Carla’s Tips on Technical Writing

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*From the author of this manual and the founder of Preferred Copy Editing, LLC:* This manual answers questions pertaining to the composition of a thesis, dissertation, proposal, and/or journal article. The topics are arranged in alphabetical order to help you find answers to your questions quickly. The manual introduces some excellent resources to help you organize your paper, and it focuses on helping those brilliant students who are still struggling with English simply because it is their second language. Whether you need a little help or a lot, I hope you find what you need here. –*Carla Roberts*



Preferred Copy Editing. has been serving the ESL academic community since March 2011. Since then, the service has gained hundreds of clients from all over the world. We have five editors ready to serve your needs. Carla Roberts and Vicki Hodder are the primary contacts. Carla is the primary contact for engineering professors and students. Vicki is the primary contact for those in the social sciences. Their email addresses are provided below. All editors on the PCE team have their own independent editing service and are able to handle papers from any discipline. This gives the Preferred Copy Editing team the capability to respond in a timely manner to all potential clients.

The topics in this manual are arranged in alphabetical order. You will find tips on word choices, how to code your research to prevent unintentional plagiarism, how to find online style guides, how to write a cover letter, abstract, literature review, and conclusion. If you would like information on a technical writing topic not found in this manual, please contact Carla or Vicki by email (see footnote). We will be happy to answer your questions. I am constantly revising and adding to this manual. Your input helps us to improve the manual and our service.

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## Above or Aforementioned

Please do not ask your reader to refer to the “above” or “aforementioned” copy. This gives *the skimmer* a reason to stop reading. *The skimmer* simply scans an article to see if something useful will pop up. The need to go back to get in tune with the “above” text” often causes *skimmers* to halt and simply go on to something else. Unfortunately, very few readers will read every word of anything. We live in a world full of skimmers, who are so focused on their own set of priorities, they do not take the time to investigate any unrelated information. We need to make sure that no one must go back to find the items he or she missed. Repetition is okay if it can be done quickly and concisely. It is okay to redefine the aforementioned concept and thereby reinforce the readers’ conception of your topic. The word “aforementioned” often makes the reader ask—the aforementioned what? Moreover, most grammar checkers will recommend you drop it for the sake of conciseness. Finally, once your article is printed, you cannot be sure where the “above” copy will land. It might be on another page. If you need to give readers a reference point for the sake of review, give them the section number or subtitle name and number.

## Absorption vs. Adsorption

## Absorption is the process in which a fluid is dissolved by a liquid or a solid (absorbent). It can also be defined as able to take liquid in through the surface and to hold it (from the Cambridge English Dictionary).  Adsorption is a surface-based process where a film of adsorbate is created on the surface and involves the entire volume of the absorbing substance.

## Adsorption is the process in which atoms, ions or molecules from a substance (it could be gas, liquid or dissolved solid) adhere to the surface of the adsorbent. (From *Dent.*)For more on the differences between absorption and adsorption, see <https://www.diffen.com/difference/Absorption_vs_Adsorption>

## Acronyms

An acronym is simply another word for abbreviation. The two acronym-related rules to follow when submitting an article are: 1) Spell out the acronym on first mention in the abstract and in the narrative followed by the abbreviation in parentheses, and 2) only capitalize proper nouns. Proper nouns are the official names of people (e.g., Patrick Henry), places (e.g., Great Wall of China), organizations (United Nations), events (e.g., Hungry Ghosts Festival) or a registered trademarked product or methodology. Registered products should be capitalized according to their official trademarked spelling (e.g., MATLAB, LABView).

When **creating** an acronym, **the four rules** to remember are: **1**) Make sure the acronym letters represent the first letter of the most prominent words in the topic being abbreviated. **2**) Short prepositions like *for, in, on,* and *at* should not be represented in an acronym. **3**) The conjunctions *and, or,* and *but*  as well as the articles *a, an,* and *the* should not be represented in an acronym*.* **4**) Do not incorporate another acronym into your new acronym.Jacek Wytrębowicz of the Institute of Computer Science, Warsaw University of Technology, made three great recommendations regarding acronyms in his “[How to Write a Good Thesis](http://bcpw.bg.pw.edu.pl/dlibra/docmetadata?id=8246&from=&dirids=1&ver_id=&lp=1&QI=)”: 1) Put a table with definitions of the used acronyms in a place that is easy to access, e.g., after the table of contents; 2) write the full name of a term, not its acronym, if it is rarely used in your text, and 3) introduce full name of the acronym on its first occurrence, and also when it has not been used for several pages. ”Several [acronym finder](http://www.acronymfinder.com/)s are available. I recommend developing your own list of acronyms that pertain to your discipline and related disciplines but are not common enough to remember.

## Actually

## The word “actually” is most often used to correct or set the record straight. It implies previous error. For that reason, I would not use it unless that is truly the message you are trying to convey. All grammar checkers will recommend not using it for the sake of conciseness.

## ADJECTIVES

An adjective modifies or describes a noun or pronoun. Anyone who has studied English knows that words like large, small, funny or sad are adjectives. However, one key value that is not mentioned is their ability to eliminate the need for the possessive tense.

**Example (Awkward):** Benefits are generally explained in terms of **individuals’** preferences.

**Example (Improved):** Benefits are generally explained in terms of **individual** preferences.

By changing individuals’ (a possessive noun meaning all or several individuals’ preferences) to “individual,” the possessive nounbecomes an adjective that describes preferences as they relate to all individuals. Adjectives never have an “s” attached at the end. The lack of the possessive ending (‘s or s’) at the end of *individual* immediately lets the reader know that “individual” is an adjective.

**Another awkward example**: The scouts’ hiking trip was postponed.

**Improved:** The scout hiking trip was postponed.

Scouts’ is a possessive noun referring to the whole troop. If only one scout from a troop was scheduled to make the trip, you would say the scout’s hiking trip was postponed. However, you can do away with the possessive tense by making scout an adjective. To say, the scout hiking trip was postponed lets the reader know that whether the scout hiking trip was planned for all the scouts or only one scout—it was postponed.

**Adjectives before a noun can be Cumulative or Coordinate**

Many authors like to describe a noun with two adjectives, but they often leave out the comma that should separate those adjectives. **Coordinate adjectives can be reversed** and need a comma between them.

**Example:** It was a sunny, cold day. If the two adjectives (sunny and cold) separately modify the noun and can technically be reversed as in: It was a cold, sunny day, then sunny and cold are coordinate adjectives.

**Cumulative adjectives cannot be reversed** andthe adjective right before the noun modifies it to the point that they become a unit.

**Example:** The most impactful seminal documents should be identified in a literature review.

In this case, each adjective (impactful and seminal) is building up to a logical arrangement that expresses a unified meaning. Reversing their order could create confusion.

**For more examples of both types of adjectives,** see Kitty Nash’s Lesson 4 on the order of adjectives at https://www.englishgrammar101.com/module-6/modifiers-adjectives-and-adverbs/lesson-4/order-of-adjectives

## ADVERBS

An adverb modifies a verb, adjective or another adverb. It expresses a relation of place, time, circumstance, manner, cause, and degree (e.g., gently, quite, then, there). An adverb that modifies another adverb (very quickly) or an adjective (potentially transformative) should appear in front of the word it modifies. An adverb that modifies a verb can appear before or after the verb it modifies (extensively used or used extensively). An adverb can also appear at the beginning of a sentence (Sadly, the experiment failed) or at the end (The project was terminated unexpectedly).

The position of the adverb can affect the meaning of a sentence. Richard Nordquist of About.com Grammar and Composition goes into more detail and is an excellent source for grammar questions. See his exposition on how to use adverbs at  [https://www.thoughtco.com/what-is-adverbial-grammar-1689067.](http://grammar.about.com/od/ab/g/adverbterm.htm.) Also, for more details about types of adverbs and their position, see <http://dictionary.cambridge.org/us/grammar/british-grammar/adverbs-and-adverb-phrases-position>.

## Adverbial Conjunctions

## The following adverbial conjunctions have more than one function, so punctuation will vary.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| accordingly additionally  afterward  again also as a result besides  certainly  comparatively | concurrently  consequently  conversely  elsewhere  equally  finally for example further  furthermore | hence  however  incidentally  in addition  in comparison in contrast  indeed  in fact  in particular | intriguingly  hence  likewise  meanwhile moreover  namely  nevertheless  next  nonetheless | notably  now  of course  otherwise  on the contrary  primarily  rather  similarly  still | subsequently  substantially  that is  then  thereafter  therefore  thus  undoubtedly  yet |

## For the most part, adverbial conjunctions have one purpose: to connect phrases or clauses. They help improve sentence flow. Thy provide an opportunity to stop and breathe—digest what was just said and then proceed to tackle the ensuing applications.

## Some of the words appearing in the table above will not need any punctuation because they only serve as adverbs, which means they modify a verb, adjective or other adverb or adverb word group. In the following examples, the adverb is italicized and the verb (or adjective in the second example) is in boldface:

## *However* frustrated I might seem, I love my job and am thankful for it.

## He was *accordingly* respectful during the interview.

## He was *further* encouraged by a party held in his honor after he completed the race.

## In 2006, Martha Kolln and Robert Funk came out with Understanding English Grammar (New York: Pearson Publishing). Their presentation of conjunctive adverbs shows how they can also appear at the start of a sentence or clause to indicate result, concession, apposition, addition, time, contrast, summary, or reinforcement. In other words, conjugative adverbs have a job to do. The following is from Kolln and Funk’s book (p. 280) and shows the tasks that conjugative adverbs achieve followed by the specific adverbs that meet their requirements. I added the words in red.

## ****Result****: therefore, consequently, of course ****Concession****: nevertheless, yet, still, after all, of course ****Apposition****: for example, for instance, that is, namely, in other words ****Addition****: moreover, furthermore, also, in addition, likewise, further Time: meanwhile, in the meantime, at the same time, coincident with ****Contrast****: however, instead, on the contrary, on the other hand, in contrast, rather, conversely, nevertheless

The adverbial conjunction, “**coincident with,**” at the beginning of a sentence connects with a past event that occurred at the same time as another related event. **Conversely** means in a contrasting or opposite way.

## ****Summary****: thus, in conclusion, then ****Reinforcement****: further, in particular, indeed, above all, in fact, notably, specifically

These conjunctive adverbs usually precede an independent clause (that part of the sentence with the subject and verb). Anytime you have the heart of the sentence (subject and verb) preceded by a conjunctive adverb or any type of dependent phrase (e.g., prepositional or gerund phrase), a comma should go after the introductory word or phrase.

Depending on the weather**,** I will attempt to finish painting the house two days early.

Still**,** I would rather take a day off and visit the ocean.  
In other words**,** a job pays the bills, but a vacation gives the energy to do a better job.

There are times when all a conjunctive adverb must do is follow the semicolon. The semicolon takes the place of the word “and.”

**Example 1:** The semicolon fulfils the role of the conjunction; consequently, it joins two complete sentences or independent clauses.

**Example 2:** The second sentence is so closely related to the first that it does not need to start over; however, the conjunctive adverb continues the thought by easing the reader into the next complete thought or independent clause.

In the first example, the conjugative adverb, consequently, introduces a result. In the second example, the conjugative adverb, however, introduces an extension of the previous thought, but it “contrasts” with that thought by adding the new concept of continuance. As noted above, the other conjugative adverbs can denote concession, apposition, addition, time, summary, and reinforcement. They complete the task of the first independent clause (the beginning of the sentence) by supporting it with a back-up clause—complete with subject and verb--that confirms or extends what was just said. Note that the

conjunctive adverb must be followed by a comma. See pages 15-16 for further discussion on how to use the comma and semicolon.

## AFFECT OR EFFECT?

In the sciences, **affect** is a verb, and **effect** is a noun. How an experimental application affects the results is determined by the observable effects.

**AGGREGATE OR AGGREGATES?**

The singular form of the word “aggregate” is used when referring to a type of aggregate, making it a noncount (mass) noun. Thus, choosing the right **aggregate** plays a major role in determining the effectiveness of concrete properties for both fresh and hardened concrete. Generally, when referring to specific aggregates, the plural form is preferred. These aggregates are usually a part of the cement mix chosen for a construction project, which can include fine, medium, or coarse grained sand, gravel, crushed stone, slag, recycled concrete and geosynthetic aggregates.

**ALright or All Right?**

## Alright has never been accepted in technical writing. The correct term has always been “all right” which means adequate or satisfactory. However, common misuse may eventually allow alright to slip into informal writing (blogs, tweets, and fictional vignettes) meaning less than accurate but satisfactory, with “all right” reserved for that which is entirely correct or accurate. For now—the rule is: Do not use alright. All right is the only correct choice in technical writing.

## ALTERNATE vs. ALTERNATIVE

**Alternative** as a noun refers to other options. Alternative is synonymous with choice. You may have devised three methods to solve a problem. After you have established your preferred method, you can set that up as the method to follow. However, if other methods remain viable, you can cite them as alternative methods. The second and third methods are alternative methods. In the preceding sentence, alternative is an adjective modifying method.

**Alternate** as a noun refers to a substitute. An alternate juror must sometimes be selected when the first choice is removed. In this case, the new juror is called an alternate and the word is classified as a noun. You may also have to take a substitute or alternate route if a major road is closed. The detour route is an alternate. Alternate as a verb means to take turns or to alternate back and forth. It can also mean to proceed by turns as when students alternate from one computer to another based on their assigned workstations. One can also alternate from one state, action, or place to another. My mood can alternate from happy to sad depending on how well I meet my deadlines.

## AMONG OR AMONGST?

In recent years, many authorities (such as the editors of [Garner’s Modern American Usage](http://ukcatalogue.oup.com/product/9780195382754.do%23.URDf8x1rh8F)) have deemed *amongst* as old-fashioned and even [pretentious.](http://ukcatalogue.oup.com/product/9780195382754.do%23.URDf8x1rh8F) A traditionally preferred English spelling, *amongst* has even fallen out of favor with some British English editors, who are beginning to object to its use. For example: [*The Guardian*](http://www.guardian.co.uk/styleguide/a)style guide shows that *among* is the preferred spelling.

## AMONG vs. BETWEEN

**Among** involves more than two things. This is especially true when discussing items or even groups that are not aligned with specific organizations or entities. For example: It was difficult to find our way *among* so many unmarked streets. The issue of toxicity causes dissension *among* those who promote clean coal technology and those who want to eliminate coal fired power plants completely. **Between** involves more than two things or groups but considers each individually. For example: We were on the street *between* red campus *and* white campus when you called. I’m amazed at the differences *between* those who want to help the coal industry *and* those who want to destroy it.

**ANALYSIS VS.** I**NVESTIGATION**

Analysis is a process of dismantling or separating into constituent elements to study the nature, function, or meaning of a process. An investigation follows up, researches, studies or inquires.

**Appositive**

An appositive is a noun or noun phrase that renames another noun right beside it. The appositive can be a short or long combination of words. For example: The mystery guest, *a well-known entertainer from the sixties*, will not be revealed until tomorrow night. In this example, the appositive is *a well-known entertainer from the sixties*. It is an apposition introducing the *mystery guest.* For more examples, see <http://www.grammar-monster.com/glossary/appositive_apposition.htm>.

**And or AMPERSAND (&)**

The ampersand (&) is not an acceptable replacement for “and” in technical writing. Do not use it in your text, titles or headings. If it is an official part of a company name (Snooks & Co. or John Wiley & Sons Australia Ltd.), then its use is permissible. You can also use the ampersand when citing two authors as in (Smith & Roberts, 2015). Note that **@** is the **at sign** most commonly used to connect a person’s namewith their email address.

**ARTICLES (*a, an,* and *the*)**

Concerning *a* and *an**,* use the article “an” before words that start with a vowel sound as in *an* apple. Use “a” before words that start with a consonant sound as in *a banana*.

The articles *a* and *an* tell the reader that the author is talking about only one thing—***an***awesome ostrich or ***a***delicious bagel. The word “the” tells the reader that the author is talking about a specific ostrich or bagel, as in ***the*** silly ostrich who ate ***the*** homemade bagel.

Many ESL students find our use of the plural tense very confusing and will put *a* or *an* in front of a plural noun, such as an experiments. If more than one experiment is involved, they should be referred to as the experiments or if referring to experiments in a general sense, no article is needed at all.

The most common error for all students, both American and international, is overuse of the word “the.” The articles, *a* and *an*, can only modify a singular noun. The word *the* can modify either singular or plural nouns, but those nouns should represent a specific noun that relates only to the sentence it is in or to a specific time period such as the 1990s or a specific group such as the Harlem Steppers or the Three Musketeers. Any singular noun that is a specific, set-apart item, event, process, collection, or decade requires “the,” as an introductory modifier. When I see “a” or “an,” I know a singular noun will follow. Plural nouns will never be introduced by “a” or “an.”

Do not insert “the” before non-specific nouns that are all inclusive; thus, words like conventional or traditional when referring to all or most of something in a general sense should not be preceded by the.

Do not insert “**the”** before the words *figure, table, equation* or *section* when identified with a number. It is not *the* Figure 1 (and numbered figures are always capitalized), but it is simply Figure 1. It is not *the* Equation 5, but simply Equation 5 or Eq. 5.

When referring to specific decades, e.g., the 1980s, use *the* to introduce that time period. Do not use an apostrophe when expressing any decade numerically. For example: In the 1970s**,** nanotechnology was unheard of.

Laws or places named after a person’s name in the possessive (e.g., Henry’s Law, Einstein’s theory of relativity, and Cassie’s Cafe) would not require “**the**” as an introductory article. If the name is not in the possessive tense, then “the” would be appropriate as in theRayleigh-Ritz method or the [Fermi paradox](https://en.wikipedia.org/wiki/Fermi_paradox). Moreover, if the full name is given as in **the** John F. Kennedy Airport or **the** Sam Tung UK Museum, which is a branch of **the** Hong Kong Museum of History, then “**the**” is needed. If you are referring to a famous document like **the** Declaration of Independence or a specific organization like **the** China National Center for Preservation & Conservation of Ancient Books (NLC), then you should use “**the**.”

When you precede a word with “the” and use it again in the same sentence, you do not always need “the” in the second usage.

**Example 1:**  Diagonal tension cracks (shear cracks) were observed at the mid-span and mid-height of the specimens. (Here, the mid-span is followed by its logical companion, mid-height.)

If “the” is covering two closely related words or phrases that are like apples on the same tree; then, don’t use “the” for the second topic of discussion.

In the following example, the Miranda warning and Maranda rights or Miranda rule are all referring to the same thing. The first **“The”** at the beginning of the sentence covers them all.

**Example 2:** **The** Miranda warning, also referred to as Maranda rights or Miranda rule, is a right to silence warning given during the arrest of criminal suspects and before their interrogation to preserve admissibility of their statements in a court of law.

**Example 3: The** cohesion (*c*) *and* interface friction coefficient (tan *φ*') between **the** soil *and* side wall were determined by the wall pull-out test.

In Example 3, the word “the” is doing double duty by naming two specific actions at the beginning and in the middle of the sentence; hence, in **the cohesion** and **interface friction coefficient**–both refer to a related specific action, which means “the” is modifying both the cohesion *and* interface friction coefficient due to their relationship. We also insert an all-inclusive **the** before **soil and side wall** because of this phrase’s separate placement in the sentence as a dual object of the main action. You can see this relationship as the soil and side wall are working together to locate the subject.

Common or non-specific topics often need to be introduced by “The” when they begin a sentence. When you are introducing a new topic at the beginning of a sentence, it becomes a very specific topic that you are going to make uniquely your own through your discussion. However, the key to when to use “the” is whether you introduce your topic as singular or plural. I was asked why I changed a sentence that began with: “Staggered truss framing (STF) system was originally developed ……”

to “**The** staggered truss framing (STF) system was originally developed to . . .”

If the author had said" STF system**s** **were** originally developed...", then he would not need "the." ***Putting your subject in the singular tense sets it apart as one, and even when that "one" is universal, it is still “the” specific point of referral.*** Simply remember that the articles *a, an*, and *the* are always used when introducing one of something. Not all ESL students have the plural tense in their language. For that reason, the plural tense in English is confusing. Most nouns become plural by adding an “s”. However, verbs do not form their plural by adding an “s”. Thus, a strong wind roars. Roars is singular here, and it is agreeing with its singular subject wind. If you want to make the subject and verb plural, you would say: Strong wind**s** roar. Then, both winds and roar are plural. This is confusing, which is why *a, an,* and *the* can help. They tell the reader immediately that we are talking about one of something. When the article is missing, we usually immediately assume that the subject or its object is plural.

[Purdue’s Online Writing Lab](https://owl.english.purdue.edu/owl/resource/540/01/%20f) has further instructions on the use of ***the*** (copied for your convenience below):

#### Geographical use of **the—**Do **not** use **the** before:

* names of most countries/territories: Italy, Mexico, Bolivia; however, the Netherlands, the Dominican Republic, the Philippines, and the United States is correct.
* names of cities, towns, or states: Seoul, Manitoba, Miami
* names of streets: Washington Blvd., Main St.
* names of lakes and bays: Lake Titicaca, Lake Erie except with a group of lakes like the Great Lakes
* names of mountains: Mount Everest, Mount Fuji except with ranges of mountains like *the* Andes or *the* Rockies or unusual names like *the* Matterhorn
* names of continents (Asia, Europe)
* names of islands (Easter Island, Maui, Key West) except with island chains like the Aleutians, the Hebrides, or the Canary Islands

Do use ***the*** before:

* names of rivers, oceans and seas: *the* Nile, *the* Pacific
* points on the globe: *the* Equator, *the* North Pole
* geographical areas: *the* Middle East, *the* West
* deserts, forests, gulfs, and peninsulas: *the* Sahara, *the* Persian Gulf, *the* Black Forest, *the* Iberian Peninsula
* **Omission of Articles**--Some common types of nouns that don't take an article are:
* Names of languages and nationalities: *Chinese, English, Spanish, Russian* (unless you are referring to the population of the nation: "**The** Spanish are known for their warm hospitality.")
* Names of sports: volleyball, hockey, baseball
* Names of academic subjects: mathematics, biology, history, computer science

## ARTICLES & ACRONYMS—Sound the letters out before deciding what article to use.

Use the article “a” before words that start with a consonant sound. Use “an” before words that start with a vowel sound. This is also true of acronyms where you sound out the letters instead of saying the words they stand for. For example, the professor won *an* NSF award. N is a consonant but when sounded out it has a vowel sound (en). Letters with vowel sounds are F (ef), H (ā-ch) L (el), M (em), N (en), R (ahr), and S (es). Words beginning with “h” are particularly tricky. If the *h* is silent, the word will begin with a vowel sound as in hour (pronounced ow'-er) and herb (when pronounced ərb). When “u” begins an acronym like UNICEF or USA, the beginning sound is “you” and the acronym’s first letter should be treated as a consonant; e.g., a UNICEF meeting.

## ASSURE, ENSURE OR INSURE?

**Assure** gives your reader confidence by providing assurance that your conclusion is correct. To **ensure** that your experimental results are correct is to follow a proven protocol, e.g., “The nanoparticles were stabilized using small amounts of hydrochloric acid to **ensure** the solution remained stable for at least three days.” To “insure” is to issue an insurance policy.

**AVOID “ABOVE, BELOW OR ON THE NEXT PAGE”** WHEN REFERRING TO TABLES AND FIGURES.

Avoid using words which place your figures or tables above, below, on the next page. Often editors will change your format and make corrections which will change the placement of copy. Figures and tables should be placed close to the copy they relate to. Exceedingly long tables should be put in an appendix.

## Behavior or Behaviors

## The 21st century has dismissed the early classification of behavior as a singular mass noun. Today, the use of “behaviors” has become commonplace, especially when referring to different types of behavior.

## CAPITALIZATION RULES

**Sentence case** refers to a capitalization style in which most words other than the first word and proper nouns or acronyms are lowercased.

**Title Case** refers to a capitalization style where the first letter of the first and last word are capitalized as well as all nouns, pronouns, adjectives, verbs, adverbs, and subordinating conjunctions (*If, Because, That, Which*). Capitalize abbreviations that are otherwise lowercase (e.g., use DC, not dc or Dc) except for unit abbreviations. Do not capitalize articles (*a, an, the*) or coordinating conjunctions (*and, but, for, or, nor*). The Chicago Manual of Style and other technical writers’ style guides tell us to never capitalize a preposition no matter how long it is.

You should not capitalize the words that represent any acronym unless they represent a commercial software program or other legally documented product, organization, place, event, or process.

**CAPITALIZATION of the words “Section, Table, and Figure:** Capitalize the word Section when referring to a numbered section title. Also, capitalize the words Table and Figure when referring to a numbered table or figure.

**Every style guide will tell you to only capitalize proper nouns**. A proper noun names specific brand names (Oreo, Mastercraft) the name of a person or an organization (John Doe of the Knights of Columbus), the names of now famous documents, (Declaration of Independence, Emancipation Proclamation) or events (Boston Tea Party, Civil War), and the names of universities, departments, and buildings. Names of methods are not capitalized unless they include a proper noun , e.g., Henry’s law constants or Monte Carlo simulation. Proper nouns also include the names of specific cities, states, countries and continents. Furthermore, even though your job title may be capitalized in the company brochure and on a website introducing you as a company vice president or administrative assistant—these titles are not capitalized in a general narrative. When placing an event on a company calendar, it is okay to capitalize the name of that event. If the event has an official name such as the Centralia, Missouri Anchor Fest, capitalize the name of that event. However, if you do not mention its official name, then it is simply Centralia’s annual craft, music, and carnival fair, not Centralia’s Annual Craft, Music, and Carnival Fair. Proper nouns are always capitalized; however, do not capitalize conjunctions (and, or, but), or prepositions (with, in, of, on) or articles (a, an, the) when they are part of a proper noun title. Also, do not capitalize any word that is not a proper noun.

**Capitalizing numbered items** like Figure 1 and Table 2 are expected. Capitalizing sections, phases, tasks, and other numbered items is optional. However, capitalizing the numbered item further defines it as separate and important. You should never put the article “the” before a numbered table, figure, section, or any other numbered item.

## Capitalizing HYPHENATED MODIFIERS:

A hyphenated modifier is a compound adjective or adverb created by hyphenating multiple words that work together as one word describing or modifying the word they precede. Examples: real-world applications, over-the-top designs, and word-of-mouth advertising. When using a hyphenated modifier in a title that is set in title case, use the Chicago Manual of Style, which tell us to:

1. Always capitalize the first element.
2. Capitalize any subsequent elements unless they are articles, prepositions, coordinating conjunctions (*and, but, for, or, nor*), or such modifiers as *flat*or *sharp*following musical key symbols.
3. If the first element is merely a prefix or combining form that could not stand by itself as a word (*anti, pre,*etc.). Do not capitalize the second element unless it is a proper noun or proper adjective. [*Chicago*gives as an example *Anti-Intellectual Pursuits.*] Carla’s Note: *Anti*-*Intellectual Pursuits* is a proper noun, i.e., the name of a book by Bernard Barber.
4. Capitalize the second element in a hyphenated spelled-out number when used in a title (*Twenty-One* or *Twenty-First*, etc.) or hyphenated simple fractions (*Two-Thirds* in *Two-Thirds Majority*). [The current *Chicago Manual of Style* agrees with this rule.]

The preceding list was updated in January 2019 and was provided in a blog by [Lynn Gaertner-Johnston](http://www.syntaxtraining.com/?utm_source=blog&utm_medium=header&utm_content=syntax-training&utm_campaign=businesswritingblog), founder of *Syntax Training* in Seattle, Washington. It was part of her Business Writing Blog feature entitled “Capitalizing Hyphenated Words in Titles.” See <https://www.businesswritingblog.com/business_writing/2010/08/capitalizing-hyphenated-words-in-titles-.html>.

**Example**: Missouri Tigers Proved Defenseless Against Tre Mason’s **304-Yard**, **Four-Touchdown Performance** in the SEC Championship Game

**CAST VS. CASTED**

The concrete and other material casting industries have always referred to the completion of casting as “cast.” Thus, cast expresses both the present and past tense. However, if you look to see how cast is conjugated, you will find casted as an alternative past tense form. The recent acceptance of casted pertains to the theater as: *The* actors for the upcoming play have not yet been casted or to fishing: T*he fisherman casted his* lure. I find the use of casted awkward in any case.

**CITING REFERENCES—IEEE STYLE**

The following is copied from the 2014 IEEE Editorial Style Manual, p. 34. This is for the benefit of those who use the Vancouver style of form of in-text citations and referencing. More recent IEEE manuals are not as thorough in their explanation. See (<http://www.ieee.org/documents/style_manual.pdf>).

*References in Text:* In text-citations referring to the bibliography often appear in square brackets, *inside the punctuation*. Grammatically, they may be treated as if they were footnote numbers, e.g., as shown by Brown [4], [5]. Research can be referred to as a consecutive range of articles or books [4]–[7] or as a single article [9]. Researchers can be the topic of a sentence where Smith [4] and Brown [5] did groundbreaking research or the names can be left out as when [3] led the way in this phase of research according to [4] and [6]–[9]. Notice that an en dash connects this range of numbers [6]–[9]. When only two numbers are involved as in [2], [3], do not use the en dash. Only use when there are three or more numbers [7–9].

*References within a Reference:* Check the reference list for *ibid.* or *op. cit.* These refer to a previous reference and should be eliminated from the reference section. In text, repeat the earlier reference number and renumber the reference section accordingly. If the *ibid.* gives a new page number, or other information, use the following forms: [3, Th. 1]; [3, Lemma 2]; [3, pp. 5-10]; [3, eq. (2)]; [3, Fig. 1]; [3, Appendix I]; [3, Sec. 4.5]; [3, Ch. 2, pp. 5-10]; [3, Algorithm 5].

**NOTE:** References in the bibliography should appear in the order that they appear in your text.

**A sentence can begin with a bracketed number as in:** [8] contributed substantially to the development of this research. Donald Wunsch, a professor and an excellent writer at the Missouri University of Science and Technology, offers the following advice:

**‘**[27] extended this work to apply…’ is preferred over ‘Jones et al. [27] extended this work to apply…’ The reasons for this preference are:

1. Unless one does the latter for all citations, it gets kind of strange deciding which ones get “name” billing and which do not.
2. The name-dropping distracts from the scientific contribution.
3. It could be mistaken for currying favor or promotion (which it often is).
4. Authors care more about being cited, which is automatically tracked, than whether they are named in the text. So, they will be happy about any citation unless it is unfairly disparaging.
5. The first author often isn't the driving force behind the research anyway. Often the last author is the famous one, or sometimes alphabetical order is used.”

However, there are two sides to the story. If historical contributions are being emphasized or the author has good reason to actively suggest viewing a particular paper, explicitly mentioning the author(s) by name makes sense. For example, Dr. Wunsch often recommends a 2014 paper by Schmidhuber, Technical Report IDSIA-03-14 / arXiv:1404.7828 v4 [cs.NE], which is replete with author names because of its tutorial and historical nature.

IEEE is clear on how the bracketed numbers should be used. Do not say “in reference [1] …”; rather, the text should be edited to read simply, “in [1] …” The author’s name should not be included in a text reference with a number (i.e., “In Smith [1]”) and should be changed to “in [1]” except in such cases where the author’s name is integral to the understanding of the sentence (e.g., “Smith [1] reduced calculated time …”).

## Citing Authors using Author-Year-in-Parentheses Styles

The author/year in parentheses style is used by many style guides including the Chicago Manual of Style, (CMOS), the Council of Science style guide, and the American Society of Civil Engineers style guide.

Every peer-reviewed paper requires a literature review with citations that support the facts needed to provide a background for the presentation of your new information or research. When an article only has three or less authors, all names should appear as in “Jones, Roberts, and Smith (2018) determined that …” Other style guides want only articles with two authors presented in this way. Thus, if an article has more than three authors (CMOS) or more than two authors (other style guides)—the last name of the lead author should be followed by et al.) followed by the year of publication.

**When emphasizing the author or authors who are leaders in an article’s featured research**, they should be presented in the following format: Wu et al. (2012) and Ragzaghi-Moghadam et al. (2016) integrated protein-protein interaction (PPI) with gene expression and biomedical knowledge for prioritizing cancer associated genes.… or

“Efroni et al. (2007) combined gene expression and network structure to find a small set of pathways whose differences can classify phenotypes.” If there are more than three authors (CMOS rule) or two authors (all other style guides), use et al.

**If you are emphasizing a method, technique or new discovery,** then the message should be emphasized and the author-year combinations should be put in parentheses: Gene expression and network structure can be combined to find a small set of pathways with differences that can be used to classify phenotypes ([Efroni et al., 2007](#_ENREF_8)).

It is great to acknowledge your peers for their contribution to the science directly as opposed to hiding them in the reference section. However, when you are expressing a well-known fact with lots of references to choose from, the parenthetical approach is preferred by both CMOS and APA. Letting the authors of important work serve as the subject of a sentence followed by an active verb strengthens your sentence grammatically by improving sentence flow and allowing the subject-active verb combination to drive your sentence forward in a more concise and precise way.

## CODING ARTICLES

Coding validates problematic and contradictory material by inserting the following capital letters or symbols at the beginning and end of the sentence or sentences of interest:

**V** for Validating ; **P** for Problematic , and **C** for Contradictory .

Every student will have some misconceptions going into their adviser-assigned field of research. There will be surprises, disappointments and rewards as the student submits to instruction. A daily journal allows the student to record their honest reactions to assignments, experiments and results. Such a record will not only represent the student’s journey, but it can also show his or her transformation from a novice to a highly-qualified researcher. This should be a personal journal—not shared with anyone. However, writing down one’s honest reactions can lead to new ideas that the student will be excited to share with others!

## CODING FOR ATTRIBUTION (ASSURING AVOIDANCE OF PLAGIARISM)

1. **Secure with Quotation Marks. Separate with Space**.

Secure copied material by inserting the appropriate quotation marks at the beginning and end of the quotation.

