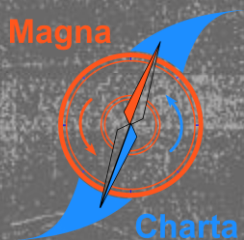


Ready to get published

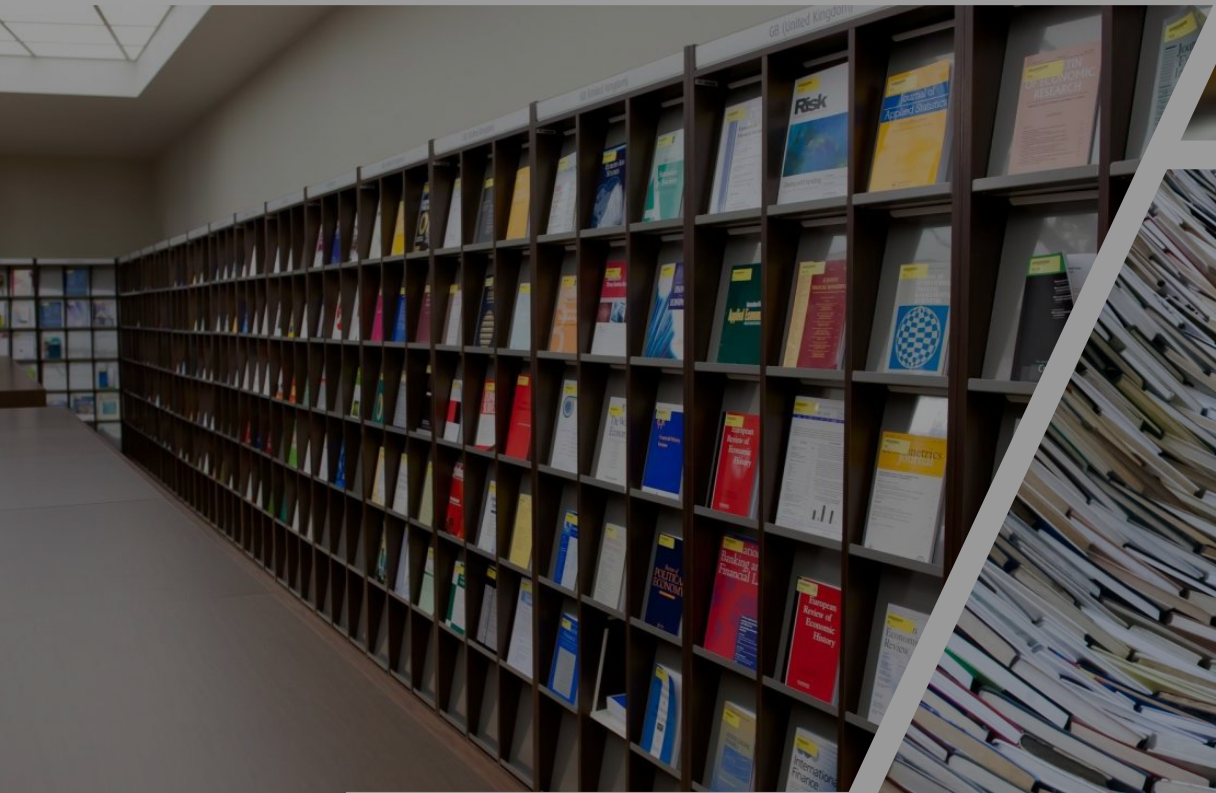
# ACTION STEPS FOR A SOUND SCIENTIFIC PUBLICATION

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Some useful terms

Action Steps for a sound scientific publication





# What is scientific publishing?

- In academic publishing, a paper is an academic work that is usually published in an academic journal.
- It contains original research results or reviews existing results.
- Such a paper, also called an article, will only be considered valid if it undergoes a process of peer review by one or more referees (who are academics in the same field) who check that the content of the paper is suitable for publication in the journal.
- Scientific publications are the aggregate of written and published records that are generated by research or theoretical summarizations and are circulated to inform specialists on the latest achievements of science and on the progress and results of research.







# What is a scientific journal?

- In academic publishing, a scientific journal is a periodical publication intended to further the progress of science, usually by reporting new research.
- Most scientific and scholarly journals, and many academic and scholarly books, though not all, are based on some form of peer review or editorial refereeing to qualify texts for publication. Peer review quality and selectivity standards vary greatly from journal to journal, publisher to publisher, and field to field.
- Most established academic disciplines have their own journals and other outlets for publication, although many academic journals are somewhat interdisciplinary, and publish work from several distinct fields or subfields.
- There is also a tendency for existing journals to divide into specialized sections as the field itself becomes more specialized.







# What is a scientific publication?

- Articles in scientific journals are mostly written by active scientists such as students, researchers and professors instead of professional journalists.
- Most journals are highly specialized, although some of the oldest journals such as Nature publish articles and scientific papers across a wide range of scientific fields.
- Scientific journals contain articles that have been peer reviewed, in an attempt to ensure that articles meet the journal's standards of quality, and scientific validity.
- Although scientific journals are superficially similar to professional magazines, they are actually quite different. Issues of a scientific journal are rarely read casually, as one would read a magazine.
- The publication of the results of research is an essential part of the scientific method. If they are describing experiments or calculations, they must supply enough details that an independent researcher could repeat the experiment or calculation to verify the results.
- Each such journal article becomes part of the permanent scientific record.



A WEEKLY ILLUSTRATED JOURNAL OF SCIENCE

TO THE EDITOR

OF NATURE

THURSDAY, NOVEMBER 4, 1869.

### NATURE: A WEEKLY ILLUSTRATED JOURNAL OF SCIENCE

**NATURE:** We are surrounded and sustained by her presence in separate members from her, and powerless to penetrate beyond her.

Without eating, or wearing, she sends her up into her glowing clouds, and while we are still as we stand, and sleep from her arms.

She is ever shaping new forms; what is, has never yet been; what has been, comes not again. Everything is new, and yet brought out the old.

We live in her world and know her not. She is incessantly speaking to us, but interpreted for us not. We constantly see signs of her, and yet have no power to see her.

The one thing she seems to care for is individuality; yet she cares nothing for individuality. She is always building up and destroying; but her workshop is immovable.

Her life is in her children; but where is the mother? She is the only being working up the most useless material into what appears; setting, without a trace of effort, or passion, on the most exact provisions, though always veiled under a certain uniform.

Each of her works has its essence of its own; each of her phenomena a special individuality; and yet their diversity is in unity.

She performs a play; we know not whether she acts in earnest, and yet she acts for us, the lookers-on.

Inconstant life, development, and movement are in her, but she advances not. She changes for ever and ever, and rests not a moment. Quiescence is immovable to her, and she has said her course upon ever. She is firm. Her ways are measured, her mysterious race, her laws unchangeable.

She has always thought and always thinks; though not as a man, but as Nature. She knows ever an

all-comprehending life, which is watching us and us.

Manifold dwell in her and she is there. With all men she plays a game for loss, and seldom the most they win. With many, but never as in hidden, that the game is over before they know it.

That which is most concealed is still Nature; the ungodly philosopher has a wealth of her genius. Whom cannot see for everywhere, were her no other signs.

She looks herself, and her immovable eyes and affections are fixed upon herself. She has divided herself that she may be her own delight. She carries an endless succession of new capacities for enjoyment in going up, that her invisible sympathy may be arranged.

She rejoices in division. When she moves it is her self and others, like the particles with the narrow spaces. Whom follows her in faith, but she takes it a child to her bosom.

Her children are numberless. To none is she altogether near; but she has her favorites, on whom she spends much, and for whom she makes great sacrifices. Over generous she spends her wealth.

She takes her creatures out of nothing, and lets them not where they came, but whither they go. It is their business to run, she leaves the road. Her mechanics has few springs; but they never break, and are always active and marvellous.

The spectacle of Nature is always new, she is always renewing the spectacle. Life is her most exquisite invention; and death is her eager co-operation to get plenty of life.

She respects in the least, and makes him for ever long for light. She creates him dependent upon the earth, full and heavy; and yet is always shaking him and by attempts to tear down it.

Cover of the first issue of Nature, 4 November 1869





# *Scientific publishing evolution*



Scientific publishing is undergoing major changes, as it makes the transition from the print to the electronic format. Business models are different in the electronic environment.



Since the early 1990s, licensing of electronic resources, particularly journals, has been very common.



An important trend, particularly with respect to journals in the sciences, is open access via the Internet. In open access publishing, a journal article is made available free for all on the web by the publisher at the time of publication.



Both open and closed journals are sometimes funded by the author paying an article processing charge, thereby shifting some fees from the reader to the researcher or their funder.



The Internet has facilitated open access self-archiving, in which authors themselves make a copy of their published articles available free for all on the web.



For scientific journals, reproducibility and replicability of the scientific results are core concepts that allow other scientists to check and reproduce the results under the same conditions described in the paper or at least similar conditions and produce similar results with similar measurements of the same measurand or carried out under changed conditions of measurement.

# Types of scientific publications

- Some journals, particularly newer ones, are now published in electronic form only.
- Paper journals are now generally made available in electronic form as well, both to individual subscribers, and to libraries.
- Almost always these electronic versions are available to subscribers immediately upon publication of the paper version, or even before; sometimes they are also made available to non-subscribers, either immediately (by open access journals) or after an embargo of anywhere from two to twenty-four months or more, in order to protect against loss of subscriptions.







# Types of scientific publications

There are several types of journal articles; the exact terminology and definitions vary by field and specific journal, but often include:

- Letters (also called communications, and not to be confused with letters to the editor) are short descriptions of important current research findings that are usually fast-tracked for immediate publication because they are considered urgent.
- Research notes are short descriptions of current research findings that are considered less urgent or important than Letters.
- Articles are usually between five and twenty pages and are complete descriptions of current original research findings, but there are considerable variations between scientific fields and journals—80-page articles are not rare in mathematics or theoretical computer science.
- Review articles do not cover original research but rather accumulate the results of many different articles on a particular topic into a coherent narrative about the state of the art in that field. Review articles provide information about the topic and also provide journal references to the original research. Reviews may be entirely narrative, or may provide quantitative summary estimates resulting from the application of meta-analytical methods.







# Types of scientific publications

There are several types of journal articles; the exact terminology and definitions vary by field and specific journal, but often include:

- Data papers are articles dedicated to describe datasets. This type of article is becoming popular and journals exclusively dedicated to them have been established, e.g. Scientific Data and Earth System Science Data.
- Supplemental articles contain a large volume of tabular data that is the result of current research and may be dozens or hundreds of pages with mostly numerical data. Some journals now only publish this data electronically on the Internet. Supplemental information also contains other voluminous material not appropriate for the main body of the article, like descriptions of routine procedures, derivations of equations, source code, non-essential data, spectra or other such miscellaneous information.
- Video papers are a recent addition to practice of scientific publications. They most often combine an online video demonstration of a new technique or protocol combined with a rigorous textual description.







# How long does it take?

- A paper may undergo a series of reviews, revisions, and re-submissions before finally being accepted or rejected for publication.
- This process typically takes several months.
- Next, there is often a delay of many months (or in some fields, over a year) before an accepted manuscript appears.
- This is particularly true for the most popular journals where the number of accepted articles often outnumbers the space for printing.
- Due to this, many academics self-archive a 'pre-print' copy of their paper for free download from their personal or institutional website.





# Peer review process

- Peer review is a central concept for most academic publishing; other scholars in a field must find a work sufficiently high in quality for it to merit publication.
- A secondary benefit of the process is an indirect guard against plagiarism since reviewers are usually familiar with the sources consulted by the author(s).
- The origins of routine peer review for submissions dates to 1752 when the Royal Society of London took over official responsibility for Philosophical Transactions.
- While journal editors largely agree the system is essential to quality control in terms of rejecting poor quality work, there have been examples of important results that are turned down by one journal before being taken to others.

There are various types of peer review feedback that may be given prior to publication, including but not limited to:

Single-blind peer review

Double-blind peer review

Open peer review

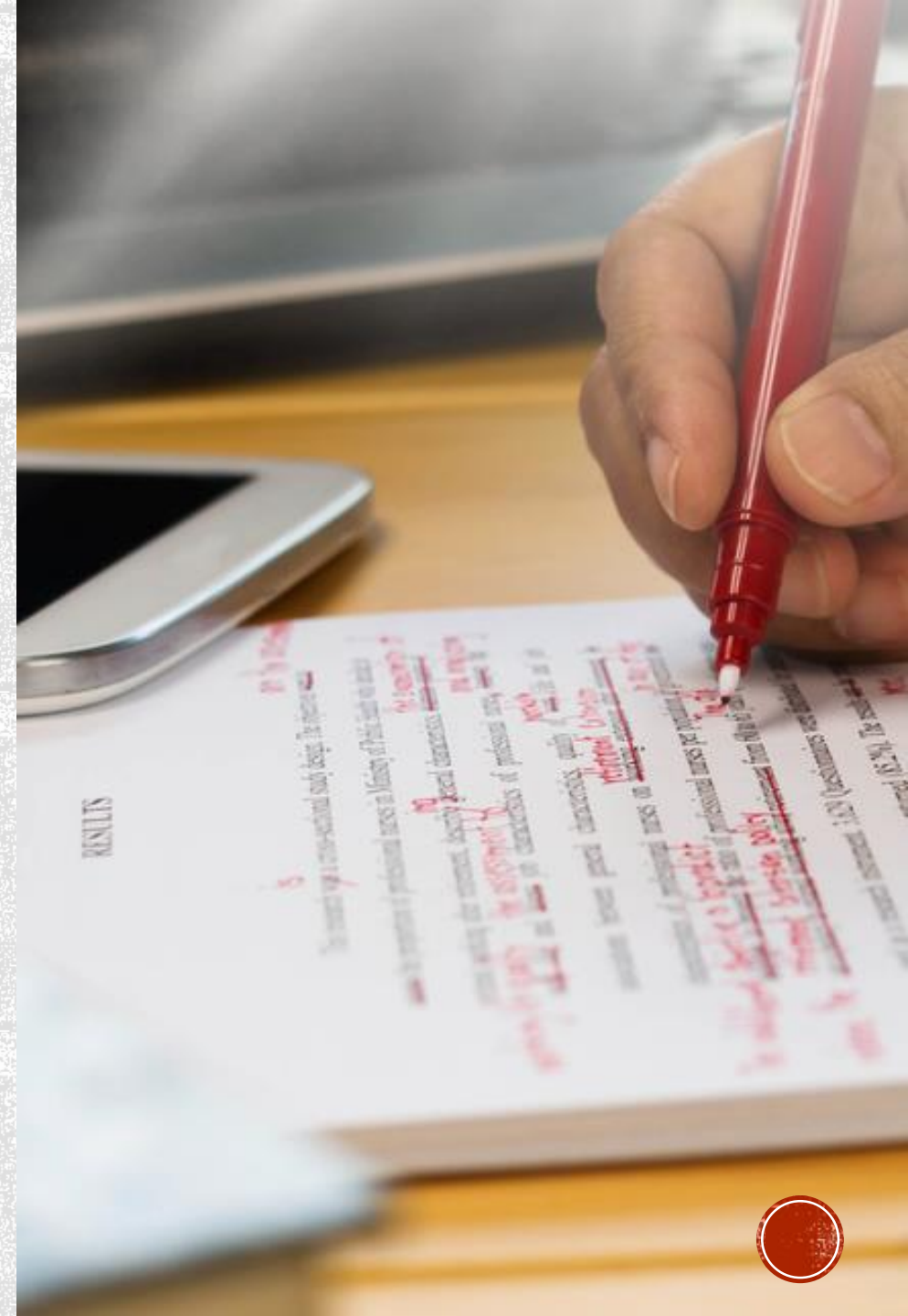






# Peer review process

- The process of peer review is organized by the journal editor and is complete when the content of the article, together with any associated images or figures, are accepted for publication.
- The peer review process is increasingly managed online, through the use of proprietary systems, commercial software packages, or open source and free software.
- A manuscript undergoes one or more rounds of review; after each round, the author(s) of the article modify their submission in line with the reviewers' comments; this process is repeated until the editor is satisfied and the work is accepted.







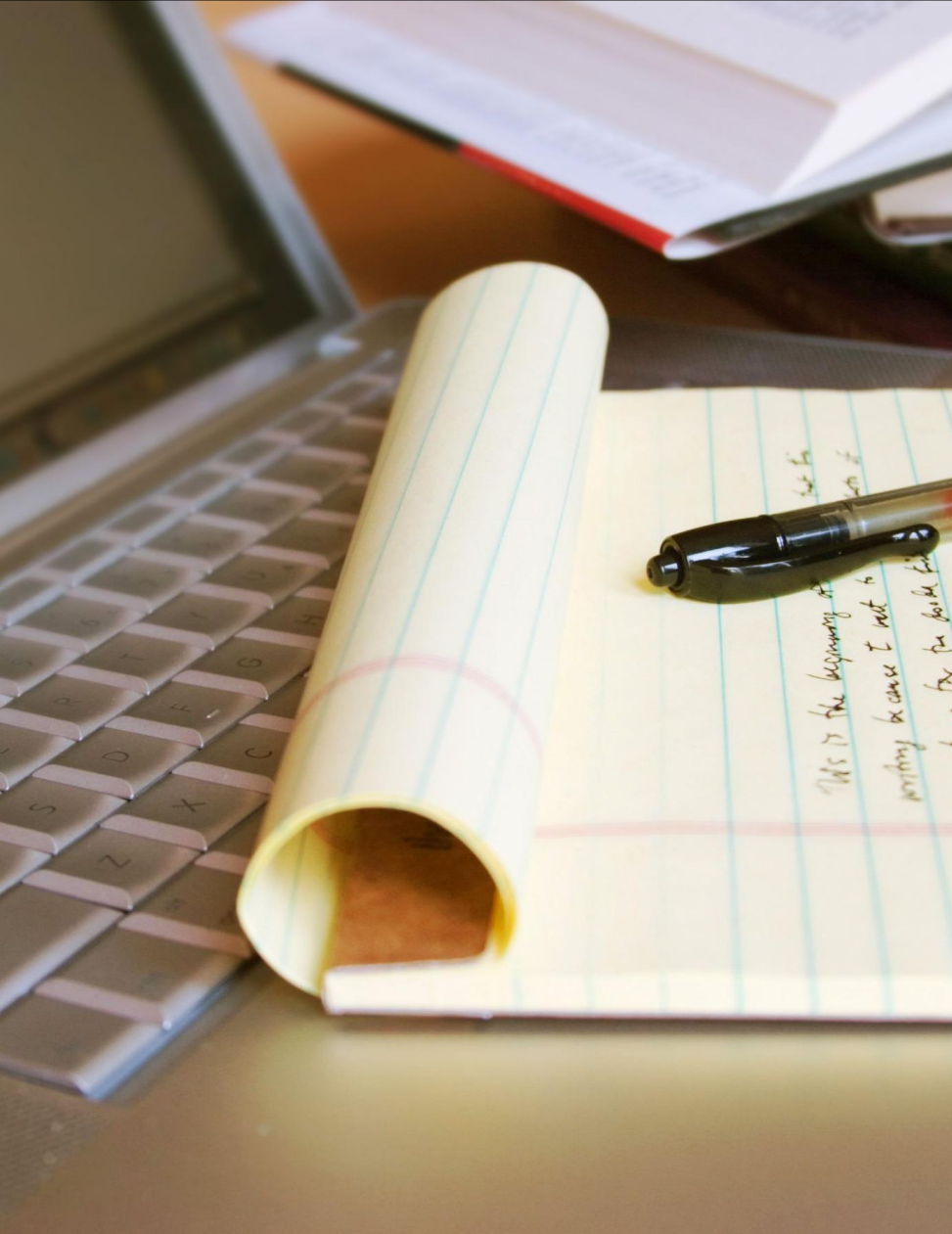
# Production process

- The production process, controlled by a production editor or publisher, then takes an article through
  - copy editing,
  - typesetting,
  - inclusion in a specific issue of a journal, and then
  - printing and online publication.
- Academic copy editing seeks to ensure that an article
  - *conforms to the journal's house style,*
  - *that all of the referencing and labelling is correct, and*
  - *that the text is consistent and legible;*
- often this work involves substantive editing and negotiating with the authors.





# Proof Correction



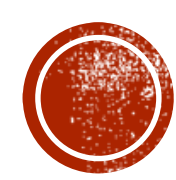
- The author will review and correct proofs at one or more stages in the production process.
- The proof correction cycle has historically been labour-intensive as handwritten comments by authors and editors are manually transcribed by a proof reader onto a clean version of the proof.
- In the early 21<sup>st</sup> century, this process was streamlined by the introduction of e-annotations in Microsoft Word, Adobe Acrobat, and other programs, but it still remained a time-consuming and error-prone process.
- The full automation of the proof correction cycles has only become possible with the onset of online collaborative writing platforms, such as Authorea, Google Docs, and various others, where a remote service oversees the copy-editing interactions of multiple authors and exposes them as explicit, actionable historic events.







