the 12th of November 2020 (although appropriate for formal British writing, this format is verbose)
- THE WORST: 12.11.20 or 12-11-20 (Is this 12 Nov 2020, 11 Dec 2020, or 20 Nov 2012?)

19. Reserve **we and us** for when you refer to a group that includes you (e.g., “I/we speculate that...”). If you want to refer to the scientific community or a group of scientists, say so. “The scientific community generally believes that...” “Humanity has long dreamed of going to Mars.” Provide citations to support your claims. If you are referring to something that you did, write “I”, not “we”.
20. **Acronyms** should be defined upon first usage: “...Weather Research and Forecast model (WRF)”. Don’t introduce an acronym unless you plan to use it at least more than once. If you introduce an acronym in the abstract, reintroduce it in the body of the text upon first usage. Don’t introduce acronyms for simple phrases that could be more easily spelled out. Spelling things out explicitly is easier for your readers who will not have remember what the acronym stands for.

CONCISION AND PRECISION

21. Look out for **vague, inderscript sentences** that say little of substance (e.g., throw-away sentences). For example, “The polar jet stream is a complex phenomenon.” or “Understanding climate change is an important problem.” Readers reading these sentences will immediately recognize that you have little of substance to say. Replace these sentences with more detail and more specifics. Provide quantitative information wherever possible to make your argument more rigorous. Words and phrases to look for in your writing that indicate possible weaknesses: “the important role of”, “further study is needed”, “complicated”, “complex”, and “not well understood”.
22. Reduce **verb verbosity**: “have found to be lacking” -> “are lacking”, “are suggested to be” -> “suggest”, “gave evidence that” -> “demonstrated”, “performed the calculations” -> “calculated”, and “has the presence of” -> “contains”.
23. **Convey the action of the sentence in the verb.** Choosing strong verbs makes your writing more powerful and more concise. Reduce the use of “is”, “are”, “was”, and “were” in your writing, which may constitute the passive voice. For example, compare “Continental drift was first described by Alfred Wegener.” versus the stronger “Alfred Wegener first described continental drift.”
24. **Use consistent verb tense.** When describing research that has been previously published, it makes sense to use past tense (e.g., “Smith et al. (1989) showed...”). When describing a figure in your text, it makes sense to use present tense (e.g., “Figure 1 shows...”). Be consistent in your approach throughout your text.
25. **Reduce redundancies and verbosity in words and phrases:** “Cambrian period” -> “Cambrian”, “small in size” -> “small”, “in the southwestern part of England” -> “southwest England” and “fundamental requirements” -> “requirements”, “high level of precipitation” -> “heavy rain”.
26. **Very** is such an overused word that its meaning has been diluted. Remove nearly all occurrences of this word from your writing and your writing will be much stronger.
27. Beware of **words that are often used interchangeably**, but are not interchangeable. Search online for these word pairs to find out why they have different uses.
that vs. which *since vs. because* *whilst/while vs. whereas/although* *its vs. it’s* *fewer vs. less*
like vs. such as *use vs. utilize*
28. Beware of **words that are both singular and plural**: *literature* and *research* (i.e., not *literatures* or *researches*).
29. Avoid **phrases that are verbose** and often unnecessary. These include the following phrases below. Search online for “words and phrases to avoid” to get a more complete list. Eliminating these phrases will help your writing sound more professional. Phrases that start with *it* are particularly amenable to being deleted: “It can be shown that”, “it was found that”, “It has been hypothesized that”, “It is clear that”, “there has been”, “the results show that”.

After you are done writing and are editing, globally search for *it*. If one of these word-hogging phrases appears, delete it and see if the sentence reads more clearly. Maybe all that is needed is an adverb instead. For example, *it is possible that* ⇒ *possibly*.

30. Avoid **platitudes, feel-good statements, or excessively vague statements and other phrases that could apply generally and lack depth.** Don’t write sentences that are so general as to be meaningless or could apply to any study. These might be recommendations to collect more data, perform additional studies in the future, or provide easy solutions to difficult environmental problems. Such feel-good statements may not address the costs, policy implications, competing effects, etc. For example, don’t end your report with a sentence such as “More data on this type of event is needed.” without providing specifics as to the justification for why more data is needed, whether collecting such data is possible, or how long it would take to collect such data. Other platitudes to avoid include “This is an important problem.” and “It is an interesting problem.”

Write with authority; don’t just write things down because they sound good. Be able to defend your statements. Here are two examples.

“The deterioration of air quality caused by traffic pollution and rapid urban development is becoming more serious.” This sentence is one that is difficult to verify. “More serious” means what? Deterioration where? Some cities have been improving their air quality. Thus, it is difficult to understand or quantify this sentence without further information.