Separate by dropping the quotation down two lines, single spacing that material, and providing a half-inch margin on each side. Put author, date of publication, and page number in parentheses. This is a Chicago Manual of Style (CMOS) in-text citation. Follow up in the next paragraph with the full reference in brackets.

“Insert the appropriate quotation marks at the beginning and end of the material and follow with an in-text citation” (Roberts 2020, 11).

[Roberts, C. (2019). *Carla’s Tips on Technical Writing,* internal communication (provided by email on mo/dd/year)]. Putting the full reference in brackets during the draft stage gives you the material you need to build your bibliography when the time comes to do so. Further review may lead you to decide that you don’t want to use the material for the article you are currently writing—but that it might be something you can use in another article. I recommend copying quotations and sources relevant to your research in a separate document for future reference and saving that document as “Quotations for Future Research on . . . ”

1. **My Summary:** In the draft stage—when paraphrasing or summarizing someone else’s information in your own words—code that material prefacing your summary remarks with *My Summary* followed by an in-text citation so you can quickly refer back to the original text (Jones 1995, 84). In this case, you are simply rewording what the author has said.
2. **My Thoughts:** When drafting your personal assessment, preface your personal thoughts with the words *My Thoughts***.** These are **not** a rewrite of the author’s findings. They reflect your educated opinion of those findings. Sorting symbols () can be used to verify your reaction. You will not use them in your final draft, but they will help you shape and reshape your convictions concerning other author’s work as you become more experienced. In the final version, you can say, “This writer approached the problem from a different perspective . . .” or “This author’s research results determined that . . .” or “My research team and I found the traditional method problematic because . . . Our new method improved performance time by 50% and was 30% more cost effective.”
3. **Identify the source of the research you are presenting**. Remember that copying someone else’s work and not giving that person credit is called plagiarism. It can cause a student to suffer disciplinary probation and even suspension or expulsion from the university.
4. **Checking for Plagiarism**: Several websites offer plagiarism checks. One free one is <http://smallseotools.com/plagiarism-checker/> by Google. Also see [http://iplagiarism.net](http://iplagiarism.net/).
5. **Self-plagiarism**: Once you have published your work with any publisher, it is unethical to use that paper or any portion of it in another submission. The [American Chemical Society](http://pubs.acs.org/paragonplus/submission/esthag/esthag_authguide.pdf) (ACS) tells us in their author instructions (from *Environmental Science and Technology*: ”If you wish to reuse a figure or table, you must cite the original publication and, if required, obtain explicit permission from the publisher. Minor modification of a figure or table solely to avoid self-plagiarism is unacceptable. Authors publishing duplicative text, data, graphics, or tables will be banned from submitting to ES&T.”

**COLLECTIVE NOUNS**

Unlike mass nouns, collective nouns are things we can count. Oxford Dictionary defines a collective noun as a noun that denotes a group of individuals (e.g., assembly, family, crew). When referring to a group as a unit or a whole, you should precede that noun with “**the**.” The American Legion meets once a month. The PTA is planning a recruitment drive. A collective noun can represent a group of individuals, but it can also refer to a **group** of things as in a **range** of numbers, a **pair** of socks, a **dozen** eggs, or a **series** of events. Here, the article **a** is the correct choice. That is generally the case, but in some cases (as when you are referring to a specific group), **a** or **an** should be replaced with **the:**  **The** majority voted to retain their bylaws and **the** number of dissenters were few. This last sentence is referring to a specific group with a specific number of dissenters. Collective nouns take a singular verb when the group as a whole is meant and a plural verb when referring to individuals.

**COLON**

The colon is used to introduce a quotation, a list, an equation and its explanation or any other formal explanation. A colon can be used to introduce anything that can be listed.

**Example:** *These items include (but are not limited to): steps, organizations, methods, problems, names, places, events, and rules.*

**Example:** *The most common mistakes in English grammar are: overuse of the word “the,” misplaced commas, and unnecessary capitalization.*

**These sentences** are also grammatically correct without the colon.

**The colon is used in formal writing**. Few people would use a colon to create a grocery list.

**Do not** capitalize the first word after a colon unless it introduces a quotation, a complete sentence or a proper noun.

**Example**: Theodore Roethke’s most quoted lines are from The Waking: *“I wake to sleep and take my waking slow. I learn by going where I have to go.”*

**Example:** *Did you actually hear the valedictorian say: “I’d like to thank Google, Wikipedia, Microsoft Word, and Copy and Paste”*!

Do not capitalize the first word of a phrase or incomplete sentence following a colon. Sometimes, a colon is used to set up a surprise as in:

**Example:** *She only wanted one thing for Christmas: a pink motorcycle!*

Numbered or bulleted items following a colon do not have to be placed in sentence format. This is contrary to what I was taught in school. However, times change, and I must change with them. According to the *Blue Book of Grammar* *and Punctuation* by Jane Straus: “If each point is a complete sentence, capitalize the first word and end the sentence with appropriate ending punctuation. Otherwise, there are no hard and fast rules, except be consistent.”

***Examples:***

I provide *Carla’s Tips on Technical Writing* free of charge to anyone who asks for the following reasons:

1. I use my tips in the comments I provide when editing.
2. I want to serve as more than an editor: I also want to be a writing coach.
3. I want ESL students majoring in the sciences to have a quick, go-to manual for answers to their questions about English words, punctuation, and grammar.

The following features are provided in my tips manual:

* topics arranged in alphabetical order,
* extra information on how to organize research, and
* specialized information for students majoring in engineering.

This is what I expect from graduate students:

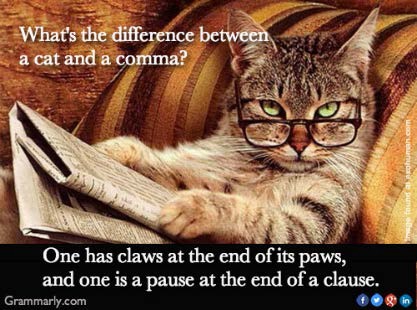
1. Do not wait until you are finished with your thesis to ask for help with editing.
2. Let me help you on a chapter by chapter basis from the early stages of writing to completion.
3. Give me three to five days to complete the edit.
4. Do not expect a 24-hour turn around for a 100-page thesis!

Salutations also use the colon in formal letters. Hence, Dear Sir: Gentlemen: Dear Members of the Search Committee: and other forms of address requiring a formal approach should use the colon.

For more information about how to use a colon, please see *The Blue Book of Grammar and Punctuation’s* rules on this topic at <http://www.grammarbook.com/punctuation/colons.asp>.

**CONCLUSION VS. CONCLUSIONS**

When writing a journal article, you will end your paper with your summation of achievements and plans for future research. I have been asked if this should be presented as Conclusion or Conclusions. If you have more than one finding to report or more than one closing thought to offer, then the plural form is the best. Most papers have this section titled “Conclusions.”

**COMMAS**

No one seems to know what to do with a comma! They are sprinkled liberally throughout most documents like too much pepper on scrambled eggs. The following rules will hopefully help you know when to use a comma and when not to.

## COMMAS AND APPOSITIVES

An appositive is a noun phrase placed next to a noun or noun phrase (usually the subject of the sentence) to define or modify it. An appositive is always set off by commas. Some examples follow:

## The Missouri Tigers, a member of the Southeastern Conference since 2012, will always be *my* team.

## While living in Lathrop Hall, located directly across the street from the stadium, I could watch Dan Devine’s 1968 Mizzou Tigers win game after game from the ninth floor.

## Nonrestrictive vs. Restrictive Clauses

**Nonrestrictive clauses** add information, and they are always preceded by a comma. The information might be helpful or even essential to some for a personal reason—but the sentence can function without it. In the sentence below, the fact that Lucky was my favorite childhood dog is nice to know, but it is not needed to make the sentence complete. The sentence is still a sentence whether that phrase or added information is there or not.

**Example**: Lucky, my favorite childhood dog, loved to accompany me on bike rides.

If we delete the nonrestrictive phrase (appositive), we have: “Lucky loved to accompany me on bike rides.” This is a structurally sound sentence with a subject (Lucky), verb (loved) and object (rides).

Nonrestrictive clauses tell you something about a preceding subject, but they do not limit, or restrict, the meaning of that subject.

**Example 1:** Dr. Hongbin Ma, director of the MU College of Engineering’s Center for Thermal Management, uses nanotechnology to create new ways of cooling electronic devices.

The rather long nonrestrictive appositive refers to Dr. Ma’s administrative position. This information is good to know, but it is not essential to the structural soundness of the sentence. It is a nonessential “nonrestrictive” appositive. It also refers to Dr. Ma’s exclusive leadership position. The appositive adds informationfor this position and must be set apart with commas. Remember:

**A Nonrestrictive Appositive** is nonessential because the sentence makes sense without it, and it must be set apart with commas because it provides added information.

The nonrestrictive appositive gives us added information (e.g., the name of a book or the title of an administrator). The added information is always helpful and often important to the meaning of the sentence, but the sentence is structurally sound and makes sense without it.

**COMMAS IN NONRESTRICTIVE CLAUSES:** Commas **are** used to set off nonrestrictive (*nonessential)* clauses. The sentence would **not** lose its ability to function as a sentence if the nonrestrictive clause or parenthetical phrase were deleted.

**Nonrestrictive Clause Example #1:** The newly appointed professor asked his department chair, *who has had great success in obtaining research grants,* for advice.

The sentence can stand on its own without the clause (who has had great success in obtaining research grants), which merely adds information.

**Nonrestrictive Example #2:** Astronomy, *which is the study of heavenly bodies,* is a fascinating subject.

This sentence would still make sense if the clause were removed.

**A Restrictive Appositive** represents essential information and is **not** set apart with commas. The sentence would **not** make sense without it.

**NO COMMAS ALLOWED IN RESTRICTIVE CLAUSES**: Commas are **not** used to set off restrictive (*necessary* or *pointing out*) clauses because the additional information can only refer to the subject.

**Example:** Only students *who have had an article accepted for publication in the proceedings* will have their trip to the conference paid for.

No comma is needed in the above nonrestrictive clause because it refers only to students who have had an article accepted for publication—and no other group. **You cannot extract the clause,** *who have had an article accepted for publication in the proceedings,* **without changing the meaning of the sentence.**

## Another Example of a Restrictive Clause:

We have decided to hire a graduate research assistant *who is familiar with the project.*

In the above sentence, the italicized restrictive clause says we are hiring a particular kind of student—

one who is familiar with the project. No other students should apply—not undergraduates and not graduate students who are unfamiliar with the project. Only graduate students familiar with the project should apply.

## RESTRICTING THE FOCUS GENERATES RESTRICTIVE CLAUSES

You usually use “who” or “that” before a restrictive clause. You do **not** use a comma.

**Example:** Engineering Week organizers ask for posters **that** will spark the interest of visiting students.

Professor Jones makes sure exceptional students go to conferences **who** offer opportunities for them to win awards based on the quality of their proceedings article.

## COMMAS BEFORE PARTICIPIAL PHRASES AT THE END OF A SENTENCE

A present participle adds –ing to a verb, which shows continuous action (e.g., reading, surveying).

A past participle adds *-ed, -d, -en* or *-t* to the end of a verb (e.g., flipped, taken, said, broken, kept). This discussion is focusing on the present participles, and our question is:

## Should we place a comma before a participial phrase at the end of the sentence?

The answer depends on whether the phrase is restrictive or nonrestrictive!

**Nonrestrictive Participial Phrase Example:** Powerful winds delayed our experiment, blowing the biomass away from the staging area.

The above sentence can stand on its own without the participle phrase: “Powerful winds delayed our experiment.” This means the phrase, *blowing the biomass away . . .,* is nonrestrictive in that it does not limit or restrict the meaning of the sentence. The phrase is additional information, and the sentence can stand on its own without it; hence, the additional information beginning with the participle, blowing, must be set off with a comma.

**Restrictive Participial Phrase Example:** A surveillance camera showed the biomass swirling up from the outdoor storage area and coming to rest at the northern wall of hay bales.

The participial phrase, *swirling up from the outdoor storage area. . .*and *coming to rest,* tells us something extremely specific about what the surveillance camera revealed. This is not extra information. It is essential in that it reports the action responsible for the new location of the displaced biomass.

**COMMAS and SEMICOLONS: THEIR WORK IN FORMING SENTENCES**

The following examples about a fictitious restaurant chain was written to help define when to use commas and semicolons.

The family-owned restaurant chain, Moxie Tamales, is moving forward with plans for two more restaurants in southwestern Missouri. [The name of the restaurant chain is set off with commas. It is a nonrestrictive appositive, which names the chain.]

Notice in the following examples that subjects have a single underline and their verbs have a double underline.

**Example of a Compound Sentence:** The first restaurant is expected to be operational by 2022, and the second restaurant will begin operation in 2024.

When you take two simple sentences, i.e., independent clauses (which means that each has its own subject and verb) and connect them with the word “and,” you have created a compound sentence. The word “and” is always preceded by a comma in a compound sentence.

**, and**

**Example of a sentence and its independent clause connected by a semicolon:**

The first restaurant is expected to be operational by 2022; the second restaurant will begin operation in 2024.

If you leave out the word “and,” you can insert a semicolon which takes the place of the word “and” by connecting the two closely related independent clauses. Don’t insert a semicolon unless the second sentence has a close easily understood connection to the first sentence.

**;**

## When a Comma is NOT Needed:

If there is no independent clause after a conjunction (*and* or *or*), do not insert a comma.

**Example #1**--The first new restaurant is expected to be operational by 2022 and the second by 2024.

Note the absence of commas here. The verb *is expected* refers to both the first new restaurant and the second. There is no new subject and verb after *and.*

**Example #2--** The drawing on page 2 shows the artist’s conception of Moxie Tamale’s latest new building and includes plans for an outdoor garden and patio area. The subject *drawing* covers the verbs on both sides of *and;* hence, no comma is needed.

## COMMUNITY OF RESEARCH

There are numerous ways you can get acquainted with your community of research. If you are a civil engineer, you can join the American Society of Civil Engineers. There’s a professional group for every discipline, and each group has a student membership available for a reduced price. Presenting posters about your research at conferences or submitting articles to a conference’s call for papers is another way to increase your publication prowess and become known among your peers. The best way to get known, however, is to have articles about your research accepted by peer-reviewed journals.

**Elsevier** has 2,721 journal titles which can be accessed by subject area at [http://www.elsevier.com/wps/find/journal\_browse.cws\_home.](http://www.elsevier.com/wps/find/journal_browse.cws_home)

**Inderscience** has 377 journals covering a variety of STEM and business journals. They invite you to browse their topics at <http://www.inderscience.com/index.php>

**Springer** publishes 2,600 journals for technical writers to choose from; hence, they have a topic search to help authors find the right journal for submission: [http://www.springer.com/authors/journal+authors/helpdesk?SGWID=0-1723213-12-817204-0](http://www.springer.com/authors/journal%2Bauthors/helpdesk?SGWID=0-1723213-12-817204-0)

**Wiley-Blackwell** publishes nearly 1,500 peer-reviewed journals. You can browse their subjects and journal selections at [http://www.wiley.com/WileyCDA/Section/id-](http://www.wiley.com/WileyCDA/Section/id-302371.html)  [302371.html.](http://www.wiley.com/WileyCDA/Section/id-302371.html)

Every discipline has several publishers specifically dedicated to their research.

**[ASTM Form & Style Manual | Blue Book - ASTM International](https://www.astm.org/FormStyle_for_ASTM_STDS.html)** https://www.astm.org › Part G. **Standards** Style Manual.

**Astronomy Students** have a number of publications to view including Springer’s [*Planetary Science*](http://www.planetary-science.com/authors/instructions) *at*  [http://www.planetary-science.co/authors/instructions](http://www.planetary-science.com/authors/instructions) as well as Elsevier’s [*Astronomy and*](http://www.elsevier.com/journals/astronomy-and-computing/2213-1337/guide-for-authors) [*Computing*](http://www.elsevier.com/journals/astronomy-and-computing/2213-1337/guide-for-authors) *at* <http://www.journals.elsevier.com/astronomy-and-computing/>and [*Astroparticle*](http://www.elsevier.com/journals/astroparticle-physics/0927-6505/guide-for-authors) [*Physics*](http://www.elsevier.com/journals/astroparticle-physics/0927-6505/guide-for-authors) *at* <http://www.journals.elsevier.com/astroparticle-physics/>.

**Automotive engineers** have several journals to choose from including a few from Elsevier which include the [*Journal of Process Control,*](http://www.journals.elsevier.com/journal-of-process-control)the [*International Journal of Process Control,*](http://www.journals.elsevier.com/journal-of-process-control)and the  [*Mechanism and Machine Theory.*](http://www.journals.elsevier.com/mechanism-and-machine-theory/)SAGE offers the [*Journal of Automobile Engineering*](http://pid.sagepub.com/) and [*Journal of*](http://pii.sagepub.com/) [*Control Engineering.*](http://pii.sagepub.com/)Inderscience has the [*Int. Journal of Vehicle Design*](http://www.inderscience.com/jhome.php?jcode=ijvd) among others.

**Bioengineers** often submit to *Cellular and Molecular Bioengineering,* a Biomedical Engineering Society Publication***.*** See <http://bmes.org/content.asp?contentid=62>for more information about that journal and others. *Frontiers in Neuroenergetics* has several topics at  [http://www.frontiersin.org/Neuroenergetics/researchtopics.](http://www.frontiersin.org/Neuroenergetics/researchtopics)

The key is to read articles by leading authors in your field; then, look at the reference section to see who they submit to. The possibilities are endless. The *Journal of Biological Engineering* is the official journal of the Institute of Biological Engineering (<http://www.jbioleng.org/about>) and is published by Springer.

**Civil engineers** look to ASCE, which has 32 journals to choose from. See list at <http://poc.smartlogic.com/demo_data/ASCE/pubs.asce.org/journals/index.html>.

The International Society for Soil Mechanics and Geotechnical Engineering publishes the *Int. J. of Geoengineering Case Histories*, which is devoted to geotechnical engineering, geotechnical earthquake engineering, environmental geotechnics and engineering geology. This represents the first refereed journal devoted to case histories. See <http://casehistories.geoengineer.org/>

The Institute of Civil Engineering (ICE) Publishing also has several journals to choose from. See <http://www.icevirtuallibrary.com/content/journals>.

**Chemical engineers** often rely on the American Chemical Society, which publishes more than 50 journals. See [http://pubs.acs.org/action/showPublications?display=journals.](http://pubs.acs.org/action/showPublications?display=journals)

With its publishing partner, Wiley-Blackwell & Sons, AIChE publishes the popular AIChE Journal and three other journals which are listed at <http://www.aiche.org/resources/publications/journals>.

**Computer scientists and computer engineers** have the Association for Computing Machinery (ACM), which sponsors a long list of journals at [http://www.acm.org/publications/journals.](http://www.acm.org/publications/journals)

**Electrical and computer engineers** have a preference for the Institute of Electrical and Electronics Engineers (IEEE), which has more than 154 journals and hosts 1,200 annual conferences. IEEE lists their offerings at [http://ieeexplore.ieee.org/xpl/periodicals.jsp.](http://ieeexplore.ieee.org/xpl/periodicals.jsp)

**Industrial Engineers** look to the Institute of Industrial Engineers, which sponsors seven journals that can be accessed at [http://www.iienet2.org/Details.aspx?id=1486.](http://www.iienet2.org/Details.aspx?id=1486)

**Mechanical engineers** look to the American Society of Mechanical Engineers, which has 26 journals listed at <http://journaltool.asme.org/Content/index.cfm>for a list.

**Nanotechnology engineers** can look to ASME’s Nanotechnology Institute for publications at <https://community.asme.org/nanotechnology_institute/w/wiki/4212.publications.aspx>.

**Nuclear engineering students** should consider *Nuclear Engineering and Design* at [http://www.journals.elsevier.com/nuclear-engineering-and-design](http://www.journals.elsevier.com/nuclear-engineering-and-design/) as well as *Nuclear Science and Engineering* at [http://www.new.ans.org/pubs/journals/nse/.](http://www.new.ans.org/pubs/journals/nse/) There’s also *Nuclear Technology* at  [http://www.new.ans.org/pubs/journals/nt/.](http://www.new.ans.org/pubs/journals/nt/)

**Physics students** examine publications by the American Institute of Physics, which has 18 journals with links to author instructions at <http://journals.aip.org/>. Also authors submitting to Health Physics (HP) and Operational Radiation Safety (ORS) are encouraged to submit manuscripts online through the journal’s Web site at [http://hpj.edmgr.com](http://hpj.edmgr.com/)**.** *Medical Physics*, aka The International Journal of Medical Physics Research and Practice, has author information at [http://medphys.org/NewInstructions.asp.](http://medphys.org/NewInstructions.asp)

The previous sources represent a broad overview of the various disciplines in most colleges of engineering. Physics and astronomy are also included. However, the first four publishing companies mentioned, Elsevier, Inderscience, Springer, and Wiley-Blackwell cover most scientific disciplines on both a national and international scale. When reading an article that pertains to your research, look at the references to see who has been cited and note the journals those authors represent. Talk to your colleagues about the best place to send your article, and do not be afraid to send an editor an abstract to see if he or she is interested in publishing your article.

**COMPARED wITH *OR* COMPARED TO**

Technically, both phrases are correct. However, ***compared to*** is more commonly used. The only difference is based on the tradition of letting “***compared with***” refer to two items which would normally fall under the same or similar classification; thus, a schnauzer is often compared with a Scottish terrier. Or in my world of editing papers on concrete: “The maximum shear force carried by the links was 44 pounds, which is negligible ***compared with*** the peak strength of the coupling beams.

**Compared to** refers to things that are not categorized together. Thus, differences are magnified when oil is compared to water. To compare to is to discuss a difference or differences between objects regarded as essentially different but which are enough alike to make a great analogy. Thus, in the Psalms, we find the art of knowing when to speak and when to remain silent **compared to** a watch (or guard) plus a door: "Set a watch, O Lord, before my mouth, keep the door of my lips."--Psalms, 141:3

**CONSTRUCTS—THEIR MEANING AND IMPORTANCE**

In technical writing, research constructs can refer to images, abstract ideas, or theories. Constructs often seem complex but are actually made up of a number of simpler elements. Constructs can pertain to the social sciences, psychology, business, engineering, and education. Researchers generally use it to define how well a test or experiment measures up to their expectations. Martyn Shuttleworth explains this concept further in his article on [Construct Validity](https://explorable.com/construct-validity). Click on this link for a good explanation of this concept.

**CONTEXT—ITS MEANING AND IMPORTANCE**

Context establishes the connection, overall situation, and background needed to prepare the reader for the concepts or information that follows. It gives the facts and logic underlying the development, use and reasoning behind the new research that you are presenting.

For computer scientists, Abowd et al. stated: “Context is any information that can be used to characterize the situation of entities, i.e., whether a person, place or object is considered relevant to the interaction between a user and an application, including the user and the application themselves. Context is typically the location, identity and state of people, groups and computational and physical objects.” [Ref: Abowd G.D., Dey A.K., Brown P.J., Davies N., Smith M., Steggles P. (1999) Towards a Better Understanding of Context and Context-Awareness. In: Gellersen HW. (eds) Handheld and Ubiquitous Computing. HUC 1999. Lecture Notes in Computer Science, vol 1707. Springer, Berlin, Heidelberg].

## COURTESY TITLES

The APA Style Guide tells us not use courtesy titles such as *Professor*, *Chancellor*, *Doctor*, or *Dr.* on second reference [The Chicago Manual of Style does not address this issue]. The APA Style Guide also tells us to not use *Miss*, *Mr.*, *Mrs.*, or *Ms.* with first and last names of participants in your proposals or other formal documents. Do not use *Mr.* in any reference unless it is combined

with *Mrs.* as in *Mr. and Mrs. James Noble* or *Mr. and Mrs. Noble.*

**Custom-made vs. tailor-made**

Custom-made is more applicable to fabricated items in laboratory experiments. Tailor-made is more applicable to clothing and is often used to refer to situations or ideas. See <http://learnersdictionary.com/qa/custom-made-and-tailor-made>

## Could, Would, and Should

Could is a verb that means the past tense of can used to indicate possibility as in "this could be right" and is also used in making requests, as in “Could I borrow your textbook?”

## All the -ould words (could, would, and should) imply some doubt—as in: We could, if they would, and they should. These are conditional words—meaning “if” this happens, this “could,” “should,” or possibly “would” happen. For this reason, I always avoid their use in technical writing.

## DASHes—EM DASH, EN DASH, OR HYPHEN

Notice the difference between a hyphen (-), en dash (–) and an em dash (—). An **em dash** tells the reader to stop—think about what has just been presented. The **en dash** is best used to indicate inclusive dates and numbers: February 10–12; pp. 26–13. Jordan Penn, author of the [Punctuation Guide](https://www.thepunctuationguide.com/index.html) states: “The en dash is used to represent a span or range of numbers, dates, or time. There should be no space between the en dash and the adjacent material. Depending on the context, the en dash is read as “to” or “through.”

**Keystrokes for en dash and em dash:** You can use keystrokes as follows:

e**n dash (Alt+0150)** Or you can use your pull-down menu under Symbols. Click on Special Characters. From there go to Font and select Normal Text. Subset should be General Punctuation. Character Code is 2013 from Unicode 30 (hex). Once it is in your short list of symbols most commonly used, it will stay there unless you add so many ahead of it that it is forced off the preferred symbol list.

**em dash (Alt+0151)** — To get the em dash, simply type two hyphens. When you hit the space bar after typing the word after the last hyphen, the dash will automatically take on its full form. An **em dash** tells the reader to stop—think about what has just been presented—and then go on to concentrate on the material that follows.

**Spacing:** When using the hyphen, en dash, or em dash, do not put a space either before or after them unless you are using a hanging hyphen.

**Hyphens: S**ee p. 24 for information on when to use a hyphen.

**Hanging Hyphen:** The hanging hyphen occurs when you have two or more adjectives modifying the same noun. For example, the word "nineteenth-" in the phrase "nineteenth- and twentieth-century literature" has a hyphen and a space after “nineteenth” to let the reader know that the connection is not complete until the conjunction (and) appears followed by the final adjective (twentieth) that modifies the noun that it and the preceding adjective is modifying.

**DATA**

The singular form of data is datum. The plural form is data. Since most people compile a large amount of data for any project, the word data is usually plural. Plural nouns take plural verbs, so data should be followed by a plural verb. Hence, “the data are compelling.”

## DATASETS OR DATA SETS?

Modern day academicians have increasingly showed a preference for *dataset* expressed as one word in technical writing due to the extraordinarily complex and extraordinarily specific nature of their work. However, *data set* is still defined as two words in most dictionaries. The exceptions are the Macmillan, Cambridge and Oxford Dictionaries, which define dataset as: a [collection](http://www.macmillandictionary.com/us/dictionary/american/collection) of [separate](http://www.macmillandictionary.com/us/dictionary/american/separate_1) [sets](http://www.macmillandictionary.com/us/dictionary/american/set_1) of [related](http://www.macmillandictionary.com/us/dictionary/american/related_1) [data](http://www.macmillandictionary.com/us/dictionary/american/data) that can be [dealt](http://www.macmillandictionary.com/us/dictionary/american/dealt) with as a [single](http://www.macmillandictionary.com/us/dictionary/american/single_1) [unit](http://www.macmillandictionary.com/us/dictionary/american/unit) by a computer. Data set is defined as an amount of [information](http://www.macmillandictionary.com/us/dictionary/american/information) [stored](http://www.macmillandictionary.com/us/dictionary/american/store_2) as a [file](http://www.macmillandictionary.com/us/dictionary/american/file_1) on a computer.

## DECADES

## Many authors refer to past decades or recent decades. This type of writing is too vague. If your literature search covers 1975 to 2015, you can refer to the past 40 years. If you want to refer to one specific decade, do not use an apostrophe when expressing that decade numerically. For example: In the 1970s, nanotechnology was unheard of. You can also say: In the '70s, nanotechnology was unheard of. Nanoscience began in the 1980s with commercial application taking off in the early 2000s.

## Different—An Adjective Always Followed by a Plural Noun

The word “different” is an adjective that should always be accompanied by a plural noun. Any item that is different from another item or interacts with other items in different ways is plural because it takes at least two items, conditions, characteristics, or processes for a difference to occur. We all have different temperaments, ideas, talents, and skills. Researchers conduct many different experiments and study several different articles relating to their topic before finalizing their conclusion.

## Dimensions

## In legal terminology 2d and 3d mean second and third, respectively (although neither term is used in British English, and the common term is 2nd or 3rd). 3-D means three-dimensional, but in technical writing, 3D without the hyphen is currently the most common application. Thus, 1D, 2D and 3D are preferred. An exception is the [iTwin.js website](https://www.itwinjs.org/bis/naming-guidelines/standard-abbreviations-and-acronyms/) (a site designed to develop web applications for infrastructure digital twins), which presents them as 1d, 2d, and 3d.

## Discussion vs. Discussions

## Discussion is a mass noun which means it can cover many discussions over a long period. Of course, discussion can also be plural (as used in the previous sentence). However, if you look at any peer reviewed journal, almost all of them have a discussion section—and no matter how lengthy or brief, “Discussion,” when used as a subtitle, is always singular.

## E (e.g. vs. i.e.)

***e.g.*** is Latin for *exempli gratia*, which means *for example*. ***i.e.*** is Latin for *id est,* which means *that is*, *namely*, or *in other words*. Both phrases are preceded and followed by a comma when placed in the middle of a sentence. The [Chicago Manual of Style](https://www.amazon.com/gp/product/0226104206/ref=as_li_tl?ie=UTF8&camp=1789&creative=9325&creativeASIN=0226104206&linkCode=as2&tag=dwt0d9-20&linkId=798f352a8de37926fe606c37b89b4611) states that *i.e.* and *e.g.* should be “confined to parentheses and notes and followed by a comma.” The [AP Stylebook](https://www.amazon.com/gp/product/0465062946/ref=as_li_tl?ie=UTF8&camp=1789&creative=9325&creativeASIN=0465062946&linkCode=as2&tag=dwt0d9-20&linkId=0e9d37192ce4793e003e21a7d66f4167), whose “punctuation-pitch” leans generally to the side of “the fewer commas the better,” is pro-comma when it comes to *i.e.* and *e.g*. According to AP, both abbreviations are “always followed by a comma.”

**et al.** is used in in-text citations when three or more names are given. Do not put any punctuation before or after *et.* However, **always** put a period after *al*. More and more style guides are asking the writer to substitute et al. with “and others.” Be sure to find out your style guide’s preference. I italicized et al. here for emphasis, but most style guides today ask writers **not** to italicize et al.

This editor prefers to see all names spelled out in the reference or bibliography section. However, IEEE says it is okay to use *et al.* in the references if there are more than six authors listed in the byline of the publication. Always check the author’s instructions before using *et al.* in any bibliography.

**Note:** The *Chicago Manual of Style* recommends using a comma after i.e. or e.g. to set apart the abbreviations as introductory modifiers.

## etc. stands for et cetera meaning literally “and so on.” Some students add “and” in front of “etc.” This is like saying and and so on. This editor discourages the use of etc. It is an empty phrase and tells the reader nothing. I would rather see all options, or the most important items, listed and the “etc.” designation left off. If an item is not important enough to mention, do not hide it behind “etc.”

## Editing Costs

## Editing costs vary from service to service. Preferred Copy Editing’s fees are below all of the major technical writers’ editing services Elsevier is one of the most transparent publishers when it comes to the cost of editing. The following prices do not apply to LaTex documents:” See

## <http://webshop.elsevier.com/languageservices/languageediting/pages/pricing_usd.html> Note:

**Preferred Copy Editing** charges $50 per hour for deep editing with a 7-10 day deadline. The rate for grant writing is $60 per hour. This includes a careful edit of your proposal and assurance that your proposal complies with the rules of the solicitation and any other guidelines provided by the agency you are submitting to. The student discount is $35 per hour if the student is paying out of his own pocket.

**Email vs. E-Mail**

## The preferred spelling for email leaves out the hyphen. Email was originally spelled with a hyphen after “e” because it represents the word “electronic.” A 2011-2012 search by Google News found that *email* outnumbered *e-mail* six to one. This search pertained to the English-speaking world. However, the non-English world also prefers *email*. See <http://grammarist.com/style/e-mail-email/>.

## ENTITLED VS. TITLED

## Yes, entitled can mean that a person has a right to something as in seniors being entitled to senior discounts at certain restaurants. However, titled and entitled are actually synonyms and are interchangeable when referring to the title of a journal article or book.

## ENVISION VS. ENVISAGE

**Envisage** is to picture something in your mind. A scientist will envisage his preconception on evidence or facts as presented by other scientists. To envisage often refers to ideas that generate real-world projects such as those ideas envisaged by those participating in a think tank.

**Envision** is a more hypothetical process and often relies on imagination.

## Evidence

## For technical writers, evidence should always be singular. There are instances where it has been used in the plural tense, but those instances are either obsolete or specialized as in historic legal records where pieces of evidence were once called evidences. In scientific communities, the word “evidence” is always a non-count singular noun, which means you should never add an “s” to evidence. It can represent one supporting fact that proves a statement or the results of tests from hundreds (if not thousands of documents) that prove a concept or case to be true. For example, global warming has a massive amount of evidence supporting its existence and dangers. The expression *as (is) evidenced by* uses evidenced as a verb used to prove the presence of a factor or factors that can be used as evidence:

## Example 1. She has become known for thorough research, as (is) evidenced by her promotion.

## Example 2. This is clearly a crime scene, as evidenced by the blood and signs of a struggle.

## EXPLETIVES

Expletives are empty words or words that fail to inform or words that can easily be deleted. Try to avoid expletives like*there is, there are, it is*, and *here is*. Also phrases like *it should be noted that* and *according to the literature* (without citing references*), as it stands now, no doubt the xx (subject) has* …, *it can be seen that* or *it is well known that* or *It is recognized that*. . . take up too much space and do not add to the value of the statement. Expletives represent a failure to achieve tight, concise writing simply because a sentence can operate very well without them.

## FIGURES AND TABLES

A figure or table is a new presentation to every reader, which always makes it a present tense occurrence. A figure or table can easily serve as the subject of a sentence whereby active verbs like *shows*, *defines* or *illustrates* can draw the reader into the learning experience.

Different style guides have different ways of handling figures. [Springer](https://www.springer.com/gp/authors-editors/authorandreviewertutorials/writing-a-journal-manuscript/figures-and-tables/10285530) separates multi-image figures with a boldface letter, e.g., without parentheses. The most common method for handling this based on the papers I have edited is to introduce each image with a letter in parentheses (a). The letter can be in the upper left hand corner of the figure itself or directly below the figure. Always check the author instructions provided by the journal you are submitting to and take the time to look at their articles. How do the final figures appear there? Copy that style. Always follow the style provided by your journal whether it is by example or through written instructions. The [APS Style Manual](http://www.apsstylemanual.org/oldmanual/parts/text/figures.htm) which is used those in the social sciences (art, history, psychology, etc.) also has some very detailed instructions. They label the different parts of their figures with a capital letter followed by a colon as in A: Briefly, the figure should first present a title followed by the items you want to identify introduced by a letter in front of its description. The legend should be as brief as possible but clearly written. Inside the figure, the reader needs to have all the symbols, non-standard abbreviations, and specialized figure graphics presented in such a way that readers can understand what is going on. Many authors fail to explain in detail what the viewer is looking at. This is particularly frustrating for the nonexpert, who is seriously interested in what the author has to say, but needs a better explanation of the figures, which are supposed to enhance the text, not cause more confusion.

## Finding the Right Publication for Your Journal Article

# There are several content-based recommendation systems designed to help authors find the right publisher to send their articles to. A new system for biomedical PubMed journals has been designed by Renchu Guan of Jilin University in Changchun, China. This system allows authors to submit their abstract. From that point on, the computer program takes over to recommend the top three choices or best matches for their manuscript. To access their website, go to <https://www.keaml.cn:8081/>. Guan also has a site for computer scientists. Again, it is a matter of copying your abstract into their box and letting their computer program recommend the top three or top 10 journals that would be interested. See  <http://www.keaml.cn/prs/>

## Other recommendation systems such as the ACM Content-based recommendation systems at <http://dl.acm.org/citation.cfm?id=1768209> provide tools for the author to search. There are several recommendation systems out there. <https://link.springer.com/chapter/10.1007/978-0-387-85820-3_3> for Springer’s Recommender System’s Handbook.

## Scopus is another place to find journal sources See <https://www.scopus.com/sources>

An interesting site is provided by Omics, which recommends journals looking for researched information from 700+ peer reviewed, [**Open Access Journals**](https://www.omicsonline.org/open-access-journals-list.php) operated by 50,000+ Editorial Board Members and esteemed reviewers and 1000+ [**Scientific associations**](https://www.omicsonline.org/international-societies-world-fedarations-scientific-associations.php) in [**Medical**,](https://www.omicsonline.org/medical-sciences-journals.php) [**Clinical**,](https://www.omicsonline.org/clinical-journals.php) [**Pharmaceutical**,](https://www.omicsonline.org/pharmaceutical-sciences-journals.php) [**Engineering**,](https://www.omicsonline.org/engineering-journals.php) Technology and [**Management**](https://www.omicsonline.org/business-and-management-journals.php) Fields. That site can be found at <https://www.omicsonline.org/scientific-journals.php> Other databases which cover technical, medical, general, and social sciences can be found at <https://www.omicsonline.org/open-access-journals-list.php>

**For** **the** **Social Sciences:**

# ProQuest is a good source for the social sciences. See IBSS: International Bibliography of the Social Sciences. See <https://about.proquest.com/libraries/academic/databases/ibss-set-c.html> to get started.

## The Interdisciplinary Social Sciences website at <https://thesocialsciences.com/journals> not only lists journals designed for different social science disciplines, but it also lists its different journal themes and provides article submission instructions at <https://thesocialsciences.com/journals/call-for-papers>

## FIRSTLY, SECONDLY, AND THIRDLY – OR – FIRST, SECOND, AND THIRD

Editors generally agree that *firstly* is acceptable, but they still prefer *first* because it is shorter and more commonly used. *Firstly* is more British than American. See Lynch’s guide to grammar rule at <http://jacklynch.net/Writing/f.html>. Adding the -ly to second, third, fourth, etc. is somewhat archaic. Most style guides prefer that today’s writers drop the -*ly* ending.

**FORWARD SLASH AKA VIRGULE/WHACK/SOLIDUS/SLANT/SEPARATRIX**

The forward slash can represent the word *per* as well as *and* or *or*. **Please avoid using the slash**. Technical writing is difficult enough without having to stop and decipher the meaning of a slash. A slash has three principal uses: 1) To separate numbers in dates (9/22/2001), 2) to denote fractions (½), and 3) to denote the original line breaks in quoted poetry (“So much depends / upon / a red wheel / barrow / glazed with rain / water / beside the white / chickens.” –William Carlos Williams, 1883-1963). These are the original line breaks in the poem as printed in its first publication.

Do not use a slash in place of the word *per.* Avoid using expressions such as *and/or*, *he/she*, and *his/her*. Write these terms out instead.

**FONT** S**IZE**

## Titles and Subtitles: I recommend not going over 14 pt. for the main title in a document where the narrative is set in 12 pt. Times New Roman. I would not go over 12 pt. in subtitles when your narrative is set in 10.5 pt Times New Roman! If the publishers specify 10.5 Times New Roman for the body type, they certainly will not want to see 14 pt. or 16 pt headers. Journals usually have author information packages, but these guides are often silent about what font size they want you to use. Some publishers provide a template where all font sizes are fixed.

## Most importantly, when composing your titles and subtitles, try not to go over two lines. Do not use abbreviations. Keep your titles as short as possible, but make sure it tells the reader what makes the article newsworthy to your research community.

**Narrative or Body Type:** The US National Science Foundation has the best rules for font size usage that I have seen. They will not accept a proposal written in Times New Roman **unless it is at least 11 pt**. They will accept: Arial, Courier New, or Palatino Linotype at a font size of 10 points or larger; Times New Roman at a font size of 11 points or larger; or Computer Modern family of fonts at a font size of 11 points or larger. A font size of less than 10 points may be used for mathematical formulas or equations, figures, table or diagram captions and when using a Symbol font to insert Greek letters or special characters. However, it must be readable. -From 2020 NSF Proposal and Award Policies & Procedures Guide (PAPPG). These rules are good to follow no matter who you are submitting to unless they have a template or specific instructions in their author guidelines on font size.

## Greek Letters

|  |  |  |  |
| --- | --- | --- | --- |
| ALT Codes for Greek Letters | | | These codes are used on a daily basis by most students and professors in the sciences. Many use equation editor or the pull-down Symbols menu to find these Greek letters. All you need is a keystroke. Hold down the Alt key and then type the number to get the code you want.  For this chart and a chart that contains ASCII codes using HTML character references (decimals), go to <https://www.thoughtco.com/writing-greek-letters-on-the-computer-118734>  Because not all codes work in all programs, make sure the Num Lock is on and press the ALT key as you type the number on the *numeric keypad*. The HTML codes are entered into HTML documents.  To cite source for Alt Codes:  Gill, N.S. "Writing Greek Letters on the Computer." ThoughtCo, Aug. 26, 2020, thoughtco.com/writing-greek-letters-on-the-computer-118734. |
| **Alt Code** | **Symbol** | **Description** |
| Alt 224 | α | Alpha |
| Alt 225 | ß | Beta |
| Alt 226 | Γ | Gamma |
| Alt 235 | δ | Delta |
| Alt 238 | ε | Epsilon |
| Alt 233 | Θ | Theta |
| Alt 227 | π | Pi |
| Alt 230 | µ | Mu |
| Alt 228 | Σ | Uppercase Sigma |
| Alt 229 | σ | Lowercase sigma |
| Alt 231 | τ | Tau |
| Alt 232 | Φ | Uppercase Phi |
| Alt 237 | φ | Lowercase Phi |
| Alt 234 | Ω | Omega |

## Ref.: Gill, N.S. "Writing Greek Letters on the Computer." ThoughtCo, Aug. 26, 2020, thoughtco.com/writing-greek-letters-on-the-computer-118734.

## Has Been vs. Was

[Nimisha Kaushik](http://www.differencebetween.net/author/nimisha/) gave us one of the best definitions of the difference between *has been* and *was* when she stated: “ ‘Has been’ is used for the present perfect continuous tense. This form is used to refer to something which was started in the past and is still continuing in the present tense. “Was” is used to denote the past continuous form. This form is used to refer to some action which was going on at some time in the past. The time of the action may or may not be indicated.” From: [Difference Between Has Been and Was | Difference Between](C:\\Users\\Carla Roberts\\Documents\\Carla's Technical Writing Manual Revised\\Difference Between Has Been and Was | Difference Between) <http://www.differencebetween.net/language/difference-between-has-been-and-was/#ixzz4YVERmKhp/> Go to this site for examples for a more detailed explanation.)

Cite as: Nimisha Kaushik. "Difference Between Has Been and Was." DifferenceBetween.net. June 8, 2016 < http://www.differencebetween.net/language/difference-between-has-been-and-was/ >.

## HENCE vs. HOWEVER

**Hence** is another way of saying “for that reason.” It tells us why. “Hence” indicates that you have presented a problem or situation which needs an explanation. **Example:** My friend is on a gluten-free diet; hence, I will need to explore gluten-free recipes if I am to invite her over for lunch.

**The word “however”** is another way of saying, “Wait! We have a problem.” Or, stop and consider an alternative or important difference. **Example:** I invited my friend over for lunch. However, I am worried about not being able to serve the gluten-free menu she maintains on her diet.

The word “however” can also mean *on the other hand.*

**HIGHLIGHTS AS SPECIFIED BY ELSEVIER** http://www.elsevier.com/authors/journal-authors/highlights

Elsevier publishes a wide variety of scientific journals. One of their most common requirements is to include highlights. These highlights are designed to tell the reader exactly what the research article is all about in three to five very concise sentence. They not only help the reader, but they also force the writer to select the most important findings of his or her research. It establishes the focal points around which the whole paper is built. The following is from Elsevier author instructions:

Highlights are a short collection of bullet points that convey the core findings and provide readers with a quick textual overview of the article. These three to five bullet points describe the essence of the research (e.g. results or conclusions) and highlight what is distinctive about it.  
Highlights will be displayed in online search result lists, the contents list and in the online article, but will not (yet) appear in the article PDF file or print. Elsevier provides uploading instructions in their author information pack, which comes with every journal they publish. The specifications to focus on during the draft stage are:

* Include **3 to 5 highlights**.
* There should be a maximum of 85 characters, including spaces, per highlight.
* Only the core results of the paper should be covered.

**Example from** [Journal of Health Economics, Volume 29, Issue 4, July 2010, 524-535](http://www.sciencedirect.com/science/article/pii/S0167629610000652)  
 **Highlights**

* + We model two hospitals which have regulated prices and compete on quality.
  + We examine changes in the level of information about hospital quality.
* Increasing information will increase quality if hospital costs are similar.

More examples can be found at <https://www.elsevier.com/authors/journal-authors/highlights> . The reason for including these highlights in this manual is to encourage technical writers to restrict their topics and learn how to focus on what’s important. If you prepare a list of highlights at the beginning of the writing process and incorporate them into an overall outline, you will learn a lot about developing and organizing a research outline and how to define your primary objectives and points.

## HYPHENATING PREFIXES

## Words with prefixes (such as bi-, tri-, re-, un-, de-, non-, sub-, pre-, under-, over-, in- and out-) should not normally be hyphenated in your narrative. However, Phil Jamieson of ProofreadNOW.com in his December 8, 2017 [Grammar *Phile* Blog](https://www.proofreadnow.com/blog/master-prefixes-and-suffixes-with-hyphens) gave the following tips:

* Use a hyphen after the following prefixes in most words: "all-", "cross-", "ex-", and "self-" (e.g., “self-service,” “ex-boyfriend,” “all-encompassing”). Most "servo-" words are also hyphenated with the following two exceptions: “servomechanism” and “servomotor.”
* Hyphens are used after all prefixes preceding a proper noun, a number, or an abbreviation (e.g., "trans-Atlantic network," "mid-1960s," or "non-GABAergic responses").
* Insert a hyphen when the prefix ends with the same vowel that the base word being connected to it begins with (e.g., "intra-arterial," “co-occur,” "anti-immune").
* Include a hyphen after a prefix to ensure the true meaning of a word is clear (e.g., “re-sign,” which means “to sign again” and “re-create,” which means “to make over again”)

Here are some common prefixes that do not usually have hyphens after them.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| anti | multi | super | counter | post | ultra | inter | pseudo |
| contra | peri | tri | infra | proto | whole | mid | sub |
| extra | pro | under | micro | semi | co | over | trans |
| intra | re | bi | non | supra | de | pre | un |

## HYPHENS WHEN NUMBERS ARE SPELLED OUT

Use a hyphen between the tens and unit number when writing out the numbers twenty-one to ninety-nine in words.

**Example:** Seventy-six trombones led the big parade.

Once numbers are expressed in the hundreds, hyphens are no longer needed.

**Example**: One hundred and ten cornets were right behind.

When a fraction is written out in words, no hyphen is needed.

**Example:** Two thirds of the class left immediately when they realized the professor had not shown up.

On the other hand, if the fraction is an adjective—a hyphen is needed.

**Example:** Hence, a two-thirds majority showed a no-tolerance policy for tardiness!

Note that in the last sentence “two-thirds” is an adjective modifying majority.

Sentences do not normally start out with a number expressed in digits. Years are an exception.

1976 was a bicentennial year in the United States. You do not have to write: Nineteen seventy-six was a bicentennial year.

When a number is part of the general narrative—the numbers *one* to *nine* are spelled out. Numbers from 10 up are expressed as modern Arabic numerals.

**In Detail**

The phrase "in detail" means fully covering every feature or aspect.

Example: "We will have to examine the proposal in detail."

**IN vs. INTO**

**Into** and "**in to**" do not mean the same thing. The word “**Into”** leads us into a movement, action or transformation; however, "**in to**" simply means "in order to." When *in* and *to* are used as separate words, they are not a combined phrase. Here are some examples:

**Example #1:** I decided to bring my potted plants **in to** protect them from the forecasted frost.

**Example #2:** I’m hoping all our hard work will transform this old house **into** a sweet cottage that friends will want to visit.

**Example #3:** The higher surface roughness when the Fe2O3 content exceeded 1% was due to the agglomeration of the nanoparticles before they were embedded into the membrane surface.

When the word **into** is used in a sentence where **in to** is meant, the resulting statement can be ridiculous. For example: 1) He turned his timesheet **in to** the supervisor (correct) OR 2) He turned his timesheet **into** the supervisor. In the second sentence, the timesheet is magically transformed into the supervisor! Yikes!

**Influence vs. Affect**

Influence means to persuade or affect an outcome to the point that a course of action changes as does the consequent results. Because “influence” usually involves persuasion, it is more appropriate for the social sciences.

As a verb, to affect is to cause a result (effect) or to bring about implementation. As a noun, effects are the results of an action, method, or recommendation. The words affect and effect are more appropriate for technical writing.

**Impact vs**. **Effect**

The Webster’s Dictionary defines impact as a **noun:** 1) an impinging or striking especially of one body against another, and 2) the force of impression of one thing on another **:** a significant or major effect. As a **transitive verb** impact is defined as: **1a)** to have a direct effect or impact on **:** impinge on, **1b)** to strike forcefully. **2a)** to fix firmly by or as if by packing or wedging and **2b)** to press together. As an intransitive verb, it is defined as: **1a)** to have an impact —often used with on and **2b)** to impinge or make contact especially forcefully. Why is this important? Because up until recent years, MIT’s [The Mayfield Handbook of Technical and Scientific Writing](https://web.mit.edu/course/21/21.guide/affect.htm)) only recognized the definition of impact as a verb meaning to "strike with a blow" or "to pack firmly together." They also warned its readers to **not** use impact as a verb in place of "to affect" or as a noun in place of "effect." The website is still up as of this date (02/07/2021). For that reason, I encourage the use of effect instead of impact, but I cannot delete the use of impact in place of effect or affect based on a rule that is no longer in effect due to the definition of impact in today’s dictionaries

**Imply vs. Infer**

To **imply** involves a 3rd party suggesting or indicating, but to **infer** involves a researcher or observer offering an educated guess, hypothesis, or logical conclusion often based on research.

**Insight**

Insight is formed from the prefix *in-* plus the English word *sight*; hence, the literal meaning is *seeing inward.* Insight provides a deeper understanding that comes with new knowledge that takes one to a new level of reasoning, making the concept clearer and more applicable. The Merriam-Webster dictionary gives the following definition of insight.

1. the power or act of seeing *into* a situation:   something).

**Example 1:** A study on cancer rates in twins provided **new insight *into*** the genetic risk of cancer.

**Example 2:** Experimental investigation of the Hox gene network can provide important insights *into* the patterns and reasons behind human disease

1. the act or result of apprehending the inner nature of things or of seeing intuitively.

**Example 1**: Research can give new **insights *on*** the genetic links to cancer.”

**Example 2:** The researchers’ post-grant meeting revealed who had contributed the most useful **insights *to***the project.

**Inter- vs. Intra-**

Inter- is a common prefix that means between or among groups. Intra- means within or inside.

**Interlaboratory variability** is the reproducibility or the variability among results obtained by different laboratories.

**Intralaboratory variability** is the repeatability for the same sample or the variance for replicate determinations obtained by one lab.

**INTRAPRENEUR VS. Entrepreneur**

An intrapreneur is an entrepreneur who works for a large firm, that fosters his or her innovative and potentially profitable ideas. Thus, the firm absorbs the risk of failure. Meanwhile, the entrepreneur is more independent, but also at more risk when it comes to losing his or her time and investment in a project, business, invention or idea that is not successful.

**IT—DOES ANYONE KNOW WHAT “IT” MEANS?**

Unfortunately, authors writing intricate and complex articles often begin their sentences with ***it.*** Even if the definition of ***it*** is in the preceding sentence, I recommend letting the reader know what ***it*** is by giving the sentence a proper subject and making the meaning of ***it*** clear from the beginning. Readers often scan articles looking for keywords. Do not hide a keyword behind “it.”

## JOURNAL ARTICLES—A CAPSULE SUMMARY OF YOUR THESIS

For student’s, their first journal article is usually based on their thesis. However, this role can be reversed. If you are a good researcher and a good writer, you may write your first journal article long before you complete your thesis. The major components of both documents are the same. The difference is in the detail provided and how carefully you restrict your focus. A journal article can summarize the whole process, or it can pinpoint one aspect of the research project. In the latter case, the more topic-specific information can provide a chapter in your thesis, which can become a journal article before or after your thesis is published.

## JOURNAL ARTICLE’S ABSTRACT

The abstract can introduce what the audience is about to discover in the present tense. However, when you summarize the final deliverable or results in the last sentence or two (the conclusion) you should switch to the past tense showing that the featured achievement was accomplished. Just make sure you can answer the questions below. Abstracts normally have a word limit between 150 and 250 words. A good abstract will answer the following questions in the order presented:

* 1. *What is the purpose of the work?* (Objective and its Importance)
  2. *What procedures or methods did you use?* (Methodology)
  3. *What are the key findings?* (Results)
  4. *What is your Conclusion?* (Value, Applications, and/or Societal Benefit)

The abstract’s summation of your methodology is not a step-by-step account. After all, you only have 1-2 sentences to answer each question. You can say you used the Monte Carlo method to achieve your purpose or the Analytic Hierarchy Process decision analysis was used to compare systems, but in the end, the work scope and methodology are separate processes. When writing an abstract, use concise but complete sentences, and get to the point quickly. Use past tense when referring to completed work. Most journals want you to place your abstract in a single paragraph. That paragraph should clearly state the objective and its importance, the method used, key findings, and conclusion so that readers can determine whether the full text will be of interest to them. Write your abstract in easy-to-understand language for a general audience—those who have an interest in your field of study, but who are not experts. Do not include jargon, equations, in-text citations or refer to a figure or table in an abstract.

**JOURNAL ARTICLE’S INTRODUCTION**

After the abstract comes the introduction. Here, you introduce your subject and present a condensed literature review.

* Immediately let your reader know why you are writing this article. For example:

“The rapidly decreasing demand for (what?) is triggering important changes in (what?) ” (which your research addresses by doing what?) or

“In this research, we examine . . ., link . . . , and estimate . . . to achieve (what?).

 Let the reader know why the problem exists and what you intend to do about it.

* Explain what makes your research different from your peers.
* Define your hypothesis.
* Establish why your research is important?

Does it add a missing piece to a puzzle that needs solving?

* + Does it address a societal need?
* Let the reader know what specific void your research fills.
* Present the key progress, innovation or take-away of your research at the beginning of your introduction. Then, show how previous research recognized important variables which laid a foundation for the new research presented.
* Show how previous research was limited. Show how previous research recognized the same problem that you are addressing but did not offer a solution.
* Read as many articles about your subject as you can find. Look up the sources listed in those articles. Download articles that pertain to your research for future reference. Highlight and code the paragraphs that pertain to your research
* Organize those articles in electronic folders. See section entitled “Organizing Your Thesis.

## JOURNAL ARTICLE’S METHODOLOGY

Description should make readers feel as though they could repeat the process themselves if given the chance. The methods section can describe:

* + study site,
  + study design (controls, treatments, variables),
  + protocol for collecting data, and
  + how the data were analyzed (name of method used).
  + If you have developed a new method—name it! Identify it as your own.

## Results:

* + Present results objectively without interpretation
  + Stress the key results which provide answers to the questions investigated
  + Use tables and figures to illustrate results in an orderly and logical sequence
  + Report shortcomings, surprises, and disappointments if applicable.

## JOURNAL ARTICLE’S DISCUSSION

1. Do your results provide answers to your testable hypotheses? If so, how do you interpret your findings?
2. Do your findings agree with what others have shown? If not, do they suggest an alternative explanation or perhaps an unforeseen design flaw? Answering this question will kick off your more detailed literature review which will:
   * identify any lack of information or inability to solve your chosen research problem,
   * justify the need for more study, and
   * convince the reader that you know what you are talking about because . . .

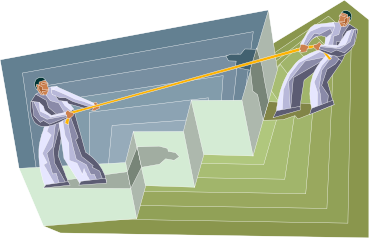
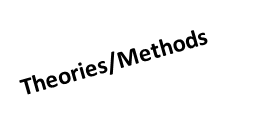
you are an expert in your field (Don’t be afraid to cite your own publications!);

you have studied the work of your peers and predecessors (Cite their studies.);

* you have tested alternative methods and found them lacking.

## JOURNAL ARTICLE’S LITERATURE REVIEW ESTABLISHES a FOUNDATIONAL FRAMEWORK

Foundational theories and/or methods help strengthen your research plan and allow you to advance your new theory or method by:



* + providing the reasoning behind your research.

**New**

* + showing how your new methodology can create new opportunities **or** provide a new theory that can advance current research.

**Old**

## A Literature Review verifies the research framework.

* + Compares previous interventions and how they apply to your comparatively successful or more successful intervention.
  + Compares how traditional practices are carried out and why your practice is exceptional.
  + Explains history of practice. Show how tradition can play a part in a theory or method’s continuance even when practicality dictates a new direction.

The Journal of the American Water Resources Association (JAWRA) summary of what they want from a literature review applies to most reviews. From their [Author Instructions](https://onlinelibrary.wiley.com/page/journal/17521688/homepage/now_publishing__water_commentaries_and_reviews.htm):

“JAWRA publishes invited literature review articles which will synthesize recent literature on an emerging topic of significant interest to the broad water community. Literature reviews should not be just limited to summarizing existing literature but should

* characterize significant research strands,
* provide critical insights, and
* identify crucial data and knowledge-gaps in the literature.

“Review articles must also address how current research is seeking to address broad questions of policy relevance and what new information or research foci are necessary to help policy makers create innovative policies and practices.”

## Citations within Text

Proper citations are critical not only as a matter of professional courtesy, but they make it easier and faster for reviewers to check a paper’s references. All sources of data and information not original to the paper should be described, either as *published literature* or as an *informal reference*. It is important to recognize how these classes are defined and treated.

* [**Published Literature**,](file:///C:\Users\Carla%20Roberts\Documents\Proofreading%20Services\Advertising%20My%20Service\Style%20Guides\JAWRA%20Instructions%20for%20Authors.docx#_bookmark22) or formal citations, includes published materials available to future researchers. All entries have an author/compiler/editor/manager (person or organization), a date of publication, and title and publishing information to uniquely identify the materials. Contractor reports to a public agency fall in this category if they can be clearly and uniquely identified. Databases and websites may be included if fully citable.
* [**Informal References**](file:///C:\Users\Carla%20Roberts\Documents\Proofreading%20Services\Advertising%20My%20Service\Style%20Guides\JAWRA%20Instructions%20for%20Authors.docx#_bookmark23)include everything else: personal communications (letters, notes, and conversations), unpublished reports, legal citations, databases, and websites. See <https://www.mendeley.com/guides/web-citation-guide> for information on how to do cite URLs.

## Published Literature

## Refer to published literature within the text by author(s) and date; for example, Black (1984) or (Black, 1984) or (Black, 1984; Green et al., 2005). Use letters to differentiate citations in the same year, as Black (1984b). Though using the author’s surname is normally sufficient, include an initial or given name when referencing multiple authors with the same surname: Black, P. (1984) and Black. A. (1984). Domix Vancouver’s bracket in number style (p. 70) in this manual) with CMOS author-date style (see p. 56).

**IMPORTANT:** Every published literature citation within the text must have a corresponding entry in the References section. **If you delete or insert an in-text citation during revision, be sure to update the References section as well.** This is one of the most common errors found in copyediting.

## Informal References

Letters, memos, and similar non-published materials are **not** included within Literature Cited. References to databases and websites are treated as informal references if they are not fully citable and already included in the Literature Cited section. Informal References are referenced as fully as possible in parentheses within the text.

Example: (Memo from AWRA Executive Vice President K.D. Reid to JAWRA Editor K.J. Lanfear, September 15, 2005, Subject: Wasn't that great water?) Describe data sources with enough detail to lead a qualified researcher to an appropriate starting point in the database. Dates of access are to be given to help resolve any future updates in the source.

Some examples of common databases are given below. You may designate a “default” source for groups of data, as in the second example:

(U.S. Geological Survey, National Water Information System. Accessed December 8, 2012, <http://waterdata.usgs.gov/nwis.)>

(U.S. Geological Survey, National Water Information System. Accessed June 2011 - December 2012, [http://waterdata.usgs.gov/nwis.](http://waterdata.usgs.gov/nwis) Unless otherwise noted all streamflow data in this paper are from this source.)

(U.S. Environmental Protection Agency, 2012. STORET. Accessed December 2012,<http://www.epa.gov/storet/.)>

Unpublished data citations should follow this example: (John Jones, USEPA, 1999, unpublished data)

Unpublished report citations should follow this example: (Acme Consulting, "Design Solutions for the Main Street Water Works", unpublished report for MegaWater, Inc., 2010.)

Legal citations should include sufficient information for the reader to identify the appropriate statute or case: (33 U.S.C. §403)

## JOURNAL ARTICLE’S DISCUSSION

* + Convince the reader that your research plan will provide a verifiable framework for going forward. You’ve compared your work with others. Make sure your work stands out:
  + Explain advantage of your research and how it could meld with current practices.

Identify biases that might be a hindrance to going forward in your field of research.

Let the reader know what still needs to be done and mention any plans for completion.

## JOURNAL ARTICLE’S CONCLUSIONS

* + Ideal opportunity to review the main points
  + Do not simply repeat (or copy) the information presented in your abstract.
  + Do emphasize the importance of your work or
  + Suggest applications and extensions.

## JOURNAL ARTICLE’S ACKNOWLEDGMENT

Some journals want the funding agency to be acknowledged in a footnote on the first page with the final Acknowledgment section reserved for collaborators or persons who contributed significantly with time, in-kind or financial support. Check with journal guidelines to see how the journal you are submitting to wants to handle acknowledgments. Normally, acknowledgements are at the very end of a paper right before the references. If you have an appendix, the acknowledgements will appear before the appendix. The references are always the last item in a research paper or proposal.

**JOURNAL ARTICLE References: Names of Journals: ABBREVIATIONS SOURCE**

## Journal names should be abbreviated according to the [List of Title Word Abbreviations](http://www.issn.org/services/online-services/access-to-the-ltwa/).

## By clicking on the hyperlinked title in the last sentence (or <http://www.issn.org/services/online-services/access-to-the-ltwa/>) you can access the INTERNATIONAL IDENTIFIER FOR SERIALS AND OTHER CONTINUING RESOURCES, IN THE ELECTRONIC AND PRINT WORLD.

Type in the title of the journal in their search engine at the bottom of the website page.

For formatting, check style guides list on pages 47–49. A Vancouver guide begins on page 73. The American Medical Association has the best quick go-to guide for the Vancouver system at <http://guides.lib.uw.edu/c.php?g=99161&p=642357>.

## JOURNAL ARTICLE’S APPENDICES

An appendix is always after the Reference section. It is the last item the editor will see. An appendix is supplemental material that does not appear in the article, but it is available online to aid the reader in understanding the more difficult areas of your paper—or you may want to add further proof or more data to verify your findings. If there is more than one appendix, they should be identified as A, B, etc. Always check author instructions. Appendices may or may not be allowed. If you include tables and figures, be sure to number them beginning with Table 1A and Figure 1A. Do not try to continue the numbering in your main document. Table captions are always placed immediately above the table. Figure captions are always placed immediately below the figure. Note that IEEE prefers the spelling Appendixes. When you refer to the appendix in your paper, refer to it as either the Appendix or Appendix A.

**JOURNAL’s Call for Proposals**

Some journals have a call for papers, e.g., ACM Transactions on Intelligent Systems and Technology (See <http://tist.acm.org/index.php>). ASCE’s list is at <http://ascelibrary.org/page/callforpapers>. ASME’s list is at <https://www.asme.org/shop/journals/administration/call-for-papers>. However, there are literally thousands of journals out there to choose from. Elsevier, Springer, and Wiley-Blackwell are the leading publishers for scientific journals.

**LIE OR LAY?**

To lay is to place something (an object) somewhere. To lie is to rest. An electrical engineer might discuss how a major difference between common-source and common-gate configurations **lies** in the value of the input impedance. In this case, the verb *lie* is synonymous with the verb *rest.* The word *lie* is never followed by an object, but it is often followed by a prepositional phrase (*in* the value of). The word *lie* is metaphorical when referring to an inanimate object (a fact or occurrence) *lying* in the result of another fact or occurrence. The following table shows correct verb form for Lay vs. Lie.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Infinitive Form | Definition | Present | Past | Past Participle | Present Participle |
| to lay | to put or place | lay(s) | laid | laid | laying |
| to lie | to rest or recline | lie(s) | lay | lain | lying |

**Example of to lay:** The student was asked to lay the book down. It laid there until others complained that it had laid there longer than necessary. The book was laying in a place reserved for experiments.

**Example of to lie:** The student chose to lie down in the middle of the floor. He lay (rested) there until others began to complain that he had lain there too long.

To lie can also mean to rest as if hidden. For example, the truth lies in the proof that is often hidden.

**Overlay vs. Overlie**

**Overlie:** One of my clients did an experiment where he overlaid 10 meters of clayey soil over a foundation of weathered sandy slate in vibration tests. **To overlie means to rest upon or lie on top of something. It denotes passive location.** If I were to visit the site, I would want to see the area where the clayey soil “overlies” the sandy slate.

**Overlay:** To overlay means to spread over or across, to lay something on top of something else. It denotes the action of placement.

**Summation:** So, if you are talking about a clayey soil that is placidly resting on top of a sandy slate foundation, it is **overlying** the sandy slate, not **overlaying** the sandy slate. The heavy equipment operators who moved the clayey soil to the test site and applied it did all of the overlaying.

## MASS NOUNS (also referred to as Non-count Nouns).

Most nouns in English are *countable* meaning they have a singular and plural form. Non-count nouns (also referred to as mass nouns) do not have a plural form. They are always singular. Thus, a mass noun refers to all of something or to a body of information or group of things. These nouns should not have an “s” at the end. Examples of mass nouns are research, literature, grammar, mortar, people, equipment, evidence, software, freight, furniture, advice, abundance, information, attention, progress, concrete, dust, and weather.

## Master’s Degree/Bachelor’s Degree

## Use an apostrophe when referring to master’s and bachelor’s degrees. Notice that the words, *master’s* and *bachelor’s,* are not capitalized. However, the formal degree is capitalized. The formal title of your degree is usually followed by your area of expertise as in Master of Science in Physics. Notice that no apostrophe appears when presenting the formal title. An associate of arts degree or associate of science degree does not have an apostrophe. He is working toward an associate of arts degree. She received her Associate of Arts in Business.

## Use uppercase without periods for most abbreviated degrees: AA, AAS, BA, BS, MS, MFA, etc. (Exceptions are Ph.D., B.Tech., Ed.D., M.A., and some medical degrees. Note: MD no longer uses periods.) You can also be a master’s degree student. However, when it comes time to earn your Ph.D., anyone seeking who is a Doctor of Philosophy is a doctoral student. Graduate students are also called M.S. and Ph.D. candidates.