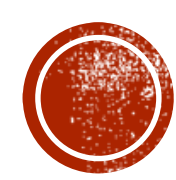




# Standards and impact

- The standards that a journal uses to determine publication can vary widely.
- Some journals, such as Nature, Science, PNAS, and Physical Review Letters, have a reputation of publishing articles that mark a fundamental breakthrough in their respective fields.
- In many fields, a formal or informal hierarchy of scientific journals exists; the most prestigious journal in a field tends to be the most selective in terms of the articles it will select for publication, and usually will also have the highest impact factor.
- In some countries, journal rankings can be utilized for funding decisions and even evaluation of individual researchers, although they are poorly suited for that purpose.
- How accurate is “citation-based impact”, such as the Hirsch-factor (h-factor) for individual researchers and the impact factor (IF) of a journal.
- In the case of the IF, only the prior two years’ worth of citations are used, and if a publication is ahead of its time, this number may, in fact, have little meaning except as a short-term indicator; the long-term impact may be wildly different than that expected from the 2-year IF.

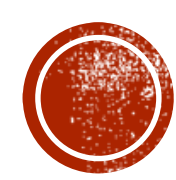




# Electronic publishing

- Electronic publishing is a new area of information dissemination.
- One definition of electronic publishing is in the context of the scientific journal. It is the presentation of scholarly scientific results in only an electronic (non-paper) form.
- This is from its first write-up, or creation, to its publication or dissemination. The electronic scientific journal is specifically designed to be presented on the internet. It is defined as not being previously printed material adapted, or retooled, and then delivered electronically.
- Electronic publishing will likely continue to exist alongside paper publishing for the foreseeable future, since whilst output to a screen is important for browsing and searching, it is not well suited for extensive reading. Formats suitable both for reading on paper, and for manipulation by the reader's computer will need to be integrated.
- Many journals are electronically available in formats readable on screen via web browsers, as well as in portable document format PDF, suitable for printing and storing on a local desktop or laptop computer.
- Moreover, electronic publishing of scientific journals has been accomplished without compromising the standards of the refereed, peer review process.





# Electronic publishing

- One form is the online equivalent of the conventional paper journal. By 2006, almost all scientific journals have, while retaining their peer-review process, established electronic versions; a number have moved entirely to electronic publication. In a similar manner, most academic libraries buy the electronic version and purchase a paper copy only for the most important or most-used titles.
- There is usually a delay of several months after an article is written before it is published in a journal, making paper journals not an ideal format for announcing the latest research. Many journals now publish the final papers in their electronic version as soon as they are ready, without waiting for the assembly of a complete issue, as is necessary with paper.
- In many fields in which even greater speed is wanted, such as physics, the role of the journal at disseminating the latest research has largely been replaced by preprint databases such as arXiv.org. Almost all such articles are eventually published in traditional journals, which still provide an important role in quality control, archiving papers, and establishing scientific credit.





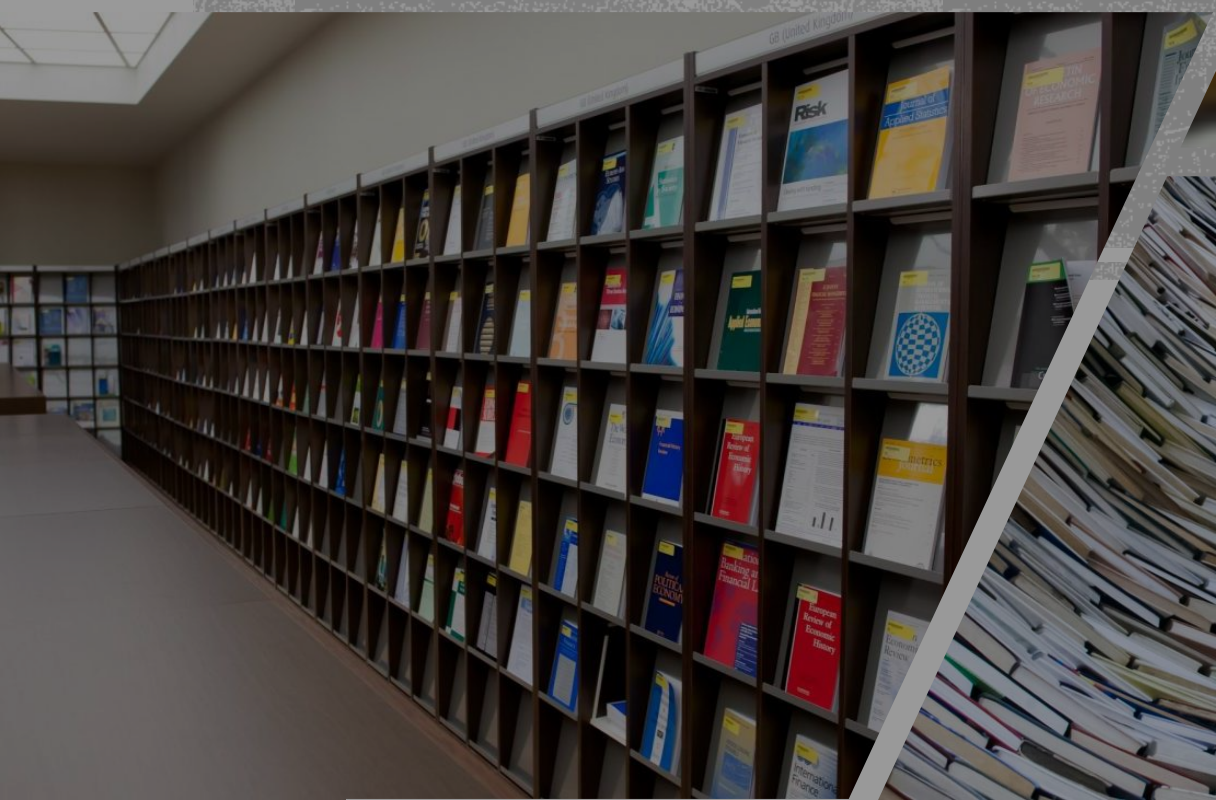
# Copyright

- Traditionally, the author of an article was required to transfer the copyright to the journal publisher. Publishers claimed this was necessary in order to protect authors' rights, and to coordinate permissions for reprints or other use.
- However, many authors, especially those active in the open access movement, found this unsatisfactory, and have used their influence to effect a gradual move towards a license to publish instead.
- Under such a system, the publisher has permission to edit, print, and distribute the article commercially, but the authors retain the other rights themselves.
- Even if they retain the copyright to an article, most journals allow certain rights to their authors.
- These rights usually include the ability to reuse parts of the paper in the author's future work, and allow the author to distribute a limited number of copies. In the print format, such copies are called reprints; in the electronic format, they are called postprints.
- Some publishers, for example the American Physical Society, also grant the author the right to post and update the article on the author's or employer's website and on free e-print servers, to grant permission to others to use or reuse figures, and even to reprint the article as long as no fee is charged.









