- Use a hyphen after a prefix to a hyphenated adjective, e.g. semi-winter-hardy plant, non-winter-hardy plant.

- Use a hyphen in a compound adjective that includes a number. This applies especially to units of measure, e.g. 10-yr-old field, 6-kg samples, 4-mm depth, 5 to 10-cm layer.

- Hyphenate compound modifiers starting with the adverb 'well', except when another adverb precedes it, e.g. well-known method, but very well known method.

- Do not use a hyphen after an adverb formed by adding 'ly' to an adjective, e.g. an intensively cultivated hillside (Note that the word 'early' ends in 'ly' but is not an adverb; therefore, "early-morning data collection" is correct.)

- Use a hyphen for compound adjectival expressions as needed for clarity, e.g. "on a per-gram basis, winter-grown cereals, but low molecular weight substance".

- Use an en–dash instead of a hyphen in a compound or prefixed adjective that has a phrase in one of its pans (and the phrase cannot be hyphenated), e.g. "*Avena sterilis*–derived resistance genes; pre–Civil War surveys."

- Use an en-dash instead of a hyphen after a superscript or subscript, e.g. F3–derived; NO_3–N; but 'nitrate N' when spelled out.

- Use hyphens to join numbers and prefixes in chemical names, e.g. trans-2-bromocyclopentanol. There are exceptions (see Dodd, 1986 for more details).

- Use an en-dash between joined nouns of equal importance, e.g. Webster–Nicollet soil complex; log–normal function; oxidation–reduction potential; corn–soybean rotation; fusarium wilt–root–knot nematode complex.

- As a specialized instance of the previous rule, use an en-dash between two chemical compounds, e.g. HC1–H_2SO_4.

- In references and in parenthetical values, use an en-dash to indicate a range of numbers, e.g. "p. 23–49; Plant Dis. 66:172–176; during the final study years (1997–1999). If either of the numbers is negative, or is otherwise modified, then use the word 'to' instead of the dash, e.g. a score of -200 to 250; -5 to 10°C.

- The above rules are given in part to explain why sometimes hyphens and sometimes en-dashes appear in final typeset form, and why sometimes hyphens are added and

sometimes deleted. If we can not or do not wish to distinguish hyphens from en-dashes in a manuscript, use hyphens throughout. Getting the hyphens absolutely correct is far from the most important step in preparing a scientific document like theses. However, never make a one-letter division, like a-mong; never carry over suffixes such as -ed, -able, -ible, -ing; do not divide the initials of a name, or the forename and the initials, the month and the day or such combinations as £12, 4s, 2005 BC or 6.00 P.M.; never carry over the hyphen to the next page.

c.   Correct Use of Common Words

The following entries address common difficulties in scientific use of very common words.

Affect vs. effect *(verb).* 'To affect' means **to act** upon something that already exists; 'to effect' means to bring some thing or condition into existence.

Affect, vs. **effect** vs. **impact** *(noun).* An 'effect' is a result or outcome; an 'affect' is an emotion (the term is used chiefly in psychology); an 'impact' is a collision, the force of a collision, or (by extension) a major effect. That is, 'impact' is not a neutral equivalent of 'effect'.

Alternate vs. alternative. Use 'alternate' to mean occurring or following by turns, or alternating in time or space — first one, then the other. Use 'alternative' for one of two or more mutually exclusive possibilities.

Based on vs. on the basis of. 'Based on' is adjectival and must modify a noun or pronoun which usually immediately precedes it. For example "This conclusion is based on four years of experience" or "Conclusions based on experience may still require testing." To modify a verb, use a phrase starting with "on the basis of. EXAMPLE: Change "based on the first four years of results, we discarded the original hypothesis" to "on the basis of our results, we discarded the original hypothesis."

Between vs. **among**. Use 'between' for two entities; 'among' for more than two.

cf. (Latin *confer,* compare) vs. see. Use 'cf.' sparingly, to mean "see, for a contrasting view." For scientific writing, the English 'see' and 'compare' are preferable.

