

NAOJ English Composition Style Guide

1) The Purpose of this Guide

As internationalization continues to increase, the amount of English language text produced about Japanese astronomy also continues to grow, along with the number of people who read these texts.

This style guide contains suggestions to help writers convey their ideas in clear, concise English. By following these suggestions, the authors will help to maintain a consistent style across the various projects and centers of the National Astronomical Observatory of Japan (NAOJ). Based on each situation and context as well as referring to the style guide, authors and editors can decide the clearest way to convey the information.

This style guide is intended for use in general audience pieces released by NAOJ. General audience pieces include but are not limited to web pages, press releases, social media, pamphlets, fliers, NAOJ News, and the Annual Report. Academic papers published as part of the "Publications of NAOJ" have different guidelines which can be found at:

<NAOJ guidelines for academic papers in English>
http://library.nao.ac.jp/publications/nenji_e.html

<NAOJ guidelines for academic papers in Japanese>
<http://library.nao.ac.jp/syuppan/rule.html>
<http://library.nao.ac.jp/syuppan/format.html>

When working on a piece to be released by another organization, that organization's style guide takes precedence.

This style guide is not meant to be comprehensive. Many excellent books have been written about the fundamentals of English grammar. Instead, this guide is meant to serve as a quick reference guide for authors when they are unsure of the style. For this reason, this guide focuses on the types of questions which arise most frequently during scientific writing and non-native English compositions.

2) Default English

The grammatical rules and vocabulary accepted as 'proper English' vary among the countries where English is used as an official language. When writing in English, the author needs to decide which style to use and follow it consistently.

NAOJ uses the English conventions of the United States of America as its default standard. If a particular project or research group is collaborating with partners in Europe, British English might be more appropriate. In cases where a group adopts conventions other than United States English, those conventions must be followed consistently in all compositions produced by the group. The author should check with the relevant project/group if there are any questions about the appropriate version of English.

For United States English, the authoritative reference is The Chicago Manual of Style for academic and professional writing. The website requires a subscription fee, but a print copy of The Chicago Manual of Style (15th edition) is available at the NAOJ Mitaka Library.

<http://www.chicagomanualofstyle.org/>

Additionally, information about writing astronomical English texts has been compiled by the [International Astronomical Union](#).

<https://www.iau.org/static/publications/stylemanual1989.pdf>

For points not covered here, please default to these references.

3) Foreign Words in English Compositions

In international scientific projects, occasions arise when it is necessary to include foreign words, especially proper nouns, in English discourse. Handled improperly, these foreign words can confuse the reader. Moreover, when different authors use different methods to translate the names to English, readers might mistake them for separate entities, rather than alternate translations. Special care is needed to maintain not only clarity but consistency.

Please confirm the preferred English translations of foreign names with the people or organizations involved.

When translating a place's name, the author should consult the website, etc., of the local government. For locations in Japan, in addition to local government websites, the Geospatial Information Authority of Japan provides guidelines for translating location names into English.

<GSI Guidelines for translating locations in Japan into English>

<http://www.gsi.go.jp/common/000138865.pdf>

<http://www.gsi.go.jp/common/000138867.pdf>

NAOJ has prepared a list of official English names related to its projects, centers, and divisions.

<Official English names for NAOJ projects, divisions and job titles>

http://jimubu.mtk.nao.ac.jp/jimubu/index.asp?ID=other_information_org-en.html

Some official names in English do not correspond to direct translations of the official Japanese names, such as "the TMT-J Project Office" for "TMT 推進室," so please always check with official websites or other reliable sources.

NAOJ maintains a staff directory with the romanizations for the names of NAOJ employees.

<NAOJ staff directory>

<http://jimubu.mtk.nao.ac.jp/naojstaff/index.asp>

When direct confirmation of the official English translations is not possible, and previous examples are either unavailable or inconsistent, authors can use the following rules to decide how to translate a word into English.