The scientific approach  
Action Steps for a sound scientific publication



# What makes Science?

- Science is a method of investigating nature--a way of knowing about nature--that discovers reliable knowledge about it. In other words, science is a method of discovering reliable knowledge about nature.
- Science is not merely a collection of facts, concepts, and useful ideas about nature, or even the systematic investigation of nature, although both are common definitions of science.
- Reliable knowledge is knowledge that has a high probability of being true because its veracity has been justified by a reliable method. Reliable knowledge is sometimes called justified true belief, to distinguish reliable knowledge from belief that is false and unjustified or even true but unjustified. Science is a method that allows a person to possess, with the highest degree of certainty possible, reliable knowledge (justified true belief) about nature.
- The method used to justify scientific knowledge, and thus make it reliable, is called the scientific method.







# Scientific and Critical Thinking

- When one uses the scientific method to study or investigate nature or the universe, one is practicing scientific thinking. All scientists practice scientific thinking, of course, since they are actively studying nature and investigating the universe by using the scientific method.
- When one uses the methods and principles of scientific thinking in everyday life--such as when studying history or literature or just trying to answer personal questions about oneself or the meaning of existence--one is said to be practicing critical thinking. Scientific thinking is identical in theory and practice, but the term would be used to describe the method that gives you reliable knowledge about the natural world. Clearly, scientific and critical thinking are the same thing, but where one (scientific thinking) is always practiced by scientists, the other (critical thinking) is sometimes used by humans and sometimes not.





# Scientific Method

- The scientific method is practiced within a context of scientific thinking, and is based on three universal ideas:
  - **using empirical evidence (empiricism):** *Empirical evidence is evidence that one can see, hear, touch, taste, or smell;* it is evidence that is susceptible to one's senses. Empirical evidence is important because it is evidence that others besides yourself can experience, and it is repeatable, so empirical evidence can be checked by yourself and others after knowledge claims are made by an individual.
  - **practicing logical reasoning (rationalism):** Scientists and critical thinkers always use logical reasoning. Logic allows us to reason correctly, but it is a complex topic and not easily learned
  - **possessing a skeptical attitude (skepticism) about presumed knowledge:** The final key idea in science and critical thinking is skepticism, the constant questioning of your beliefs and conclusions. Good scientists and critical thinkers constantly examine the evidence, arguments, and reasons for their beliefs.



# Format of a scientific publication-Journal guidelines

- The formats of journal articles vary, but many follow the general IMRAD scheme recommended by the International Committee of Medical Journal Editors. Such articles begin with an abstract, which is a one-to-four-paragraph summary of the paper. The introduction describes the background for the research including a discussion of similar research. The materials and methods or experimental section provides specific details of how the research was conducted. The results and discussion section describes the outcome and implications of the research, and the conclusion section places the research in context and describes avenues for further exploration.
- In addition to the above, some scientific journals such as Science will include a news section where scientific developments (often involving political issues) are described. These articles are often written by science journalists and not by scientists. In addition, some journals will include an editorial section and a section for letters to the editor. While these are articles published within a journal, in general they are not regarded as scientific journal articles because they have not been peer-reviewed.



# Predatory Journals

- Predatory publishing, sometimes called write-only publishing or deceptive publishing, is an exploitive academic publishing business model that involves charging publication fees to authors without checking articles for quality and legitimacy and without providing the other editorial and publishing services that legitimate academic journals provide, whether open access or not.
- They are regarded as predatory because scholars are tricked into publishing with them, although some authors may be aware that the journal is poor quality or even fraudulent.
- New scholars from developing countries are said to be especially at risk of being misled by predatory publishers.
- According to one study, 60% of articles published in predatory journals receive no citations over the five-year period following publication.



## Are you submitting your research to a trusted journal?

Publishing your research results is key to **advancing your discipline** – and your **career** – but with so many journals in your field, how can you be sure that you're choosing a **reputable, trustworthy** journal?



Tips to **confirm** a journal's credentials and decide if it will help you **reach** the right audience with your research, and make an **impact** on your career.

Take control of your career at  
[thinkchecksubmit.org](http://thinkchecksubmit.org)



# Predatory Journals Characteristics

- Accepting articles quickly with little or no peer review or quality control, including hoax and nonsensical papers.
- Notifying academics of article fees only after papers are accepted.
- Aggressively campaigning for academics to submit articles or serve on editorial boards.
- Listing academics as members of editorial boards without their permission, and not allowing academics to resign from editorial boards.
- Appointing fake academics to editorial boards.
- Mimicking the name or web site style of more established journals.
- Making misleading claims about the publishing operation, such as a false location.
- Using ISSNs improperly.
- Citing fake or non-existent impact factors.
- Boasting about being "indexed" by academic social networking sites (like ResearchGate) and standard identifiers (like ISSNs and DOIs) as if they were prestigious or reputable bibliographic databases.



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[thinkchecksubmit.org](http://thinkchecksubmit.org)



# Predatory Journals-Growth and Structure

- Predatory journals have rapidly increased their publication volumes from 53,000 in 2010 to an estimated 420,000 articles in 2014, published by around 8,000 active journals.
- Early on, publishers with more than 100 journals dominated the market, but since 2012 publishers in the 10–99 journal size category have captured the largest market share.
- The regional distribution of both the publisher's country and authorship is highly skewed, with three-quarters of the authors from Asia or Africa.
- Authors paid an average fee of US \$178 each for articles to be published rapidly without review, typically within 2 to 3 months of submission. As reported in 2019, some 5% of Italian researchers have published in predatory journals, with a third of those journals engaging in fraudulent editorial practices.



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# Predatory Journals-What to consider

- A journal will not necessarily be predatory if they meet one of the criteria, "but the more points on the list that apply to the journal at hand, the more skeptical you should be."
- 1. The publisher is not a member of any recognized professional organization committed to best publishing practice
- 2. The journal is not indexed in well-established electronic databases (like MEDLINE or Web of Science)
- 3. The journal and the publisher are unfamiliar to you and all your colleagues
- 4. The papers of the journal are of poor research quality, and may not be academic at all
- 5. There are fundamental errors in the titles and abstracts, or frequent typographical throughout the published papers
- 6. The journal provides an impact factor in spite of the fact that the journal is new
- 7. The journal claims an unrealistically high impact based on spurious alternative impact factors (such as 7 for a bioethics journal, which is far beyond the top notation)
- 8. The journal website posts non-related or non-academic advertisements
- 9. The journal does not describe copyright agreements clearly or demands the copyright of the paper while claiming to be an open access journal



**THINK**

Are you submitting your research to a trusted journal?

Publishing your research results is key to advancing your discipline – and your career – but with so many journals in your field, how can you be sure that you’re choosing a reputable, trustworthy journal?