Compare to vs. compare with *(verb + preposition).* Use 'compare to' to point out similarities only; use 'compare with' to point out differences (or both differences and similarities). More broadly, use 'compare to' for overall likenesses and contrasts and for subjective, qualitative comparisons and use 'compare with' for objective, quantitative comparisons. Also do not be afraid to simplify "more --- compared with" to "more --- than" (e.g., "more bio-mass at the second harvest than the first" instead of "more biomass at the second harvest compared with the first").

13

Due to *(adjective or preposition)* **vs. because of** *(preposition).* 'Due to' as an adjective must modify a noun or pronoun; as a preposition, however, it is equivalent to 'because of or 'owing to' and can modify a whole clause. Authorities disagree on this usage. The ACS manual (Dodd, 1997) rejects the prepositional usage, and both *Webster's Tenth New Collegiate Dictionary* and *The Hew Fowler's Modern English* (Burchfield, 1996) uphold it. The CBE manual (1994) is silent on this point (CBE, 1994, p. 756). A writer who wishes to avoid minor controversy may safely use 'because of instead of 'due to' at the beginning of a sentence or an independent clause.

e.g. (Latin *exempli gratia,* **for example) vs. i.e. (Latin** *id est,* **that is). Use '**e.g.' to give an example out of available possibilities; use 'i.e.' to specify exactly what is intended, if, as you write, you think "for example" and "that is" instead of "ee-gee" and "eye-ee", you will not have trouble with the distinction.

e.g. and i.e. vs. for example and that is. Use the abbreviated form in figures, tables, and in parentheses; otherwise, use the English words in full.

Ensure vs. insure *(verb).* Use 'ensure' to mean "make certain that a desired outcome occurs." Use 'insure' to mean "protect" against monetary loss as in an insurance policy.

et al. (Latin *et alii,* **and others) vs. etc. (Latin** *et cetera,* **and the rest).** 'Et al.' is limited to reference citations and entries, and refers to people. There is one period ('et al.', not 'et. al.' or 'et al'). , and only one 'etc.' refers the reader to additional, unspecified examples of what has just been mentioned. If an adequate group of examples has been introduced as such (with 'e.g.' or 'for example'), the 'etc.' is unnecessary. If the reader needs to be told to think of other possibilities, say so in English words ("and the like" or "and so forth"). In scientific writing, however, a specific statement is preferable. Give the right examples, or a complete list, but do not leave it to the reader to figure out what else we mean.

Further vs. farther *(adj. or adv.).* 'Further' means in addition or to a greater extent; 'farther' implies distance in space or time.

Geographical names. Use common English equivalents of place names where such exist (e.g. Rome, not Roma; Munich, not Munchen; Mexico City, not Mexico; but Buenŏs Aires. Beijing).[1]

---

[1] Many dictionaries include geographic names, either in the regular sequence or as an appendix. Geographic coordinates as well as spelling can be checked on-line at http://mapping.usgs.gov/ www/gnis/gnisform.html *(for* the USA and Antarctica) or http://164.214.2.59/gns/html/index.html (for the rest of the world).

Likely vs. probable *(adj.)* **and likely** vs. **probably** *(adv.).* In general, use 'probable' and 'probably', unless the emphasis is on the future. 'Likely' is often used in combination with another adverb (e.g. more likely, most likely, very likely), but such expressions do not often have a place in scientific writing. For example "The phenomena described in this research could probably have ---," but not 'The phenomena described in this research could likely have ---" (because the statements are in the past). "It is likely that the results will ---" is a good use of likely, since it looks to the future: "It is likely that the results were ---" makes sense only if the emphasis is less on the explanation than on the likelihood of the explanation.

Percent vs. percentage vs. percentage point. 'Percent' is used with numeric values, and is spelled out only at the beginning of a sentence. 'Percentage' describes such a value, and is always spelled out. 'Percentage point' is used with numeric values, and refers to a step of 1% in a percentage value; it is treated as a word, not a unit, and so is not abbreviated. For example "Grain fill was 20%; Nine percent of the plants; the percentage of grain fill."

Principal *(adj.)* **vs. principle** *(noun).* Use 'principal' to mean foremost, chief, main; use 'principle' to mean a tenet or belief.