“The accuracy of modeling systems also needs to be improved.” This sentence may be true, but a conclusion section that is a bunch of obvious statements such as this without qualification as to what specifically about these modeling systems is wrong and how to fix them is not helpful to your readers.

31. Don't write **vague or waffly text** and expect the reader to be impressed. Say only what you mean to say and that you can defend.
- Avoid making general statements about literature being abundant, rare, or nonexistent. Ideally, as a scientist, you should be able to quantify this result. And, in most cases when people say that there is little to no literature out there, there actually is literature out there. Look harder, and don't overgeneralize.
 - Don't write statements such as “Lots of people are working on this.” Similarly, this kind of a statement is not a meaningful critical analysis of the literature.
 - Don't say the science is *complex* or *complicated*. It may be; it may not be. In any case, your job as a scientist is to make it less complex through rational and evidence-based explanations.
 - Be especially vigilant about bland statements in the abstract. As the abstract might be the only part of your paper that people read, make those few words count as a summary of your article.

GRAMMAR

32. **Run-on sentences** are two or more sentences or sentence fragments that are spliced together. Sometimes the second sentence in the run-on often started with a nonspecific *this*. The easiest way to fix run-on sentences is to separate them into two separate sentences. To improve, see these Web pages.
<http://grammar.ccc.commnet.edu/grammar/runons.htm>
<http://grammar.about.com/od/rs/g/runonsentenceterm.htm>
<https://writingcenter.unc.edu/tips-and-tools/fragments-and-run-ons/>
33. A companion issue to run-on sentences is the **incomplete sentence or sentence fragment**. Sentences need both a subject and a verb, and an incomplete sentence is missing one or both. A sentence needs to express a complete thought. Read it out loud to see if it makes sense.
<https://www.englishgrammar.org/sentence-fragments-2/>
<https://writingcenter.unc.edu/tips-and-tools/fragments-and-run-ons/>
34. **“However”, “thus”, and “therefore” are not conjunctions.** They cannot be used to join two separate independent clauses. Use a semicolon or write them as two separate sentences.
<https://www.iup.edu/writingcenter/writing-resources/grammar/common-problems-with-however,-therefore,-and-similar-words/>
http://grammar.ccc.commnet.edu/grammar/indep_clauses.htm
35. **Misplaced or dangling phrases** in the sentence can make for humorous meanings.
POOR: “When hiking in the Grand Canyon, the river is a beautiful sight.” (The river doesn't hike.)
IMPROVED: “When [I was] hiking in the Grand Canyon, I noticed that the river is a beautiful sight.”
36. Many students **capitalize words** appearing in the middle of sentences. Only capitalize proper nouns, acronyms, and the first words of sentences. **“Earth”** is capitalized if referring to the planet (“Earth's clouds”), but not if referring to the ground (“the earth underneath”). **Directions are not capitalized**, unless referring to a specific geographical feature rather than a region of direction: *north*, but *central Europe*, *northern California*, *North Pole*, and *Northern Hemisphere*. **Do not capitalize elements, chemicals, minerals, or rocks**, unless you are referring to a specific rock: nitrogen, dihydrogen oxide, pyrite, sandstone, Yorkshire Grit, Acasta Gneiss. **Capitalize software packages**, recognizing that some are acronyms: Microsoft Excel, Python, R, MATLAB, FORTRAN. For a list of capitalization rules, see the following URLs.
<http://www.grammarbook.com/punctuation/capital.asp>
http://hubpages.com/hub/Grammar_Mishaps_Capitalization_Rules
37. **Numbers** less than or equal to ten should generally be spelled out, unless they are part of a list of numbers or quantities (“nine planets”, but “9 km”). A number at the start of a sentence is spelled out (e.g., “Three hundred and fifty-nine earthquakes were studied.”).
38. If you have **misspellings** in your essay, please pay more attention to the red-underlined words if using Microsoft Word (this can be set in the preferences, if you don't see this). If these words are flagged, find the correct spellings and fix them. If phrases are underlined in green, then these are indications that the **grammar may** not be correct. Take a second look to see if you have made an error.

39. Either **indent paragraphs** or place a vertical space between them so that paragraphs don't run together.
40. Avoid pronouns where the antecedent is unclear. The two most common pronouns with unclear antecedents are **this** and **it**. For example, starting a sentence with the "naked *this*" can be confusing to the reader because they may not know what *this* refers to. Likewise, the phrases with *it* in them in #29 indicate an unclear or unspecified antecedent. Who showed that? Who found that? Who has been hypothesizing that? One way to eliminate the naked *this* is to combine the two sentences. But, only do this if the resultant sentence is clear and not too long.
- DRAFT: ...showed that the increasing temperature was leading to the Greenland ice melting faster. This was a result of the more rapid penetration of meltwater...
- IMPROVED: ...showed that the increasing temperature was leading to the Greenland ice melting faster, a result of the more rapid penetration of meltwater...
41. The abbreviations **i.e.** and **e.g.** and their associated text should appear inside parentheses.
- DRAFT: They showed that severe weather, e.g., tornadoes, hail, heavy precipitation, occurs all year round.
- IMPROVED: They showed that severe weather (e.g., tornadoes, hail, heavy precipitation) occurs all year round.