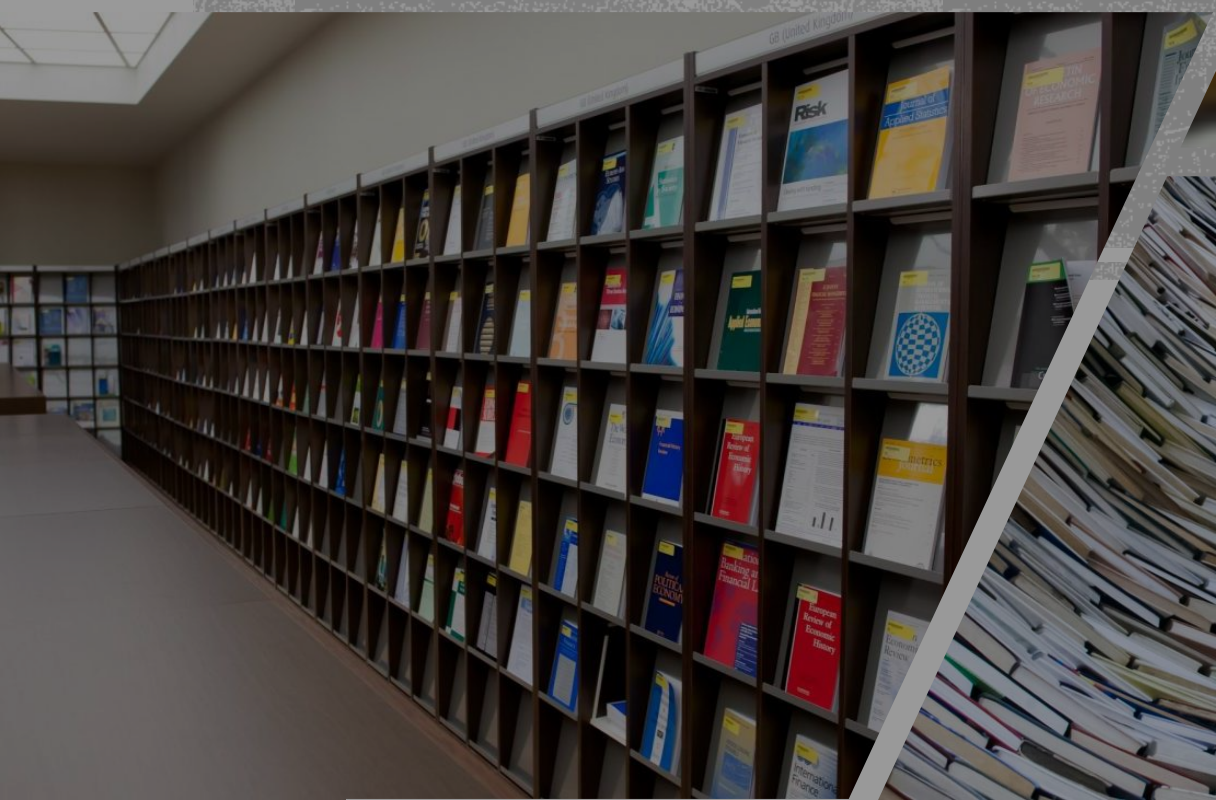
**THINK** Tips to confirm a journal's credentials and decide if it will help you reach the right audience with your research, and make an impact on your career.

**CHECK**

**SUBMIT**

Take control of your career at [thinkchecksubmit.org](http://thinkchecksubmit.org)





The manuscript  
Action Steps for a sound scientific publication



# The Question?

- One must ask a meaningful question or identify a significant problem, and one should be able to state the problem or question in a way that it is conceivably possible to answer it.
- Any attempt to gain knowledge must start here.
- Scientists are very curious about nature, and they have to possess this emotional characteristic to sustain the motivation and energy necessary to perform the hard and often tedious work of science.
- However, they don't let their emotions give false validity to their conclusions, and, in fact, the scientific method prevents them from trying to do this even if they wished.
- Scientists must choose which problems to work on, they decide how much time to devote to different problems.



# The Framework?

- One must next gather relevant information to attempt to answer the question or solve the problem by making observations.
- The first observations could be data obtained from the library or information from your own experience. Another source of observations could be from trial experiments or past experiments.
- These observations, and all that follow, must be empirical in nature--that is, they must be sensible, measurable, and repeatable, so that others can make the same observations.
- Great ingenuity and hard work on the part of the scientist is often necessary to make scientific observations.
- Furthermore, a great deal of training is necessary in order to learn the methods and techniques of gathering scientific data.



# The Scenario?

- Now one can propose a solution or answer to the problem or question.
- In science, this suggested solution or answer is called a scientific hypothesis, and this is one of the most important steps a scientist can perform, because the proposed hypothesis must be stated in such a way that it is testable.
- *A scientific hypothesis is an informed, testable, and predictive solution to a scientific problem that explains a natural phenomenon, process, or event.*
- In critical thinking, as in science, your proposed answer or solution must be testable, otherwise it is essentially useless for further investigation.
- Most individuals--noncritical thinkers all--stop here, and are satisfied with their first answer or solution, but this lack of skepticism is a major roadblock to gaining reliable knowledge. While some of these early proposed answers may be true, most will be false, and further investigation will almost always be necessary to determine their validity.



# The Approach?

- Next, one must test the hypothesis before it is corroborated and given any real validity. There are two ways to do this.
- First, one can conduct an experiment. This is often presented in science textbooks as the only way to test hypotheses in science, but a little reflection will show that many natural problems are not amenable to experimentation, such as questions about stars, galaxies, mountain formation, the formation of the solar system, ancient evolutionary events, and so forth.
- The second way to test a hypothesis is to make further observations. Every hypothesis has consequences and makes certain predictions about the phenomenon or process under investigation.
- Using logic and empirical evidence, one can test the hypothesis by examining how successful the predictions are, that is, how well the predictions and consequences agree with new data, further insights, new patterns, and perhaps with models.
- The testability or predictiveness of a hypothesis is its most important characteristic. Only hypotheses involving natural processes, natural events, and natural laws can be tested; the supernatural cannot be tested, so it lies outside of science and its existence or nonexistence is irrelevant to science.

# Format of a scientific publication-Wording

- Articles tend to be highly technical, representing the latest theoretical research and experimental results in the field of science covered by the journal.
- They are often incomprehensible to anyone except for researchers in the field and advanced students. In some subjects this is inevitable given the nature of the content.
- Usually, rigorous rules of scientific writing are enforced by the editors; however, these rules may vary from journal to journal, especially between journals from different publishers.
- Articles are usually either original articles reporting completely new results or reviews of current literature.
- There are also scientific publications that bridge the gap between articles and books by publishing thematic volumes of chapters from different authors.
- Many journals have a regional focus, specializing in publishing papers from a particular geographic region, like African Invertebrates.



