Constructive reviews of your peer’s science is at the heart of the scientific enterprise. It also sharpens your critical thinking skills and expands your network as a scientist. But it can also be intimidating. When are you ready for this and how do you do it. Let’s peel back the layers of a science review to make it more accessible to everyone.

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This is the talk’s outline in the form of learning objectives.
An invitation to review may come from many different sources.

These 3 questions are always relevant.

Don’t worry about:

?How much will they pay me (peer-review is typically [although not always] a volunteer activity)

But I am only a graduate student (if you are ready for this, go ahead and ask the 3 questions).
No? State why: time, conflict, expertise (so they don’t hit you up too soon with another manuscript that you cannot help with) It is helpful if you recommend someone else

Some of this may seem obvious, and need no clarification, but if not, go ahead and ask (for example)

- Do they want me to read the entire or just part of the document? (How much time should you spend)
- Who is the target audience? (How important is this or what level should the background and terminology be at?)
- What is the deadline, and is this hard or soft?

Your role as a constructive critic is typically a dual one:

1) To improve the quality of the manuscript as it goes through further revision.
2) To advise an editor or grant program manager (or some other gatekeeper) whether this is worth going forward. You may step up as an advocate for a particular paper that is worthy even if it does not shine for some reason.

Spot review: for example, to only read the Methods section, or to make sure that the citations in the text and the reference section agree.

Be sensitive to author or manuscript constraints. For example, if there is an immediate deadline, then the author is not ready to receive a lot of comments about restructuring the discussion. If it works,
then let some of that sit. Revision of several paragraphs is likely to create new editorial issues that you may not have time to spot with a short deadline.
Many journals – but not all – have a copy editor, who will be well versed in the particular format style of the journal. In such a case, copy editing is not a primary need of the journal. Nonetheless, if you see something, say something.

There is no one type of review. Try to adapt your review to the situation. If the situation is informal, say a colleague has asked for a friendly review, you might approach it this way. After you read the manuscript and have assembled some notes, go out to lunch or for a beverage, and discuss your thoughts and seek more input from the author before writing up your review.
Let's go through different aspects of a full science review.

https://en.wikipedia.org/wiki/Peer_review
Act as a subject matter expert to proved value to the author, editor, and ultimately the reader.

Content (as the polygon indicates, spend most of your time here)
• One coherent topic, as reflected in the title, abstract, and thesis or claim
• The topic is relevant to the journal or funding program
• The topic is important to basic or applied science
• Identify content that is missing but needed
• Identify content that is extraneous and can be cut

Style
• How the topic is framed
• How the sections are organized
• How the topic sentences are used
• Does the Intro. need more background or is the Disc. long-winded

Format
• Is the verb tense consistent and fitting?
• Is the taxonomic nomenclature up to date?
• Are the mathematical formula correct
• Are terms defined, professional, and used consistently
In particular, focus on issues outside the journal’s familiarity
(such as their specific formatting requirements, general grammar usage, etc.)

Springer, New York

These header labels are from their Table 1. These labels are suitable as keywords to use in your topic sentences as your express major concerns about a paper.

If you find problems with most or all of these categories, pick the three worst and focus on that in the major part of your review.
Your goal is not to find every misspelling or rewrite the document for the authors but to direct the revision towards improvement.

For example, I consider the split infinitive to be much ado about nothing (but some disagree, sometimes quite strongly). Often a typo or two is not big deal, but if I encounter several typos or misspellings, then this may erode my confidence in the quality behind the document.

As another example, some light copy editing may fix an awkward sentence, but a poor topic sentence may lead the reader astray for an entire paragraph, and a persistent lack of strong topic sentences may destroy the coherence of an entire section.

Sample size values are often not scrutinized, but if they disagree between the text and a figure, for example, call attention to it. Is this a typo? Do the samples in one represent a subset of the other?

