Scientific research articles will undoubtedly require the use of abbreviations. Acronyms and units will be the most common abbreviations you will need to use. Abbreviations reduce the wordiness of your article, which is a plus, but can also cause confusion if you do not use them properly. This module presents:

1. Guidelines for using acronyms and initialisms in scholarly writing
2. Guidelines for using contractions in scholarly writing
3. How to use units in scholarly writing

Also, see the companion module Latin Words in Scholarly Writing for information on using Latin abbreviations.

1. Abbreviations

1. An abbreviation is any form of a shortened word.
2. Putting a period after letters in an abbreviation depends on the writing style that you use, so be sure to check out the writing style guide (e.g. APA or Chicago) to see what you should do. Journals will require you use a specific writing style for your article, so formatting the details like this right off the bat will improve your likelihood of publication and reduce the edits that you will be required to do.
Using Abbreviations: Acronyms and Units
www.sites.psu.edu/pubhub

Example 1: Abbreviation styles

American Psychological Association → APA
American Psychological Association → A.P.A.
November → Nov.
Doctor → Dr.
Self contained underwater breathing apparatus → scuba

2. Acronyms & Initialisms

1. These are common types of abbreviations
2. Acronyms take the first letter of each word in a phrase to create a new word.
   Caveat: On occasion an acronym will not contain the first letter of a word.
3. Initialisms do the same but do not spell pronounceable words
4. The first time that you are going to use a specific acronym or initialism in your article, write out a phrase or name first and then put the acronym/initialism in parentheses. After that, you can use the acronym/initialism on its own.

Example 2: Defining an acronym in the text

The United States Department of Agriculture (USDA) is responsible for allocating food assistance program funds. These programs used to be called "food stamps" but are now called the Supplemental Nutrition and Food Assistance (SNAP) and the Women, Infant, and Children (WIC) programs. One reason the USDA changed the program names was because the funds were no longer distributed as stamps but rather on an electronic card, much like a debit card.

USDA is an initialism because it is not a pronounceable word. SNAP and WIC are acronyms because they are pronounceable words.
3. Contractions

1. Contractions are abbreviations that include the first, last, and sometimes one or two middle letters of a word.
2. Capitalize the first letter of a contraction if the word needs to be capitalized (if it is a proper noun or begins a sentence).

<table>
<thead>
<tr>
<th>Example 3: Formatting contracted abbreviations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr.</td>
</tr>
<tr>
<td>amt.</td>
</tr>
<tr>
<td>vol.</td>
</tr>
</tbody>
</table>

4. Capitalizing Abbreviations

1. Abbreviations are usually capitalized, even if they do not represent proper nouns.
2. Some acronyms become so commonly used over time that they turn into words themselves. These do not need to be capitalized. A rule of thumb is that if the dictionary lists them as a word, then you do not need to capitalize them or spell out what they represent.

<table>
<thead>
<tr>
<th>Example 4: Capitalized abbreviations</th>
</tr>
</thead>
<tbody>
<tr>
<td>NASA</td>
</tr>
<tr>
<td>LCD</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Example 5: Lowercase abbreviations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser is actually an acronym for light amplification by stimulated emission of</td>
</tr>
</tbody>
</table>
radiation, but you almost never see laser written like an acronym LASER.

5. Abbreviating Units

1. Never use periods when you abbreviate units.
2. According to the Chicago Manual of Style, The International System of Units (SI) is the general method for writing units in a scholarly article. The following list describes rules you need to follow when using units.

Example 6: Unit abbreviations and periods

Incorrect: The average Lumbricus terrestris length was 10.16 c.m.
Corrected: The average Lumbricus terrestris length was 10.16 cm.

3. All units are written in lowercase except for “Celsius.”

Example 7: Lowercase unit abbreviations

Incorrect: The addition of 10 Lb of dry ice dropped the cylinder’s temperature 12 °c.
Corrected: The addition of 10 lb of dry ice dropped the cylinder’s temperature 12 ℃.
Incorrect: The addition of two Pounds of dry ice dropped the cylinder’s temperature six degrees celsius.
Corrected: The addition of two pounds of dry ice dropped the cylinder’s temperature six degrees Celsius.

4. Most abbreviations are lowercase unless they represent a proper name.
Example 8: Abbreviations representing proper names

The units watt, volt, and ampere are derived from the names of scientists, so their abbreviations should be capitalized.

watt → W  
volt → V  
ampere → A

5. Always abbreviate units when they follow a number.

Example 9: Abbreviate units when they follow a number

Incorrect: The tail was 16 centimeters long.

Corrected: The tail was 16 cm long.

6. Always place a space between the number and the unit.

Example 10: Spacing units

Incorrect: We added 2L of reagent.

Corrected: We added 2 L of reagent.

Note that L, the abbreviation for “liter” is uppercase. There are other cases where abbreviations are uppercase even if the unit is not a proper word. Consult your style guide for correct usage.

7. Use the same abbreviation for singular and plural units.
Example 11: How to write singular and plural units

Incorrect: They planted 50 ha’s of corn.
Corrected: They planted 50 ha of corn.
AND: They planted one ha of corn.

8. Spell out a unit if you use it without a numerical context.

Example 12: When to spell a unit

Incorrect: We recorded the volume of the tincture in ml.
Corrected: We recorded the volume of the tincture in milliliters
Incorrect: The final volume of the tincture was 12 milliliters.
Corrected: The final volume of the tincture was 12 ml.

9. Feet and inches, although not in the SI system, are sometimes accepted in scholarly articles. In this case, know that the official symbols are prime and double prime, NOT a single and double quotation mark.

Example 13: How to insert prime and double prime

In Word go to Insert → symbol → advanced symbol

10. Units that are raised to power (squared, cubed, etc.) can either have the modifier (the power) come before or after the unit.

Example 14: Units raised to a power

The researchers added three square meters to the pasture for the goats.
The researchers kept two goats per every 10 m\(^2\) of pasture.

11. Units that represent a rate are represented using a forward slash.

**Example 15: Units that represent a rate**

Incorrect: The world’s fastest car traveled at 435.31 km/hr.

Corrected: The world’s fastest car traveled at 435.31 km/h.

12. Only write numbers between 0.1 and 1,000 in an article. Once the number exceeds this range, convert it to a different unit.

**Example 16: Converting large and small numbers to a different unit**

\[ \begin{align*}
2,150 \text{ m} & \rightarrow 2.15 \text{ km} \\
.001 \text{ m} & \rightarrow .1 \text{ cm}
\end{align*} \]

13. Avoid starting sentences with numbers (this generates the passive voice). If you do start a sentence with a number, write out the number and unit.

**Example 17: Starting a sentence with numbers**

Incorrect: *Four hundred kg* of produce was donated.

Corrected: *Four hundred kilograms* of produce was donated.

Even better: The community donated *400 kg* of produce.

14. Units not part of the SI system, but still accepted, are “L” for liter, “t” for metric ton, and “h” for hour.
15. Other abbreviations not listed here:
   a. Astronomy: International Astronomical Union
   c. Military and civil titles
   d. Biblical: The Society of Biblical Language Handbook of Style

Sources and Additional Resources:

1. National Institute for Science and Technology
2. Chicago Manual of Style: Abbreviations (must be on a subscribing university’s network or have an account)

Additional resources suggested by the Chicago Manual of Style: