Rules of Thumb for Scientific Writing

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You will find the appropriate number where there is a related issue in your manuscript. If the issue is repetitive in nature, it will only be noted the first few times.

**WRITING**

1. Use upper- and lower-case consistently.
2. Avoid starting sentences with citations. It is better to put the main idea at the beginning of the sentence, and the citation at the end in brackets.
3. Avoid starting sentences with symbols, numbers, or acronyms.
4. Use consistent labeling throughout (for example in abbreviating site names, procedures, etc).
5. Reassign logical labels or site names (rather than inherited ones) when appropriate.
6. Provide citations for each statement, unless they are so well know they are beyond dispute. Use textbook or review paper citations for reasonably well know facts, and referred papers for ‘newer’ science, or less well know facts.
7. Don’t use jargon to describe particular things (even if correct) if the terms are more commonly used for other things. For example use ‘schematic’ instead of ‘map’ if you’re not describing a geographic map.
8. Be concise wherever possible. Often this involves NOT using ‘of’. For example, say “Soil moisture can strongly affect root density” instead of “The amount of water in the soil can strongly affect root density”.
9. Be sure verbs and nouns are consistent in tense and singular/plural sense.
10. Use subsections judiciously. Too many subsections can make the document seem unnecessarily long and unwieldy.
11. You shouldn’t have to state where data are, or what is contained in figures or tables in your text. Rather you should make a statement related to their content and refer the reader to them. The captions should describe the content of figures and tables.
12. Use the simplest, most direct language possible. For example, use the verb ‘use’ instead of ‘utilize’.
13. In lists, use a comma after the second last item.
14. Scientists are incredibly picky about clear language. Make sure your sentence can’t be misconstrued. For example, “Samples were taken mid-stream, and from both banks” should read “‘Samples were taken mid-stream, and near each bank’ since it’s difficult to get a water sample from a streambank.
15. Put the most important information first in the sentence. For example, you should say “Four samples failed to meet water quality guidelines”, rather than “When compared to water quality guidelines, four samples did not comply”.

**CITING REFERENCES**

16. You should not cite lecture material or personal communications unless the information is truly not published in the refereed scientific literature.
17. You should typically cite the original reference, not a document that cites the original reference. An exception is made for textbooks, which typically contain material from older references that is now ‘well-known’.
18. It is better to cite peer-reviewed literature when possible. More ‘grey’ literature (i.e. conference proceedings, unpublished reports) can be difficult for readers to find.
19. Identically authored papers should be listed chronologically. If you have identical authorship and year, list them as Smith et al., 2009a, and Smith et al., 2009b, etc.

**DATA (in text, tables, or graphs)**

20. Watch out for significant digits. Remove un-needed decimal places. Consider changing the units (or putting “×10ⁿ” in your label) if you have large numbers on your axis or in your table.
21. Whenever you have repetitive information (names, categories, units, etc.), try to reorganize to minimize the repetition.

**TABLES**

22. Data should be centered in columns.
23. Do not use any vertical lines, and use the minimum number of horizontal lines you need for clarity.
24. Spell out abbreviations the first time they are used in the table, even if they have already been defined in the text.
25. Place units in their own row, not in the row heading. Try to group identical units together, write the unit once and then use a horizontal line to indicate which columns it covers.

**GRAPHS**

Your goal is to maximize the information you are communicating, while minimizing clutter and reader/viewer effort.

26. Remove as much clutter as possible e.g. gridlines, borders, the grey background Excel gives as a default, etc.
27. Make your symbol and font sizes appropriately large for easy viewing.
28. Only very complex graphs should be larger than 1/6th of a page size. Typically your graphs should be small enough to fit six graphs on a page. This will make the ratio of the graph label and symbols sizes appropriate for usual journal publications and for slides (where you might expand the graph to a single slide).
29. Put related graphs (i.e. graphs that have similar y- or x-axes) on the same page so the reader can compare the data without leafing through your manuscript. You can reasonably include up to six graphs on a slide (each with appropriately large symbols and large font; see previous point).
30. If possible, instead of using a legend, attempt to label directly on the graph. This saves the reader from having to look back and forth between the data and legend. The labels can be color coordinated with series.
31. Aim for three to six labels on your axes. Check for significant digits.
32. If including multiple graphs on one page with a common x-axis, try to line up the graphs and include the axis title only on the bottom graph.
33. When possible put related information onto a single graph. Use both y-axes if reasonable.
34. Consider carefully whether a line should join data points on a graph. As a rule of thumb, discrete data should be plotted as points, and continuous data as lines.
35. If your graph has a caption, it doesn’t need a title.

For further information, see instructions for authors in any journal. For example [https://www.agronomy.org/publications/style/](https://www.agronomy.org/publications/style/)