BIOLOGY WRITERS USAGE MANUAL

(Reviewed Fall 2005)

Learning to write well is one of the most important skills that you can develop. Writing is thinking on paper. The ability to write clearly is an indication of your clear thinking and solid logic. You will have several different writing assignments this semester. Expect to continue these writing assignments in future biology courses you may take.

You should expect to go through several drafts before you have a paper that you are willing to hand in for a grade. It's a good idea to start your writing well in advance of the deadline. You will find your ability to improve on a draft will be increased greatly if you let the paper sit for a day or two before you start on a new draft.

Good writing is economical and clear. You should to state your points as concisely as possible. Avoid redundancy. Make sure your sentences flow smoothly.

Of course, one hallmark of good writing is correct grammar. No matter how well written a paper is, readers (including BI 161 lab instructors!) will look unfavorably on a paper that is filled with grammatical errors and misspellings. Below we provide a list of frequently made grammatical errors in scientific writing. You are well advised to look over this list carefully and make sure you are not committing any of these errors in the papers you submit.

1. Avoid noun phrases.
   Poor usage. I conducted a forest ecosystem disturbance investigation.
   Better usage. I investigated the effects of disturbance on a forest ecosystem.

2. **Affect/effect**. In their common uses, *affect* is a verb meaning "to change something" while *effect* is a noun meaning "the change itself".
   Examples:
   One of the *effects* of the drug epiluramide is high blood pressure.
   Daylength *affects* the growth rate of plants.

3. **i.e.** and **e.g**. The first is an abbreviation for the Latin "id est" meaning "it is" and is followed by an explanation. The second is an abbreviation for the Latin "exempli gratia" meaning "for example" and should be followed by an example.
   Examples:
   The population size of the orchid is perilously low; i.e., the orchid is in danger of extinction.
   Several marine invertebrates are commercially important in Maine, e.g., lobsters and steamer clams.

4. If you begin a list with *for example* or *such as*, then you do not need to end with "and so on" or "etc.".

5. An incorrect but widely used construction is **and/or**. "A or B" does not preclude the inclusion of both A and B; therefore, the and in and/or is redundant. If you wish to specify A or B but not both, you need to be explicit and write "A or B but not both".

6. Use the passive voice minimally. There is no need to be bashful. Write "I measured the plants daily" instead of "The plants were measured daily".

7. **Hopefully**. This word means "full of hope". It does not mean "I hope that".

8. **Apostrophe**. This punctuation mark in used in contractions but not with possessive pronouns.

Its main use is in contractions; *it's* not used in possessive pronouns (his, her, hers). If *you're* careful, *your* writing will be a model of clarity.

9. **that** and **which**. These are tricky words. *Which* is used for a phrase, set off by commas, to give further information about a group, which is already specified.
Examples:

> The Peregrine Falcon, *which* is on the Endangered Species List, is making a comeback from near-extinction in the western United States.
> The Peregrine Falcons *that* are found in the western United States are making a comeback.

[In the first example *which* introduced information that related to all Peregrine Falcons; in the second example, *that* was used to introduce information that pertains to only some Peregrine Falcons, namely those in the western United.]

10. **Subjunctive mood**. The subjunctive mood is used to express possibility rather than actuality. In other words, the subjunctive mood expresses what something might be or do rather than what something actually is or does.
Example:

> If one *were* to remove the blue crabs from Chesapeake Bay, the survivorship of small clams would increase.

11. Avoid ending a sentence with a **preposition**.

> Incorrect example: Crustaceans were the main item the fish stomach was full of.
> Correct example: The fish stomach was mainly full of crustaceans.

12. Although it consists of two words, an **infinitive** is a unit and should not be split. Compound verbs are not considered units and can be split with an adverb.
Correct examples:

> He was able to measure carefully the size of each fruit fly.
> He is carefully measuring the size of each fruit fly.

13. Use **only** directly before the word that is "only". "
Examples:
He only turned 21 last week. This sentence means that <u>all</u> he did last week was to turn 21.
He turned 21 only last week. This sentence means that he turned 21 quite recently.

The same advice holds for *nearly, even* and *almost*.

14. **Less/few**. Use *less* for quantities that aren't composed of identifiable units and *few* for units you can count.
Examples:

> Waterville received *less* rain in July than Augusta.
> *Fewer* moose are found in the southern part of Maine compared to the northern part.

15. **Comprise/compose**. *Comprise* means "include". The whole *comprises* the parts. The parts *compose* the whole.
Examples:

> The central nervous system *comprises* the brain and spinal cord.
> The brain and spinal cord *compose* the central nervous system.

16. Watch those antecedents. **This/these/that/those** are probably a lot clearer to you than to your readers. Explicitly say what you mean: "this experiment", "these predators", "that orchid".