Restrictive and nonrestrictive clauses (that vs. **which).** Generally, 'that' introduces a restrictive clause, one that gives information essential to the meaning of the sentence; 'which' may also do so, but to be read as restrictive the 'which' must not be preceded by a comma. Examples: "Only soil samples that contained >30% clay were tested. Those samples which were rejected for testing were stored for use in a separate study. This is the house that Jack built." If in such sentences, the restrictive 'that'-clause were omitted, essential meaning *(what kind of samples? >30 % clay; which samples? the rejected ones; what about this house? Jack built it)* would be lost.

"Which" introduces a nonrestrictive clause, one that gives only incidental or supplemental information. For example "The soil samples, which had been stored in a rain shelter, were tested for clay content. The rejected samples, which received no further treatment, were stored for use in a separate study. The house, which Jack built, will be razed next week. If in such a sentence the nonrestrictive 'which' clause were removed, the basic statement *(samples were tested, samples were stored, the house will be razed)* remains. The difference in meaning between restrictive 'that' or 'which' and nonrestrictive 'which' is so important, but is signaled by so slight an item as an ordinary comma, that it may be worth resorting to a simple rule. Use 'that' (but not 'which') with no comma before when

the added phrase gives essential information (is restrictive); use 'which' with a comma before when the added phrase is incidentally useful (is nonrestrictive).

Some troublesome singulars. Apparatus (pl. apparatuses or apparatus); criterion (pl., criteria); medium (pl., media); phenomenon (pl., phenomena); species (pl., species).

Use vs. employ *(verb).* 'Use' is the simpler word, and neutral. 'Employ' carries additional connotations, as of advantageous use or hiring for wages.

Use vs. utilize *(verb).* The meanings are not identical. Use 'utilize' meaning "to turn to practical use" only to indicate that some unexpected use was found for an object or procedure, e.g. At the development phase, it was possible to utilize earlier research. The word 'use' is used to put something to a particular purpose, e.g. The old hospital is not using any more. The participle 'using' must modify the agent of the action, and the agent must be expressed. People (and experiments) use, but plants and pieces of equipment do not. A passive sentence such as "the samples were oven-dried using the larger oven" implies "by us" (this grammatical construction is called *subject understood),* but in scientific writing an explicit statement is far preferable. Recast the sentence in the active voice (We oven-dried the samples using ---). Alternatively, change "using" to "with" for pieces of equipment or materials and "by" for procedures.

Whereas vs. while vs. but. Most contexts require only the simple 'but'. Use 'whereas' only when we intend a strong and parallel contrast (while on the contrary). Use 'while' occasionally for a mild and parallel contrast, but never when it can be confused with "and at the same time. Except in formal proclamations and resolutions (where it means "in view of the fact that"), 'whereas' requires a comma before and takes no comma after.

Words of foreign origin. Foreign words in common usage in English (such as denouement, de novo, per diem, or Zeitgeist) are considered to have been incorporated into the language. They are thus considered English words, and are set in roman type, not italic. Dictionaries indicate roman vs. italics for words of non-English origin. Common words of this kind include ad hoc, a priori, et al., in situ, in vitro, in vivo, per se, vice versa, and vs. Do not hyphenate such foreign words, not even in adjectival position (e.g. in vitro development, ex officio member, in situ changes).

/ (slash or solidus). With rare exceptions, the slash is reserved for mathematical division and ratios. If we want to express a combination of ideas, decide on exactly what we mean and say it in words. For example "In an expression such as 'appearance of collar/ligule of first leaf, change the wording to 'collar or ligule', 'collar and ligule' or 'collar and/or ligule'. "

Slang words. The authors/writers should avoid the use of such words as for as possible or should give some explanation for the readers and audiences.

Foreign Words: Foreign words are underlined unless used in a quotation. Foreign words that have been anglicized need not be underlined.

Tense: The past tense is proffered for scientific writing . Exceptions are quotations and references to existing facts , or to facts which will be true in the future , in which cases the present and future tenses may be used.

Person: Personal pronouns (I, we, he, they, and the like) should be avoided .For example, "Clover was found to be better quality than was alfalfa " is preferable to "I (or he, they, etc.) found that clover was of better----". However, an exception to this rule is the case where personal pronouns appear in material that is quoted.