On the other hand, if the methods are not reproducible, is this simply a matter of adding details to the Methods section or is there a more serious underlying problem.
Reviewer biases (see also Jude, 2012; p. 164)

1) If a paper defies established dogma, ask: Is this truly groundbreaking or over hyped? Reviewers will often be biased to not accept it (I would add to see literature on scientific revolutions).

2) Junior or unknown scientists demand more scrutiny than senior or familiar scientists.

3) Negative results are not worth publishing but that may depend on the saturation of information on a topic.

4) The paper needs expanding on a topic that is of interest to you (it really only needs to support a strong thesis) (this was added by me).

Sometimes I feel that the authors are channeling a serious case of ennui. These are red flags.

Call out an uninteresting title. The editor certainly wants titles to be specific and relevant in a way that will attract readers and create citations.

If the authors are not sure what the significance of the paper is, then perhaps you will waste your time in reading this.

If the authors did not start with a strong thesis, it is doubtful that one emerged later.

http://www.dictionary.com/browse/ennui  (boredom)
TRAIN WRECK

Should be rare, as such manuscripts should have been rejected without review, but they slip by, too.

Don't fret: You are not expected to ‘fix’ any manuscript.

Regardless, provide feedback so that the editor can explain to the authors why the manuscript was deficient.

Your strategy to prioritize your feedback will be useful here. You are not expected to write a longer review, and in fact, a short review may suffice in this case.

For example, after noting a half dozen typos found in the first 2 or so pages, you can simply say that they – collectively – are a serious problem but you stopped writing them down after this point.
Communicate your criticism to the authors

**General summaries**
- The paper's main point
- Your main impression, put the paper in some context
- A (or a few) key strength(s) & weakness(es)

**2-4 major points of concern**
- Identifying remedies, too.

**Minor**
- Line-by-line editorial comments

**Date it. Sign it?**

This is just a suggested format

**Begin with a general overview**

The paper’s main point (a clear statement here helps especially if your point is different than what the authors thought they presented).

Your main impression. If you are left wondering ‘so what’ then say so. If you think this is particularly original, or cutting edge, or comprehensive, etc., say that.

A (or a few) key strength(s) & weakness(es).

“Recognizing the worth of the author’s work increases your credibility with the authors.” Alley (2000)

**2-4 major points of concern**

Content, style, ethics

A paragraph on each point of concern to back up your summary.

Minor
Line-by-line editorial comments

Refer to specific lines in the manuscript (assuming you are not marking a hard copy) to facilitate the author’s and the editor’s use as a checklist.

Include citations to any reference you used. It is OK to cite your own work, when it is relevant.

Date. If you have met the journal deadline, then take credit for it.

Sign it?

You can sign it, particularly if you are willing to let the author contact you for further clarification. If you are well-known in the field, the authors may be pleased to learn that you reviewed it. However, it is unethical to let such contact lead to co-authorship on a later revision of the paper.

You may choose to not sign it, which is acceptable. This may be particularly true if you might be concerned that an honest but highly critical review may cause you trouble later from the author(s). You must not, however, hide behind anonymity to write a review with unfair or personal attacks.

I personally like the idea of anonymous reviewers, which make authors read the comments without judgements about who wrote this or that. However, I have signed a lot more of my reviews as I become more established.

Double bind reviews are becoming more common and fairly deal with this situation, too.
Reviewers have a dual role:

- to provide to the editor a well supported recommendation, while providing the authors with constructive comments to improve the manuscript.

Here you have an opportunity to be more candid. With respect to being tactful or to avoid a misunderstanding with the author, you can share your thoughts here. Perhaps, you want to advocate for the paper directly to the editor, in a way that the editor feels that you are not constrained by the author seeing your comments (e.g., ‘this study approach is out of fashion but it is also very well done, a reminder that it is still useful, and it is worthy of adding to the modern literature.’)

You can point out any limits to your expertise, and if you are particularly concerned, perhaps you should recommend an additional subject matter expert.