3.1) Translating Proper Nouns

In most cases, authors can translate proper nouns into English, such as names of institutes, using both transliteration and direct translation. Transliteration is sounding out the pronunciation of proper noun elements of the word into the English alphabet. Direct translation is writing the literal meaning of common noun elements of the word in English. The first letter of each of the elements should be capitalized. For example, Ishigakijima tenmondai (石垣島天文台) consists of the proper noun Ishigakijima and the common noun tenmondai. The proper noun element of Ishigakijima should be retained, and the common noun of tenmondai should be translated into English as Astronomical Observatory with a capital A and O; Ishigakijima tenmondai can be thus translated as Ishigakijima Astronomical Observatory in English. According to the GSI Guideline, Ishigakijima is translated as 'Ishigaki Island.' When deciding an English name, whether to follow the GSI guideline is up to an organization's choice, but please consistently use an official name when determined.

We discourage the use of untranslated foreign words in English discourse without translation or glosses of those words. While few authors would consider including kanji in an English document without explaining the meaning, phrases from European languages (Raison d'être, mano a mano, etc.) appear with some regularity. It cannot be assumed that the reader understands the language in question. Since many of your readers will be non-native speakers of English, they may be unable to distinguish between standard English and the foreign inclusions. Foreign words should be included with transliteration or additional information, or only when the appearance of the words themselves is important for the readers' comprehension (such as indicating a bus stop name).

3.2) Transliterating Japanese into English

Non-Japanese authors working with NAOJ are concerned with the transliteration of Japanese into English. Japanese transliterations should usually use the Hepburn romanization system (<https://www.ezairyu.mofa.go.jp/passport/hebon.html>), with the exception of the treatment of "double" vowels. See section 3.2.1.

3.2.1) Double vowels

In principle, all vowels should be retained except when an 'o' is followed by another 'o' or a 'u'. The second vowel is normally dropped for this. For example 東京 (Toukyou)-->'Tokyo' or 大阪(Oosaka)-->'Osaka.' However, there are some variations for this case such as 'Oshima,' 'Ohshima,' or 'Ooshima' for 大島. If possible, contact the people or organizations involved to determine the preferred version. In cases where a precedent does not exist or is contradictory, we recommend the first method of dropping the vowel without a replacement.

4) Numbers and Units

In general contexts, numbers appearing within text should be spelled out in letters for single-digit numbers one through nine (1–9) and all other values should be expressed in numerals. In addition, when the first word in a sentence is a numerical value, it should be spelled out regardless of its value or the sentence should be rewritten so as not to start with a numeral.

In science, numerals rather than words are used for expressing values, including single-digit numbers. Please also refer to existing examples such as "5-axis machining tool" and use your best judgement.

<General context> We went on a picnic for three straight days.

<Scientific document> We observed those phenomena in Mars for 3 straight days.

<Sentence starting with a number>

(Not recommended) 20% answered yes to the question.

(Spelling out the number) Twenty percent answered yes to the question.

(Rewriting the sentence) Of those surveyed, 20% answered yes to the question.

Because numbers are often used in the names or descriptions of telescopes, sometimes it is necessary to count objects which are themselves numbers. To avoid confusion the names should be expressed in numerals and the counters should be spelled out.

“The Morita Array consists of four 12-m antennas and twelve 7-m antennas.”

Numbers over 1,000,000 used within a paragraph should be truncated, either with scientific notation or with a word indicating the magnitude (million, billion, or trillion). These magnitude words are lower case, and used in singular tense (‘million,’ not ‘millions’). Units following a magnitude indicator should also be spelled out. For example, ‘a meteor impact caused mass extinctions 65 million years ago.’ Decimal notation can be used to add greater precision. For example, ‘a light-year is 9.46 million kilometers.’

A blank space should separate the unit from the numerical value.

When a number and a unit appear in the name of an instrument, they act as a multi-word adjective and should be connected with a hyphen (-). For example, ‘the 50-cm Telescope for Public Outreach.’

5) Dates and Times

Many different conventions exist for writing dates. The method preferred by NAOJ is to spell out the name of the month, followed by the day in numerals (without an ordinal suffix), and last the unabbreviated year.

Month DD, YYYY

April 1, 1988

July 20, 2000

For dates less than 10, a leading ‘0’ is not needed.

Dates should be expressed using the Standard Gregorian calendar. The suffix ‘A.D.’ is not needed, except when there is a possibility of confusing the year with the B.C. date. The suffix ‘B.C.’ should be attached when relevant. NAOJ prefers B.C. and A.D. to alternate naming systems (B.C.E./C.E., for example). Please note there is no year 0 in the Gregorian calendar; 1 A.D. follows 1 B.C. Remember to account for this fact when exact B.C. dates are required.