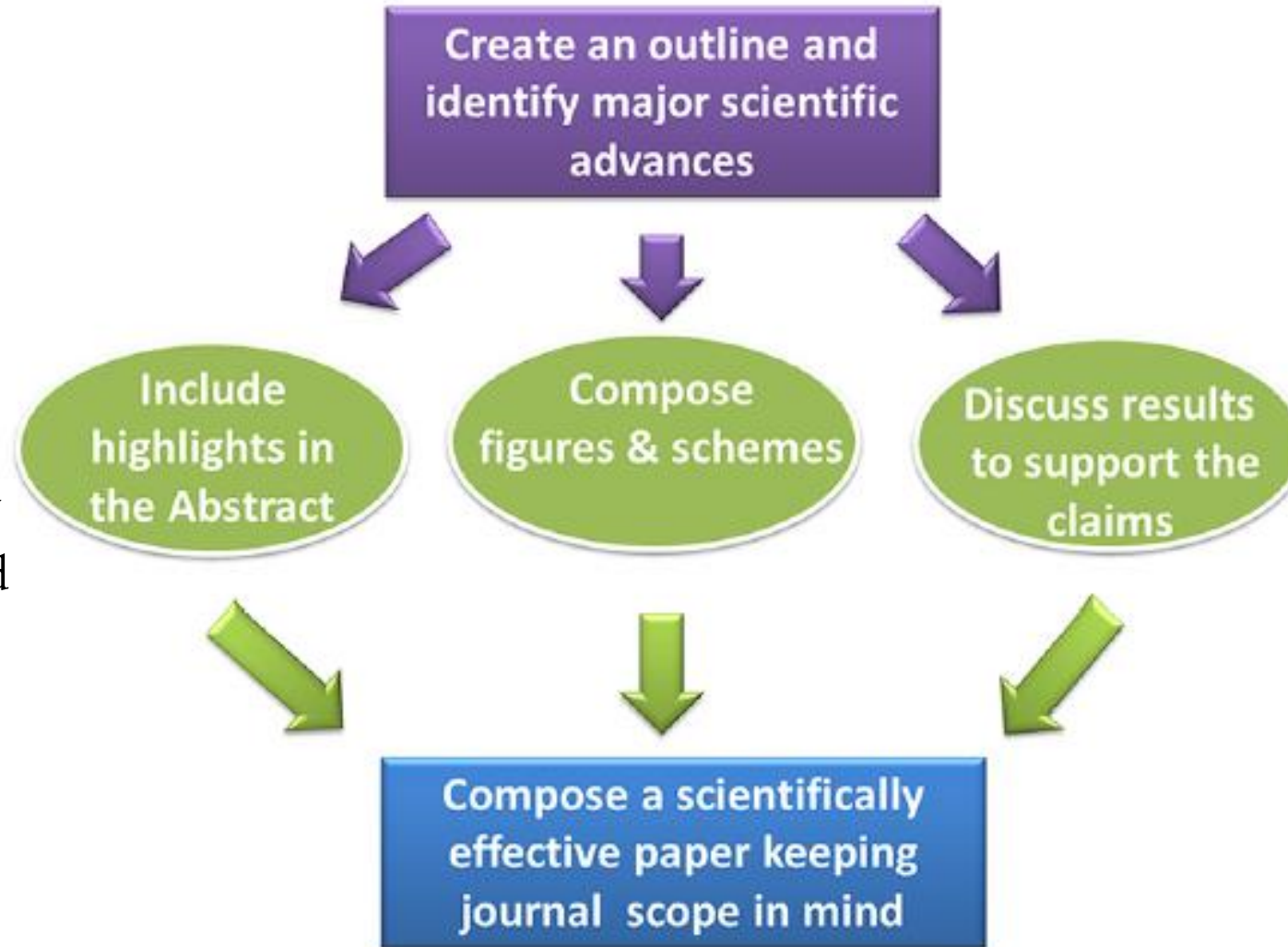
# How to Make Your Next Paper Scientifically Effective



# Step 01: Outline

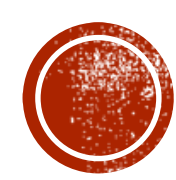
The first step before writing the paper is to create an outline. You need to gather all data and identify the major advances that emerged from the study.

Generally, it makes the most sense to create a figure based outline in which you list the major results of your study and organize them into different anticipated figures.



The outline should include the order of the data presentation so that a short scientific story emerges. Proper presentation is crucial to bringing significant interest among the journal readership.





## Step 02: Journal Choice

The next step is to select the journal in which your new findings will be communicated.

The choice of the journal should be based on the scope of your investigation, and it should not be based on the journal impact factor.

Carefully read the journal's "Authors' Instructions" and find out the specific format and submission requirements.

If there are questions about who should be the authors, the COPE (Committee on Publication Ethics) Guidelines (<http://publicationethics.org/resources/guidelines>) should be consulted.

# Step 03: Figures

The figures are the heart of a paper as they deliver the data in a concise, orderly fashion.

Well-drawn figures give the readers the greatest number of ideas in the shortest time and with the least ink in the smallest space.

Figures should communicate ideas with clarity, precision, and readability.

Graphics, in rectangle form (ratio of sides being 1.6) with the horizontal side greater in length than the height, are aesthetically pleasing.

Getting rid of the grid lines that accompany graphs from spreadsheet software, adjusting the scale bars in order to have a reasonable number of items on each axis, and maintaining a consistent and large font size are additional ways to further enhance the scope of figures.

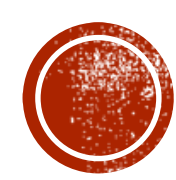
Another important aspect is the axis title and units. Each axis should have a title and corresponding unit, if any. Avoid using symbols as the axes titles. Verify that the units employed are correct. Do not add units that can mislead the readers.

Make sure all symbols are accurately identified in the figure caption or legend.

Do not fill in figures with too much text

Use the Supporting Information (SI) section for extra details, movies, and photos.





## Step 04: Main Text

Use the Supporting Information (SI) section for extra details, movies, and photos.

- The writing style used in the main text, including discussion of results, is a personal choice as every author has his/her own characteristic writing style.
- Because the purpose of the scientific paper is to communicate scientific advances, it is important to write grammatically correct sentences.
- A simple style of composing the text with short sentences rather than long and complex sentences is preferred. It is important to keep the diverse journal readership in mind when writing.
- The more easily your readers can understand your paper, the more likely they will be to enjoy and appreciate it. Writing clearly and concisely will enhance an elegant study, rather than diminish it.
- Special attention should be given to the presentation of the data and related scientific discussion.
- Remember to select representative results that support the major findings that were included in the abstract.
- The scientific presentation should flow smoothly so that the readers are compelled to read the entire paper.
- By comparing (or contrasting) observations with previous results within a healthy scientific discussion, you can bring significant strength to the manuscript.
- The bottom line is to keep the scientific story simple and focused so that a general readership can appreciate the new findings.



# Step 05: Introduction

The Introduction is arguably one of the most difficult parts of a paper for many authors.

If you think of your article as a story or essay, the way you begin and frame the narrative is key.

A good introduction requires that the authors fully understand the significance of their work and how it fits in with the current state of knowledge in a specific area.

Write an introduction that generates a story, draws the reader into your study, and clearly defines the message you wish to share.

Start with two or three introductory paragraphs to present recent advances, motivation for conducting the study, and scientific issues being addressed in the paper.






# Step 06: Experimental Methods

In many journals, the experimental section is presented at the end of the text.

Provide all of the experimental methods and procedures so that other scientists can reproduce your results, if needed.

Include an acknowledgment thanking the funding agency and any others who might have contributed to the study.



# Step 07: References

The availability of reference databases to download citations has made referencing relevant papers easier than ever.

Some journal require authors to include titles of all references (written in title case) and full page ranges.

Please refer to the author guidelines to see Journal's complete reference format.