## Matter

## Matter is a non-count mass noun. Matter can refer to a microscopic amount or a massive amount of physical or corporeal substance in general, whether solid, liquid, or gaseous, Mass nouns should always be singular. Matter never has an “s” at the end unless it refers to a circumstantial situation under consideration as a topic of concern. For example: It is the intent that matters, not the result. Or, for Mr. Dooley, only his personal bank account matters. Both significant and insignificant affairs (depending on one’s mind set) are also referred to as “matters” on a colloquial (everyday—nonscientific) basis. Housekeeping is at the bottom of Mrs. Klinger’s list when it comes to family matters. Quality time with her family is what really matters (what is most important).

## Measurements—Length, width, height?

There is no correct order (unfortunately) in listing dimensions. If you work for a packaging country in the U.S., their “correct” order is length, width, and height for boxes. However, if they are measuring bags, the dimensions are given as width and length, while label dimensions are given as length and width.

## Mechanism

## A mechanism in a technical paper should describe the function, appearance, and operation of a device or model. This should be done as concisely and as precisely as possible. If you are talking about a machine, then you must define your invention or modification and state its purpose or operation principle. Your description will depend on your audience. Technical Report Writing.org has a good description entitled [Planning the Mechanism Description](http://www.technicalreportwriting.org/planning-the-mechanism-description-3188). Please follow link in title.

## In computer science, mechanism refers to the functionality of the model or algorithm you have created. It’s breaking down the functional components and explaining each one. Georgios Varsamopoulos, a computer science professor at Arizona State University states:

## If you describe a distributed algorithm, explain the protocol-of specific part (message format, etc.) separately from the semantics and decision-making part of the algorithm. It is both important and useful to provide figures demonstrating the functionality of your solution. Make the figures look similar to the system model figure, if applicable, and exploit the similarities and differences to point out important aspects of your solution. –Varsamopoulos, G., (2004), “[How to Write a Technical Paper: Structure and Style of the Epitome of Your Research](https://kfarr.gcsu.edu/how%20to%20write%20a%20technical%20research%20paper.pdf),” an online article that is brief and easy to understand.

## MODIFERS—DANGLING AND MISPLACED

**Dangling Modifiers have nothing to modify because their companion word is Missing in Action (MIA)**: Conventionally, a participial phrase, prepositional phrase, infinitive phrase, or an appositive phrase modifies the nearest word in the *same* sentence. The same is true for adjectival or adverbial phrases. If that noun appears in an earlier sentence or doesn't appear at all, the reader will become confused. This situation is called a **dangling modifier**. In the case of adverbs, adverbs should modify the nearest verb or the subsequent adverb or adjective in the *same* sentence. If not, it also is a dangling modifier. When a phrase does not have a companion word to modify—I classify that phrase’s companion or subject as **missing in action**!

**Example 1:** Trying to carry too many packages, my I-Phone fell into a puddle of water. (Was the *I-Phone* trying to carry too many packages?)

Notice that the subject is missing. Who was carrying too many packages?

**Corrected Example:** Trying to carry too many packages, **I** dropped my I-Phone, which fell into a puddle of water.

**Example 2:** After ordering the wrong chemicals, **the experiment** was doomed to failure.

Once again, the subject is missing. In the above sentence, the experiment ordered the wrong chemicals. The prepositional phrase, “After ordering the wrong chemicals,” does not have a proper subject to modify. Hence it becomes a dangling modifier. Who ordered the wrong chemicals?

**Corrected Example:** After ordering the wrong chemicals, **I** realized that the experiment was doomed to failure. See [http://web.cn.edu/kwheeler/gram\_dangling\_mod.html](http://web.cn.edu/kwheeler/gram_dangling_mod.html%20) has an excellent explanation of dangling and misplaced modifiers.

## MISPLACED MODIFIERS

A misplaced modifier is a word, phrase, or clause that is improperly separated from the word it modifies or describes. If a phrase describes, renames, or elaborates upon a specific word, good writers do two things: 1) They place this modifier immediately beside the word it modifies. 2) They make sure the word being modified appears in the sentence!

**Example:** Complaining loudly, her impatience did not help Mary work more efficiently.

This sentence suggests that Mary’s **impatience** was complaining loudly. Misplaced modifiers can usually be **corrected** by ***moving*** the modifier to a more sensible place, generally next to the word it modifies.

**Corrected:** Complaining loudly, Mary found that her impatience did not help her work more efficiently.

Several more examples can be found at <http://www.towson.edu/ows/moduledangling.htm>. The most dangerous misplaced one-word modifiers are: *almost, even, hardly, just, merely, nearly, only*, and *simply*.

**Example 1:** I almost burn the beans every time I cook. (This means that although the beans get

really dry before I remember to add water, I manage not to burn the beans)

**Example 2:** I burn almost every pot of beans I cook. (This means I burn more beans than I cook.)

## MINUS SIGN AND MULTIPLICATION SYMBOL

For the minus sign, use keystroke Alt+8722 to get − or under Symbols, use character code 2212 from Unicode (hex) −. For a multiplication symbol, use Alt+0215 to get ×. For an en dash use Alt+0150. For an em dash, use Alt+0151 to get —. When you are giving a citation, the en dash separates the numbers in your references, e.g., Jones et al. [1]–[3]. Some might write it Jones et al. [1–3]. Both can be correct depending on the style guide being used. Page numbers are also expressed with an en dash as in pp. 546–558.  The minus sign is simply the symbol used in subtraction as in 5 − 3 = 2 or used to express a negative number as in − 24 °C.  If you want to use the Word pull down menu, go to Symbol under Word’s Insert tab. Make sure normal text appears in Font pulldown menu. Subset pulldown menu will have Mathematical Operators. For the Character code, type 2212 and then choose Unicode hex from final pulldown menu. It will automatically generate when you type in the character code. Once *you hit Insert, the minus sign will always be in your symbol choices if you use it all the time.*

## NIST Checklist

## The National Institute of Standards and Technology (NIST) has an excellent [Guide for the Use of the International System of Units (SI)](http://physics.nist.gov/cuu/pdf/sp811.pdf), (<https://physics.nist.gov/cuu/pdf/sp811.pdf>). This NIST guide is 90 pages, which is why their checklist beginning on p. v is especially helpful. The following check list is intended to help NIST authors review the conformity of their manuscripts with proper SI usage and the basic principles concerning quantities and units. (The chapter or section numbers in parentheses indicate where additional information may be found.)

|  |  |  |  |
| --- | --- | --- | --- |
| (1) | 🗌 | Only SI units and those units recognized for use with the SI are used to express the values of quantities. Equivalent values in other units are given in parentheses following values in acceptable units *only* when deemed necessary for the intended audience. (See Chapter 2.) | |
| (2) | 🗌 | Abbreviations such as sec (for either s or second), cc (for either cm3 or cubic centimeter), or mps (for either m/s or meter per second), are avoided and only standard unit symbols, SI prefix symbols, unit names, and SI prefix names are used. (See Sec. 6.1.8.) | |
| (3) | 🗌 | The combinations of letters “ppm,” “ppb,” and “ppt,” and the terms part per million, part per billion, and part per trillion, and the like, are not used to express the values of quantities. The following forms, for example, are used instead: 2.0 µL/L or 2.0 × 10–6 *V*, 4.3 nm/m or  4.3 × 10–9 *l*, 7 ps/s or 7 × 10−12 *t*, where *V*, *l*, and *t* are, respectively, the quantity symbols for volume, length, and time. (See Sec. 7.10.3.) | |
| (4) | 🗌 | Unit symbols (or names) are not modified by the addition of subscripts or other information. The following forms, for example, are used instead. (See Secs. 7.4 and 7.10.2.)  *V*max = 1000 V *but not*: *V* = 1000 Vmax  a mass fraction of 10 % *but not*: 10 % (*m*/*m*) or 10 % (by weight) | |
| (5) | 🗌 | Statements such as “the length *l*1 exceeds the length *l*2 by 0.2 %” are avoided because it is recognized that the symbol % represents simply the number 0.01. Instead, forms such as **“***l*1 = *l*2 (1 + 0.2 %)” or “*Δ* = 0.2 %” are used, where *Δ* is defined by the relation *Δ* = (*l*1 − *l*2)/*l*2. (See Sec. 7.10.2.) | |
| (6) | 🗌 | Information is not mixed with unit symbols (or names). For example, the form “the water content is 20 mL/kg” is used and not “20 mL H2O/kg” or “20 mL of water/kg.” (See Sec. 7.5.) | |
| (7) | 🗌 | It is clear to which unit symbol a numerical value belongs and which mathematical operation applies to the value of a quantity because forms such as the following are used. (See Sec. 7.7.)  35 cm × 48 cm *but not*: 35 × 48 cm  1MHz to 10 MHz or (1 to 10) MHz *but not:* 1 MHz – 10 MHz or 1 to 10 MHz  20 ºC to 30 ºC or (20 to 30) ºC *but not*: 20 ºC – 30 ºC or 20 to 30 ºC  123 g ± 2 g or (123 ± 2) g *but not:* 123 ± 2 g  70 % ± 5 % or (70 ± 5) % *but not*: 70 ± 5 %  240 × (1 ± 10 %) V *but not*: 240 V ± 10 % (one cannot add 240 V and 10 %) | |
| (8) | 🗌 | Unit symbols and unit names are not mixed and mathematical operations are not applied to unit names. For example, only forms such as kg/m3, kg · m−3, or kilogram per cubic meter are used and *not* forms such as kilogram/m3, kg/cubic meter, kilogram/cubic meter, kg per m3, or kilogram per meter3. (See Secs. 6.1.7, 9.5, and 9.8.) | |
| (9) | 🗌 | | Values of quantities are expressed in acceptable units using Arabic numerals and the symbols for the units. (See Sec. 7.6.)  *m* = 5 kg *but not*: *m* = five kilograms or *m* = five kg  the current was 15 A *but not*: the current was 15 amperes. | |
| (10) | 🗌 | | There is a space between the numerical value and unit symbol, even when the value is used as an adjective, except in the case of superscript units for a plane angle. (See Sec. 7.2.)  a 25 kg sphere *but not*: a 25-kg sphere  an angle of 2º3'4" *but not:* an angle of 2 º3 '4 "  If the spelled-out name of a unit is used, the normal rules of English are applied: “a roll of 35-millimeter film.” (See Sec. 7.6, note 3.) | |
| (11) | 🗌 | | The digits of numerical values having more than four digits on either side of the decimal marker are separated into groups of three using a thin, fixed space counting from both the left and right of the decimal marker. For example, 15 739.012 53 is highly preferred to 15739.01253. Commas are not used to separate digits into groups of three. (See Sec. 10.5.3.) | |
| (12) | 🗌 | | Equations between quantities are used in preference to equations between numerical values, and symbols representing numerical values are different from symbols representing the corresponding quantities. When a numerical-value equation is used, it is properly written and the corresponding quantity equation is given where possible. (See Sec. 7.11.) | |
| (13) | 🗌 | | Standardized quantity symbols such as those given in Refs. [4] and [5] are used, for example, *R* for resistance and *A*r for relative atomic mass, and not words, acronyms, or ad hoc groups of letters. Similarly, standardized mathematical signs and symbols such as are given in Ref. [4: ISO 31-11] are used, for example, “tan *x*” and not “tg *x*.” More specifically, the base of “log” in equations is specified when required by writing log*a x* (meaning log to the base *a* of *x*), lb *x* (meaning log2 *x* ), ln *x* (meaning loge *x*), or lg *x* (meaning log10 *x* ). (See Secs. 10.1.1 and 10.1.2.) | |
| (14) | 🗌 | | Unit symbols are in roman type, and quantity symbols are in italic type with superscripts and subscripts in roman or italic type as appropriate. (See Sec. 10.2 and Secs. 10.2.1 to 10.2.4.) | |
| (15) | 🗌 | | When the word “weight” is used, the intended meaning is clear. (In science and technology, weight is a force, for which the SI unit is the newton; in commerce and everyday use, weight is usually a synonym for mass, for which the SI unit is the kilogram.) (See Sec. 8.3.) | |
| (16) | 🗌 | | A quotient quantity, for example, mass density, is written “mass divided by volume” rather than “mass per unit volume.” (See Sec. 7.12.) | |
| (17) | 🗌 | | An object and any quantity describing the object are distinguished. (Note the difference between “surface” and “area,” “body” and “mass,” “resistor” and “resistance,” “coil” and “inductance.”) (See Sec. 7.13.) | |
| (18) | 🗌 | | The obsolete term normality and the symbol *N*, and the obsolete term molarity and the symbol M, are not used, but the quantity amount-of-substance concentration of B (more commonly called concentration of B), and its symbol *c*B and SI unit mol/m3 (or a related acceptable unit), are used instead. Similarly, the obsolete term molal and the symbol m are not used, but the quantity molality of solute B, and its symbol *b*B or *m*B and SI unit mol/kg (or a related SI unit), are used instead. (See Secs. 8.6.5 and 8.6.8.) | |

## NUMBERS

Numbers under 10 are spelled out unless you are dealing with several numbers in a series or when explaining an equation or referring to a number-unit combination as in 7 bit or 6 mW. Arabic numerals are used for percentages, decimals, dates, and numbers followed by abbreviations. However, knowing how to handle numbers isn’t always easy. Here’s a question that took a long time for me to address: Why do so many authors leave out the commas when writing out numbers larger than 1,000? I didn’t find out the answer, but I did find out that it’s okay! Ben Mudrak in his online article

[Editing Tip: Using Numbers in Scientific Manuscripts | AJE | American Journal Experts](http://www.aje.com/en/arc/editing-tip-using-numbers-scientific-manuscripts/" \t "_blank) answered my question:

|  |
| --- |
|  |

“Here are two other ways to make sure that your numerals are consistent within your manuscript. Consistency in your formatting choices is one way to demonstrate your attention to detail. Always consult your target journal’s style sheet to see what they prefer. When using numbers larger than 1000, be sure to format them all in the same way. For example, *156000*, *156,000*, and *156 000* are all acceptable, but use only one format in your document.”

Please see Dr. Mudrak’s entire article for more advice on how to handle numbers.

**Numbering Lines**

**To add page and line numbers to a Word file for your manuscript/article:**

1. Click the View Tab and use Print Layout view.

2. Click the Insert Tab. In the Header and Footer section, click Page Numbers. Insert page numbers at the top right of each page.

3. Click the Page Layout Tab. In the Page Setup section, click Line Numbers. Select “Continuous.” This will insert continuous line numbering from the beginning to the end of your document.

4. Alternative line numbering format (every 5 lines): Click on “Line Numbers” and select “Line Numbering Options.” This will open a dialogue box. Click “Line Numbers” in the bottom right corner. A second box will open. Click the "Add line numbering" check box and fill in the following options:

> Start at: 1  
> From text: Auto  
> Count by: 5  
> Numbering: Continuous  
> Click on the "OK" button.  
> Save your document.

**Numbering an Outline**

The numbering system most often used in engineering papers and proposals looks like this:

1. Main Topic

1.1 Subheading

1.1.1 This Is Another Level of Subheading

1.1.2 Another Level

1.2 Second Subheading of Main Topic

1.3 Third Subheading

2. Next Topic

2.1 Subheading

2.1.1 Another Level

2.1.2 Another Level

**OPTIMAL VS. OPTIMUM**

Optimal denotes the best or most effective, while optimum indicates the amount or degree of effectiveness. (Definition from [The Society of Petroleum Engineers](http://www.spe.org/authors/docs/%20styleguide.pdf) Style Guide, p. 5)

**OVERUSE OF THE WORD “Of ”**

The word “of” is a reader’s speed bump. When used too many times, it distracts from the flow of thought. Try to avoid repeating the prepositional “of” twice in the same sentence—especially in succession. Notice how changing “beam” to a possessive noun in Example 1, and changing “aggregate” to an adjective in Example 2 eliminated the need for that extra “of.”

**Example 1.** “The color **of** the top surface **of** the beam was gray after the fire test.”

The color of the beam’s top surface was gray after the fire test.

**Instead:** The beam’s top surface color was gray after the fire test.

**Example 2:** Figure 5 shows the influence **of** the size **of** the fine aggregate on the yield stress and plastic viscosity of the mortar samples.

**Instead:** Figure 5 shows the influence **of fine aggregate size** on the yield stress and plastic viscosity of the mortar samples. See another discussion on how to use the word ‘of’ at http://www.quickanddirtytips.com/education/grammar/do-you-overuse-of

## OXFORD COMMA

The serial or Oxford comma comes right before the conjunction (*and* or *or*) when three or more items are listed in a sentence. For example, “My heart beats true for the red, white, and blue.” American preference keeps the comma before “and.” The British preference is to leave it out. Since most technical articles are prepared for American journals, I encourage you to leave it in. In fact, all of the major style guides including the Chicago Manual of Style, the American Psychological Association (APA) Style Guide, and the Modern Language Association (MLA) Style Manual, say that the Oxford comma should be retained. Only the Associated Press (AP) has discontinued approval of its use. For a wonderful infographic on this subject, see <http://www.onlineschools.com/in-focus/oxford-comma>

## PARALLEL CONSTRUCTION:

Parallel construction requires keeping the same grammatical forms consistent throughout their usage when put together to modify, give examples, or when creating a series of options or requirements.

Parallel ideas are easier to understand when expressed in parallel grammatical constructs. Single words should be balanced with single words, phrases with phrases, and clauses with clauses. Notice the improvement in the examples below that comes when the writer utilizes the consistent use of gerunds

(-ing words that serve as nouns) thereby establishing parallel construction.

**NOT Parallel:** The agenda for this month’s meeting will includediscussion on *buying* a new steam chamber or fix the one we have. *Attending*the upcoming ASCE conference *will be discussed*, and bids received for the construction of our new lab *will be reviewed, and the best one will be selected.*

**PARALLEL:** This month’s agenda will include discussion on **buying** a new steam chamber or **repairing** the old one, **attending** the February ASCE meeting, and **selecting** the best bid for construction of our new lab.

**Another example:** They discussed *direct, indirect, and interactive* relationships. This sentence was originally written: They discussed direct, indirect and ***interaction*** relationships. Note that *interaction* is a noun, but *direct* and *indirect* are adjectives. All of the describing words must be adjectives to establish parallel construction; thus, *interactive* replaced *interaction.*

**Parallel construction** calls for parallel grammatical patterns; thus, two or more subjects would be expressed as nouns or noun phrases. Two or more verbs would all retain the same form. Parallelism makes for a smoother sentence flow. The following maxim by Confucius is a great example of parallelism:

*“I hear and I forget. I see and I remember. I do and I understand.”*

## Passive Voice (In Defense of)

## http://t0.gstatic.com/images?q=tbn:ANd9GcSKi6dPUpgtcmdwQ8xGVJ7bjz_i98hcY3rtU3QzaLCzY8pVO8cfThe passive voice is indispensable when the action is more important than the doer, when the doer of the action is not known, or when the writer wants to place the emphasis on the recipient of the action rather than the doer. It can also be used to protect the doer!

## Example: “All my strawberries have been eaten.” This sentence protects the guilty culprit who was asked not to eat all the strawberries. If we want to use the active tense, we simply say: “Jimmy ate all of the strawberries.”

## Use the passive voice when the readers do not need to know who or what performed the action.

## Example: “Dandelion seeds are dispersed in such a way that no lawn can be totally free from them.

## The passive voice is preferable if the performer cannot easily be named or if the performer is irrelevant to the discussion. However, one common problem is authors putting the passive verb at the end of a sentence:

## Example: In particular, both unsupervised and supervised techniques for automatically scoring disease resistance to southern leaf blight in maize from imagery of important leaves were developed.

## This sentence does not need “In particular.” The main problem is the subject (techniques) and its verb (were developed) are not together. A better rendition would be:

## Better Example: Both unsupervised and supervised techniques were developed for automatically scoring disease resistance to Southern Leaf Blight in maize by using imagery of important leaves.

## The Active Voice—Still an Option:

## Another approach to writing this sentence is to put the emphasis on the authors. This would allow the use of the active voice. If you are writing about someone else’s work, you can say:

## Example: Jones et al. used imagery of important maize leaves to develop both supervised and unsupervised techniques for automatically scoring disease resistance to Southern Leaf Blight.

## You could also say

## Example: “We used imagery of important maze leaves to develop . . . “

## The use of “we” is commonly seen in journal articles. Many journal editors are telling their authors that “we” is okay simply because it is too awkward to say: “The authors of this article developed both unsupervised and supervised techniques.”

## PhD or Ph.D.?

Either is correct. **PhD** can be written as PhD with no periods or **Ph.D.** with periods. The Oxford Dictionary states that **Ph.D.** is especially North American English. If you are going to use periods, you need to include a period after Ph and after D.

## Phenomenon

A phenomenon is an observable situation where the cause is not easily evident or understood. A sense of the extraordinary is usually inferred. Phenomenon is overused and should be avoided.

## PREPOSITIONS

Prepositions connect or show relationships between nouns or pronouns and their objects. Most show a relationship of *position* (*on, beside, near*). Others show relationships of *reference* or *separation* (*from, beyond, but*, *concerning*). Prepositions are difficult for ESL students to master because different prepositions can change the meaning of the same word. For example:

**Differ *with*:** He differs *with* his partner over a matter of importance. In other words, they disagree.

**Differ *from*:** His methodology differs *from* her methodology in many ways. It is different.

**Different from:** The written instructions are different *from* those in the book. [Note: Different *from* is preferred. Different *than* was at one time deemed incorrect. The use of *than* with *different* is accepted now, but this editor would still like to ban *different than* from technical writing.

Prepositions are confusing! Consider the use of “**on**” and “**in**.” When a person devotes time to a project they will spend time **on** that project. You would not normally say a person will spend time **in** a project unless you are talking about his or her personal involvement. For example: He became so involved **in** the project that he would often forget to eat. His expertise is **in** aerospace management. There are 150 prepositions. An online English Club provides the [English Prepositions List.](http://www.englishclub.com/grammar/prepositions-list.htm)

**PRINCIPAL vs. PRINCIPLE**

**A principal** is a person who presides (as in the principal of a school or a **principal investigator** of a research project). Another definition is: capital or property before interest. As an adjective, it would refer to the primary or most important area of interest as in *a principal* *area of concern*, or *principal objective.*

**A principle** is a rule, truth, or law.

**PROPOSAL REJECTION: NIH LIST OF REASONS WHY**

From <http://www.studygs.net/proposal.htm>

## The National Institute of Health (NIH) analyzed the reasons why over 700 research proposal applications were denied. Their findings as to the cause of rejection are worth reviewing:

* 1. Nature of the Problem (18%)

1. It is doubtful that new or useful information will result from the project (14%).
2. The basic hypothesis is unsound (3.5%).
3. The proposed research is scientifically premature due to the present inadequacy of supporting knowledge (0.6%).
   1. Approach to the Problem (38.9%)
      1. The research plan is nebulous, diffuse and not presented in concrete detail (8.6%).
      2. The planned research is not adequately controlled (3.7%).
      3. Greater care in planning is needed (25.2%).
4. The research plan has not been carefully designed (11.8%).
5. The proposed methods will not yield accurate results (8.8%).
6. The procedures to be used should be spelled out in more detail (4.6%).
   1. A more thorough statistical treatment is needed (0.7%).
      1. The proposed tests require more individual subjects than the number given (0.7%).
   2. Competence of the Investigators (38.2%)
      1. The applicants need to acquire greater familiarity with the pertinent literature (7.2%).
      2. The problems to be investigated are more complex than the applicants realize (10.5%).
      3. Applicants propose to enter area of research for which they are not adequately trained (12.8%).
      4. The principal investigator intends to give actual responsibility for the direction of a complex project to an inexperienced
      5. co-investigator (0.9%).
      6. The reviewers do not have sufficient confidence in the applicants to approve the present application, largely based on the past efforts of the applicants (6.8%).
   3. Conditions of the Research Environment (4.8%)
      1. The investigators will be required to devote too much time to teaching or other non-research duties (0.9%).
      2. Better liaison is needed with colleagues in collateral disciplines (0.4%).
      3. Requested expansion on continuation of a currently supported research project would result in failure to achieve the main goal of the work (3.5%).

**Based on the above analysis,** a carefully designed, well-reasoned proposal will overcome these common pitfalls. It also represents an important credibility statement about the investigator.

**The Bureau of Occupational and Vocational Education** conducted a study comparable to the preceding NIH study as to why grant applications are rejected.

Based on a sample of 353 research grant applications:

-- 18% forgot to number the pages.

-- 73% forgot to include a table of contents.

-- 81% had no abstract.

-- 92% failed to provide resumes of proposed consultants.

-- 25% had no resume for the principal investigator.

-- 66% included no plan for project evaluation.

-- 17% forgot to identify the project director by name.

-- 20% failed to list the objectives of the project.

## QUESTION MARKS AND EXCLAMATION POINTS

Question marks and exclamation points go outside quotation marks only if the entire sentence is a question or exclamation, rather than just the quoted text.

**Example #1** Do you have a copy of “The ACS Style Guide”?

**Example #2**: Her love for her roll-top desk was based on a childhood vision where she said: “Every full moon brought a video of silhouettes; my man in the moon came in a door and sat down at a roll-top desk—he worked for a few minutes and then left; I thought everyone saw him”!

## Example #3: What do you think of Edvard Munch’s “The Scream”?

If the whole sentence provides a quote that asks a question or makes an exclamation, then the question mark goes inside the end quotation mark. No period is needed after the end quotation mark.

**Example 1:** When his son quit looking for work, the father had to ask: “What are your career goals?”

**Example 2**: My daughter once asked, “If a turtle doesn’t have a shell, is he homeless or naked?”

## If a question ends with a quoted statement that is not a question, the question mark will go outside the closing quotation mark.

## Example: Was it Bill Gates who said: “Be nice to nerds. Chances are you’ll end up working with one”?

## When a Question Ends with an Exclamation Mark

If a question ends with a quotation containing an exclamation mark, the exclamation mark will supersede the question and suffice to end the sentence. Notice that the whole sentence is a question even though it ends with an exclamation point, which means the exclamation point goes outside the end quotation mark. If this were not an exclamatory sentence, the question mark would still be placed outside the end quotation mark.

**Example:** Was it Erma Bombeck who said, “In two decades I've lost a total of 789 pounds. I should be hanging from a charm bracelet”!

## QUOTATION MARKS:

**SINGLE vs. DOUBLE QUOTATION MARKS**

Single quotations are used when the quoted material inserts another quotation by someone else. For example, if you wanted to submit an article on the history of the Caterpillar Company, you might write:

A [Production Technology](http://www.techdirections.com/Holt.pdf) article about the inventor, Benjamin Holt, tells us, “Company photographer Charles Clements had observed that the tractor crawled like a caterpillar. Holt responded, ‘Caterpillar it is. That’s the name for it!’ ”

Of course, you would cite the Production Technology article [(http://www.techdirections.com/Holt.pdf](http://www.techdirections.com/Holt.pdf)). Notice that at the end of the sentence you have a single quotation mark after the exclamation mark followed by a double quotation mark indicating the closure of the complete quotation. A thin space was put between the single and double quotation marks to separate and identify and separate both marks. The "thin space" and "hair space" are Unicode characters 2009 and 200A. The "six-per-em space" is 2006. They can be found in Arial Unicode MS and Lucida Sans Unicode.

## COMMAS AND PERIODS *INSIDE* THE END QUOTATION MARKS

## The 2014 IEEE Editorial Style Manual (p. 27) states: “Punctuation always goes inside quotation marks, except for the colon and semicolon.” Use single quotation marks around quotes within quotes.

In American writing, one should place commas and periods *inside* the quotation marks, regardless of logic. For example: "Marian," mom interrupted, "put that book down and help me in the garden.ʺ

This rule applies even when the unit enclosed is at the end of the sentence and consists of just a

single word rather than an actual quotation: Staples tells us to press the button marked, “Easy.”

The only tilde

***exception*** to the placement of commas and periods **inside** quotation marks is when that last item enclosed in quotation marks is one letter or a number, in which case the period or comma will go *outside* the closing quotation marks: The buried treasure was marked on the map with a large "X".

Remember though, that the above “X” is in quotation marks. If the last item in the sentence is a number in brackets, the punctuation goes inside the quotation mark. The Institute of Electrical and Electronics Engineers (IEEE) Editorial Style Manual (p. 5) at [http://www.ieee.org/documents/stylemanual.pdf,](http://www.ieee.org/documents/stylemanual.pdf) states: In-text references should appear in square brackets, inside the punctuation, e.g., “as demonstrated in [3], according to [4].”

The following is provided by the Farlex Grammar Book.

## Quotation marks in American and British English

In American English, a period or comma used at the end of direct speech always appears within the end quotation mark. In British English, however, if the quotation ends in a period or comma, it is usually placed outside the end quotation mark. For example:

|  |  |
| --- | --- |
| **American English** | **British English** |
| The CEO said, “This is a great day for the company**.”**  “I want to be a doctor when I grow up**,”** Jamie announced. | The CEO said, “This is a great day for the company**”.**  “I want to be a doctor when I grow up**”,** Jamie  announced. |

**RADIUS: ITS PLURAL FORM**

This Latin word can form its plural by adding –es (radiuses). However, the traditional radii (pronounced ray-dee-eye) is still preferred—especially in technical writing.

## REDUCED CLAUSES

## Please consider the following cause and effect sentences.

## *The more we laughed, the more we cried.* *The more we tried, the more frustrated we became.*

## Each sentence is each made up of two reduced clauses. They represent a correlative comparative in the form of a paired construction. Each clause is syntactically alike and separated by a comma.

## Notice that each example of a reduced clause above has a verb on at least one side of the comma.

## *The longer the bridge is out of service, the more congested the detoured traffic.*

## That is not the case in the next sentence.

## *The more time spent on the road, the higher the chances of encountering accidents.*

## No verb appears in this sentence, which technically makes it a sentence fragment. However, American catchphrases like: “The hotter the oven, the better the pie.” or “The sooner, the better” and “The more, the merrier” have given us some liberty in modern-day expressions. Adding verbs in this instance does not clarify. If the meaning is obvious, the no-verb reduced clause is okay. However, I strongly advise against omitting a verb in any other instance.

**RELATION VS. RELATIONSHIP**

The words **relation** and **relationship** are almost interchangeable. However, even though both words refer to a connection, shared process or common ground between two things, ***relation*** usually refers to the *way* things are connected or *how they interact*, while ***relationship***refers to the connection or process itself.

## RESEARCH DELIVERABLES

Research is the common bond that unites the goals of editors, advisers and funding agencies. The end results are called research deliverables. Research deliverables are based on what a funding agency wants. These same deliverables can be found in journal articles, theses and dissertations.

Journal articles report the results of successful research. Theses and dissertations are based on research that is either funded by grant agencies or is seeking funding by grant agencies. Journal articles serve to unite the research community by providing updates on advances and needs. In the end, professors, journal editors and funding agencies are interdependent forming a never-ending cycle of requests for research deliverables from the entire research community.

**Research Deliverables**

|  |  |
| --- | --- |
| **What Journal Editors and Advisers Want** | **What a Funding Agency Wants** |
| **Journal Editors** want deliverables in the form of articles on innovative projects that address the interests and needs of their publication. Study their website and follow their authors’ instructions. Look for Calls for Papers and study the publications themselves. Read articles about your area of interest with a desire to build your knowledge and your literature survey base. | **Funding agencies** want deliverables in the form of original solutions to costly national or international problems. Sponsors will sometimes give you more than one research goal (topic) to choose from. Check out agency websites for lists of upcoming solicitations. Give yourself at least two months to prepare any proposal you are interested in applying for. |
| **An adviser** expects a student to follow his or her lead in an ongoing research project, which will form the basis of a thesis or dissertation. You may be asked to go to a conference which will require you to write a paper based on your thesis study. This paper will be published in a confer-ence proceedings. | **Funding agencies** will clearly define their deliverables according to specific parameters in their requests for proposals (RFPs). Read all instructions. If the RFP recommends you read a supplemental grant proposal guide—read it! Not following the rules can result in a proposal returned without review! |
| **Advisers** want their students to write articles on their research results. This adds to the student CV and increases confidence of sponsors, who require publications to justify their support. | **Multi-disciplinary research and collaboration with industry** is essential as researchers in the US and abroad join forces to add their unique skill sets to solve difficult worldwide problems. |

**COMPARING NSF AND NIH CRITERIA**

The following discusses the parallel research criteria of the National Science Foundation and the National Institutes of Health, two of the leading US funding agencies for researchers in every field of science. If you have an idea that solves a national problem, has not been done before, is cost efficient, and contributes to your field of research with the potential to change the way things are done—you will get funded.

## Does it have intellectual merit? (A National Science Foundation Criteria)

* Does it contribute to the body of knowledge sought after by your community of research? NSF wants to know if it will advance knowledge and understanding within its own field or across different fields.
* NSF’s intellectual merit refers to a potentially transformative concept? (Will it change the way your peers think about your topic? Will it change the way things are currently done because it is more efficient or more cost effective?
* NIH asks: Does the project address an important problem or a critical barrier to progress in the field? Is there a strong scientific premise for the project? If the aims of the project are achieved, how will scientific knowledge, technical capability, and/or clinical practice be improved? How will successful completion of the aims change the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field?
* **Does it have broader impacts?** (Another NSF Criteria)

Does it have societal value? Will it help others? How will your new knowledge be applied to solve real-world problems?