When the Japanese era system for years is used, the word ‘Era’ should be included between the era name and the year. The Gregorian year should be provided as parenthetical information.

Meiji Era Year 21 (1888)

Showa Era Year 63 (1988)

Please include the following foot note in every composition where the Japanese era system is used.

“Note: In addition to the standard Gregorian calendar, Japan has its own era name system. The different eras were defined by changes in the Japanese government, and accompanied by changes in Japanese society, and since 1868, era names have changed only upon imperial succession.”

The months of the luni-solar calendar (太陰太陽曆) do not correspond to the months of the Gregorian calendar. Thus the names of the Gregorian months should not be used when referring to dates in the luni-solar calendar. Dates in the luni-solar calendar should explicitly state the ordinal of the day and the ordinal of the month.

“The traditional Tanabata festival is celebrated on the 7th day of the 7th month in the luni-solar calendar. This date normally falls in August in the modern calendar.”

When referring to universal time, please use Coordinated Universal Time represented by UTC, as opposed to the closely related ‘UT’ or ‘GMT.’

6) Capitalization

All proper names should be capitalized. This includes unique astronomical objects, such as the Sun and the Solar System.

Special care is needed because many astronomical terms have different meanings depending on whether or not they are capitalized.

With a capital ‘E’ and without ‘the,’ Earth refers to the planet Earth. With a lowercase ‘e’ and preceded by ‘the,’ ‘the earth’ is in most cases used for non-astronomical or general contexts. Although ‘the Earth’ is also used in both astronomical and non-astronomical contexts, ‘Earth’ without ‘the’ is recommended when needed to clearly mean the planet Earth. Lowercased ‘earth’ also refers to soil and land depending on the context. NAOJ discourages use of the term earth to mean things other than the planet Earth and prefers to use other relevant terms or to make its meaning clear because of the possibility of confusing it with the planet Earth.

Examples:

<Astronomical text> The distance from Earth to the Sun is 1 astronomical unit.

<Astronomical text> Mars is smaller than Earth and Venus.

<Non-astronomical text> The Earth’s climate has drastically changed.

<Non-astronomical text> How much of the earth is covered with water?

<Replaceable with soil> The earth is ploughed at a depth of 20 cm.

<Replaceable with land> The earth beneath our feet trembled violently enough to prevent us from escaping.

The Moon (also known as Luna), with a capital ‘M’ and ‘the,’ refers to Earth’s natural satellite. A moon in lowercase refers to any natural satellite of significant size orbiting a planet. Phrases describing the appearance of the Moon (new moon, crescent moon, gibbous moon, full moon, etc. which are often accompanied by articles such as ‘a’ and ‘the’) are not capitalized.

The Sun, with a capital ‘S’ and ‘the,’ indicates specifically the star which Earth orbits. Other stars hosting planets are referred to as stars. Likewise, the Solar System is a unique name referring the collection of objects, including eight planets, orbiting the Sun. Systems of planets orbiting stars other than the Sun should be referred to stellar systems or exoplanet systems.

The proper names of planets, stars, or minor bodies should always be capitalized. Adjectives derived from these proper names ('Martian,' 'Jovian,' etc.) should also be capitalized.

The Galaxy refers specifically to the Milky Way Galaxy. A galaxy is any large-scale group of stars.

The Universe is also capitalized since only one has been confirmed to exist. In theoretical simulations considering multiple possible universes, the term should not be capitalized, analogous to how the term galaxy is used to represent the Galaxy or other galaxies.

7) Use of the word 'the'

Planets, moons, and minor bodies are not preceded by the word 'the.' This includes extrasolar planets. For example, 'Venus,' 'PH-1,' or 'Comet Lovejoy.' The proper names of galaxies are preceded by the word 'the.' For example, 'the Milky Way,' 'the Large Magellanic Cloud,' or 'the Andromeda Galaxy.' In these cases 'Galaxy' is capitalized, but 'the' is not capitalized unless it comes at the beginning of a sentence.

7.1) Tables and Charts

When the name of an organization, instrument, etc. which uses the word 'the' appears outside normal text (such as in a chart, table, or the start of a title), the word 'the' should be dropped.

