Grammar and style notes for scientific writing

Main goal: exact, clear, and compact.

- Compact is usually clear!
- Other desirable properties: smooth and objective
Exact

• Word choice: make certain that every word means exactly what you want to express. Choose synonyms with care. Be not afraid of repetition.

• Avoid vague expressions which are typical for the spoken language.

E.g. the interpretation of words which approximate quantities (”quite large”, ”practically all”, ”very few”) depends on the reader and the context. Avoid them especially if you describe empirical observations.
• Make clear what the pronouns refer to. The reader shouldn’t have to search the previous text to determine their meaning. Simple pronouns like this, that, these, those are often the most problematic, especially when they refer to the previous sentence. Hint: mention the noun, e.g. ”this test”.

• Avoid ambiguous and illogical comparisons. These are often due to missing words or non-parallel structures. E.g.

”Female students draw concept maps more often than male students.”
”The students’ points were lower than the average computer science students.”
• Antropomorfism: do not attribute human characteristics to machines or other inanimate things.

E.g. a computer cannot understand data, an experiment cannot control variables or interpret findings, a table or a figure cannot compare results.

• Incorrect grammar and careless sentence structures can create ambiguities!
Clear

• Use illustrative titles which describe the essential in a chapter or a headline.

• Write a brief introductory paragraph in the beginning of each chapter or headline with subheadlines.

• Divide the text logically into sentences and paragraphs.
  – Direct, declarative sentences with simple, common words are usually best.
  – Paragraphs should be logically uniform and continuous.
• Place the adjective or the adverb as close as possible to the word it modifies.

• Avoid **scientific jargon** = continuous use of technical vocabulary when it is not relevant.

• Write numbers as digits when they refer to sizes or exact measurements. Otherwise the general rule is to write numbers $< 10$ as words. Express decimal numbers with a suitable precision. See APA pp. 122-129.

• Use punctuation to support meaning.
Compact

• Say only what needs to be said!

• Short words and short sentences are always easier to comprehend

• Weed out too detailed descriptions. E.g. when you describe previous work, avoid unnecessary details. Give a reference to a general survey or a review if available.

• Don’t describe irrelevant or trivial observations (i.e. don’t mention obvious things)
• Avoid wordiness, e.g.

"based on the fact that" → "because"
"at the present time" → "now"
"for the purpose of " → "for/to sg."

Notice: "reason" and "because" have the same meaning → don’t use together!

• Use no more words than are necessary. Redundant words and phrases (which have no new information) should be omitted.

• Avoid too long sentences and paragraphs
Smooth

• Verbs: Stay within the chosen tense! No unnecessary shifts in verb tense within
  – the same paragraph
  – in adjacent paragraphs

• Use verbs rather than their noun equivalents

• Prefer active to passive voice

• Avoid long noun strings!

  Hint: sometimes you can move the last word to the beginning and fill in with verbs and prepositions
• Each pronoun should agree with the referant in number and gender.

• Transitional words help to maintain the flow of thought
  – time links: then, next, after, while, since
  – cause-effect links: therefore, consequently, as a result
  – addition links: in addition, moreover, furthermore, similarly
  – contrast links: but, however, although, whereas

• Notice: some transitional words (while, since) can be used in several meanings → limit their use to their temporal meaning! (Use ”because” instead of ”since”; ”although”, ”whereas” or ”but” instead of ”while”, when there is no time connection.)
• Use abbreviations sparingly, especially the abbreviations which you define yourself for technical terms.

• Do not use emphasis (italics) when it is not needed. Use syntax to provide emphasis.

• Metaphors can sometimes help to simplify complex ideas. However,
  – Don’t overuse them
  – Don’t mix several metaphors in one sentence
  – Avoid cliches
Objective

- Use the 3rd person rather than the 1st person.
- Use emotionally neutral expressions, e.g. ”Students suffering from dyslexia” → ”students who have dyslexia”
- Use words which are free from bias (implied or irrelevant evaluation) Especially, be careful when you talk about
  - gender
  - marital status
  - racial or ethnical groups
  - disability
  - age
Hints:

- Select an appropriate degree of specificity. When in doubt, prefer the more specific expression. E.g.
  - Instead of ”man” use ”men and women” or ”women and men” to refer to all human beings
  - Instead of ”old people” define the age group ”ages 65-83”
  - Instead of ”Asian” mention the nationality ”Chinese”

- Differences should be mentioned only when relevant. Careless use of biassed words can create ambiguities.
  E.g. avoid the use of ”man” as a generic noun or an ending for an occupational title. Otherwise it can imply incorrectly that all people in the group are male.