PUNCTUATION

42. Please learn the difference in usage between **semicolons (;), colons (:), and em dashes (—)**. Most scientific documents contain only a few semicolons, colons and em dashes, if any. Also, whereas American publishing style is to use the em dash with no spaces in between, British publishing style is to use the en dash (–) with spaces in between. I am not concerned with which you use, as long as you are consistent.
- <http://www.thepunctuationguide.com/em-dash.html>
<http://www.grammarbook.com/punctuation/colons.asp>
43. Nearly all students misuse the **comma (,)**. Even students who write otherwise excellent essays often neglected proper comma usage.
- <https://www.grammarly.com/blog/comma/>
<https://www.bbc.co.uk/bitesize/topics/zvwwxnb/articles/zc773k7>
<https://www.businessinsider.com/a-guide-to-proper-comma-use-2013-9?r=US&IR=T>
44. Correctly employ **hyphens, en dashes, and em dashes**. For example, "1085-m Snowdon" versus "Snowdon is 1085 m in elevation". For another example, "pages 60–89" is correct, whereas "pages 60-89" is incorrect. See *Eloquent Science*, appendix A for more details.
45. Use **possessives** correctly.
- "the university's Visitor Centre" "the five cats' hair balls" "Smith et al.'s (1988) conclusion" "Mars's thin atmosphere"
46. Avoid **contractions** in formal writing: "can't", "we'll", and "it's".
47. Avoid putting **quotes** around commonly used terms: "pyrite is known as 'fool's gold'...", "is known as 'plate tectonics'...". If you are introducing a definition, italicize it. Otherwise, skip the quotes.

SOURCES, CITATIONS, AND REFERENCES

48. Make sure that you use **primary, peer-reviewed sources**. Web pages are acceptable if the information comes from a respected source and no peer-reviewed publication is available. Otherwise, do not include web pages. Wikipedia is generally not a valid source. Course textbooks are generally not valid peer-reviewed sources and should be avoided.
49. **Discuss the science, not the source.**
- DRAFT: The paper by Smith et al. (1999) showed that increasing clouds were a result of higher SSTs.
- IMPROVED: Smith et al. (1999) showed that increasing clouds were a result of higher SSTs.
- EVEN BETTER: Increasing clouds were a result of higher SSTs (Smith et al. 1999).
50. **Citations** go inside the sentence. Put the period after the citation: "blah blah blah (Smith et al. 1999)." In general, don't cite with first initials. Provide the year following the authors' names. Don't leave out the "et al.", if needed. <http://libweb.anglia.ac.uk/referencing/harvard.htm>
51. **Et al.** requires a period after al., as an abbreviation for the Latin words *et alia* ("and others"): "Chang et al. (2001)" or "(Chang et al. 2001)".

a. Generally, **three or more authors are called “et al.”** in citations, not “Smith, Jones, and Chen (2020)”. (Spelling out three authors is a format used in some social-science journals, but not generally in science journals.) In the reference list, all authors should be listed, unless there are nine or more authors.

b. When **citing a reference with three authors** (e.g., Chen, Smith, and Jones), remember to use “Chen et al. (1980)”, not “Chen (1980)”.

c. **Lists of citations should appear in chronological order.**

INCORRECT: “... (e.g., Smith et al. 2014; Jones et al. 1999; Chen et al. 2020).”

CORRECT: “... (e.g., Jones et al. 1999; Smith et al. 2014; Chen et al. 2020).”

d. If you have provided citations to a sentence, **make it clear to the readers why these citations are provided**. What makes these articles worth citing? Are they representative of the larger body of literature? Where is the synthesis and interpretation? If you present an example from the literature, you need to say why are you presenting this case. If there are numerous studies to support your statement, can you think of a way to synthesize the studies to discuss them instead?

For example, don't write: “Various frontal structures of extratropical cyclones exist (Schultz et al. 1998).” In this case, what frontal structures are described in Schultz et al. (1998) are unclear. Instead, write something such as the following, “Different frontal structures of extratropical cyclones are produced when the along-flow wind is either confluent or different (Schultz et al. 1998).”

e. **Don't use “the study” or “The scholars” or “the authors” as the subject of a sentence.** Just use the citation in its active form. Or, if it would be clear what the article is being discussed, then just describe the results without reference to the article. “Smith et al. (1999) did XXXXX. They also found YYYY.”

f. Few, if any, formats for reference lists in journals include the **“pp.”** These can be deleted.