8) 'That' verses 'Which'

'That' is used to indicate information which narrows the topic under discussion, i.e. excludes examples that do not fit the definition following the word 'that.' 'Which' is used to provide additional information that does not change the scope of the topic under discussion. If the information the author wishes to include could be omitted without changing the meaning of the sentence, 'which' should be used. If omitting the information would change the meaning of the sentence, then 'that' should be used.

"Stars that fuse hydrogen into helium in their cores are referred to as main sequence stars."

"Heavy main sequence stars, which fuse hydrogen into helium in their cores, evolve into red giants when the hydrogen fuel in their cores has been depleted."

The first excludes all stars where hydrogen fusion does not occur in the core (red giants, neutron stars, etc.) The second reminds the reader of one of the properties of main sequence stars, namely the fact that they fuse hydrogen into helium in their cores. In the first case, excluding the added information ('that fuse hydrogen into helium in their cores') as in the sentence below changes the meaning of the sentence (to an incorrect statement).

"Stars are referred to as main sequence stars."

In the second case, the meaning remains unchanged (and correct) even if the added information ('which fuse hydrogen into helium in their cores') is removed.

"Heavy main sequence stars evolve into red giants when the hydrogen fuel in their cores has been depleted."

9) Lists

NAOJ prefers to include a comma before the final 'and' in a list containing 3 or more items. Authors should use semicolons when the list includes phrases rather than individual terms.

A list that ends in 'etc.' does not use the conjunction 'and.'

For more information about lists, please refer to the Chicago Manual of Style.

10) Data

In NAOJ documents, the term 'data' is plural and should be used as such. The singular term 'datum,' refers to a single data point. To determine if a verb is conjugated correctly to be used with data as a plural term, try substituting the word 'results.' If the sentence reads correctly with the word 'results' then it is properly constructed.

11) Plurals

Astronomy has a number of irregular plurals formations. The plural of "nebula" becomes "nebulae," but the plural of "antenna" is "antennas" not "antennae." Celestial objects ending in the word dwarf use "dwarfs" for the plural, not "dwarves." (Please note that when referring to living creatures "antennae" and "dwarves" are the proper forms.)

12) Adverbs Modifying Uniqueness

Do not use adverbs to modify adjectives like 'first,' 'last,' 'farthest,' 'hottest,' 'unprecedented,' or 'unique,' which already indicate unparalleled status. Something cannot be 'effectively unique' or 'extremely unique.' Either it is unique or it is not unique. We prefer 'one of the first' over 'almost the first.'

13) Special Concerns for Digital Media

The limitations of information technology and compatibility issues require that extra care be taken when preparing publications to be circulated digitally.

13.1) Special Characters

Care should be taken when using characters not found in the basic ASCII list. These characters do not always display correctly when read by different programs or machines. This is especially true when the default language of the device used to read international digital publications might be something other than English or Japanese. For printed materials, be sure to check the final proofs to make sure that special characters will be printed correctly before starting the full print run. For digital publications, it is usually best to avoid special characters.

ASCII Table

Dec	Char.	Dec	Char.	Dec	Char.	Dec	Char.
32	Space	56	8	80	P	104	h
33	!	57	9	81	Q	105	i
34	"	58	:	82	R	106	j
35	#	59	;	83	S	107	k
36	\$	60	<	84	T	108	l

37	%	61	=	85	U	109	m
38	&	62	>	86	V	110	n
39	'	63	?	87	W	111	o
40	(	64	@	88	X	112	p
41	)	65	A	89	Y	113	q
42	*	66	B	90	Z	114	r
43	+	67	C	91	[	115	s
44	,	68	D	92	\	116	t
45	-	69	E	93	]	117	u
46	.	70	F	94	^	118	v
47	/	71	G	95	_	119	w
48	0	72	H	96	`	120	x
49	1	73	I	97	a	121	y
50	2	74	J	98	b	122	z
51	3	75	K	99	c	123	{
52	4	76	L	100	d	124	|
53	5	77	M	101	e	125	}
54	6	78	N	102	f	126	~
55	7	79	O	103	g		

For names and words from the Hawaiian language appearing in online documents, NAOJ encourages replacing the `okina to mark a glottal stop in Hawaiian with the left single quotation mark (basic ASCII character 96) and omitting instances of the kahako, or the macron, which indicates long vowels, in order to ensure letters containing those diacritical markings are readable on web pages. Please include the following footnote in every composition that uses these conventions.