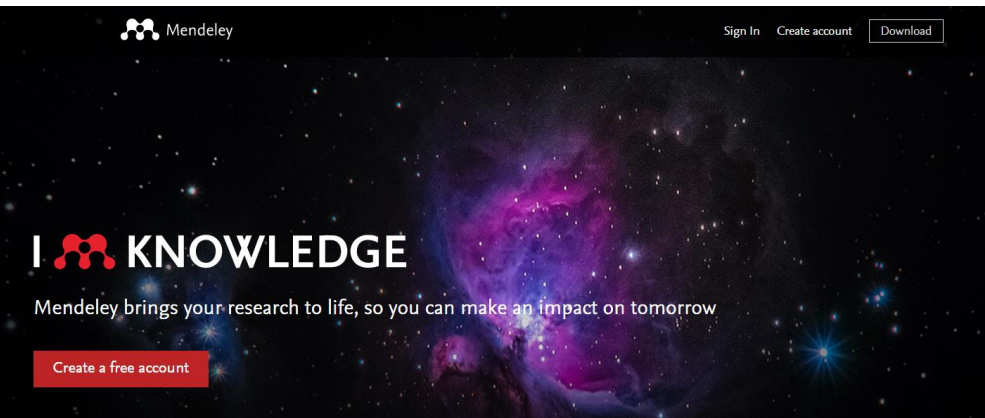
Authors should refrain from excessive self-citations.

It is important to keep the journal scope in mind while discussing relevant scientific papers.

If the majority of your citations are from specialized journals, the editor may refer you to a journal specialized in a specific topic.



# Step 07: References



## Access your library, everywhere

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With Mendeley Reference Manager you can:

- Store, organize and search all your references from just one library.
- Seamlessly insert references and bibliographies into your Microsoft®

Word documents using Mendeley Cite.

- Read, highlight and annotate PDFs, and keep all your thoughts across multiple documents in one place.
- Collaborate with others by sharing references and ideas.

## Easy referencing

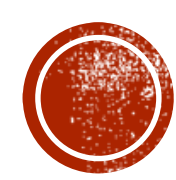
Generate references, citations and bibliographies in a whole range of journal styles with just a few clicks.



## Step 08: Eye Catcher: Title

- An important step in writing the paper is to come up with an attractive title that will appeal to a broad readership.
- The title should be simple, effective, and accurately reflect the content of the paper. If you are submitting a paper to a physical chemistry journal, avoid using phrases such as Synthesis, Device Fabrication, or Application in the title as they imply the focus of the paper is highly specialized in nature.
- Descriptive words such as Study, Investigation, or Demonstration should also be avoided because they can undermine the uniqueness of the study.
- Similarly, avoid adjectives such as Significant Enhancement, Highly Efficient, Novel, Facile, or Green unless you have a major finding that conclusively supports the claim.
- Excessive and unnecessary use of these types of adjectives can discredit or lessen the paper's appeal. Because all scientific papers report novel results, there is no need to emphasize novelty in the title or in the text.





# Step 08: Eye Catcher: Abstract

- The abstract, is a summary of the work being discussed in the paper.
- An abstract should be written in such a way that any reader who is not familiar with the topic will be able to understand and appreciate the main points of the study.
- One or two sentences that clearly highlight significant new findings and/or advances should be made the centerpiece.
- A couple of sentences indicating the methodology and key observations should be included to provide the scope of the study.
- Finally, the abstract should end with a sentence summarizing the implication of the study in a broader context (e.g., possible applications) that highlights the importance of the work being presented.
- Because the abstract is evaluated by both the editors and general readers, extra effort should be taken to compose an effective and concise abstract.



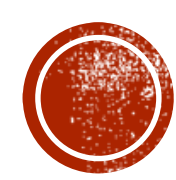
## Step 08: Eye Catcher: TOC Graphics

- The purpose of a Table of Content (TOC) graphic is to summarize the theme of the scientific paper in a graphical way.
- TOC graphics are an excellent platform designed to grab the attention of the readers.
- A simple scheme or illustration provides the best clarity and will draw the readers' attention to the paper.
- TOC graphic is printed adjacent to the abstract of the paper.
- Do not use a figure from the manuscript as the TOC graphic in order to avoid duplication.

## Step 08: Eye Catcher: Multimedia

- The electronic era has brought new dimensions to disseminate scientific research.
- For example, some journals regularly posts author-narrated perspective videos to provide a quick visual touch to the emerging topics.
- The availability of new media features, however, has imposed additional burdens on the authors.
- Authors now find it necessary to explore new approaches to communicate their research and connect with media-savvy readers.





# Step 08: Eye Catcher: Conclusions

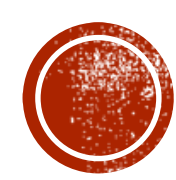
- A concluding paragraph adds a special touch to the paper and further aids in increasing the impact of research.
- You should not repeat the phrases that you have already mentioned in the abstract.
- This is the place to inject some bold remarks that reflect the outcome of the study.
- You can also identify issues and challenges that can be addressed in future studies.



# Step 09: Final Checklist

- Once the writing task has been completed, carefully proofread the paper and then pass it on to coauthors, friends, and/or colleagues for their feedback.
- Ask them to provide you with a critical review so that you can further improve the presentation.
- It is important to have the papers reviewed internally by one or two colleagues before formal submission to a journal.
- A paper with nicely presented, complete, and accurate information will sail through the review process with a greater chance of success.
- Once published, well-composed, meaningful papers are read and frequently cited by other scientists.
- A little extra effort and care in preparing the manuscript makes a large difference in terms of the paper's impact.





# Step 09: Final Checklist

## Quick Checklist

- ❖ Is the title appealing to broader readership?
- ❖ Have significant findings been identified in the abstract?
- ❖ Does the introduction provide motivation for the study?
- ❖ Are the figures and schemes scientifically correct and aesthetically pleasing?
- ❖ Do the discussion of results and cited references fall within the scope of the journal?
- ❖ Is the discussion centered on the main theme of the paper?
- ❖ Have proper acknowledgements been made?
- ❖ Have all coauthors seen and commented on the final draft of the manuscript?



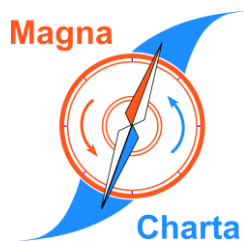
# Take home message

- *Why scientific publications are important?* Scientific journals contain articles that have been peer reviewed, in an attempt to ensure that articles meet the journal's standards of quality, and scientific validity. The publication of the results of research is an essential part of the scientific method.
- *How is a scientific paper published?* Publishing a scientific paper involves interactions among authors, editors, reviewers, copy and technical editors, and the publisher, with the goal to publish the best-quality research as timely as possible.
- *Are scientific journals reliable?* Most journals are reliable. But at the bottom of the list in terms of impact lie two types of journals: respectable journals that publish peer reviewed results that are solid but of limited interest – since they may represent dead ends or very specialist local topics.





# ACTION STEPS FOR A SOUND SCIENTIFIC PUBLICATION



M. Angelakeris, Professor

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