INCORRECT: “Thomas, C. M., and D. M. Schultz, 2019: What are the best thermodynamic quantity and function to define a front in gridded model output? *Bull. Amer. Meteor. Soc.*, **100**, pp. 873–895.”

CORRECT: “Thomas, C. M., and D. M. Schultz, 2019: What are the best thermodynamic quantity and function to define a front in gridded model output? *Bull. Amer. Meteor. Soc.*, **100**, 873–895.”

52. Most people use Harvard **referencing style**. The reference lists need to follow a consistent style. For the rules of referencing style, this URL has quite a few formats. Unless specified by the instructor, the choice of referencing style is your own. But, please take care and use a consistent referencing and citing format. **Do not let the referencing go until the last thing you do on your paper.**

<http://libweb.anglia.ac.uk/referencing/harvard.htm>

FOR RESEARCH PAPERS

53. Use **scientific language appropriate for your level of education**. Avoid colloquial words or phrases that do not convey the knowledge of an expert: “weather system”, “precipitation is caused by colliding air masses”.

54. Reserve **words with clear mathematical or scientific meaning**, but also have colloquial usage, for scientific usage.

a. For example, the word **“significant”** has a colloquial meaning of “large” or “important”, but it also has a scientific meaning as in “statistically significant”. So, if you write “a relationship is significant”, please ensure that you have conducted a statistical test on the relationship and have determined it to be statistically significant at a stated level (e.g., 95%, 99%).

b. The word **“correlate”** means “relate” colloquially, but it also has a mathematical meaning of “correlation” with a calculated correlation coefficient. So, reserve that word for when you have calculated a correlation coefficient and state what that value is.

c. The word **“trend”** makes the most sense when describing changes as a function of time or a particular direction. So, if you are describing a map of a static quantity (such as the elevation on a topographic map or a map of concentrations of particulate matter), it is generally better to talk about the “patterns” or “distribution” of the quantities in space. Reserve the word “trend” for when you are talking about a change as a function of time (e.g., “a trend in the ozone concentration at Manchester from 1990–2020”) or describing an apparent relationship from a scatterplot or line graph (e.g., “an upward trend in ozone concentration as solar radiation increases”).

55. Where possible, **present quantitative evidence**. As scientists, we need physical measurements to test our hypotheses. You should be conversant in the numerical language of science.

56. **Figures and tables** should be meaningful and discussed within the text. Do not include a figure in your essay that isn't involved in the text in a useful way. Figures should be presented in the text as close to numerical order as possible (e.g., Figure 1 should be discussed in the text before Figure 2). Spell out *Figure 1* if it starts a

sentence; otherwise, *Fig. 1* is acceptable either within the sentence or in parentheses at the end of the sentence. Always spell out *Table 1*.

INCORRECT: Fig. 1 shows that ozone concentration increases with increasing insolation.

CORRECT: Figure 1 shows that ozone concentration increases with increasing insolation.

BEST: Ozone concentration increases with increasing insolation (Fig. 1).

RESOURCES

Eloquent Science: A Practical Guide to Becoming a Better Writer, Speaker, and Atmospheric Scientist. The DEES library has a copy on reference (cannot be taken out of the room) and the John Rylands Library has several copies to sign out. On campus or behind the VPN, you can download it for free at <http://www.bit.ly/EloqSci>. Best chapters to read: 4 (Structure), 5 (Motivation), 6 (Getting Started), 7 (Scientific Writing), 8 (Paragraphs), 9 (Sentences), 10 (Words), and 13 (Editing and Revision).

Strunk and White: *The Elements of Style*. Everyone should own a copy. This classic is powerful enough to teach anyone how to write better. The book is short enough to read in an evening (about 100 pages) and comes in the size of a paperback novel. The original 1918 book by Strunk is freely available online: <http://www.gutenberg.org/ebooks/37134>.

"The Science of Scientific Writing." Gopen and Swan (1990) argue that by understanding the science of how readers read, authors can improve their writing. Of greatest significance is the importance of coherence between sentences. Examples, both before and after editing, apply their techniques. <https://www.americanscientist.org/blog/the-long-view/the-science-of-scientific-writing>

The University of Manchester has several resources to help you with your writing.

- Academic Literacy Program: <http://eml.manchester.ac.uk/fls/ALP/ALPFAQ/>
- Academic Phrasebook: <http://www.phrasebank.manchester.ac.uk/>
- My Learning Essentials: <https://www.library.manchester.ac.uk/using-the-library/students/training-and-skills-support/my-learning-essentials/>

Purdue University has an excellent set of resources through its Online Writing Laboratory. https://owl.purdue.edu/owl/purdue_owl.html