“Note: We, the National Astronomical Observatory of Japan, deeply respect Hawaiian culture, and are aware that the Hawaiian language uses `okina and kahako characters; however, in order to make the Hawaiian words recognizable on as many digital devices as possible, we choose to replace the `okina with a left single quotation mark and omit the kahako here due to the limitations of information technology on special characters. We respectfully promote the proper use of the Hawaiian language outside the digital platforms.”

For typing proper `okina and kahako especially on documents addressed to the people of Hawai`i, please refer to information provided by the University of Hawai`i (<https://www.hawaii.edu/askus/1767>).

13.2) Image Replacement Text

Unfortunately due to compatibility and bandwidth issues, some browsers fail to display graphics, instead displaying alternative text. Alternative text is also used by webpage reading programs for people who are visually impaired. Rather than short names for each graphic (for example, Fig. 1) please include alternative text that describes the contents of the graphic (for example, Diagram of the Subaru Telescope).

14) Inclusive Writing

Be aware that in writing, issues like discrimination against people with disabilities, sexual minorities, religious beliefs, and aboriginal or indigenous communities might occur. Inclusive language is language that encompasses people of all abilities, genders, ages, religions, races, origins, and other

types of distinctions, and allows the author to acknowledge and respect this diversity through writing, making readers more feel part of the communication. It is also an attempt to address and eliminate any forms of discrimination, whether conscious or subconscious, which exists in society. Some terms are in progress for consensus, but the author can use best practice words with care and intention, avoiding inadvertent misrepresentation, offence, or the perpetuation of prejudices.

14.1) Gender Pronouns

English has traditionally been a masculine language, meaning that the male pronouns were used by default when the gender of the subject was unclear. Lately, more gender neutral practices are increasingly being used to promote inclusivity and diversity in writing. Given the fact that there is a spectrum of genders and also that some people do not identify with the gender binary, NAOJ strongly advises rewriting the sentence so that it does not require gender pronouns.

Three of the most effective methods to avoid gender pronouns are to: rewrite the sentence to use plural pronouns; address the reader using second person pronouns; or replace the pronoun with the preposition "the."

Plural pronoun examples

(Not recommended) "Each first-year student should open his orientation package."

(Recommended) "First-year students should open their orientation packages."

(Not recommended) "When a student writes a paper, he must proofread carefully."

(Recommended) "When students write their papers, they should proofread carefully."

Second person pronoun example

(Not recommended) "The student should make sure to check her references carefully."

(Recommended) "You should make sure to check your references carefully."

Example using "the"

(Not recommended) "A good lawyer takes his or her job seriously."

(Recommended) "A good lawyer takes the job seriously."

14.2) Information Accessibility

Ensuring information accessibility is in line with what inclusive language aims at. Information accessibility can create equal opportunities to benefit from information on astronomy for all people, including people with disabilities and those who do not have fast internet connections. It also facilitates astronomical research and education, and enhances reader participation. The author should be aware of the requirements for various people to access to information. Although there seems to be no one-size-fits-all solution to meet diverse needs and preferences, examples of the methods commonly applied are as follows:

- Provide text for non-text content, including graphs, images and videos, for those who use text-to-speech software, those who are deaf or hard of hearing, and those with slow internet connections.

- Use short, simple sentences and be concise for those with reading difficulties.
- Use flexible text formats that readers can change in accordance with their individual needs.

15) Tips for Clear Writing

The sections up to this point have dealt with rules for composition. In this section we present tips to improve the clarity of the writing. Noncompliance with these tips does not make a sentence wrong. In fact, overly strict adherence to these suggestions could make the text more difficult to read. But keeping these tips in mind when writing and revising will improve the clarity of the writing.

15.1) Use Active Voice

In English, passages using active voice not only engage the reader more; they are clearer and usually shorter than passive constructions with identical meanings. Increasing your use of active voice is the single simplest, most powerful tool for improving your writing.

Passive voice can be used in moderation without being noticed by the readers (like in this sentence). But most authors overuse passive voice, sometimes to the exclusion of active voice. This is particularly true in scientific writing where authors focus on the subject being discussed as opposed to the people conducting the research. This trend is further exacerbated by the tendency in Japanese to imply the subject of a sentence without explicitly stating it.