Example:

High levels of infrared radiation result in reduced plant growth. This indicates that infrared light is stressful to plants. [Does "this" mean "infrared radiation" or "reduced plant growth"? This should refer to the nearest singular noun preceding it, which would be "growth". The writer probably wishes *this* to refer to infrared radiation.]

17. As you strive to write with economy, here are a few ways to shorten your prose.
Whether or not usually means no more than *whether*.
After works very well for *subsequent to*.
Use *indicates* rather than *is indicative of*.
Don't write *In order to determine* when *To determine* is shorter.

18. **The reason why** is redundant and the reason is because *reasons* are already *why*?

19. **The fact that** one can begin a sentence this way does not mean that one should.

20. Although it may seem obvious that two or more subjects, even when conceptually linked, take a plural verb, errors of this sort abound.
Incorrect examples:
The distribution and abundance of organism *constitutes* the primary focus of ecology
Where's my shoes?
Corrected examples:
The distribution and abundance of organism *constitute* the primary focus of ecology
Where *are* my shoes?

21. When *neither* and *nor* are used, the verb should agree with the part of the subject closest to the verb.
Example In the experiment, neither the newly hatched chicks nor their older sibling was fed by the parents.

22. Be consistent in the use of tense. Use the past tense to describe what you did or observed and present tense for general statements about nature.

23. Capitalize all Latin taxonomic names except the species part of a binomial. You should italicize (or underline) Latin names for genera and species.

Example: *Homo sapiens* belongs to the Order Primates and the Family Hominidae.

24. **Position and emphasis**. Words at the beginning or end of a phrase automatically receive extra emphasis. Placing important words there can reinforce your point. "This is an exciting result" emphases not that what you found is exciting but that it is a result. "This result is exciting" is better.

25. **Principal** as an adjective means most important. **Principle** is a noun meaning a basic rule or truth.
Examples:
Altitude is the *principal* determinant of the distribution of subalpine fir.
The Competitive Exclusion *Principle* states that two species cannot occupy the same niche.

26. **Unique** means one of a kind. A thing cannot be *most, very* or *quite* unique; it is simply unique.

27. **Because** and **since**. Most meanings of *since* incorporate the notion of time. *Because* indicates a direct reason whereas *since* has a more casual meaning, indicating conditions attendant on the main statement.

Examples:
Average human height has increased over the past 100 years because of improved nutrition.
Global temperature has been rising *since* the level of carbon dioxide in the atmosphere reached 330 ppm.

28. For positive integers ≤10, spell out the word but use Arabic numerals for larger integers. Use the Arabic form for small integers when used with a symbol.
Examples:
We saw six Great Blue Herons and 14 Snowy Egrets.
The spider was 6 cm long.

Plurals

There are quite a few biological nouns, which have been borrowed directly from, Greek or Latin. Their plurals are not always straightforward. Here are some nouns that have tricky plurals.

Singular	Plural
alga	algae
analysis	analyses
bacterium	bacteria
basis	bases
cilium	cilia
criterion	criteria
datum	data
flagellum	flagella
focus	foci
formula	formulae, formulas
fungus	fungi
genus	genera
hypothesis	hypotheses
index	indices (for numerical expressions), indexes (in books)
larva	larvae
locus	loci
matrix	matrices
medium	media
nucleus	nuclei
octopus	octopodes[1]
ovum	ova
phenomenon	phenomena
phylum	phyla
protozoan	protozoa, protozoans
pupa	pupae
species	species
stimulus	stimuli
stratum	strata
taxon	taxa
testis	testes

[1]There is no word “octopi” in Greek (octopus is a third-declension noun not a first-declension noun for you classical scholars). Octopi is an English bastardization and should not be used. If you don’t want to use octopodes as the plural of octopus, octopods works just fine.

Standard Symbols and Abbreviations Used in Biology

To conserve space, biologists and other scientists generally use the following abbreviations in their writing.

ångstrom	Â	logarithm (base 10)	log
approximately	ca. or ≈	logarithm (base e)	ln
calorie	cal	meter, metre	m
cubic centimeter	cm^3	microgram	μg
cubic meter	m^3	microliter	μl
day	d	micrometer	μm
degree celsius	°C	minute (time)	min
degree fahrenheit	°F	month	mo
degrees of freedom	df	number (sample size)	*n*
figure, figures	fig., figs.	parts per million	ppm
gram	g	percent	%
greater than	>	plus or minus	±
hectare	ha	second (time)	s
height	ht	species (singular)	sp.
hour	hr	species (plural)	spp.
kilocalorie	Kcal	square centimeter	cm^2
kilogram	kg	square meter	m^2
kilometer	km	square millimeter	mm^2
less than	<	week	wk
liter	l *or* L	weight	wt

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