* **Does it have high scientific caliber that is relevant to public health needs and which can meet**[**NIH Institute and Center**](http://www.nih.gov/icd/)[Link to External Site](https://grants.nih.gov/grants/disclaimer.htm)**(IC) priorities.** IC priorities highlight research priorities on their individual [websites](http://www.nih.gov/icd/index.html) [Link to External Site](https://grants.nih.gov/grants/disclaimer.htm).
* **Is it commercially viable?** Is it patentable? Can you break down the complexity of your subject to where even a first-year college student can grasp the basic concepts behind what you are doing? Have you discussed commercialization with the university’s patent office?
  + **Can you get others excited about what you are doing?** Remember that the primary funding agencies for most scientists want you to be able to reach out to K-12 students by creating innovative and exciting experiments, videos, games or any other creative way of catching students’ interest. In the U.S., lack of proficiency in science, technology, engineering and mathematics (what is commonly called the STEM subjects) has become a national crisis.
  + **Always be thinking about ways to simplify your explanation so that it can be understood by the anyone with a genuine interest in your topic.** Your readers are looking for specific information, and for many, English is their second language. A large part of your reading audience is made up of brilliant researchers from all over the world; however, they don’t want to have to look up every other word in a dictionary because you are trying to show off your vocabulary. Likewise, they do not want to have to guess at what you are trying to say because you have assumed everyone has a basic knowledge of the protocol that drove your research. Don’t leave out essential steps and whenever possible, allow the reader to mentally walk through the process by providing word descriptions that let them visualize what you are talking about**.**

## Reputed vs. Reputable

At one time, reputed and reputable both meant highly respected or having a good reputation. However, **reputed** is now more often used to refer to something refers to something that is said to be true or to exist, or to have a reputation that is not always flattering and usually questionable. However, the word **reputable** still refers to something that is held in high esteem—as in [The World's Most Reputable Universities In 2017 - Forbes](https://www.forbes.com/sites/karstenstrauss/2017/06/14/the-worlds-most-reputable-universities-in-2017/).

## RESPECTIVELY

Only use respectively when you have specific referents (topics of interest)—each of which can be matched to a parallel attribute, parameter, or value that follows it based on the order in which the referents appear. Respectively should not be used unless there are two or more referents separated by their matching values or parameters in the same sentence. “Respectively” means in the order given; hence, it defines the order of a series. There will always be one order of items followed by a second order (usually the parameters of the first items presented in the order given). Always put a comma before the word respectively. The comma tells the reader to stop and look at the order of the items just mentioned. Respectively is usually put at the end of a sentence so the reader can relate the order of the last items to the order of the first items. Overuse and misuse of “respectively” are two of the biggest problems editors encounter in technical writing. Only use it when the match-up is obvious as in the following examples:

**Example 1:** POLYCAT® 5 and POLYCAT ® 8 were used as the blowing catalyst and gelling catalyst, respectively.

**Example 2:** To facilitate drainage, P5 filter paper (Fisher Scientific) and a nonwoven geotextile were placed on the top and bottom of the sample, respectively.

Here, the P5 paper was placed on the top and the nonwoven geotextile was placed on the bottom.

**When we have two or more parallel sets of parameters within a single sentence**, to maximize clarity, *respectively* should be placed after the first set of parameters with no comma needed before or after *respectively*.

**Example 1:** The concrete compressive strength, tensile strength and elastic modulus were designed respectively as 32.4 MPa, 2.64 MPa and 3.35 × 104 MPa for the columns and 29.6 MPa, 2.51 MPa and 3.45 × 104 MPa for the shell body.

**Example 2.** The reinforcing steel bars of 14 and 16 mm diameter respectively had yield strengths of 483 and 519 MPa and ultimate strengths of 614 and 632 MPa.

## For more examples, on how to use respectively, see ACS discussion at <https://www.aje.com/en/arc/editing-tip-respectively-revisited/>).

## When respectively is NOT needed:

**Example**: Kunitz and Roethke both taught at Bennington College in Vermont~~, respectively~~.

The sentence above illustrates a common error. I put a strike through respectively because Bennington College is one unit, and no comparison can be made based on the order of the poets’ service, which is not stated.

**RESPECTIVE** is an attributive adjective which refers separately to individual items, persons, or groups.

**Example 1**: The decorated eggs went into their respective gift boxes and were delivered to all the elementary schools in the area.

**Example 2:** The brothers gave up their respective jobs to join forces and start a television reality show.

In both examples, respective is not needed and like an expletive, the word simply takes up space! You could just as easily say: The eggs were put into different gift boxes and delivered . . .

Or: Each brother gave up his job to . . .

## Responding to Reviewers’ Comments

## Very few journal articles are accepted after the first review. Most writers will receive an email asking them to “Revise and Submit.” If the reviewers state that the article is not in line with their journal’s mission and objectives, then look for another journal! However, always examine reviewers’ comments carefully and see if you can improve your paper based on the criticism offered.

## When you respond to a journal’s review, address each comment separately. You do not have to praise each reviewer for his or her insightfulness, especially when that reviewer (in your opinion) did not understand what you were trying to say and responded inappropriately! Do thank the editor and reviewers in your cover letter. Let them know that you appreciate the comments and have addressed each one with care by providing a detailed response to their concerns.

## Responding to Reviewer’s Comments:

## When you begin your Response to Reviewer’s Comments, simply begin each paragraph as follows:

## Reviewer 1-Comment 1: Copy the reviewer’s comment here (or work from the original critique) and directly underneath the comment or criticism, type your response.

## Response: Be professional and make sure that you do not insult them by inferring that they should have understood what you were saying. Redefine and add any information needed to make sure that no one will misunderstand your intent this time. After your explanation, I recommend copying the related sentences or revised paragraphs that you have added to your original narrative in the response to this reviewer’s comment. Paste your new copy underneath comment by setting it apart with a .25ʺ left and right margin and a subtitle. Put at least 6 pts of space between your explanation and the next Reviewer Comment:

## Copy revision as it now appears on page(s) xx. You can also number the lines of your resubmission and refer to the line numbers. This can get messy though because multiple changes can make the numbers change multiple times. Section numbers and page numbers are the best go-to sources.

## Reviewer 1-Comment 2: Make sure the comment is copied in full. Do not skip any comment and take each one seriously.

## Response: Prepare your response with great care.

## Scenario: To Use or Not to Use

I discourage the use of the word “scenario” because it is too general to apply in a technical paper. Collins dictionary defines it as

1. an outline or [synopsis](https://www.collinsdictionary.com/us/dictionary/english/synopsis) of a play, [opera](https://www.collinsdictionary.com/us/dictionary/english/opera), or the like, [indicating](https://www.collinsdictionary.com/us/dictionary/english/indicate) scenes, characters, etc.

2.  the [script](https://www.collinsdictionary.com/us/dictionary/english/script) of a film

3. an outline for any [proposed](https://www.collinsdictionary.com/us/dictionary/english/propose) or [planned](https://www.collinsdictionary.com/us/dictionary/english/plan_1) [series](https://www.collinsdictionary.com/us/dictionary/english/series) of events, [real](https://www.collinsdictionary.com/us/dictionary/english/real) or [imagined](https://www.collinsdictionary.com/us/dictionary/english/imagine)

I know scientists use the word, and it is okay to use if you are referring to all events based on what happened and **what could have happened.** However, “what could have happened” is a matter of supposition at times that cannot be proved. All possibilities must be considered, but in the end—only what can be proved will be accepted in a final report.

## SEMICOLONS: CLEARING UP SOME CONFUSION

If you want to go from one independent clause to the other **without** inserting “and,” you have to use a semicolon instead of a comma to separate the two thoughts. The semicolon signifies the end of a complete thought (one that contains both a subject and verb); it also tells us that the next complete (independent) thought or clause is closely related to what was just said. Independent clauses are used when two statements are so closely related, the second statement is a natural extension of the first sentence.

## Example: The most difficult task in a perennial garden is separating the weeds from the flowers; my cone flowers were falsely identified; yes, I pulled them. It was a terrible sin, and I will miss them.

You will also use a semicolon when you want to connect two independent clauses wherein the independent clause, i.e., the complete thought with its own subject and verb is preceded by an introductory word like “however” or “for example.”

## Example: Learning grammar can be a drawn out and tedious process; however, one cannot claim to be a master of technical writing if they are not willing to master grammar.

**Do not use semicolon when separating items in a series.**

**However, a semicolon can be used in a series when interrupted by an additional internal comma**, as in

**Example:** (Smith and Jones, 1984; Wang et al., 2015; Chen, 2017).

You can also use a semicolon when a sentence contains parenthetical information set aside with commas.

**Example:** We would like to thank Dr. Yadong Li**,** Jackson State University**,** for providing test results**;** Hongbin Ma**,** University of Missouri-Columbia**,** for providing helpful consultation**;** and Jason Burlage**,** Gundlach Machine Company**,** for technical support.

## SI UNITS (SYSTEM INTERNATIONAL UNITS)

All technical journals want you to use SI units. There are several online sources which list these international units and their meanings. System International (SI) units are the most widely and officially recognized system of metric units. SI units represent the primary system of weights, dimensions, and other physical measures. You can download the NIST[**Guide for the Use of the International System of Units (SI)**](http://physics.nist.gov/cuu/pdf/sp811.pdf) (<https://physics.nist.gov/cuu/pdf/sp811.pdf>). I have reprinted the checklist in this manual on pages 34- 36. Notice Checklist #10, which tells us to always put a space between the number and the unit. This is a universal publishing rule, which also refers to the following mathematical symbols which should also have a space before and after their entry when used as verbs, conjunctions, or operators: ±, =, <, >, ≤, ≥, +, −, ÷, ×, ⋅, ≈, ∼, ∩, ∫, Π , Σ , and |.

For Example: a ± b , a = b ,  a + b ,  a − b , a ÷ b , a × b, a ⋅ b , a > b , a < b P < . 0 0 1 2 + 3 = 5

See [AMA Manual of Style, 11](https://www.amamanualofstyle.com/search?q=space+before+and+after+mathematical+symbols&searchBtn=Search&isQuickSearch=true)[th](https://www.amamanualofstyle.com/search?q=space+before+and+after+mathematical+symbols&searchBtn=Search&isQuickSearch=true) [Ed](https://www.amamanualofstyle.com/search?q=space+before+and+after+mathematical+symbols&searchBtn=Search&isQuickSearch=true).

**Seminal Sources**

Seminal sources represent major research-based findings that have offered solutions to problems, which have proven to be bottlenecks through the years. Usually, the findings precede their use in current articles by as many as 20 to 50 years. They represent research that is considered fundamental to the success of current research activities even if the author who cites them does not agree with the seminal work’s findings. Some excellent ideas on how to find seminal work pertaining to your research can be found at <http://libraryresearch.weebly.com/seminal-works.html>.

**Sentence Flow**

The natural word order of an English sentence is subject, verb, and direct object. Modifiers, phrases, or clauses crammed between these essential parts make it harder for the reader to understand a sentence.

**Example:** Each corpus, *which is a collection of written or spoken communication used for language research*, includes haptic or tactile data beyond what can be acquired via point-and-touch interface, *and in the population of interest, a new data collection effort* *was undertaken.*

The italicized phrases in this example are clutter. They hinder the sentence flow. The definition of corpus should be given in the introductory material. The last phrase is completely unnecessary. It not only states the obvious, but it also ends with a passive verb (was undertaken). The phrase does not add to the value of the sentence nor does it tell the reader something he or she does not already know. The fact that the author had initiated and completed a new data collection effort had already been established as the objective of his thesis. All we really need here is the following:

Direct Object

Subject

Verb

Each corpus includes haptic or tactile data beyond what can be acquired via point-and-touch interface. Placing the subject at the front of the sentence with its active verb followed by the direct object tells the reader quickly and succinctly the main point. The remainder of the sentence prepares the reader for the material that follows. With a strong topic sentence, the paragraph can now flow.

## SIGNIFICANTLY—WHEN TO USE

Significantly should not be used unless it refers to statistical significance and can be given a *P* value. If you have used it to refer to the value of a concept as it relates to the topic at hand, then consider replacing it with *substantially*, *notably*, or *markedly*.

## SPECIES

Species is both singular and plural. Whether you are talking about one species or several species, the spelling is the same. The only time it is spelled without an “s” at the end (specie) is when it is referring to a form of money, particularly coins.

## SPLIT INFINITIVES

Mignon Fogarty (Grammar Girl) calls the split infinitive rule an imaginary rule that was forced into English grammar during the Victorian age because you could not split an infinitive in Latin. Most grammar experts agree that when a sentence flows well—even when an adverb splits or separates “to” from its verb—as when Star Trek fans were told "**to *boldly* go** where no one has gone before," it is okay! See <http://www.quickanddirtytips.com/education/grammar/split-infinitives?page=all>

This means we can put an adverb between the auxiliary verb and the main verb. For example: The parameters were subsequently measured. Subsequently is an adverb telling when. The students **were constantly reminded** of the deadline for their assignments. Another example—the split infinitive **has often been determined to be** a relic of Victorian adherence to Latin rules that simply do not apply to modern English.

Present style manuals do not prohibit the split infinitive. As early as 1931, George Oliver Curme best known for his *A Grammar of the English Language* not only defended the split infinitive as being correct but said it "should be furthered rather than censured, for it makes for clearer expression." For a more thorough discussion on the split infinitive, see <https://www.revolvy.com/topic/Split%20infinitive&uid=1575>.

For a classic case of when “fixing” a split infinitive caused a national embarrassment, see <http://www.grammar-quizzes.com/adv_split.html>. This site gives an example of a U.S. chief justice who rewrote the presidential oath of office to satisfy the antiquated split infinitive rule. Type “The Inaugural Stumble” in your search engine for the rest of the story.

## STYLE GUIDES

There is a **Citation Machine** at <http://www.citationmachine.net/apa/cite-a-govt/manual>. This is a recent discovery this editor made while looking for information on how to cite government publications. The following publications can provide useful guidance in preparing your manuscript.

* **The American Chemical Society (ACS) Style Guide** is the premier source for Chemical Engineers. Published by the American Chemical Society, it covers the complete range of writing concerns from grammar and punctuation to how to use the International System of Units. The ACS Style Guideis in the form of a book, which is an excellent reference and can be purchased on the ACS website, but if you need some quick free help on how to handle in-text citations and references, Williams College Libraries has what you need at <http://library.williams.edu/citing/styles/acs.php>.
* **American Institute of Physics.** [**Style Manual for Guidelines in the Preparation of Papers**](http://scitation.aip.org/upload/Scitation/authors/PreparingMS.pdf). 4th ed. New York: American Institute of Physics, 1990. Follow title link to download complete guidelines.
* [**The American Society of Agricultural and Biological Engineers (ASABE) Style Guide**](https://www.asabe.org/media/19670/asabe_guide_for_authors.pdf) may be used for research papers in the fields of agriculture, biochemistry, and biosystems engineering.
* **American Mathematical Society. A Manual for Authors of Mathematical Papers.** 8th ed. Providence: American Mathematical Society, 1990. See the official [AMS Website](http://www.ams.org) and the [AMS Author Handbook](http://www.ams.org/publications/authors/tex/author-handbook) website, which has different rules for different types of publications. Follow the [AMS Author Handbook](http://www.ams.org/publications/authors/tex/author-handbook) link to get to all options. To download the guide specifically for journals, go to <http://www.ams.org/publications/authors/tex/Author_Handbook_Journals.pdf>.
* **The American Medical Association (AMA)** **Manual of Style** is becoming more and more popular. This involves the use of superscripts and is a Vancouver style of citing. Unpublished works and personal communications should be cited in the text (and not on the reference list). Superscript numbers are placed outside periods and commas,1 and inside colons and semicolons2; moreover, when citing the same source more than once, give the number of the original reference, then include the page number (in parentheses) where the information was found.3(pp 41-44) Other examples are in this manual under Superscript Numbering—Can it be Used for In-Text Citations (page 53). For a quick guide on AMA citing, go to <http://guides.lib.uw.edu/c.php?g=99161&p=642357>. If you want an online version of the style guide, a subscription can be obtained by going to <http://www.amamanualofstyle.com/>
* **American Physiological Society (APS) Style Manual.** This style guide presents the rule concerning putting space between numbers, symbols and units. Specifically, “Insert spaces between numbers if the following mathematical symbols are used: ≈, ≡, <, >, =, +, «minus», ×, and ÷. Do not insert spaces between these symbols: /, |…|, ~, and %.” See <http://www.apsstylemanual.org/apsHouseStyle/mathematics/synopsis.htm>
* **American Psychological Association (APA).** This is most often used in the fine arts and social sciences. A quick and easy aid is the [APA Quick Reference Guide](https://ssw.unc.edu/files/web/pdf/APA_Quick_Reference_Guide.pdf) provided by the University of North Carolina and [Advanced APA Formatting](https://ssw.unc.edu/files/web/pdf/APA_Quick_Reference_Guide.pdf) . The Purdue Online Writer’s Lab also has some excellent help on their [APA Style](https://owl.english.purdue.edu/owl/section/2/10/) website.
* **The American Society of Civil Engineers** has recently updated their author information. They now have an e-book, which can be downloaded on a chapter by chapter basis entitled Publishing in [ASCE Journals: A Guide for Authors](http://ascelibrary.org/doi/book/10.1061/9780784479018). The style guide is [Chapter 5\_ Manuscript Submission and Revision Requirements](http://ascelibrary.org/doi/abs/10.1061/9780784479018.ch05), which can be downloaded as a [PDF with Links](http://ascelibrary.org/doi/pdfplus/10.1061/9780784479018.ch05).
* **The American Society of Mechanical Engineers (ASME)** has all of their information online. A good place to start is <http://journaltool.asme.org/Help/AuthorHelp/WebHelp/JournalsHelp.htm>.

* **[The Chicago Manual of Style](https://www.chicagomanualofstyle.org/tools_citationguide/citation-guide-2.html)** (University of Chicago Press) has been a respected source by engineers for many years. There is a Notes and Bibliography Style for the social science writers and an Author Date Style for technical writing. The CMOS style is similar to the [Harvard](http://guides.is.uwa.edu.au/ld.php?content_id=13183324) or [Council of Sciences style guide](http://writing.wisc.edu/Handbook/DocCSE_NameYear.html#intext is). Be sure to check the journal you are submitting to for their instructions on style guides, which are often found in Author Information Packages on the journals’ websites.
* **The Council of Science Writers Handbook** covers the author(s) name-year in-text citation/reference at <http://writing.wisc.edu/Handbook/DocCSE_NameYear.html#intext> . It is almost identical to the **ASCE st**yle guide, which can be found at <https://ascelibrary.org/doi/pdf/10.1061/9780784479018> and the

**Harvard style guide** which can be found at<https://www.mendeley.com/guides/harvard-citation-guide>

**Elsevier** has an  [Author information pack](http://www.elsevier.com/wps/find/journaldescription.cws_home/956?generatepdf=true) that is available to all who submit articles to their journals. Be sure to check the author information link of the journal you choose to submit to. It may have a different source. However, all of the articles that I have edited have used this guide up to this point. Elsevier often requires Highlights. See page 24 of this manual.

* The **Geological Society of America** has a very brief style guide at <http://www.geosociety.org/pubs/geosphere/gsGuide4.htm> which is applicable to all of their journals.
* The **IEEE Reference Guide at** <http://journals.ieeeauthorcenter.ieee.org/wp-content/uploads/sites/7/IEEE-Reference-Guide.pdf> follows the Vancouver style and is a great source.
* The [Journal of the American Water Resources Association](http://www.awra.org/jawra/JAWRA%20Instructions%20for%20Authors.pdf) (JAWRA) has author instructions with formatting and manuscript preparation instructions, which follows the Chicago Manual of Style.
* **National Institute of Standards and of Standards and Technology** [**Guide for the Use of the International System of Units (SI)**](http://physics.nist.gov/cuu/pdf/sp811.pdf) has an especially helpful checklist which I am including in this manual, see pages 37–41.
* For assistance with citing US Government reports, standards, and other publications, go to the University of Indiana-Bloomington Libraries’ site, [**Guide: Citing U.S. Government Publications**](https://libraries.indiana.edu/guide-citing-us-government-publications). They have an online help based on *The Complete Guide to Citing Government Information Resources: A Manual for Writers and Librarians* by Diane L. Gapner and Diane H. Smith.
* [The **Society of Petroleum Engineers**](http://www.spe.org/authors/docs/%20styleguide.pdf) has a 2015-2016 edition, which can serve as an excellent source of technical writing information for anyone in any discipline. See <http://www.spe.org/authors/docs/SPE-Style-Guide-2015-16.pdf>.
* **NIH US National Library of Medicine:** The [International Committee of Medical Journal Editors (ICMJE)](http://www.icmje.org/about.html) offers guidance to authors in its publication [Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals (ICMJE Recommendations)](http://www.icmje.org/urm_main.html), which was formerly the Uniform Requirements for Manuscripts. The recommended style for references is based on the National Information Standards Organization [NISO Z39.29-2005](http://www.niso.org/apps/group_public/project/details.php?project_id=50) (R2010) Bibliographic References as adapted by the National Library of Medicine for its databases. Details are in [***Citing Medicine***](http://www.ncbi.nlm.nih.gov/books/NBK7256/)***.***
* **National Institute for Standards and Technologies** (NIST) Guide for the Use of the International System of Units (SI). See <https://physics.nist.gov/cuu/pdf/sp811.pdf>.
* **Taylor & Francis Group** will tell you to go to the specific journal you are submitting to and look for the author guidelines. I did that and found that they have a very different approach to the Vancouver style than other journals. From author instructions for the [*Journal of Environmental Science and Health, Part B*](http://www.tandfonline.com/action/authorSubmission?journalCode=lesb20&page=instructions#.Vo3MyBU4GCo): Please cite references in the text by number only superscripted in bracket. At the end of the article, list the references in the order they appear in the text.

**Example:** Kaufman et al.[1] showed that 81% of the nearly 2600 participants had taken one medication in the past week and 25% had taken 5 or more medications. Much of the pharmaceutical dose used therapeutically is not completely degraded in the human body.[2–3]  Heberer [4] showed that indeed, many pharmaceuticals are excreted unchanged or as conjugates of metabolic transformation (e.g. gluconurides, sulfates). Note the reference number citation particularly at the end of sentence.

* **The Vancouver style** of citing and referencing can be found at <http://guides.lib.monash.edu/citing-referencing/vancouver>. This editor is impressed with this aid. However, it is written for writers outside of the US. I added some material to accommodate authors writing for US publications. I also added IEEE examples of citations. The entire aid with my additions in red begin on page 72 of this manual.

## SUBJECTS AND VERBS

A sentence is a word or group of words that express a complete thought. Every sentence must have a subject and verb. Without these two components, the sentence is a sentence fragment. Sentence fragments are unacceptable in any kind of writing.

**Example:** The University of Texas at San Antonio opened the nation’s first college campus bookless *library* in 2010.

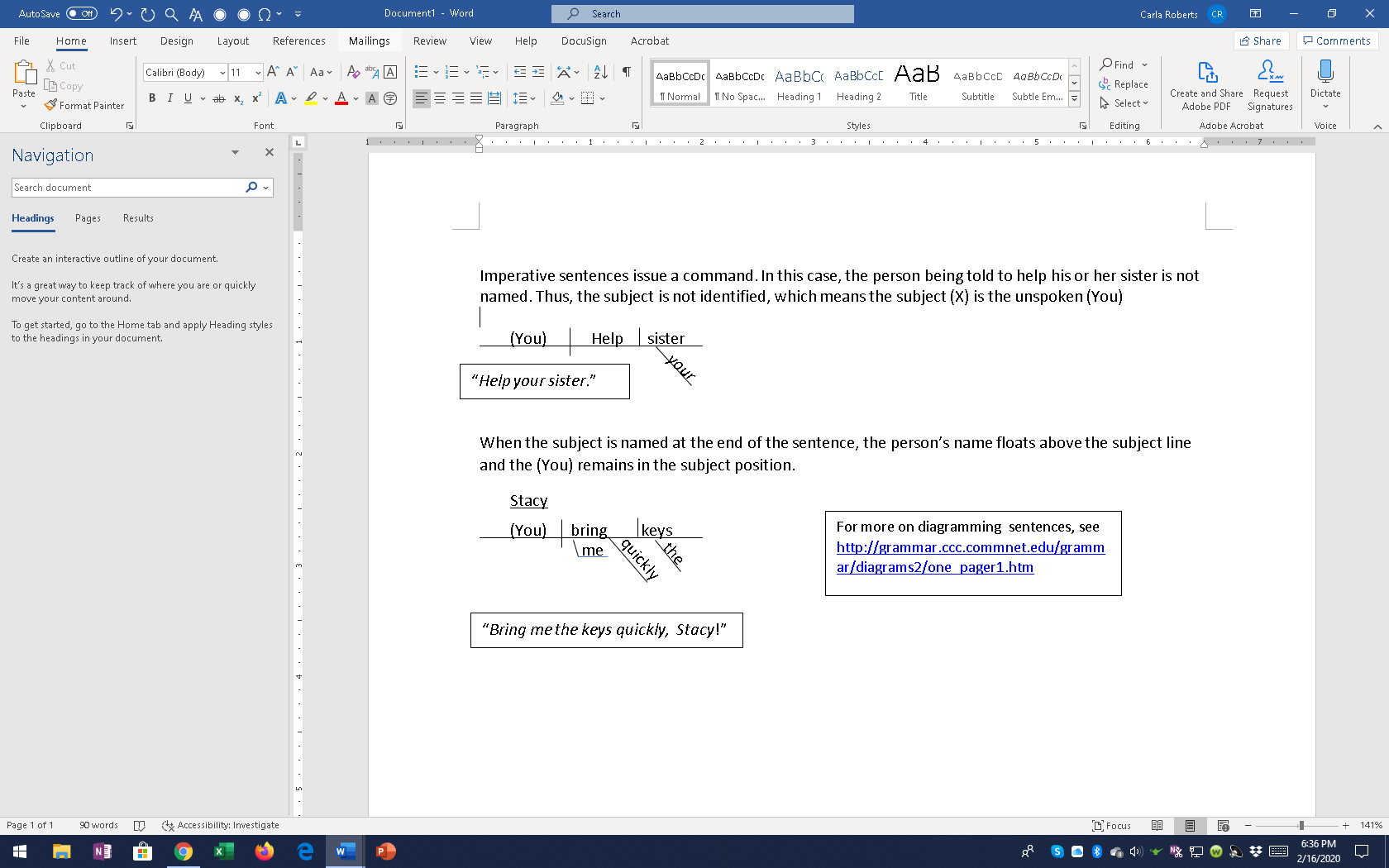
The subject of a sentence is shown in this manual with one underline. The verb has the double underline and the direct object is in italics.

The only time you can**not** see the subject in a sentence is when it is the invisible “you.”

**Example:** Jump at your own risk! Don’t push the panic button.

The subject in both sentences is “You.” (You) jump at your own risk! Don’t (you) push the panic button. An imperative (command sentence) will always have “you” as the subject. The verb here is do not push with “not” being an adverb modifying the auxiliary verb “do.” Together they modify the simple verb “push.” Another example can be diagrammed as follows:

Imperative sentences issue a command. In this case, the person being told to help his or her sister is not named. Thus, the subject is not identified, which means the subject (X) is the unspoken (You).



Every sentence has a simple subject and simple predicate. It also has a *complete subject* and a *complete predicate*. In this manual, the simple subject has a single underline. The simple verb has a double underline.

**Example of Simple** Subject and **Simple** Predicate (Verb) with No Modifiers:

~~Many~~ founders ~~of Missouri towns~~ were ~~of German descent~~. (The modifiers are crossed out.)

The **complete subject** of a sentence is that part about which something is said, and it includes the simple subject plus its modifiers. In the sentence above, the *complete subject* is

Many founders of Missouri towns…

The **complete predicate** is the part of the sentence containing a verb, but it also tells us something about the subject (complete predicate [verb] = simple predicate [verb] plus its modifiers and words that complete the verb).

were of German descent.

## SUBJECT-VERB AGREEMENT

**Basic Rule.** The basic rule states that a singular subject takes a singular verb, while a plural subject takes a plural verb. How can you know whether the subject is singular or plural? *Answer:* Verbs do **not** form their plurals by adding an *s* as nouns do. To determine which verb is singular, ask what ***he* or *she*** would say. To determine what is plural use the word **they**. *Example:* **He** *talks—*but: **They** *talk.* Therefore, *talks* is **singular**, and *talk* is **plural**. The helping verbs simply must be memorized.

Some sentences have a compound subject. A compound subject occurs when two (or more) subjects are joined by and; thus, **they** *are* always plural.

Sharon and Karen graduate in June. Balloons and kites will fill the air. When the subjects are joined by "and," the verb is plural; thus, graduate is the plural verb linked to the compound subject, Sharon and Karen. In the second sentence “will fill” is the plural future tense verb linked to the plural subject, “Balloons.”

The following table has to do with conjugating helping verbs. These verb forms must be memorized.

**CONJUGATING the helping verbs, *to be***

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| The **present tense** | | | | |  | The **past tense** | | | | |
| **Person** | | **Singular** | **Plural** | |  | **Person** | | **Singular** | **Plural** | |
| **1st Person** | | I am | We are | |  | **1st Person** | | I was | We were | |
| **2nd Person** | | You are | You are | |  | **2nd Person** | | You were | You were | |
| **3rd Person** | | He-she-it is | They are | |  | **3rd Person** | | He-she-it was | They were | |
| The **future tense** | | | | |  | The **present perfect tense** | | | | | |
| **Person** | **Singular** | | | **Plural** |  | **Person** | **Singular** | | | **Plural** | |
| **1st Person** | I will be | | | We will be |  | **1st Person** | I have been | | | We  have been | |
| **2nd Person** | You will be | | | You will be |  | **2nd Person** | You have been | | | You  have been | |
| **3rd Person** | He-she-it will be | | | They will be |  | **3rd Person** | He-she-it  has been | | | They  have been | |
| The **past perfect tense** | | | | |  | The **future perfect tense** | | | | | |
| **Person** | **Singular** | | | **Plural** |  | **Person** | **Singular** | | | **Plural** | |
| **1st Person** | I had been | | | We had been |  | **1st Person** | I will  have been | | | We will  have been | |
| **2nd Person** | You had been | | | You  had been |  | **2nd Person** | You will  have been | | | You will  have been | |
| **3rd Person** | He-she-it had been | | | They  had been |  | **3rd Person** | He-she-it will have been | | | They will have been | |

**Singular pronouns and gender issues**

When a pronoun is the subject of a sentence, that pronoun must agree with the main verb in number.

This means you must be able to recognize the singular and plural forms of each pronoun on sight.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Singular** | **Plural** | **These pronouns are**  **always singular** | **These pronouns are**  **always plural** |
| First Person | I | we | anyone, either, neither, | both, many |
| Second Person | you | you | anything, everyone, no one, | several, others |
| Third Person | he/she/ it | they | whatever, what | Few |

**Example Problem:** *Everyone on the project (****has/have****) to come to the meeting.*

There is only one pronoun in this sentence: Everyone. It is acting as the subject of the sentence, so we must check for agreement with the main verb. Referring to the chart above, you can see that the pronoun “everyone” is singular and requires the singular form of the verb, so:

**Answer:** “Everyone on the project **has** to come to the meeting.

**Gender Issues (He or She/ His or Her?):** The current emphasis on gender neutral wording has led to some writers assigning the universal representative of humanity to a woman. Rather than saying “Each has **his or her** role to play in the success of this team effort,” some will simply say: Each has **her** role to play… to avoid giving males any false superiority. This is foolish! The subject of humanity has always had its all-encompassing “mankind” to cover both men and women when discussing our common plight. I have never been offended by assigning an unknown subject to the masculine gender. When I read, “The traveler checked **his** map to make sure **he** was going in the right direction,” I am not offended because the traveler was automatically assigned masculinity. In fact, if the automatic assumption was that the traveler had to check “her” map, I might ask if the author was implying that all women have no sense of direction. If the subject is singular, the accompanying pronoun must also be singular. We have to choose. Each has ***his*** . . . Each has ***her*** . . . or Each has ***his or her*** . . .

## Story vs. Storey

## In American English, a single floor or level of a building is called a *story*. Different floors or levels of a building are referred to as *stories*.

## In other countries, storeyis preferred and the plural of the storey is storeys.

## SUBJECT AND VERB—PLEASE KEEP THEM TOGETHER

Always try to keep your subject and verb together, and *if possible, please* avoid ending your sentence with a passive verb. In the examples below, the subject has a single underline. The verb has a double underline.

**Example:** Challenges in sorghum transformation were discussed.

**Corrected Example:** This article will address challenges in sorghum transformation.

To say that this *article* will *address* gives this sentence a more direct (and stronger) approach. You can also say “The authors will address . . . “

Journals are also accepting the use of “we” and “I,” but few actually use “I.” See page 67 for further discussion on using the first person in technical writing.

**Example 1:** We finished at the top of the group competing in the hard template-based human modeling category and third in refinement prediction, finishing overall in the top 15 at the 10th Critical Assessment of Techniques for Protein Structure Prediction competition.

**Example 2:** The MU College of Engineering protein structure prediction team, MUFOLD, finished at the top of the group competing in the hard template-based human modeling category . . .

Giving your team or research project a name when results are ready for publication increases recognition. In a paper, team members are the authors and are recognized in the byline. In a thesis or magazine article, their names should be included along with their roles in the research.

Keeping your subject and verb together allows the reader to grasp the action immediately. They set the stage for what follows. They represent the natural order of logical thinking. They also represent the natural order of sentence structure.

**Subordinating Conjunctions:**

A subordinating conjunction joins a subordinate (or dependent) clause, which further describes the independent clause. Some of the most common subordinating conjunctions are:

|  |  |  |  |
| --- | --- | --- | --- |
| after  as  as if  as long as  as much as  as soon as  as though  before | how  although  because  even if  even though  how  if  in as much | in order that  now that  provided that  since  so that  than  that  though | unless  until  when  when  whenever  wherever  while |

For a complete explanation and examples, go to <https://www.thoughtco.com/subordinating-conjunction-1692154>.

**SURVEYS AND STATISTICS**

Every university follows a strict protocol regarding contacting participants for a survey and for handling the information you collect. Always contact your university’s Research Office or Office of Sponsored Programs and find out what office can help you with your training. At the University of Missouri-Columbia, the Institutional Review Board handles training for everyone who does any kind of research involving human subjects—including preparing surveys.

The most important measure of success for anyone conducting a survey is to have enough participants respond to their survey for credible results.

If you are preparing a survey for your thesis or dissertation, make sure you get as much help as possible before creating the survey. Make sure it is approved by your institutional review board and adviser. Most importantly, you should know what is expected from a survey before you begin.

## SUPERCRIPT NUMBERS—When and How to Use

Like most organizations, IEEE uses superscript numbers for footnotes. The IEEE Editorial Style Manual tells us “Footnotes should be numbered in consecutive order throughout the text. The **footnote numbers are superscripts in text and in the actual footnotes**. In text, place the superscript footnote numbers after the punctuation such as periods, commas, and parentheses, but before colons, dashes, quotation marks, and semicolons in a compound sentence. The footnotes should be placed at the bottom of the text column in which they are cited.” (<http://www.ieee.org/documents/style_manual.pdf>). A sample of how numbers appear in brackets and are thereby linked to references in the bibliography is well illustrated in the 2015 IEEE Editorial Style Manual. The IEEE information has been copied and inserted into this manual under **Citing References-IEEE Style** on p. 77.

# SUPERSCRIPT NUMBERING—CAN IT BE USED FOR IN-TEXT CITATIONS?

This was written before adding the Monash University material at the end of this manual. I am leaving it in because it is a simple explanation of how to handle superscript numbering. For me, the differences in the way authors handle superscript citations has been one of the most frustrating parts of my job. The most commonly recognized style manuals do **not** use superscript numbers for in-text citations. However, the practice is becoming more common; hence, we see engineers using the American Medical Association (AMA) style guide, which uses superscript numbers for in-text citations in their articles. AMA sources are numbered consecutively and refer to the sources listed in the "References" at the end of a paper.

**Examples:** The report1 found that... As has been noted previously,2

This argument was refuted in another study.3

Other reports4,5 confirm these findings. **(Two sources are cited.)**

"...as has been the conclusion of this author."6 **(Use after direct quotation.)**

In recent reports1,3-5,9 surgical outcomes have been...(**Multiple sources cited.)**

You may cite the same source more than once by using the same endnote number. However, when you repeat a number, you should include a page number, in parentheses, next to the Vancouver number. The following example is from <http://library.stkate.edu/assets/library-uploads/files/citeAMA.pdf> . Also see notes on superscripts in the Vancouver Style manual beginning on page 70 of this manual.

**Example of citation with page number**

Of the respondents, 95% felt that discharge arrangements were adequately explained to them.4 Further examination of the data in this study revealed other significant discrepancies.4(p275)

**Example of AMA Reference**

4. Cleary M, Horsfall J, Hunt GE. Consumer feedback on nursing care. *J Adv Nurs.* 2003; 42:269-277.

For citation examples, see <http://guides.lib.uw.edu/c.php?g=99161&p=642357>

If you put the citation numbers in brackets, the numbers and brackets should be full size. The only exception is if you are writing for the Taylor-Francis Group. Normally, you should follow the style set forth in the AMA Style manual.

**Tables and Figures**

Tables and figures are always present tense occurrences. They are created solely for the paper they appear in and their mission is to show the reader what the authors are talking about. The table can list, indicate, and present the data and results as clearly and as concisely as possible. The Figure shows, illustrates, and provides a schematic, plots a graph and often outlines steps in a flow chart. Once you stop using the figure or table and start talking about completed research, then you should return to the past tense.

Start your figure caption with a label, which briefly summarizes what the reader is looking at. Put a period at the end of this short description (label), but do not stop there! Do not rely solely on the text to explain the figure. The following page shows the concepts of qualitative and quantitative research explained in two ways—by a figure and table.

# 

# Figure 1. Quantitative and qualitative research. The similarities and differences are based on the types of methods used to accomplish the research goals. Both conduct a background assessment. Quantitative research is more measurable and qualitative research is more inductive. The similarities and differences are clearly shown in this illustration.\*

Quantitizing is the process of assigning a numerical value to certain information to facilitate comparisons or to show a relationship or pattern. An excellent article on this subject can be found by following DOI:[10.1177/1558689809334210](https://doi.org/10.1177/1558689809334210). The first few lines of the abstract are copied below.

# Sandelowski, M., Voils ,C. and Knafi, G. (2009) On Quantitizing, *Journal of Mixed Methods Research,*

“Quantitizing, commonly understood to refer to the numerical translation, transformation, or conversion of qualitative data, has become a staple of mixed methods research. Typically glossed are the foundational assumptions, judgments, and compromises involved in converting disparate data sets into each other and whether such conversions advance inquiry. . .”

**Table 1.** A Comparison of Qualitative and Quantitative Research

|  |  |
| --- | --- |
| **Qualitative** | **Quantitative** |
| The aim is a complete, detailed description. | The aim is to classify features, count them, and construct statistical models |
| Researcher may only know roughly in advance what he/she is looking for. | Researcher knows clearly in advance what he/she is looking for. |
| Recommended during earlier phases of research projects. | Recommended during latter phases of research projects. |
| The design often emerges as the study unfolds. | All aspects of the study are carefully designed before data is collected. |
| Researcher is the data gathering instrument.  Surveys are used but are more subjective. | Researcher uses tools, such as questionnaires or equipment to collect numerical data. |
| Data is presented as words, pictures or objects. | Data is presented as numbers and statistics. |
| Subjective—individual interpretation of events is important, e.g., uses participant observation, in-depth interviews etc. | Objective—seeks precise measurement & analysis of target concepts, e.g., uses surveys, questionnaires etc. |
| Qualitative data can be richer, but is also time consuming, and less able to be generalized. | Quantitative data is more efficient and able to test hypotheses but may miss contextual detail. |

**Table 2.** Chicago Manual of Style Formatting[[From Journal of American Water Resources Assn.](file:///C:\Users\Carla%20Roberts\AppData\Roaming\Microsoft\Word\Book%09Fritts,%20H.%20C.%201976.%20Tree%20Rings%20and%20Climate.%20London:%20Academic%20Press)]

|  |  |
| --- | --- |
| **Book** | Fritts, H. C. 1976. Tree Rings and Climate. London: Academic Press. |
| **Paper in a Proceedings** | Rickert, D. A., W. G. Hines, and S.W. McKenzie. 1975. “Implications of Dissolved Oxygen in the Willamette River, Oregon.” In: Urbanization and Water Quality Control, edited by William Whipple, Jr., 70-84.  Middleburg, VA: American Water Resources Association. |
| **Databases** may be included in the Literature Cited if they are fully citable and are to include a DOI. Provide access dates in the text citation. | Moschetti, M.P., 2017. Database of earthquake ground motions from 3-D simulations on the Salt Lake City of the Wasatch fault zone, Utah: U.S. Geological Survey data release, https://doi.org/10.5066/F7V98691. (available online:  https://[www.sciencebase.gov/catalog/item/58beff98e4b014cc3a3a9b84;](http://www.sciencebase.gov/catalog/item/58beff98e4b014cc3a3a9b84%3B) access date 02/28/2018) |
| **Journal article:** It is important to look at how a journal prefers to abbreviate its name, and how the name of the journal is presented. It should usually be italicized. Always include the digital  object identifier (DOI) unless one is not available. | Robbins, J. L. and L.Y. Lewis. 2008. “Demolish It and They will Come: Estimating the Economic Impacts of Restoring a Recreational Fishery.” Journal of the American Water Resources Association (JAWRA) 44 (6): 1488-1499. https://doi.org/10.1111/j/1752-1688.2008.00253.x |
| Thesis or Dissertation | Cosgrove, D. M. 2001. “Response Functions for the Conjunctive Management of Water in the Eastern Snake River Plain, Idaho.” Ph.D.  diss., University of Idaho. |

For a more complete table on the CMOS Quick Style Guide for the sciences go to <https://www.chicagomanualofstyle.org/tools_citationguide/citation-guide-2.html>. This uses the author/year citation and is similar to the [Harvard](http://guides.is.uwa.edu.au/ld.php?content_id=13183324) or [Council of Sciences style guide](http://writing.wisc.edu/Handbook/DocCSE_NameYear.html#intext is). Be sure to check the journal you are submitting to for their instructions on style guides, which are often found in author information packages on the journals’ websites. For website citations, see <https://www.mendeley.com/guides/web-citation-guide> for information on the way APA, MLA, and Harvard style guides handle URLs. Harvard is much like CMOS and the Council of Science guidelines.

**Table 3** Measurement Conversion

|  |  |  |
| --- | --- | --- |
| **When You Know** | **Multiply by** | **To Find** |
| **Length** |  |  |
| inches (in.) | 25.4 | millimeters (mm) |
| feet (ft) | 0.305 | meters (m) |
| yards (yd) | 0.914 | meters (m) |
| miles (mi) | 1.61 | kilometers (km) |
|  |  |  |
| **Area** |  |  |
| square inches (in.2) | 645.1 | millimeters squared (mm2) |
| square feet (ft2) | 0.093 | meters squared (m2) |
| square yards (yd2) | 0.836 | meters squared (m2) |
| acres | 0.405 | hectares (ha) |
| square miles (mi2) | 2.59 | kilometers squared (km2) |
|  |  |  |
| **Volume** |  |  |
| fluid ounces (fl oz) | 29.57 | milliliters (mL) |
| gallons (gal) | 3.785 | liters (L) |
| cubic feet (ft3) | 0.028 | meters cubed (m3) |
| cubic yards (yd3) | 0.765 | meters cubed (m3) |

**More on Figures and Tables**

Let the reader know why your information is important through illustrations (figures) and categorized easy-to-understand information (tables). For figures, you don’t have to have a detailed explanation. That should be in the narrative, but please explain what the basic parts are. Introduce them based on their function, and then simply tell us what we are looking at.

I recommend you check out the17 tips from WORDVICE on [How to Write Strong and Effective Figure Legends](https://wordvice.com/how-to-write-effective-figure-titles-and-legends/). Also, check out the American Journal Experts article entitled [Writing an Effective Figure Legend](http://www.aje.com/en/arc/writing-effective-figure-legend/). Different style guides have different ways of handling figures. Always check the author instructions provided by the journal you are submitting to. The [APS Style Manual](http://www.apsstylemanual.org/oldmanual/parts/text/figures.htm) for some very detailed instructions. If you are submitting to a journal, study that journal and see how they handle figures and tables. Follow their example and download their author instructions. Author instructions are the only instructions that count when you are submitting to a specific journal.

**Technical Writing**

**TECHNICAL WRITING is not like writing a mystery novel!**

Let your reader know what your objective is immediately. Don’t hide facts for a surprise ending!

Let your heading and subheadings be like mile markers that that assure a safe destination. The best destination is a conclusion, which convinces your readers that the trip was worth the journey. Start your paragraph with a topic sentence and end with a summary or another sentence that reinforces the importance of your topic (i.e., subject).

**Write short easy-to-understand sentences.** Avoid long introductory phrases. Journal editors hate sentences that look like paragraphs! Avoid loading your sentences with prepositions. Strive to make the subject a doer. Technical writing says what needs to be said quickly and concisely.

**Example (Awkward):** Successful adoption of a new research protocol for our lab depends on the leadership of our adviser and the cooperation of participants in following the new procedures.

**Example (Improved):**  We will adopt the new research protocol and follow our adviser’s instructions.

The incorrect sentence is cluttered with six unnecessary prepositions. In the corrected sentence, the subject “we” performs the action expressed by its verbs: *will adopt* and *follow*.

**Strive to keep your sentence length down to no more than 30 words.** What we want, however, is clarity. Inserting parenthetical information is like inserting speed bumps. They not only slow down the sentence flow, they can cause the reader to seek an alternative route if they are too annoying. In other words, if a paper is not easy to read and understand, it will not get read.

**English has a yin-yang type of flow if given the chance.** When the sound of words have an internal rhyme, it gives your sentence a poetic effect and allows your sentence to flow. Words that disrupt the flow of a sentence are like boulders in a word stream. We want a sentence that is natural with all the elements working together like pebbles tumbled and smoothed—ready for the reader to find his or her nuggets of information among them. For example, instead of comparing a nanoparticle-i**ncorporated** membrane with an unmodified membrane, compare a **modified** membrane with an **unmodified** membrane. The internal rhyme here is simple (modified vs. unmodified).

**Yin-yang construction** does not have to rhyme but it must have a **parallel connection.** The American name for this type of writing is parallel construction. It calls for parallel grammatical patterns; thus, two or more subjects would be expressed as nouns or noun phrases. Two or more predicates (the verb driven part of the sentence) should retain the same form. Parallelism makes for a smoother sentence flow. The following maxim by Confucius is a great example of parallelism. Notice the use of two active present tense verbs in each sentence:

*“I hear and I forget. I see and I remember. I do and I understand.*

**TECHNICAL WRITING IS NOT OBSCURE VERBOSITY—IT IS INFORMATION!**

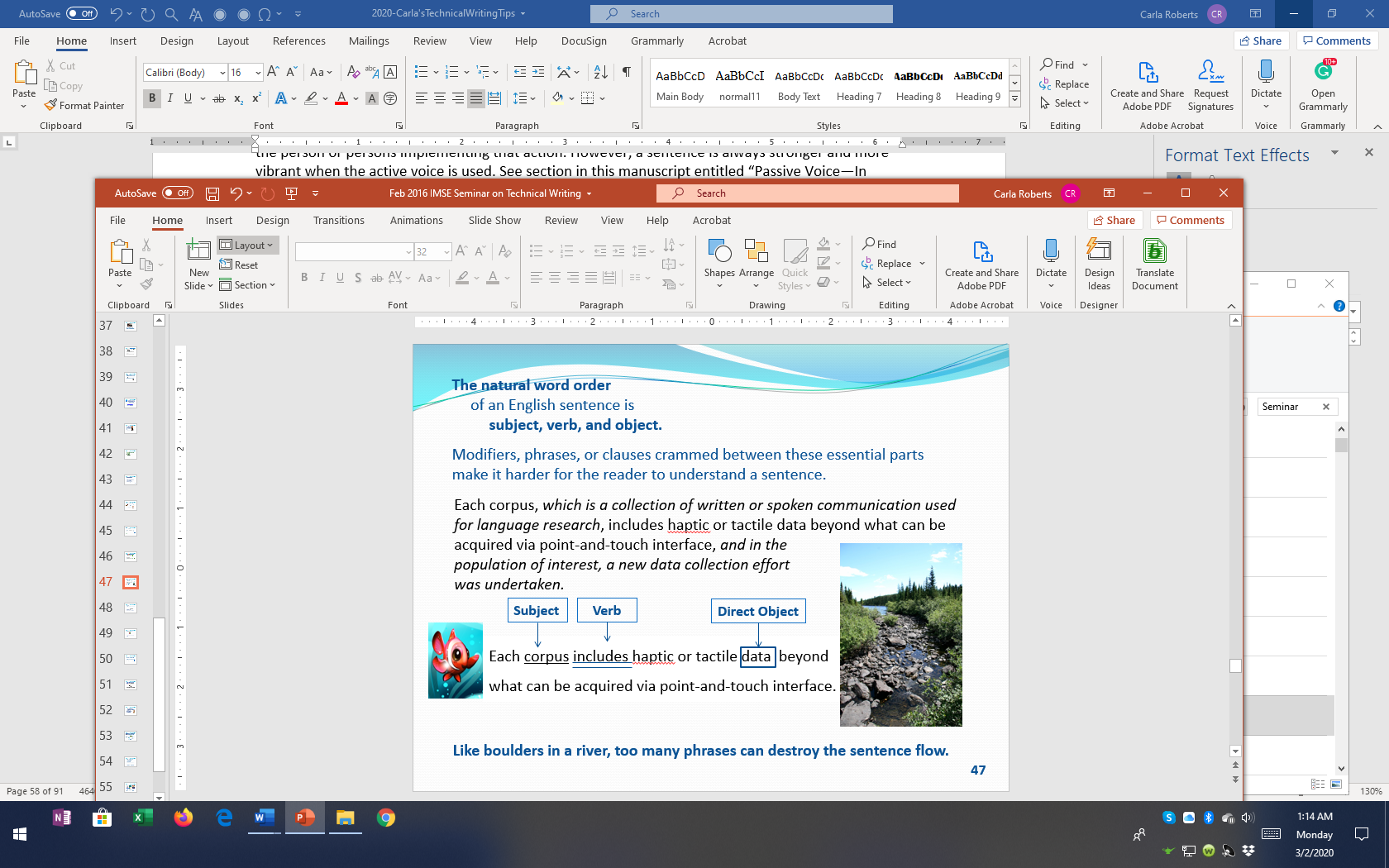
Readers want to extract from articles what they want to know quickly. Authors are often looking for additions to their literature review. The keywords in abstracts facilitate this search. Keywords can also help authors get cited, which builds their reputations as reliable source. Search engines also contribute much to keeping researchers in touch with their specific interests. See page 86.

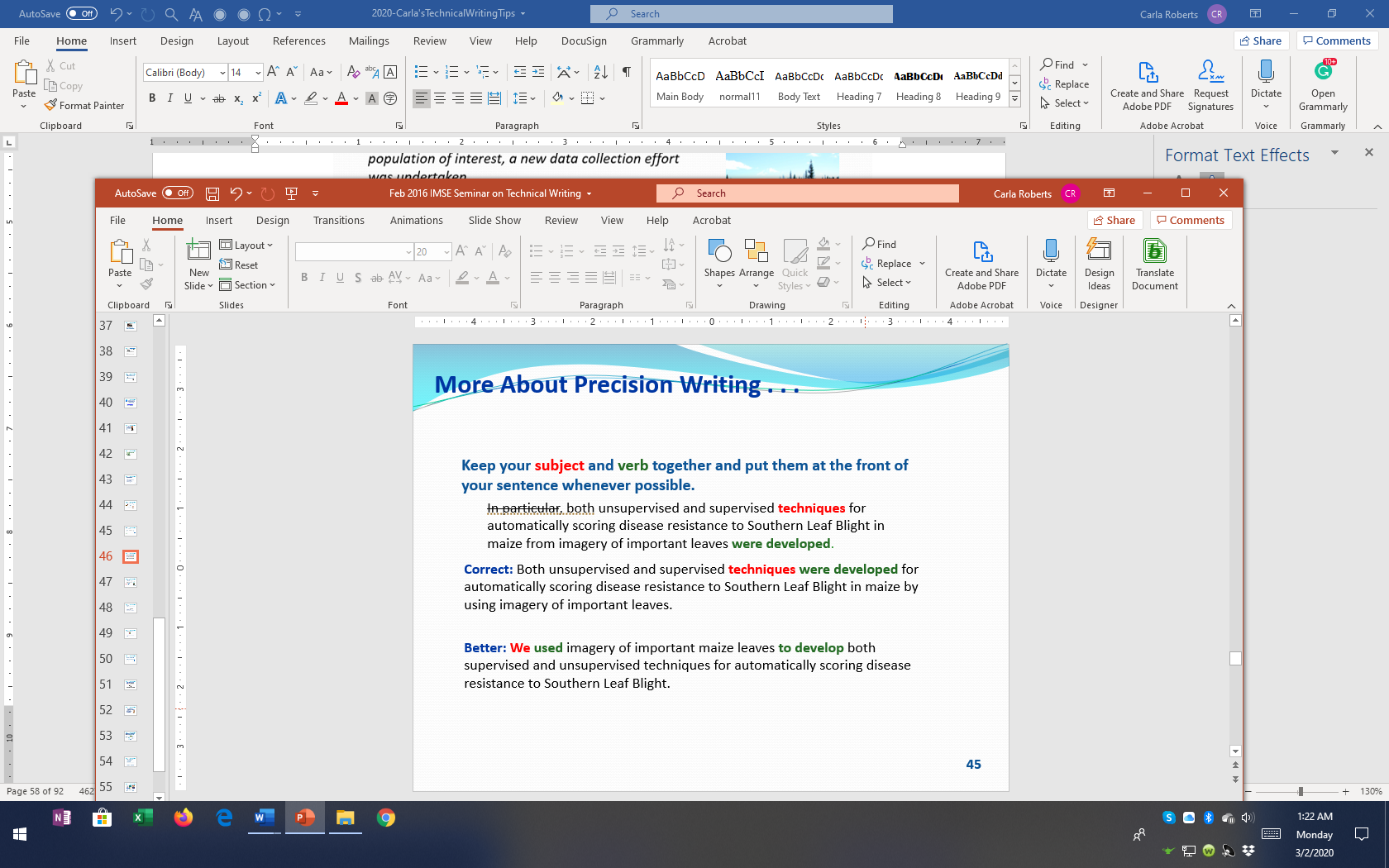
**Technical Writing Lets the Subject be the Doer and Keeps the Verbs Active**

It is not a sin to use passive verbs. In fact, they are preferred when the action is more important than the person or persons implementing that action. However, a sentence is always stronger and more vibrant when the active voice is used. See section in this manuscript entitled “Passive Voice—In Defense of” and “Voice—Active vs. Passive.”

**Technical Writing is CONCISE**

When self-editing your work, look at each sentence and ask: “What can I cut?” or “ Have I repeated a concept, stated the obvious or used too many words to express a simple concept?” Conciseness is the key to effective writing. Technical writers should always strive to write only what needs to be said in as few words as possible without sacrificing the meaning.





“In particular” is not needed. Also, the verb is at the end of the sentence.

**Technical Writing** **AVOIDS UNNECESSARY WORDS**

Removing passive *helping* verbs usually makes the sentence more concise. See page 50 for list of the helping or “to be” verbs. Do not be afraid to perform surgery on your sentences!

**Cutting out Expletive Constructions:**

An expletive construction involves “there” and “it” followed by a *to be* verb such as *is, was,* or *were.* Expletives are considered excess verbiage. Verbiage is speech or writing that contains too many words or that uses words that are more difficult than necessary.

**Expletive Example 1:** *There were* some excellent results in this experiment involving social work.

**Corrected Sentence:** The social work experiment produced excellent results.

**Expletive Construction Example 2:** *It was* too hot to get any work done.

**Corrected Sentence**: We could not work in such intense heat.

Notice how giving Example 2 the subject, “we,” allows us to follow up with an active verb “could not work,” and makes for a more interesting sentence.

**TECHNICAL WRITING has Zero Tolerance for Rambling**

When an editor accuses you of rambling, he or she is saying that you have included sentences that do not focus on the primary purpose of your paragraph. If you are writing a bare-bones overview of the primary drivers of your research, then you need to define what those drivers are and then explain how they work as precisely and as concisely as possible.

**TECHNICAL WRITING Must be organized**

A technical journal article follows the same organizational outline as a thesis. See page 62 for the outline you need to follow. These components are in every article, no matter how many pages you devote to your topic. Always read the author instructions of the journal you are submitting to. Some publishers provide a template that makes organization and submission easy. Some publishers are very specific about every component of an article including formatting, word count, and organization.

**TECHNICAL WRITING Must Have Topic Sentence Success**:

A precise concise topic sentence makes a definite assertion or asks a direct question. It contains the key words that give the topic its substance and clearly states the value of the topic. Do not make the reader guess your intention. Make sure that your supporting sentences back up and develop the central idea in your topic sentence by providing the needed details. Ask yourself, “Does this sentence do anything to clarify the topic and move my thoughts on the subject forward? If it does not, cross it out or move into a supplementary information document that can be developed into another paragraph. Each sentence should lead naturally to the next. That is what editors call coherence. **Your concluding sentence should summarize your topic sentence.** Let the reader know the primary fact you want him or her to remember in this paragraph.

# TECHNICAL WRITERS MUST CONSIDER THE NEEDS OF THEIR SPECIFIC AUDIENCE

Who are your peers? Will they think your research is important? Can you tell potential readers how your new approach or method can be applied?

* Your peers are those who share your interests. Don’t be afraid to broaden your interests because the only certainty in research and technology is uncertainty and change. You will undoubtedly be forced to change your course or at least expand your focus numerous times throughout your career.
* Study the journals which relate to your research interests. They will help you discover who the current experts in your field are and will help you keep up with changes, which are a natural part of the research process.
* Always anticipate the question: **So what?** Be prepared to explain why your topic is important.

# TECHNICAL WRITERS MUST LEARN HOW TO WRITE A LITERATURE REVIEW

# The most impactful (groundbreaking) documents should be identified in a literature review. The literature review substantiates the author’s reason for undertaking the new research presented in the paper. It should not cover every related project for the past 20 years! When discussing recent research, do not go back further than the past four years. Try to restrict your coverage to the past 10 years. It’s okay to cite a predecessor whose work goes back more than 10 years if his or her work is considered groundbreaking (seminal) research, which led to the current line of research. Select the most important methodologies that dominate the research protocol in your discipline. Compare those methods with your methods. Your Introduction should mention two or three of the most important examples of contemporary research in your area. You can go into more detail in the discussion.

# Five indications of a good literature review are:

1. Concisely explains how other authors’ research relates to the new research under consideration.
2. Gives a brief overview for novices and keeps professionals current on the most important advances in the featured field of research.
3. Notes if the article has a seminal contribution and compares the most important advantages and disadvantages of other authors’ end results with the latest innovations.
4. Accurate interpretation shows that the author read the article carefully. To misinterpret another author’s work is offensive to the author and hurts the reviewer’s credibility.
5. Literature review must pass a plagiarism check. This can be difficult. The author must learn how to paraphrase, that is, to convert the published text into different words that concisely and accurately summarize the value of the reviewed authors’ research.

# I often see: “To the best of our knowledge, the solution, theory, or methodology presented here has not been presented before now.” This is a good way to cover any accusations from another researcher saying that he or she has published similar work, which precedes your claim to innovation. A good search engine should enable the prevention of copycat research.

# [Google Scholar](https://scholar.google.com/) has recently been acclaimed the No. 1 academic search engine, [Microsoft Academic Search](https://academic.microsoft.com/) is No. 2, and [BASE](https://www.base-search.net/) is No. 3 followed by [CORE](https://core.ac.uk/), [Science.gov](http://science.gov/), [Semantic Scholar](https://www.semanticscholar.org/), and [Baidu Scholar](https://xueshu.baidu.com/). [Baidu](https://xueshu.baidu.com/) has a Chinese interface, and its index contains articles in both Chinese and English. All search engines are hyperlinked for the reader’s convenience.[[1]](#footnote-1) Other search engines include [Academic Info](http://www.academicinfo.net/subject-guides), [Seek](http://education.iseek.com/iseek/home.page), [Virtual LRC](http://www.virtuallrc.com/), and [Refseek](https://www.refseek.com/).[[2]](#footnote-2)

# The literature review substantiates the author’s reason for undertaking his or her new approach or method. Research ages fast simply because there are so many seeking (and finding) solutions to the same problems. Seminal articles will precede current articles by as many as 20 to 50 years. They represent research that is considered fundamental to the success of current research activities even if the author who cites them does not agree with the seminal work’s findings. Review the most important methodologies that dominate the research protocol in your discipline. Compare those methods with your methods. Your Introduction should mention two or three of the most important examples of contemporary research in your area. You can go into more detail in the discussion. Some excellent ideas on how to find seminal work pertaining to your research can be found at <http://libraryresearch.weebly.com/seminal-works.html> .

# TECHNICAL WRITERS SHOULD TAKE THEIR READER ON A GUIDED TOUR

Many writers assume their readers know as much as they do about their research! This simply does not make sense. When key information is left out causing the reader to misunderstand a methodology or research process, then the author is doing one of four things: 1) assuming the reader is as much of an expert in this field as he or she is, 2) skipping steps, 3) failing to introduce the process or concept properly by defining related terms, or 4) relying on a citation on previous research, forcing the reader to look up another article to understand the methodology.

***Try taking your readers on a guided tour through the written word.*** Assume that you are introducing new research with new methodology never before used in today’s labs. Once you introduce the material, then you can slip into the more technical details. Use these five steps to create your methodology’s guided tour:

1. Define the terms needed to understand the process in your introduction.
2. Show how you handle each step in your process in the order of its occurrence.
3. Enumerate the steps
4. Use language that is understandable to anyone from the undergraduate level on up.
5. Use lots of figures and tables to illustrate your points.

## TECHNICAL WRITERS UNDERSTAND TENSE

When writing about basic principles that are still true, use the present tense. When writing about completed work and observations, use the past tense. When discussing your results, you will use the past tense with phrases like we determined or tests confirmed, new evidence was found, or the sample exhibited. . . (Subject has single underline; verbs have double underline).

The present tense is used for general truths or statements and conclusions (when you form your conclusion in the form of a recommendation). In your conclusion, you might say the authors (or we) recommend or suggest further research in this area and plan to . . .

Many writers use an award’s proposal as a springboard for their report or journal article. They are comparing what they said they were going to do (written in future tense) with what was done. In the process, they sometimes transfer (copy) sentences from their proposal to their article without changing the tense. I am surprised to see this happens so frequently. This tells me that the writer simply got in too big of a hurry.

Please see the section on Tables and Figures to find out why the present tense should be used when describing tables (page 55).

Please avoid the word *could*, *should*, and *would*. These words imply doubt. Use the word *can* or *will* to show confidence in your results. Remember that “*would*” is the past tense form of will. When considering past events, achievements, or even failures, you can use *would* to point to an expectation that was in your future at some point but is not necessarily in your future now. Thus, “*would*” preserves the future expectation when discussing the past.

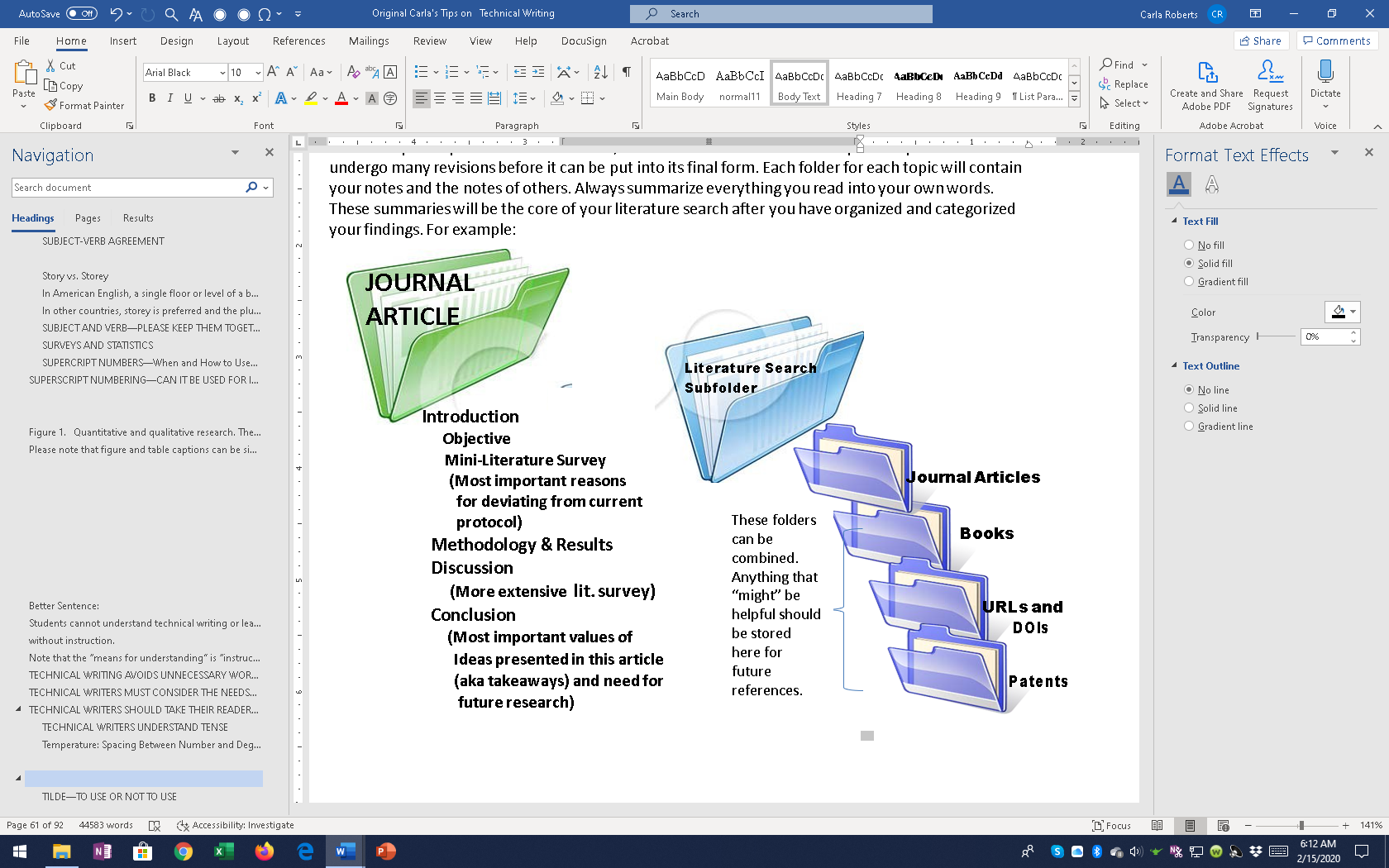
Once your expectation becomes a reality, you will hopefully be able to say: “What I thought *would* happen based on receiving my Ph.D. has exceeded my expectations and given me many pleasant surprises.”

## Temperature: Spacing Between Number and Degree Symbol

Always place a space after the number, as in 24 °C This is recommended by the  [International Bureau of Weights and Measures](http://en.wikipedia.org/wiki/International_Bureau_of_Weights_and_Measures), which is where SI units began. According to p. 16 of the National Institute for Standards and Technologies’ Guide for the Use of the International System of Units (S), the symbol °C for the degree Celsius is preceded by a space when one expresses the values of Celsius temperatures.

See [Guide for the Use of the International System of Units (SI)](http://physics.nist.gov/cuu/pdf/sp811.pdf), (<https://physics.nist.gov/cuu/pdf/sp811.pdf>)

**Thesis Organization (Also Applicable to journal articles)**



Organizing your literature summaries and thesis notes can easily be done through the use of electronic folders. You can’t summarize your work until you have finished it! You have to be able to step back after you have organized all of your thoughts and findings into sections. The sections are ordered according to their appearance in your manuscript; hence the abstract folder is the first folder under the primary thesis folder. However, the abstract will be the last item you complete. It will undergo many revisions before it can be put into its final form. Each folder for each topic will contain your notes and the notes of others. Always summarize everything you read into your own words. These summaries will be the core of your literature search after you have organized and categorized your findings. An illustration is provided on the next page.