Below, we present examples of passive phrases paired with active phrases of identical meaning which should be used instead.

(Not Recommended) "The instrument was prepared."

(Recommended) "We prepared the instrument."

(Not Recommended) "It should be noted that..."

(Recommended) "The reader should note that..."

(Also Recommended) "Note that..."

(Not Recommended) "In Figure 1, it can be seen that..."

(Recommended) "Figure 1 shows that..."

Authors and editors should consider every passive construction when reviewing a manuscript and eliminate as many as possible. Authors are in a better situation than editors, because the author knows (or can find out) which groups performed each of the actions described.

Do not be afraid to repeat the names of the people/organizations conducting the research. In compositions intended for the public or others not familiar with the subject, repeated mention of the groups involved improves clarity and recall. For a more specialized audience already familiar with the groups involved, an author can save space by using the 'academic we,' i.e. using 'we' as the subject for all activities conducted in the research group or host institution, regardless of whether or not the author was personally involved in those activities. Also do not be afraid to address the reader directly, either as 'the reader' or as 'you.' You can also address the reader politely by starting a sentence with the word 'please.'

Passive constructs can be identified because they are formed by a conjugation of the verb 'to be,' followed by the past participle of another verb. Using a word processor search function for the following conjugations of 'to be' will identify every passive construction in a composition:

am, is, are, was, were, be, been

In addition to passive constructions, these searches will also return uses of the verb 'to be' as an independent verb. But as the next section explains, those cases should also be reviewed.

15.2) "To be, or not to be, that is the question"

The English verb 'to be' and its various conjugations 'is,' 'was,' 'am,' 'will be,' etc. are extremely useful. So useful that authors often use them at the expense of other verbs. Japanese authors have particular trouble with this point because of the parallels between verb 'to be' and the Japanese phrases 'desu,' 'imasu' and 'arimasu' which can be used with greater frequency than 'to be.' In English, the verb 'to be' should be used in moderation and other verbs should be used when possible. For example:

(Not Recommended) "A galaxy is an object containing billions of stars."

(Recommended) "A galaxy contains billions of stars."

(Not Recommended) "'Subaru' is a Japanese name for the Pleiades Star Cluster."

(Recommended) "The Japanese word 'Subaru' refers to the Pleiades Star Cluster."

It would be impossible to produce a correct English composition without using 'to be' at all. (The previous sentence uses 'would be' for that matter.) However, authors and editors need to review every case to see if a more dynamic verb would serve their purposes better. Searching for the list of conjugations listed in section '15.1 Use Active Voice' will also return all occurrences of the verb 'to be' allowing authors to address these two points at the same time.

15.3) Use Short Sentences

Longer sentences containing multiple clauses are more difficult to understand than short, simple sentences. Academic authors in particular favor long sentences. Ironically, the average reader of scientific literature is a non-native speaker of English, possibly relying on a dictionary or automatic translation software. Thus, simpler constructions are favored over long elegant sentences. An average of 15 to 20 words per sentence is considered ideal for native speakers of English.

15.4) Hyphens

Hyphens are included here with tips for clearer writing, rather than in the section of grammatical rules, because they help readers to understand complex sentences and phrases. Omitting the hyphens does not make a sentence grammatically incorrect, only more difficult to understand. Using too many hyphens in readily understood sentences harms the clarity. The 'rules' depend on the tastes of the author and the needs of the audience.

An author can use hyphens to show that multiple words form a single, indivisible idea. Hyphens are particularly useful for compound adjectives such as 'state-of-the-art,' or 'optical-infrared.' As stated in section '4 Numbers and Units,' when dimensions are included in a telescope name, they are considered a compound adjective (i.e. Nobeyama 45-m Radio Telescope).

NAOJ prefers that hyphens always be used for some words, regardless of the sentence structure. Please use hyphens for multiword names of wavelength bands such as 'near-infrared,' 'mid-infrared' and 'radio-frequency.' You should also include hyphens in compound units such as 'light-year,' 'Newton-meter' or 'cubic-centimeter.' Hyphens are optional for multiword units containing the word 'per,' i.e. 'kilometers per second,' or 'grams per cubic-centimeter.'

15.5) Respectively

Do not use the word 'respectively' to join lists of 3 or more terms together. Instead place the corresponding terms adjacent to each other or present the data in a table.

(Not recommended) "The *V-R*, *R-Ic*, *R-J*, *J-K*, and *H-Ks* colors of the Sun are 0.38, 0.35, 0.78, 0.35 and 0.05 respectively."

(Recommended) "The Sun's colors are 0.38 *V-R*, 0.35 *R-Ic*, 0.78 *R-J*, 0.35 *J-K*, and 0.05 *H-Ks*."

15.6) Wasted Words

Avoiding unnecessary words allows more content to fit on a printed page, thus reducing costs. In digital publications, brevity allows more information to be displayed in a single screen, saving the reader time. Even native speakers have difficulty writing concisely, but there are some 'suspect' words which can usually be eliminated.

15.6.1) Significant, Meaningful, Noteworthy

Terms to denote significance are redundant in scientific discourse. The fact that the author chooses to mention a detail automatically makes it significant. Authors frequently describe results which disagree with their reading of the data as 'not significant,' but if such data were actually insignificant the author and reader would not have noticed them in the first place.

The only time it is acceptable to refer to results as significant or insignificant is when discussing statistical significance. In these cases the author needs to state early on what constitutes 'statistical significance' for this discussion.

15.6.2) Approximately, Roughly, About

If the author follows proper conventions for significant digits and indicating uncertainty, the reader does not need to be reminded that all values have some level of uncertainty attached.

The general public is less concerned than researchers about exact values. In pieces for the general public, rounded values work better. Provided that proper rounding conventions are followed, there is no need to qualify them as rough, or approximate; they are correct for the number of terms presented.

15.6.3) Nouns Formed from Verbs

Science is littered with nouns which are based on verbs: observation (observe), analysis (analyze), production (produce), reaction (react), movement (move), explosion (explode), simulation (simulate), etc. In addition, many words can function as either nouns or verbs: experiment, reference, review, signal, etc. Scientific authors have become so used to these nouns that they forget the verb forms

exist. Verbs like 'carry-out,' 'conduct,' 'perform,' and 'occur' are often used with nouns derived from other verbs. Rather than combining the noun formation with an additional verb, the same idea can be expressed more clearly and concisely by using the original verb.

(Not Recommended) "We conducted two nights of observations."

(Recommended) "We observed for two nights."

(Not Recommended) "An analysis of the data revealed..."

(Recommended) "Analyzing the data revealed..."

(Not Recommended) "After conducting a review of the relevant literature..."

(Recommended) "After reviewing the relevant literature..."

(Not Recommended) "In an H-II rocket, propulsion is provided by the combustion of a hydrogen/oxygen mixture."

(Recommended) "In an H-II rocket, hydrogen and oxygen mix and combust to propel the rocket."

15.6.4) "Do, or do not. There is no try."

Phrases which indicate an attempt to perform an action are not needed. You can skip straight ahead to the results.

(Not Recommended) "We attempted to reproduce the results by..."

(Recommended) "We were able to reproduce the results by..."

(Also Recommended) "We reproduced the results by..."

(Not Recommended) "Although we tried to..."

(Recommended) "We weren't able to..."

(Not Recommended) "We wanted to..."

(Recommended) "We weren't able to..."

15.7 Use the Correct Names

Many authors fail to follow this seemingly common-sense rule. The correct names of institutions and instruments are often long and cumbersome for casual speech, leading researchers to develop shortened forms or nicknames. Unfortunately, authors also subconsciously use these casual names in formal writing. Before you start writing, remind yourself of the official names of the entities and objects relevant to your work. And make sure that the first time each one appears in your document, the full formal name is given. If you would like to use a shortened form or nickname, be sure to explicitly define the corresponding full proper name the first time the shortened form appears.

15.7.1 "the Subaru Telescope"

Authors need to consider trade name issues when referring to "the Subaru Telescope." In order to avoid confusion with the automotive and aerospace company SUBARU CORPORATION, the telescope SHOULD NOT be abbreviated as "Subaru" or written as "SUBARU" without "Telescope" and all in capital letters. The correct official name of NAOJ's telescope in Hawai'i is "the Subaru Telescope" accompanied by "the" and with a capital "S" and "T," and it should be consistently written as such without being abbreviated.

15.8 Grammar Check

If your first language is something other than English, when possible you should have a native speaker or someone who is well-versed in English writing check your manuscript before submitting it for publication.