The literature search subfolders can feed your thesis or journal articles throughout your academic career. You should put everything that pertains to prior research in these folders, which are subdivided above to fit the types of research you access. You will not necessarily use everything you save but having instant access to something that wasn’t all that important when you first looked at it—but suddenly becomes very important toward the end of your study—will save you time. The introduction tells the reader why your research is important. It will also explain what others have done to solve the problem or problems you are studying. That information is shown om Figure 1 as your condensed literature summary. The discussion section will include more detailed findings from your literature search.

If you are coming in as a team member on a research project that has been years in the making, and your thesis is covering the progress to be made during your time as a graduate student, then you need to research the history of your project, its motivation and accomplishments. More importantly, you need to define your role in the project and find out early what your adviser’s expectations are. Every thesis or journal article is divided into sections. Those sections are the framework of a house full of information, which you must store in rooms custom built for the innovation that will launch your career as a scholar, teacher, and researcher. Your thesis will go into more detail as you expand your research to fill in the gaps created by rooms (research) that may have been started by others but not finished until you came along.

## TILDE—TO USE OR NOT TO USE

APA rules tell us to: Use tilde (~) to mean *approximately equal to.* I prefer the en dash over the tilde when expressing a range of numbers. I realize that the tilde is becoming more popular, but the fact remains that the en dash is specifically set up to express a range of numbers and the tilde originally had a different purpose. The tilde can be used in mathematics to denote equivalence.  
x ~ y means that “x is equivalent to y”; however, in English, it has always meant approximately. I understand that the tilde has been used in Asia to express a range of numbers for many years. That has not been the case in the U.S. If writing for a U.S. audience, I recommend using the en dash. It can be inserted using the keystroke Alt + 0150. – The traditional and correct use of an en dash lets the reader know immediately that we are talking about a “range” of numbers, which may not always be exact. This makes the tilde unnecessary when used to replace the en dash.

## TIMELINES or GANTT CHARTS

Every funding agency wants a timeline for projected tasks. A two-year research project should have quarterly goals and these goals should be easy to follow and illustrated in a Gantt chart or timeline. Free PowerPoint templates can be found online. A brief and easy-to-follow article on using Excel to create a Gannt chart can be found at [http://office.microsoft.com/en-us/excel-help/create-a-gantt-](http://office.microsoft.com/en-us/excel-help/create-a-gantt-chart-in-excel-HA001034605.aspx)  [chart-in-excel-HA001034605.aspx](http://office.microsoft.com/en-us/excel-help/create-a-gantt-chart-in-excel-HA001034605.aspx). Some example Gantt charts follow:

**Timeline for Year 1: June 1, 2020-May 31, 2021 and for Year 2: June 1, 2021-May 31, 2022**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year 1: Tasks | Jan.-Mar. | Apr.-Jun. | July-Sept. | Oct.-Dec. |
| Literature Search, Consortium Planning Sessions |  |  |  |  |
| Preliminary Tests and Analysis of Results |  |  |  |  |
| Data Management Plan and Final Tests |  |  |  |  |
| Preparation and submission of Year 1 Report |  |  |  |  |

**Timeline for Year 2, June 1, 2016-May 31, 2017**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year 2: Tasks | Jan.-Mar. | Apr.-Jun. | July-Sept. | Oct.-Dec. |
| Preparation of Year 1 Report to Consortium |  |  |  |  |
| Build Prototype |  |  |  |  |
| Plan & hold Conf., Recruit more sponsors |  |  |  |  |
| Write Commercial Plan; Submit Phase II proposal |  |  |  |  |
| Test Prototype, complete and submit final reports |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Work Plan(mo/dd/yr to mo/dd/yr) | Year 1 | | | | | Year 2 | | | | Year 3 | | | | Year 4 | | | | Year 5 | | | |
| Task 1 |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Subtask 1.1 (General Task name here.) |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Subtask 1.2 (Details in narrative.) |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Task 2 |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Do not forget the proposed start date and end date. NSF usually starts funding an award six months after the final proposal due date. Research duration is usually between two and five years. If the application does not say when applicants will be notified of success or failure, allow between 9 and 12 months after proposal submission to establish your start date. The research team should meet to finalize the definition of each person’s role and responsibilities. You may not be able to use current students due to graduation, but you should indicate that a graduate research assistant or an honors undergraduate student will perform certain tasks. The paragraph on timeline tasks should include a brief overview of each team member’s responsibilities.

**TitleS Matter**

The title, abstract, and keywords are the gateway to your research for anyone seeking information on your topic through a literature search. The title is all some people read when determining the value of an article, but most use keywords to find topics related to their areas of interest. The abstract should “sell” the readership value to the targeted audience by providing the purpose, highlights, and significance of the research.

A title must be descriptive and concise. Short-titled articles generally have higher viewing and citation rates than those with longer titles. Velany Rodrigues in an online article entitled

“[How to write an effective title and abstract and choose appropriate keywords](http://www.editage.com/insights/how-to-write-an-effective-title-and-abstract-and-choose-appropriate-keywords)” stated:

Good research paper titles (typically 10–12 words long) use descriptive terms and phrases that accurately highlight the core content of the paper (e.g., the species studied, the literary work evaluated, or the technology discussed). –[Editage Insights](http://www.editage.com/insights/how-to-write-an-effective-title-and-abstract-and-choose-appropriate-keywords)

Your abstract should contain a strong statement on your research objective or achievement. This is always the “core” of a title. Answer the question: Why is my article important? Think about the research community you are writing for. Do not assume they have an expert’s knowledge of your topic.

If you want to highlight the value of a new application and the benefit of its results, you will certainly want to mention the name of the catalyst, process, or technology that is novel or innovative.

A title does not have to be a headline—although I personally prefer those types of titles. In other words, you don’t have to have a subject and **verb** in the lead announcing the discovery. (e.g., CMOS variable gain **amplifier improves** linearity and lowers power consumption). You can use the label approach which simply states the accomplishment (e.g., “[A high dynamic range CMOS variable gain amplifier for mobile DTV tuner](https://www.researchgate.net/publication/2983381_A_high_dynamic_range_CMOS_variable_gain_amplifier_for_mobile_DTV_tuner).” The latter title is the one that was chosen, and it was able to capture the approval of the editors. It was written for electrical engineers studying ways to improve mobile DTV tuners. This article appeared in the IEEE JOURNAL OF SOLID-STATE CIRCUITS, VOL. 42, NO. 2, FEBRUARY 2007 and was written by Jianhong Xiao, Iuri Mehr, and José Silva Martinez. If you follow the link in the title, you will see that the accomplishments are so many it would be hard to state them in a succinct title.

## To vs. Toward

To and toward are prepositions of direction or motion. *To* is often used to express going somewhere with the intention of arrival. *Toward*is used to express a motion or direction toward something, such as a goal, city, or even a tensile zone if you are a structural engineer. The point of destination (when using *toward*)does not refer to an area meant for arrival; it is simply a term of placement.

## UK Spelling vs. US Spelling

## Please see <http://www.tysto.com/uk-us-spelling-list.html> for a list showing the difference. Many publishers will accept either form, but they only want one form used throughout.

## VERB TENSES

As technical writers, you hear a lot about active and passive verbs (see next topic discussion on **Voice—Active vs. Passive)**. However, the main thing to remember is that all verbs are grouped into six tenses, which show action (edit, conducts, analyzed) or states of being (I am, you are, he is or they are). Knowing the differences between the **six tenses of English verbs** will give you **six keys to success i**n mastering English and getting published. The following is a brief discussion of these tenses—three of which are *simple tenses.* The other three are *perfect tenses.*

## SIMPLE TENSES

Simple tense verbs cover three basic time frames: past, present, and future.

* + 1. **Simple present tense verbs** show actions that occur regularly or they are presently occurring. These actions are ongoing.
       1. We *present* the results of our lab work in a monthly meeting with our adviser.
       2. Dr. Liu *schedules* a trip to a Beijing conference once a year.
    2. **Simple past tense verbs** show actions that occurred in the **past.**
       1. We *presented* the results of our lab work in this month’s meeting with our adviser.
       2. Dr. Liu *scheduled* his annual trip to a conference in Beijing.
    3. **Simple future tense verbs** show actions that have not yet occurred. These actions will take place in the **future**.

We *will present* this month’s results of our lab work next Wednesday.

Liu *will give* the keynote speech at this year’s Beijing conference on pipelines.

## PERFECT TENSES

The three perfect verb tenses are: Present perfect tense, past perfect tense, and future perfect tense, all of which are formed with the [helping verbs](http://sbiapps.sitesell.com/sitebuilder/blockbuilder/preview.xml%23link_2206134) *have, has, had,*

*will* and *shall* have.

* + 1. **P****resent perfect tense verbs** show an action or actions that were completed at some point in the past but extend to the present. Thus,
       1. We *have finished* the NSF award’s planned tasks.
       2. Several studies on the bond behavior between rebars and concrete *have been* conducted [15-21].
       3. There *has been* low acceptance of combined heat and power (CHP) technology despite its technical and economic potential.
    2. **[Past perfect tense verbs](http://www.english-grammar-revolution.com/past-perfect-tense.html)** use the word *had* and show an action that occurred before a related past event, which may affect or has affected the outcome or status of any related activities that follow. Past perfect tense verbs were once referred to as *pluperfect,* but this term is now obsolete.
       1. Despite its benefits, the product line *has had* low acceptance.
       2. They were asked questions about how their FFA program *had grown* since the convention.
       3. He could not take advantage of his pre-planned discount because the offer *had expired*.
    3. [**Future perfect tense** verbs](http://www.english-grammar-revolution.com/future-perfect-tense.html) show actions that will happen before other future actions happen. This verb tense uses *will have* and *shall have*.
       1. By this time tomorrow, we *will have completed* the race.
       2. According to this training program agenda, I *shall have mastered* the national lab’s software by September 22nd and will be ready to set up training in my department lab for immediate implementation.

## PROGRESSIVE OR CONTINUOUS VERB FORMS

Both simple and perfect verb tenses can be made into *progressive* verb forms also known as *continuous* verb forms. They show an activity that is happening now or is ongoing. To form this type of verb, you add the present participle form of a verb (ending in –*ing)* to a “*to-be- verb,*” e.g., *is, am,* ***are****, was,* ***were****,* ***be****, being,* and *been*. The following shows the different progressive verb forms for the first person plural pronoun “we” with the present participle “studying.”

*a) We are studying. (present progressive)*

1. *We were studying.* (past progressive)
2. *We will be studying.* (future progressive)
3. *We have been studying.* (present perfect progressive)
4. *We had been studying.* (past perfect progressive)
5. *We will have been studying.* (future perfect progressive)

## [REGULAR VERBS](http://www.english-grammar-revolution.com/regular-verbs.html)

These verbs do not represent different tenses, but they are important. Verbs that add -*d* or

-*ed* to form the past tense are regular verbs. Sample sentences with regular verbs follow: He *finished* the course. He *showed* the class how to calculate radian angles. She *graduated* with honors. She *distributed* the samples.

**V.** [**IRREGULAR VERBS**](http://www.english-grammar-revolution.com/irregular-verbs.html)

An irregular verb is irregular because it does not take the -ed ending. [USEnglish.com](http://www.usingenglish.com/) is an excellent guide for ESL students. Their definition of the word *irregular* notes that: “Some irregular verbs do not change; e.g., *put, put, put*, while others change completely. See *buy bought, bought* and how it is conjugated at <https://conjugator.reverso.net/conjugation-english-verb-bought.html>

1. **FUTURE PROGRESSIVE TENSE**

These verbs indicate ongoing or continuing action. They can indicate that something will happen in the future. This tense uses the modal "will" plus "be," plus the present participle of the verb (with an *-ing* ending): "I will be voting in the election. Current events indicate that Hillary Clinton will be winning the spot as the nation’s first woman president. " (Entry made 10/10/2016). My interpretation of current events in this case was wrong! (posted 04/09/2017).

For a more extensive discussion of irregular verbs, please go to [http://www.usingenglish.com/glossary/irregular-verb.html.](http://www.usingenglish.com/glossary/irregular-verb.html) Another great source is  [*Grammar Revolution*.](http://www.english-grammar-revolution.com/) Their lesson on verb tenses can be found at [http://www.english-](http://www.english-grammar-revolution.com/verb-tenses.html)  [grammar-revolution.com/verb-tenses.html.](http://www.english-grammar-revolution.com/verb-tenses.html) It’s **fun** and easy to understand. Also see <https://leo.stcloudstate.edu/grammar/tenses.html> for some excellent illustrations of auxiliary verbs.

**VISION VS. OBJECTIVES VS. GOALS**

**A** **vision** is your perception of how your research will benefit the research community and the society it serves. DARPA asks its applicants: How will the state of the art be different after your project compared to now? The answer would reflect the applicant’s vision. This is a good question to answer when writing any proposal.

**Objectives** tell the reader **what you are going to do and why**. NSF is especially fond of the word **objective** because it immediately lets them know **the ultimate deliverable of your proposal**. It also helps them decide if that deliverable is something they would like to fund. When seeking funding, discuss your objective and goals with your program manager as soon as possible.

**Goals** are uniquely tied to methodology. They are driven by your vision and objectives but represent feasible ways to achieve your planned deliverables. Tasks are the outcome of goals.

**VISION AND THE NATIONAL SCIENCE FOUNDATION**

NSF wants to know how your project will transform or change the way things are being done in the future. Donald Wunsch, a highly regarded professor at Missouri University of Science and Technology in Rolla, also reminds us that:

“A CAREER proposal needs to have another component to vision, and that is the interplay between teaching and research. Five years is a long time in high-technology. Our nation’s best up-and-coming talent will be changing the nature of science during that time period. By applying for a CAREER award, you are saying you want to be one of those talents. That is not about how got you to where you are now but what you will do with it next. How will you change your field in the coming five years? And how will you bring your students along for the ride? Which students do you hope to impact most? Advisees, undergrads, K-12 students to whom you reach out, or all of the above?”

Thank you Professor Wunsch for this valuable input.

**VOICE—ACTIVE VS. PASSIVE**

In a sentence that utilizes the active voice, the subject performs the action.

**Example 1**: Fire destroyed the storage building.

**Example 2:** The assistant mailed the letter.

A sentence using the passive voice shows the subject being acted upon. The passive voice is often used in scientific writing and is not only acceptable but unavoidable when the action is more important than the actor.

**Example 1:** Prototypes were designed with an emphasis on portability and cost efficiency.

**Example 2:** The device was built on a glass substrate with gold electrodes.

The passive voice is often used when the actor is unknown, unimportant, or in some instances, in need of anonymity for protection.

**Example 3:** Mistakes were made. (This protects the persons responsible for the mistakes.) **Example 4:** Area schools were closed due to the snow. (The names of the administrators who announced the closings are not relevant. Furthermore, since this is past tense, the urgency in knowing what schools were closed is gone.)

## WE or I—It’s OKAY to USE THE FIRST-PERSON PLURAL IN A Scientific Paper!

Students writing their thesis often use “we” to describe the teamwork behind their research. This can give anonymous credit to a group when, in fact, the work discussed is one person’s work. The person who did the work should get the credit.

The use of the first person “I” is not as common as “we.” It is okay to say “I” did it! Thesis writers are especially cautious about using “I,” but they often overuse “we,” and they fail to mention who “we” are!

If you want to mention your team by saying “We determined that . . .,” please define who that team is. I recommend introducing those who helped you develop the research at the beginning of the thesis or dissertation. This is not necessary in journal articles where authors are clearly defined in the byline.

In 2011, [David M. Schultz](http://weather.seaes.manchester.ac.uk/schultz/), a Professor of Synoptic Meteorology at The University of Manchester, wrote a [blog](http://eloquentscience.com/2011/02/are-first-person-pronouns-acceptable-in-scientific-writing/) featuring his book on how to become a better scientific writer stating that first-person pronouns are acceptable in limited contexts. Schultz states:

In *Eloquent Science* (pp. 76-77), I advocate that first-person pronouns are acceptable in limited contexts. Avoid their use in rote descriptions of your methodology (“We performed the assay…”). Instead, use them to communicate that an action or a decision that you performed affects the outcome of the research.

NO FIRST-PERSON PRONOUN: Given option A and option B, the authors chose option B to more accurately depict the location of the front.

FIRST-PERSON PRONOUN: Given option A and option B, we chose option B to more accurately depict the location of the front.

Schultz then provided some quotes from other writers who expressed their opinion on this matter. Only one author disagreed with using I or we (Hans F. Ebel in *The Art of Scientific Writing*). Most of the quotes that Schultz shared are as follows:

“Because of this [avoiding first-person pronouns], the scientist commonly uses verbose (and imprecise) statements such as “It was found that” in preference to the short, unambiguous “I found.” Young scientists should renounce the false modesty of their predecessors. Do not be afraid to name the agent of the action in a sentence, even when it is “I” or “we.”” — *How to Write and Publish a Scientific Paper* by Day and Gastel, pp. 193-194

“Who is behind the universal ‘it’? “*It is thought that*… is a meaningless phrase and unnecessary exercise in modesty. The reader wants to know who did the thinking or assuming. Was it the author, or some other expert.” — *The Science Editor’s Soapbox* by Lipton, p. 43

“I pulled 40 journals at random from one of my university’s technical library’s shelves…. To my surprise, in 32 out of the 40 journals, the authors indeed made liberal use of “I” and “we.” — *Style for Students* by Joe Schall, p. 63

Schultz summarize this topic by saying: Thus, first-person pronouns in scientific writing are acceptable if used in a limited fashion and to enhance clarity.

## WHICH OR THAT?

**Which:** A phrase beginning with *which* may be essential to what you are trying to say. However, if the sentence is structurally sound with a subject and verb preceding the additional information provided by “which,” then the clause beginning with *which* is not essential, which makes it nonrestrictive.

For example: I love my amethyst necklace, which was given to me on my 40th birthday.

The subject (I) and verb (love) along with the object (necklace) makes this sentence complete in the sense that it can stand alone without any added information. The fact that it was given to me on my 40th birthday is nice to know, but it is not essential to the construction of the sentence.

**That:** If you have a phrase that specifically restricts some other part of the sentence—so much so that the meaning of the sentence would change without it—then the relative pronoun, *that,* isneeded

For example: The amethyst necklace that my daughter gave me was stolen last month.

It was not just any necklace (nonrestrictive). It was the necklace “that” my daughter gave me (restrictive).

See pp. 14-16 of this manual for more information on restrictive and nonrestrictive clauses and when to use which and that. Also see <http://www.grammarbook.com/grammar/whoVwhVt.asp> and <http://www.kentlaw.edu/academics/lrw/grinker/LwtaThat_Versus_Which.htm> for rules on when to use which and that.

## While: To Use of Not To Use As a Subordinating Conjunction

Yes, **while**  is a subordinating conjunction meaning during the time that… or at the same time as…e.g., "nothing much changed while he was away."

It also means whereas (indicating a contrast). For example: "One person wants to stay, while the other wants to leave and never come back." The word **while** is becoming more and more popular, but its usage is being misapplied. If the sentence makes sense without it, it is not needed.

## WIDOWS AND ORPHANS

**Widow:** You will often see where a paragraph extends to the next page. The paragraph’s last line goes forward to the beginning of the following page or column and is separated or “widowed” from the rest of its text. This separation is called a widow. Like a widow in the true sense of the word, it continues to support its family (the paragraph) and completes the paragraph’s work after the separation.

**Orphan:** When the first line of a new paragraph heading appears by itself at the bottom of a page or column—then that line is called an orphan. A word, part of a word, or a very short line which is separated from the rest of the paragraph it is related to is called an orphan. The orphan then is left behind until you move it to the next page so it can join its related text.

Orphans are always at the bottom of the page. Widows always complete their discussion in one line at the top of the next page. Orphans should be avoided. Keep the paragraphs with their subheadings together on one page or the other.

## WRITER’S BLOCK AND THE FIVE Ws

Every investigative reporter is taught to ask the five Ws—who, what, why, when, where—as well as how. A good researcher is designated as the principal investigator of funded projects. Every good investigator knows how to ask questions and find the answers. To solve the writer’s block dilemma, make sure you have asked all the questions that can be asked pertaining to the topic you are pursuing. Assume the role of an investigative reporter by answering:

* + **Who** established the foundational theories of my research?
  + **Who** are the experts?
  + **Who** else is seeking to accomplish the same mission with different methods?
  + **What** are they doing?
  + **What** am I doing that is different?
  + **What** am I bringing to my research community that is new or valuable or potentially transformative?
* **Why** is my research important?
* **Why** are my methods better than others?

## Writing for Better Organization, Clarity, and Coherence

The first sentence of your paragraph is a topic sentence, and it represents the central idea of that paragraph. Readers seldom read every word of an article, but instead, they search for keywords pertaining to their interest. Every paragraph should encapsulate an idea that can stand on its own. Do not begin a topic sentence with a pronoun or adverbial conjunction like however, therefore, or nevertheless. Completely identify the subject. Say what you want to say up front and build on that thought until you are ready for the next concept (e.g., the next paragraph).

**Topic Sentence Success**: A precise concise topic sentence makes a definite assertion or asks a direct question. It contains the keywords that give the topic its substance and clearly states the value of the topic. Do not make the reader guess your intention.

**Coherence:** Make sure that your supporting sentences back up and develop the central idea in your topic sentence by providing the needed details. Ask yourself, “Does this sentence do anything to clarify the topic and move my thoughts on the subject forward? If it does not, cross it out or extract so it can be saved with other supplementary information that can be developed into another paragraph. Each sentence should lead naturally to the next. That is what editors call coherence.

**Emphasis:** Your concluding sentence should summarize your topic sentence. Let the reader know the primary fact you want him or her to remember in this paragraph.

**Avoid Repetition:** This is especially important in a journal article. Journal articles often emphasize a transformation whereby a change was made that was extremely important—and thus, needs to be repeated for emphasis. That is okay as long as you don’t repeat the same phrase to the point that it is annoying—especially if it is touting achievements. Find a different way to express the achievement—using different words, but words that express the same thought. Thus, the innovation will change the way xxx leaders and professionals achieve …. Some of the most important changes introduced by this innovation are….

## Writing Out Descriptions OF Equations and Other Numerical Topics

The following is from the 2018 IEEE Editorial Manual of Style (<http://ieeeauthorcenter.ieee.org/wp-content/uploads/IEEE-Editorial-Style-Manual.pdf>) :

“When editing technical publications, it is important to remember that the mathematics often carries as much if not more meaning than the body of text itself. Therefore, it is critical that the grammar of an equation be considered when editing.

Most equations should read like a sentence. They should contain a noun and a verb and often contain adjectives, prepositional phrases, conjunctions, and conditions. Equations also contain punctuation. When math occurs along with text it shares the grammatical characteristics of the text. A displayed expression may be a main or subordinate clause, an expression in apposition, a direct object, an item in a list, or the object of a preposition. Use comma at end of introductory sentences after: i.e., e.g., “Hence” or “That is.” Use a colon after words such as “following” or “as follows.” There should be no punctuation after forms of the verb to be, or between a verb and its object or a preposition and its object. IEEE style dictates that the only punctuation used at the end of an equation is a period. However, other punctuation is permitted in the equation itself and between an equation and its condition. This interior punctuation contains mathematical meaning and must not be changed.” Page 29, Ch. IV Editing Mathematics, Section A. The Language of Math.

**Use of “where” when explaining an equation:**The word “where” is a subordinating conjunction, which is the first word in the **subordinate clause** that continues the explanation of an equation. This clause cannot stand alone because it depends on the rest of the sentence for its meaning. In engineering papers, this editor often sees the subordinating conjunction “where” capitalized after an equation. Because math is a language, an equation always makes a statement. It is usually introduced, then presented on a separate line followed by a definition, which begins with “where….”Thus, “where” continues to explain what the different components of the equation represent. When “where” concludes the explanation of an equation, it should always be set flush left on a line directly below the equation, and it should never be capitalized.

Notice that IEEE puts a space between the number and its unit. This is demonstrated in their discussion of hyphenating compound adjectives. The following is copied from the 2018 IEEE Style Manual :

“Numbers and units used as compound adjectives may be hyphenated only if needed for clarity: 10-kV voltage, 5-in-thick glass. Do not insert a hyphen when they are not used as adjectives: a current of 2 A, a line that is 4 in long, a length of 3.05 mm.”

**Do not use a hyphen in place of a minus sign**. A hyphen (-) is a punctuation mark used to join words or parts of words. It is not interchangeable with other types of dashes, and it should not serve as a minus sign (−). The hyphen is a bit lower-down on the line of text (baseline) than the minus sign and dashes. Moreover, the hyphen is also noticeably short. It sits too close to the baseline and is too tiny to be used in mathematical expressions.

The **minus sign** − is a little higher than an en dash –. **Type Alt + 8722** to get the minus sign. If that does not work, you can also go to the Insert tab icon in Word, choose Symbol, then More Symbols and **type 2212 in the Character Code box**.

Notice the difference between a hyphen (-), en dash (–) and an em dash (—). (See pages 18 and 19 for dash keystrokes and discussion on the different types of dashes). It is important to use the correct marks. When using any kind of dash, do not put a space before or after the mark.

**Nonbreaking Hyphen:** A non-breaking hyphen can be inserted with the keystrokes **Ctrl+Shift+hyphe**n, which keeps MS Word from splitting a word when the word wraps at the end of a line. This is good to have if you have a hyphenated name like Silva-Martinez and you want to keep both names on the same line.

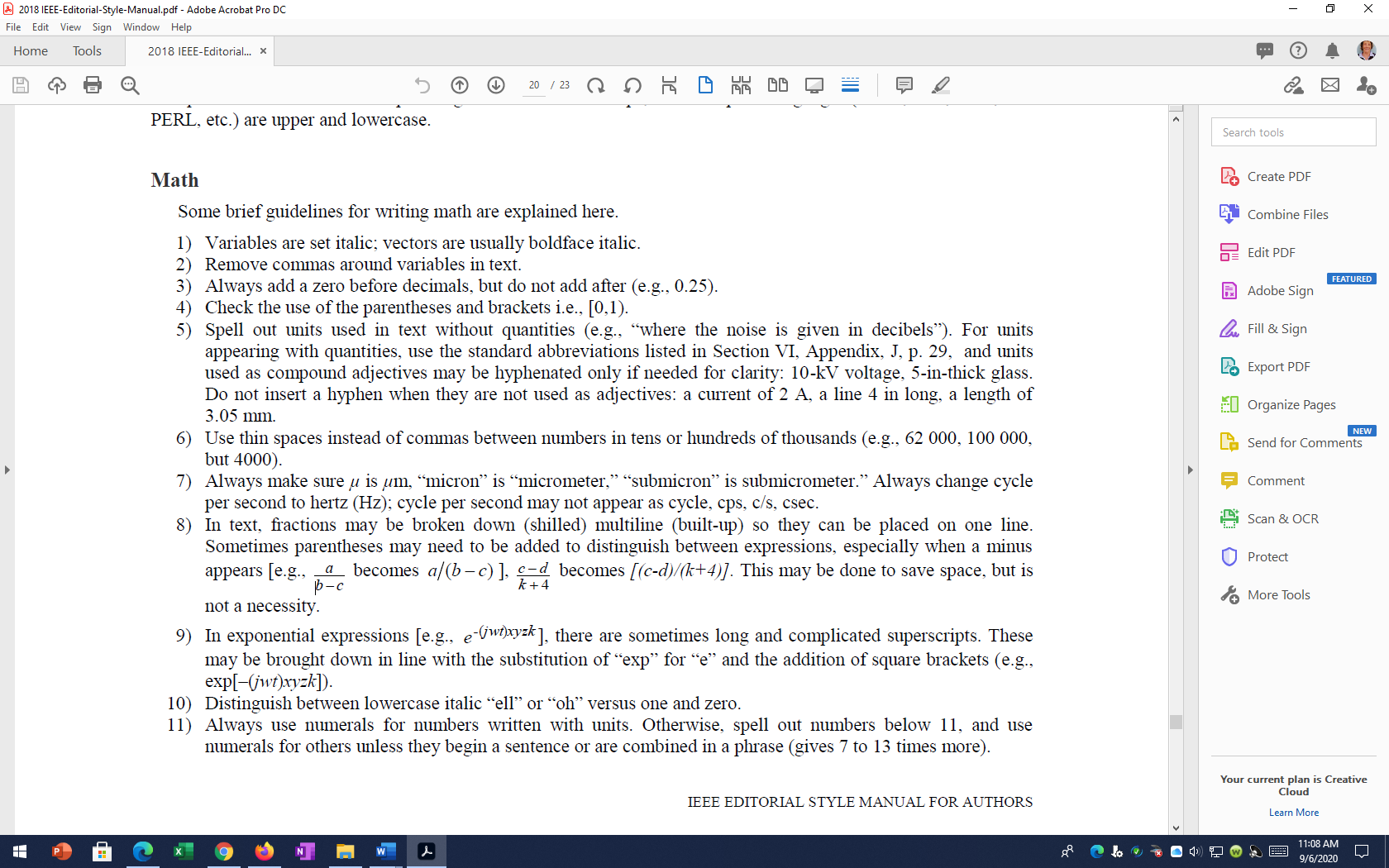
**Nonbreaking Spacing**: When a line is justified, it often stretches out spaces to accommodate the block style paragraph. This often separates the parts of an equation by splitting it from one line to the next. To prevent that, when typing the spaces between symbols and units or between the +, −, = or < and > signs, use the keystroke **Ctrl+Shift+Spacebar for a nonbreaking space**, which is designed to keep the number and unit on one line by not allowing a line break before the equation or parameter expression is completed.

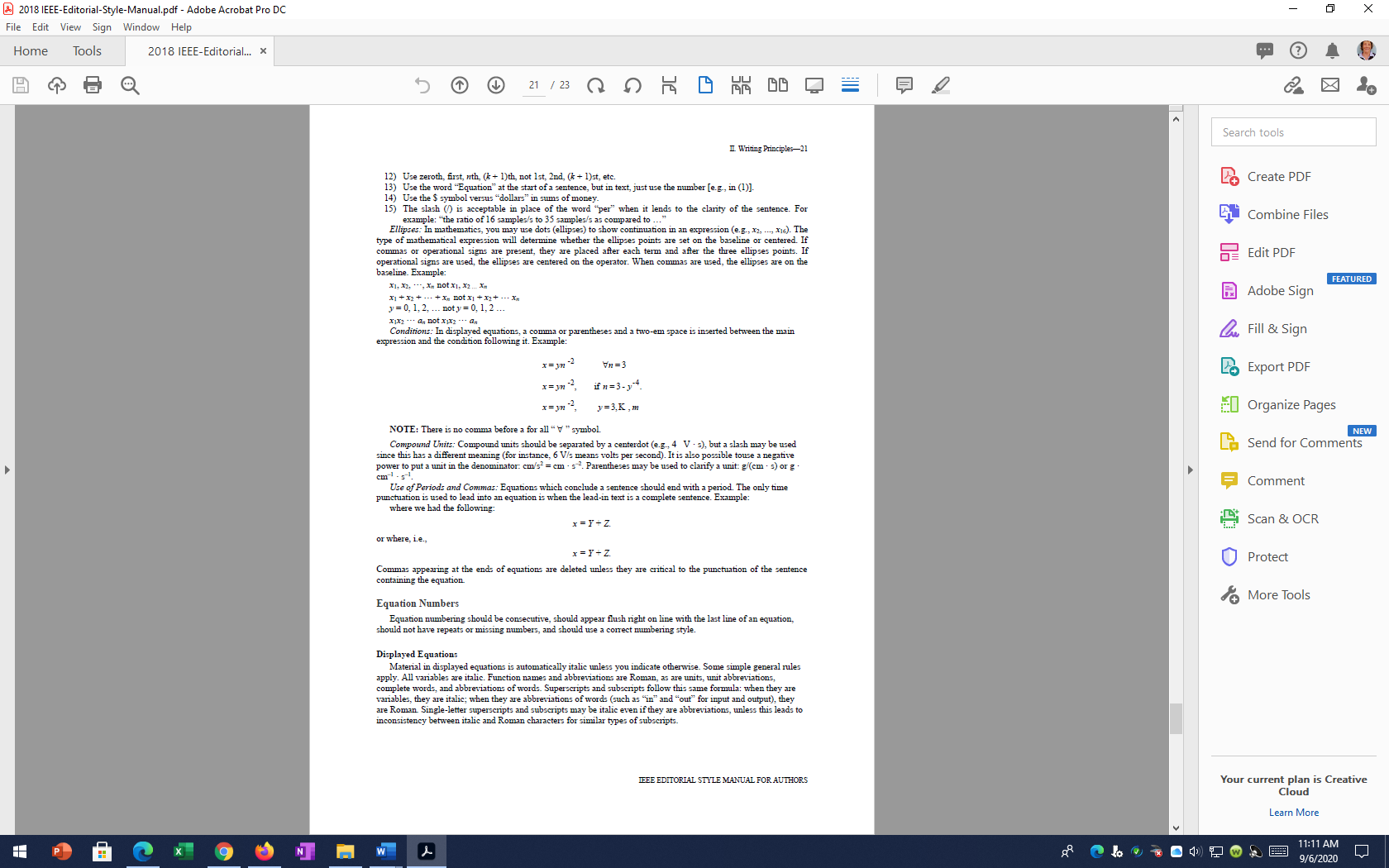
A minus or plus sign should have a space before and after the symbol. If the space is too large, you can also use the **nonbreaking space** to tighten the line.

Use the keystroke **Alt + 0177 to get** **±.** For a **multiplication symbol**, use **Alt+0215** to get ×.

For a **percent symbol**, the Chicago Manual of Style advocates **no** space between the unit and the % symbol. However, the International System of Units manual (chapter 5) states: "**A space separates the number and the symbol %.**" The ISO 31-0 standard also specifies a space, and the TeX typesetting system encourages using one. This is in accordance with the general rule of adding a nonbreaking space between a numerical value and its corresponding unit of measurement. I recommend checking the journal you are submitting to. Look at the articles associated with your journal of interest and see how they express percentages; then use their practice as your standard for the papers you submit to that journal. For an excellent set of rules pertaining to writing out equations in the narrative and in Equation Editor, go to 2018 IEEE Editorial Style Manual found at <http://ieeeauthorcenter.ieee.org/wp-content/uploads/IEEE-Editorial-Style-Manual.pdf>. **The American Chemical Society’s style guide** tells us:

“Use numerals with units of time or measure, and use a space between the numeral and unit, except % (50%) ,$ ($250), ⁰ (angular degrees or 180⁰, *but* 180 ⁰C), ‘ (angular minutes), and “ (angular seconds) as in 47⁰8’23”.” Please note I copied this from the ACS Style Guide (2006, 3rd Ed., p. 203). They had the examples in three columns below the rule, but I selected the relevant ones in parentheses next to descriptions.





**Vancouver Citing & Referencing style**

***\*\*\*(For more comprehensive information consult the Citing & Referencing library guide)\*\*\****

# <http://guides.lib.monash.edu/citing-referencing/vancouver>

**A note from Carla:** This aid is provided by Monash University. If you go to the page featuring the Vancouver style you will also find links to style guides from APA, CSIROT, IEEE, Harvard, Law, MLA, MHRAT, and Turabian. Monash University has provided a wonderful resource. I am including their information on the Vancouver Style with some additional information from IEEE, and some information based on my own experience with Vancouver using various style guides. Remember that many journals provide their own style guides. When submitting to a journal, always check its author information resources and see what style(s) its editors recommend. Always follow the journal’s recommendation. **The Monash presents the UK style of punctuation in citations.** **My examples (in red) are based on the American style of punctuation in citations. I marked copy that deviates from the Monash presentation (based on American standards) by setting the first sentence of the new additional commentary paragraph in red.** In one instance, I provide a table showing citation differences between UK and American citation requirements.

Vancouver is a numbered referencing style commonly used in medicine and science, and consists of:

* citations to someone else's work in the text, indicated by the use of a number
* a sequentially numbered reference list at the end of the document providing full details of the corresponding in-text reference

It follows rules established by the International committee of Medical Journal Editors, now maintained by the U.S. National Library of Medicine. It is also known as Uniform Requirements for Manuscripts submitted to Biomedical Journals.

# Before using this guide check with your faculty, school or department for their specific referencing guidelines

**In-text citations**

* Insert an in-text citation:
  + when your work has been influenced by someone else's work, for example:
    - when you directly quote someone else's work
    - when you paraphrase someone else's work
* General rules of in-text citation:
  + A number is allocated to a source in the order in which it is cited in the text. If the source is referred to again, the same number is used.
  + Use Arabic numerals (1,2,3,4,5,6,7,8,9)
  + Either square [ ] or curved brackets ( ) can be used as long as it is consistent. Please check with your faculty/lecturer to see if they have a preference.
  + Superscripts can also be used rather than brackets e.g., ...was discovered. 1,3
  + Reference numbers should be inserted to the left or inside of colons and semicolons.
  + Reference numbers are generally placed outside or after full stops and commas - however check with your faculty/journal publisher to determine their preference. For consistency in this guide, we are placing reference numbers after full stops.
  + Whatever format is chosen, it is important that the punctuation is consistently applied to the whole document.

# Multiple works by the same author:

Each individual work by the same author, even if it is published in the same year, has its own reference number.

# Citing secondary sources:

A secondary source, or indirect citation, occurs when the ideas on one author are published in another author's work, and you have not accessed or read the original piece of work. In the author-date system: Cite the author of the work you have read followed by the secondary author and year. and also include the secondary source in your reference list. For example: (as cited by Jones et al., 2020 from Yang et al., 2018). You should also look at the original work (if possible) to see if the information presented by Jones et al. represents the true meaning of the work they cited. In the Vancouver system, you would write: (as cited by [8] from [9]).

# In-text citation examples

The in-text citation is placed immediately after the text which refers to the source being cited: However, when an in-text citation number comes between the end quotation mark and the period, the period should go to the outside of the bracketed citation number.

**The period (in US submissions) goes before the superscript number(s).** US rules are in the left-hand column below. See AMA Style Guide (http://guides.lib.uw.edu/c.php?g=99161&p=642357 ).

The international formatting provided by Monash University is shown in the right-hand column and has not been altered.

|  |  |
| --- | --- |
| For American Journals (Carla’s Addition) | For Intl. Journals (Orig. Monash U. Copy) |
| Using parentheses: ...as one author has put it "the darkest days were still ahead"(1). | *Using round brackets:* ...as one author has put it "the darkest days were still ahead".(1) |
| Using square brackets: ...as one author has put it "the darkest days were still ahead"[1]. | *Using square brackets:* ...as one author has put it "the darkest days were still ahead".[1] |
| Using superscript: ...as one author has put it "the darkest days were still ahead."1  The author's name can also be integrated into the text: Scholtz 1 has argued that... | *Using superscript:* ...as one author has put it "the darkest days were still ahead".1  The author's name can also be integrated into the text: Scholtz 1 has argued that... |
| Please Note: Without the quotation marks, the darkest days won’t be ahead if you simply put the period before the superscript.1 Sentences without superscripts or quotation marks using the full-size bracketed number will always end with a period [2]. | |

**Because this guide is for writers submitting to American publications,** the editor (Carla Roberts of Preferred Copy Editing) is showing the correct referencing format according to American copy-editing rules in the left-hand column and in the bottom notation. Please see the AMA example of this type of referencing at <http://guides.lib.uw.edu/c.php?g=99161&p=642357>

**Including page numbers with in-text citations***:* **To add a page number in the American style above, simply add the page number as shown here: "the darkest days were still ahead.”(1, p.23)** In American journals, separate the regular size citation number and page number in brackets or parentheses with a comma, e.g., [1, p. 23] or (2, p. 27).

**Monash University Instructions continued:**

This is British formatting.

American formatting will always expect commas and periods to be inside (i.e., to the left) of the end quotation mark.

Page numbers are not usually included with the citation number.

However, should you wish to specify the page number of the source,

the page/s should be included in the following format:

...as one author has put it "the darkest days were still ahead".1(p23)

...as one author has put it "the darkest days were still ahead".(1 p23)

Scholtz (1 p16–18) has argued that...

## Citing more than one reference at a time*:*

The preferred method is to list each reference number separated by a comma, or by a dash for a sequence of consecutive numbers. There should be no spaces between commas or dashes. For example: (1,5,6–8).

# Please note that Taylor-Francis Group deviates from all the other publishers by allowing bracketed numbers to appear in superscript.

# Reference List (See example Reference List on last page)

* References are listed in numerical order, and in the same order in which they are cited in text. The reference list appears at the end of the paper.
* Begin your reference list on a new page and title it 'References.'
* The reference list should include all and only those references you have cited in the text. (However, do not include unpublished items such as correspondence).
* Use Arabic numerals (1, 2, 3, 4, 5, 6, 7, 8, 9).
* Abbreviate journal titles in the style used in the [NLM Catalog](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=journals&amp;Cmd=DetailsSearch&amp;Term=currentlyindexed%5BAll%5D)
* Check the reference details against the actual source - you are indicating that you have read a source when you cite it.
* Be consistent with your referencing style across the document.
* For additional information you may wish to consult [Citing Medicine, 2nd ed](http://www.ncbi.nlm.nih.gov/books/NBK7256/).

# Scholarly journal articles

* Follow these examples closely for all layout, punctuation, spacing and capitalization. These general rules apply to both print and electronic articles.
* Enter author's surname followed by no more than 2 initials (full stop).
* If more than 1 author: give all authors' names and separate each by a comma and a space.
* For articles with 1 to 6 authors, list all authors. For articles with more than 6 authors, list the first 6 authors; then, add 'et al.'
* Only the first word of the article title and words that normally begin with a capital letter are capitalized.
* Journal titles are abbreviated (to decipher/find correct abbreviations see: [*PubMed Journals Database*](http://www.ncbi.nlm.nih.gov/nlmcatalog/journals)
* Follow the date with a semi-colon;
* Abbreviate months to their first 3 letters (no full stop)
* Give the volume number (no space) followed by issue number in brackets
* If the journal has continuous page numbering through its volumes, omit month/issue number.
* Abbreviate page numbers where possible, e.g., 123–29. **(Use en dash instead of hyphen when expressing this range of numbers).**

# Digital Object Identification (DOI) and URLs

The digital object identifier (DOI) is a unique identifier, and should be provided in the reference where it is available. This alphanumeric string is usually located on the first page with other referencing elements in the article. More recent electronic journal articles will be displayed as permanent URL's. They will look something like this - [http://dx.doi.org/10.1037/a0024996.](http://dx.doi.org/10.1037/a0024996) Both formats are acceptable, use the form as it appears in your source.



# Print articles

|  |  |
| --- | --- |
| **Article with 1 to 6 authors** | Author AA, Author BB, Author CC, Author DD. Title of article. Abbreviated title of journal. Date of publication YYYY Mon DD;volume number(issue number):page numbers. |
|  | Petitti DB, Crooks VC, Buckwalter JG, Chiu V. Blood pressure levels before dementia. Arch Neurol. 2005 Jan;62(1):112-6. |
| **Article with more than 6 authors** | Author AA, Author BB, Author CC, Author DD, Author EE, Author FF, et al. Title of article. Abbreviated title of journal. Date of publication YYYY Mon DD; volume number (issue number): page numbers. |
|  | Hallal AH, Amortegui JD, Jeroukhimov IM, Casillas J, Schulman CI, Manning RJ, et al. Magnetic resonance cholangiopancreatography accurately detects common bile duct stones in resolving gallstone pancreatitis. J Am Coll Surg. 2005 Jun; 200(6):869–75. |

**Electronic journal articles**

* The word [Internet] in square brackets should be inserted after the abbreviated journal title.
* The date cited [in square brackets] must be included after the date of publication.
* The URL (web address) must be included at the end of the reference.
* For electronic journal articles, include the DOI (digital object identifier) at the end of the reference, after the URL

|  |  |
| --- | --- |
| **Electronic journal article** | Author AA, Author BB. Title of article. Abbreviated title of Journal [Internet]. Date of publication YYYY MM [cited YYYY Mon DD]; volume number(issue number):page numbers. Available from: URL |
|  | Stockhausen L, Turale S. An explorative study of Australian nursing scholars and contemporary scholarship. J Nurs Scholarsh [Internet]. 2011 Mar [cited 2013 Feb 19];43(1):89-96. Available from: [http://search.proquest.com.](http://search.proquest.com/) ezproxy.lib.monash.edu.au/ docview/858241255?accountid=12528 |
| **Electronic journal article with DOI** | Author AA, Author BB, Author CC, Author DD, Author EE, Author FF. Title of article. Abbreviated title of Journal [Internet]. Year of publication [cited YYYY Mon DD]; volume number(issue number):page numbers. Available from: URL DOI |
|  | Kanneganti P, Harris JD, Brophy RH, Carey JL, Lattermann C, Flanigan DC. The effect of smoking on ligament and cartilage surgery in the knee: a systematic review. Am J Sports Med [Internet]. 2012 Dec [cited 2013 Feb 19];40(12):2872-8. Available from: <http://ajs.sagepub.com/content/40/12/2872> DOI: 10.1177/0363546512458223 |

# Note: Carla added thesis information from IEEE Editorial Style Manual

# Thesis and Dissertations from <http://www.ieee.org/documents/style_manual.pdf>

|  |  |
| --- | --- |
| **Thesis** | Author, AA, Title of thesis, M.S. thesis, Abbrev. Dept., Abbrev. Univ., City of Univ., Abbrev. State, year |
|  | Kawasaki, N, Parametric study of thermal and chemical nonequilibrium nozzle flow, M.S. thesis, Dept. Electron. Eng., Osaka Univ., Osaka, Japan, 1993. |
| **Dissertation** | Author AA, Title of dissertation, Ph.D. dissertation, Abbrev. Dept., Abbrev. Univ., City of Univ., Abbrev. State, year. |
|  | Williams, JO, Narrow-band analyzer, Ph.D. dissertation, Dept. Elect. Eng., Harvard Univ., Cambridge, MA, 1993. |

# Books and book chapters

* Follow these examples closely for all layout, punctuation, spacing and capitalization.
* Enter author's surname, followed by no more than 2 initials.
* Give **all** authors' names and separate each by a comma and a space.
* Enter all authors' names in the order in which they appear in the original source.
* Only the first word of the article title and words that normally begin with a capital letter are capitalized.
* For book chapters abbreviate page numbers as p. 12-25. Where appropriate abbreviate thus: p. 122-8.
* For electronic books include the DOI (Digital Object Identifier) if it is given and place it after the URL (web address).
* Abbreviate months to their first 3 letters
* The formats for Tables and Figures (see below) can also be applied to charts, photographs, graphs etc.
* For more detailed information go to: [http://www.nlm.nih.gov/citingmedicine](http://www.ncbi.nlm.nih.gov/books/NBK7256/)

|  |  |
| --- | --- |
| **Book :**  **a.) Print book OR**  **b.) Electronic book** | **a.)** Author AA. Title of web page [Internet]. Place of Publication: Sponsor of Website/Publisher; Year published [cited YYYY Mon DD]. Number of pages. Available from: URL DOI: (if available) |
|  | **a.)** Carlson BM. Human embryology and developmental biology. 4th ed. St. Louis: Mosby; 2009. 541 p.  **b.)** Shreeve DF. Reactive attachment disorder: a case-based approach [Internet]. New York: Springer; 2012 [cited 2012 Nov 2]. 85 p. Available from: |
|  | <http://ezproxy.lib.monash.edu.au/> login?url[=http:](http://dx.doi.org/10.1007/978-1-4614-)/[/dx.doi.org/10.1007/978-1-4614-](http://dx.doi.org/10.1007/978-1-4614-) 1647-0 |
| **Chapter :**  **a. ) in an edited book**  **OR**  **b.) in an edited electronic book** | **a.)** Author AA, Author BB. Title of chapter. In: Editor AA, Editor BB, editors. Title of book. # edition. Place of Publication: Publisher; Year of publication. p. [page numbers of chapter].  **b.)** Author AA, Author BB. Title of chapter. In: Editor AA, Editor BB, editors. Title of the book [Internet]. Place of publication: Publisher's name; Year of publication. [cited YYYY Mon DD]. p. #. [page or chapter number/s]. Available from: URL DOI [if available] |
|  | **a.)** Blaxter PS, Farnsworth TP. Social health and class inequalities. In: Carter C, Peel JR, editors. Equalities and inequalities in health. 2nd ed. London: Academic Press; 1976. p. 165-78.  **b.)** Halpen-Felsher BL, Morrell HE. Preventing and reducing tobacco use. In: Berlan ED, Bravender T, editors. Adolescent medicine today: a guide to caring for the adolescent patient [Internet]. Singapore: World Scientific Publishing Co.; 2012 [cited 2012 Nov 3]. Chapter 18. Available from: <http://www.worldscientific.com/> doi/pdf/10.1142/9789814324496\_0018 |

# Citing References-IEEE Style

# The following is from the [2015 IEEE Editorial Style Manual](https://www.ieee.org/publications_standards/publications/journmag/online_style_manual-10292015.pdf)

#### **Published Conference Proceedings**

The general form for citing conference proceedings is to list the author and title of the paper, followed by the name (and location, if given) of the conference *in italics* using standard abbreviations.

Write out all the remaining words but omit most articles and prepositions like “of the” and “on.” That is,

*Proceedings of the 1996 Robotics and Automation Conference* becomes *Proc. 1996 Robotics and Automation Conf.*

**NOTE:** All published conference or proceedings papers have page numbers.

**IEEE formatting continued:**

**Proceedings Basic Format:**

[1] J. K. Author, “Title of paper,” in *Abbreviated Name of Conf.*, (location of conference is optional), year, pp. *xxx-xxx.*

**Examples:**

1. G. R. Faulhaber, “Design of service systems with priority reservation,” in *Conf. Rec. 1995 IEEE Int. Conf. Commun.*, pp. 3–8. *\*\*\* If the year is given in the conference title, it may be omitted from the end of the reference as shown here.\*\*\**
2. S. P. Bingulac, “On the compatibility of adaptive controllers,” in *Proc. 4th Annu. Allerton Conf. Circuit and Systems Theory*, New York, 1994, pp. 8–16.
3. W. D. Doyle, “Magnetization reversal in films with biaxial anisotropy,” in *1987 Proc. INTERMAG Conf.*, pp. 2.2- 1–2.2-6.
4. C. T. Meadow and D. W. Waugh, “Computer assisted interrogation,” in *1991 Fall Joint Computer Conf., Proc. AFIPS Conf.,* vol. 29. Washington, DC: Spartan, 1991, pp. 381–394. *\*\*\* There is an <emspace> between “vol. 29.” and “Washington.”\*\*\**
5. P. C. Parks, “Lyapunov redesign of model reference adaptive control systems,” in *1993 Joint Automatic Control Conf., Preprints*, pp. 485–491.
6. T. S. Hsia, “System identification,” in *IEDM Tech. Dig.*, 1993, vol. 2, no. 8, pp. 6–13.

#### **Papers Presented at Conferences**

**Basic Format:**

[1] J. K. Author, “Title of paper,” presented at the abbrev. Name of Conf., City of Conf., Abbrev. State, year.

**Examples:**

1. J. G. Kreifeldt, “An analysis of surface-detected EMG as an amplitude-modulated noise,” presented at the 1989 Int. Conf. Medicine and Biological Engineering, Chicago, IL, USA, Nov. 9–12, 1989.
2. G. W. Juette and L. E. Zeffanella, “Radio noise currents on short sections on bundle conductors,” presented at the IEEE Summer Power Meeting, Dallas, TX, Jun. 22-27, 1990, Paper 90 SM 690-0 PWRS. *\*\*\* PES Papers—For years prior to 1997, all Power papers were presented at a conference.\*\*\**
3. J. Arrillaga and B. Giessner, “Limitation of short-circuit levels by means of HVDC links,” presented at the IEEE Summer Power Meeting, Los Angeles, CA, Jul. 12–17, 1990, Paper 70 CP 637. *\*\*\*Preprints are available before the conference from the IEEE Customer Services Department, at the conference from Paper Sales, and after the conference from ASK\*IEEE.\*\*\**

#### **Patents**

**Basic Format:**

[1] J. K. Author, “Title of patent,” U.S. Patent *x xxx xxx*, Abbrev. Month, day, year.

**Example:**

1. J. P. Wilkinson, “Nonlinear resonant circuit devices,” U.S. Patent 3 624 125, July 16, 1990.
2. T. Mei and T. Yang, “Circuit and method for average –current regulation of light-emitting diodes,” U.S. Patent 7 898 187 B1, 2011, Mar. 1, 2012.
3. S. P. Voinigescu *et al*., Direct *m*-ary quadrature amplitude modulation (QAM) operating in saturated power mode,” U.S. Patent Appl. 20110013726A1, Jan. 20, 2011.

**NOTE:** Use “issued date” if several dates are given.

# Monash University guidelines continued:

# Government and other reports

* Follow these examples closely for all layout, punctuation, spacing and capitalization.
* Enter author's surname, followed by no more than 2 initials.
* Give all authors and separate each by a comma and a space.
* Where the author is an organization, quote the full name of the organization, omitting the word "The" if preceding the name. Follow the name with the country of origin in parenthesis ( ) using only the two letter country code. See [Appendix D](http://www.ncbi.nlm.nih.gov/books/NBK7249/) of Citing Medicine.
* Where an author and organization are cited, use the author's name. Add the organization’s name at your discretion.
* If there are no authors, only editors, list all editors, followed by a comma and the word editor(s)
* Only the first word of the article title and words that normally begin with a capital letter are capitalized.
* The place of publication is the city in which the report was published. For US and Canadian cities follow with the two letter state code in [Appendix E](http://www.ncbi.nlm.nih.gov/books/NBK7254/) of Citing Medicine for all other cities us the two-letter country code in Appendix D of Citing Medicine
* Include page numbers in an abbreviated format. e.g.: p. 12-25. Where appropriate abbreviate e.g. p. 241-8
* For electronic reports include the DOI if it is given and place it after the URL.
* Abbreviate months to their first 3 letters

|  |  |
| --- | --- |
| **Government reports** | Author AA, Author BB. Title of report. Place of publication: Publisher; Date of publication. Total number of pages. Report No.: |
|  | Rowe IL, Carson NE. Medical manpower in Victoria. East Bentleigh (AU): Monash University, Department of Community Practice; 1981. 35 p. Report No.: 4. |

# Dictionaries and encyclopedias

|  |  |
| --- | --- |
| **Article from online reference work** | Title of encyclopedia [Internet]. Place of publication: Publisher; year. Title of article; [updated YYYY Mon DD; cited YYYY Mon DD]; [# of pages/screens]. Available from: URL |
|  | A.D.A.M. medical encyclopedia [Internet]. Atlanta (GA): A.D.A.M., Inc.; c2005. Ear barotrauma; [updated 2006 Oct 20; cited 2006 Nov 16]; [about 4 screens]. Available from: <http://www.nlm.nih.gov/medlineplus/ency/article/001064.htm> |
| **Article from electronic drug guide** | Title of work [Internet]. Place of publication: Publisher/Website; year. Name of drug: [revision/review date; cited YYY Mon DD]; [# of pages/screens]. Available from: URL |
|  | AHFS consumer medication Information [Internet]. Bethesda (MD): American Society of Health-System Pharmacists, Inc.; ©2008. Protriptyline; [revised 2007 Aug 1; reviewed 2007 Aug 1; cited 2008 Oct 2]; [about 5 p.]. Available from: <http://www.nlm.nih.gov/medlineplus/druginfo/meds/a604025.html> |

# Audio visual media

|  |  |
| --- | --- |
| **DVD’s** | Author A. Title [Format]. Place of publication: Publisher; year of publication. Item description. |
|  | Subbarao M. Tough cases in carotid stenting [DVD]. Woodbury (CT): Cine-Med, Inc.; 2003. 1 DVD: sound, color, 4 3/4 in. |
| **Video file e.g Web streaming vdieo** | Author, A. Title [format]. Place of publication: publisher; date of publication [date it was viewed]. Available from: website address |
|  | Silverstein O. Mothers and sons: the crucial connection [web streaming video]. Hanover (USA): Microtraining Associates; 2005 [cited 2010 May 27]. Available from: <http://ctiv.alexanderstreet.com/View/536289> |

**From the Internet**

* Follow these examples closely for all layout, punctuation, spacing and capitalization
* Author names should be listed in the order they appear on the site.
* Reproduce the title of a homepage as closely as possible to the wording on the screen
* Place the word Internet in square brackets following the title (and content type if present)
* Place of publication is defined as the city where the homepage is published. If place, publisher, date unknown use [place unknown], for example.
* Publisher is defined as the individual or organization issuing the homepage.
* The publication date is when the page was first published on the internet and includes the year.
* Date of up-to-date/revision - Always give the year and include the date/month, if provided, after the year.
* Include the date that you saw the page on the internet.
* Begin with the phrase "Available from". Insert the URL in its entirety. End with a period only if the URL ends with a slash, otherwise end with no punctuation
* For a more detailed guide to referencing website information please consult:

Patrias K. Citing medicine: the NLM style guide for authors, editors, and publishers [Internet]. 2nd ed. Wendling DL, technical editor. Bethesda (MD): National Library of Medicine (US); 2007 [updated 2009 Oct 21; cited 2010 Jan 8]. Available from: [http://www.nlm.nih.gov/citingmedicine](http://www.ncbi.nlm.nih.gov/books/NBK7256/)

|  |  |
| --- | --- |
| **Web page: a.) homepage b.) part of website** | **a.)** Author/organization's name. Title of the page [Internet]. Place of publication: Publisher's name; Date or year of publication [updated yr month day; cited yr month day]. Available from: URL  **b.)** Title of the homepage [Internet]. Place of publication: Publisher's name; Date or year of publication. Title of specific page/part; Date of publication of part [Date cited of part]; [location or pagination of part]. Available from: URL |
|  | **a.)** Diabetes Australia. Diabetes globally [Internet]. Canberra ACT: Diabetes Australia; 2012 [updated 2012 June 15; cited 2012 Nov 5]. Available from: <http://www.diabetesaustralia.com.au/en/> Understanding-Diabetes/Diabetes-  Globally/  **b.)** Australian Medical Association [Internet]. Barton ACT: AMA; c1995-2012. Junior doctors and medical students call for urgent solution to medical training crisis; 2012 Oct 22 [cited 2012 Nov 5]; [about 3 screens]. Available from: https://ama.com.au/media/junior-doctors -and-medical-students-call-urgent- solution-medical-training-crisis |
| **Image from web** | **Note:** If the title of the image is not shown construct a title that describes the image shown. Use enough words to make the constructed title meaningful. Place the constructed title in square brackets.  Author or organization. Title. Image on internet. Place of publication: Publisher's name; date of publication [date cited]. Available from: URL |
|  | Centers for Disease Control and Prevention. Photos of People with Shingles. [Image on internet]. 2018 [updated 2018; cited 2018, Mar 6]. Available  from: <http://www.cdc.gov/shingles/about/photos.html> |

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| --- | --- |
| **Lecture notes on Moodle** | Author, A.A. Title of lecture [format]. Place of Publication: Publisher; Date of Publication [Date cited]. Available from: 'website address' |
| A social media platform for educators, featuring collaboration. | Cloe, J. The normal distribution [Lecture notes on internet]. Melbourne: Monash University, Faculty of Medicine, Nursing and Health Sciences; 2012 [cited 2012 Jun 26]. Available from: [http://moodle.vle.monash.edu.au](http://moodle.vle.monash.edu.au/) |
| **Custom textbook or unit reader** | Author, A.A. Title of article. Publication details including original pages. Reprinted in: Smith, B editor, Title of course material. Place of publication: Publisher; Year of publication. |
|  | Shaffer, E, Brenner J. International trade agreements: hazards to health? International Journal of Health Services. 2004;34(3):467-481. Reprinted in: BTW3201 International Trade Law course materials 2011. Melbourne: Monash University; 2011. |

# University course materials

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# Sample reference list

**REFERENCES**

1. O'Campo P, Dunn JR, editors. Rethinking social epidemiology: towards a science of change. Dordrecht: Springer; 2012. 348 p.
2. Schiraldi GR. Post-traumatic stress disorder sourcebook: a guide to healing, recovery, and growth [Internet]. New York: McGraw-Hill; 2000 [cited 2006 Nov 6]. 446 p. Available from: [http://books.mcgraw-](http://books.mcgraw-/) hill.com/getbook.php?isbn=0071393722&template=#toc DOI: 10.1036/0737302658
3. Halpen-Felsher BL, Morrell HE. Preventing and reducing tobacco use. In: Berlan ED, Bravender T, editors. Adolescent medicine today: a guide to caring for the adolescent patient [Internet]. Singapore: World Scientific Publishing Co.; 2012 [cited 2012 Nov 3]. Chapter 18. Available from: <http://www.worldscientific.com/doi/pdf/10.1142/9789814324496_0018>
4. Stockhausen L, Turale S. An explorative study of Australian nursing scholars and contemporary scholarship. J Nurs Scholarsh [Internet]. 2011 Mar [cited 2013 Feb 19];43(1):89-96. Available from: <http://search.proquest.com.ezproxy.lib.monash.edu.au/docview/858241255?accountid=12528>
5. Kanneganti P, Harris JD, Brophy RH, Carey JL, Lattermann C, Flanigan DC. The effect of smoking on ligament and cartilage surgery in the knee: a systematic review. Am J Sports Med [Internet]. 2012 Dec [cited 2013 Feb 19];40(12):2872-8. Available online at: <http://ajs.sagepub.com/content/40/12/2872> DOI: 10.1177/0363546512458223
6. Subbarao M. Tough cases in carotid stenting [DVD]. Woodbury (CT): Cine-Med, Inc.; 2003. 1 DVD: sound, color, 4 3/4 in.
7. Stem cells in the brain [television broadcast]. Catalyst. Sydney: ABC; 2009 Jun 25.
8. G. Norris, R. Duvall, S. Brown, S. Bai, EPA Positive Matrix Factorization (PMF) 5.0 Fundamentals and User Guide prepared for the U.S. Environmental Protection Agency Office of Research and Development, Washington, DC (2014) (EPA/600/R-14/108; STI-910511-5594-UG, April)
9. P. Bingulac, “On the compatibility of adaptive controllers,” in Proc., 4th Annu. Allerton Conf. Circuit and Systems Theory, New York, 1994, pp. 8–16[[3]](#footnote-3)
10. G. R. Faulhaber, “Design of service systems with priority reservation,” in Conf. Rec. 1995 IEEE

Int. Conf. Commun., pp. 3–8. \*\*\* If the year is given in the conference title, it may be omitted from the end of the reference as shown here.\*\*\*

**SOFTWARE:**

1. ABAQUS Analysis User’s Manual Online Documentation. (Version 6.8), Dassault Systèmes Simulia Corp., Providence, RI, USA. (2008)
2. BRE Global (2019) CEEQUAL, version 6. Manual available for purchase at website, "BRE Global launches CEEQUAL Version 6 to support infrastructure projects' teams sustainability goals," <https://www.ceequal.com/news/bre-global-launches-ceequal-version-6-to-support-infrastructure-project-teams-sustainability-goals/>
3. Chappell, E. 2015 Autodesk InfraWorks 360 and Autodesk InfraWorks 360 LT essentials. New York, NY: John Wiley & Sons.
4. CMG’s GEM 2017. User’s Guide (Version 2017.10, Computer Modeling Group, Ltd. Calgary, Alberta, AB, Canada.
5. Environmental Systems Research Institute (ESRI). (2012). ArcGIS Release 10.1. Redlands, CA.
6. IBM Corp. Released 2010. IBM SPSS Statistics for Windows, Version 19.0. Armonk, NY: IBM Corp.
7. Klein, S.A. et al., 2017. TRYNSYS 18. A Transient System Simulation Program, Solar Energy Laboratory, University of Wisconsin, Madison, USA, <http://sel.me.wisc.edu/trnsys>
8. Infrastructure Sustainability Council of Australia (2021). IS Rating Scheme, <https://www.certifiedenergy.com.au/is-rating>
9. Institute for Sustainable Infrasturcture (ISI). 2018. Envision: Sustainable Infrastructure Framework Guidance Manual, 3rd Ed., ISBN 978-1-7322147-0-5, Published by Institute for Sustainable Infrastructure Washington, DC, ©2018. Available at https://sustainableinfrastructure.org/wp-content/uploads/EnvisionV3.9.7.2018.pdf
10. ISI 2021. Envision. Introduction with link to tutorials. at https://sustainableinfrastructure.org/resource/website-tutorials/
11. MathWorks, Inc. MATLAB : The Language of Technical Computing : Computation, Visualization, Programming : Installation Guide for UNIX Version 5. Natwick :MathWorks Inc., Natick , MA, USA, 1996.
12. OriginPro, Version 8.0. (2008) OriginLab Corporation, Northampton, MA, USA.

**Journal Name Abbreviations** should be abbreviated according to the [List of Title Word Abbreviations](http://www.issn.org/services/online-services/access-to-the-ltwa/)

# provided by The International Centre for the registration of serial publications, which is an intergovernmental organization which manages at the international level the identification and the description of serial publications and ongoing resources, print and online, in any subject.

# ASTM Standards will show you how they want their standards to appear in references at the very bottom of the screen where they are described, e.g.,

# [12] ASTM G1-03(2017)e1, Standard Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens, ASTM International, West Conshohocken, PA, 2017, [www.astm.org](https://www.astm.org/).

[13] ASTM E21-09, Standard Test Methods for Elevated Temperature Tension Tests of Metallic Materials. ASTM International, West Conshohocken, PA, 2009, [www.astm.org](http://www.astm.org).

**Chinese standards:**

[14] MOHURD (Ministry of Housing and Urban-Rural Development of the People’s Republic of China). (2012). GB 50009-2012: Load Code for the Design of Building Structures, China Architecture & Building Press, Beijing, China.

[15] MOHURD (Ministry of Housing and Urban-Rural Development of the People’s Republic of China). 2010. GB50011-2010, Code for seismic design of buildings. Beijing, China.

[16] MOHURD (Ministry of Housing and Urban-Rural Development of People’s Republic of China (1998). GB/T 2975-1998

[17] State Environmental Protection Administration of China (SEPA), GB 18918-2002. Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant. Beijing: 2002 (in Chinese)  (SEPA now known as Ministry of Environmental Protection, MOEP). In Chinese

[18] State Environmental Protection Administration (SEPA): Water and wastewater monitoring and analysis method (4th Edition). (China Environmental Science Press, Beijing, 2007). (SEPA now known as Ministry of Environmental Protection, MOEP). In Chinese

[19] General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) and Standardization Administration (SAC) of the People's Republic of China. GB/T 1346-2011 Test methods for water requirement of normal consistency, setting time and soundness of the Portland cement, Standards Press of China, https://www.chinesestandard.net/PDF/English.aspx/GBT1346-2011

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1. 1Paperpile, (2019 update) “The Top List of Academic Search Engines,” Research and Writing Guides online information posted at <https://paperpile.com/g/academic-search-engines/> [↑](#footnote-ref-1)
2. 2Lowcountry Graduate Center, College of Charleston, “The 6 Best Search Engines for Academic Research,” *The Journal,* online information posted March 23, 2017. <https://www.lowcountrygradcenter.org/the-6-best-search-engines-for-academic-research/> [↑](#footnote-ref-2)
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