Typically there was a box to check about your recommendation (i.e., accept, accept with minor revision, etc.). Here you can state the confidence you have in your recommendation in a way that the editor can integrate with the recommendations of the other reviewers.
Be impartial, but show some emotion to let them know that you were engaged

In a friendly review, or an in-house review, you may need to be sensitive if your criticism will affect a deadline, or upset a particularly prickly author, etc.
If your emotion is building during the review towards frustration, try these tips to even out the nature of the review.

Reflection will benefit everyone
Some journals like to have a list of standard questions, with points to chose from:

i.e.
Please rate the originality of this paper 1 2 3 4 5 (higher values mean more original)
Etc.

http://www2.latech.edu/~jenna/seminar-presentations/review_a_paper_proposal_an_article.pdf
The proposal review: To fund or not?

<table>
<thead>
<tr>
<th>Importance and/or relevance and applicability of proposed project to the program goals: (25 percent): For this competition, assess (1) how well the proposed project aligns with the selected program priority; (2) how well it reflects the applicant’s comprehensive understanding of the issue(s) to be addressed; and (3) how well it will contribute to our understanding and/or management.</th>
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<tr>
<td>Technical/scientific merit (30 percent): For this competition, assess (1) how clearly the proposal describes project goals and objectives; (2) how feasible, scientifically sound, and/or innovative the methods are with respect to the proposal’s goals and objectives; (3) whether it demonstrates full compliance with all applicable federal, state, and local environmental laws; (4) how applicable and useable the outputs of the proposed project will be for the intended user(s); and (5) whether their data management plan is complete and sound.</td>
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<tr>
<td>Overall qualifications of applicant (15 percent): For this competition, assess the capability of the investigator(s) and collaborator(s) to complete the proposed work as evidenced by past research and science application accomplishments; previous cooperative work; and timely communication of findings, data, and other research products.</td>
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<td>Project costs (10 percent): For this competition, assess the completeness of the budget narrative and how realistic the budget is for achieving the project’s outcomes within the proposed timeframe.</td>
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<td>Outreach/education (20 percent): For this competition, assess (1) how well the proposal identifies end users for the project’s findings and outputs; (2) how engaged the identified end users are in the project planning and implementation process; (3) the effectiveness of their plan to transfer the project’s findings and outputs to identified end users; (4) and how well the applicant proposes to make project findings and/or</td>
</tr>
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</table>
outputs known and available to the broader resource management, scientific, and/or stakeholder community.

While it depends on the agency, NSF uses a 5-point scale:

- Excellent
- Very Good
- Good
- Fair
- Poor

Only proposals with mostly excellent and some very good ratings are likely to be funded.
What’s a Line Edit?
A line edit addresses the creative content, writing style, and language use at the sentence and paragraph level. But the purpose of a line edit is not to comb your manuscript for errors – rather, a line edit focuses on the way you use language to communicate your story to the reader. Is your language clear, fluid, and pleasurable to read? Does it convey a sense of atmosphere, emotion, and tone? Do the words you’ve chosen convey a precise meaning, or are you using broad generalizations and clichés?

In That Case, What’s a Copyedit?
By contrast, the goal of a copyedit is to address flaws on a very technical level – to make sure the writing that appears on the page is in accordance with industry standards. This is like an incredibly high-end proofread.

Source:
http://nybookeditors.com/2015/01/copyediting-vs-line-editing/
If pressed, focus on the title, abstract, and illustrations and their legends.

Some words are more commonly misspelled or mistaken for their meaning, etc., and deserve more attention.

Do with 2 people if this is really important (e.g., a press release).

Some printer changes may occur that you just need to leave as is (for example journal-specific formatting that you may not normally agree with such as British spelling conventions).
Think about it more than just your duty.

https://www.elsevier.com/connect/10-tips-for-reviewing-scientific-manuscripts-and-5-red-flags


Authors may wish to contact you but it is generally a conflict of interest to accept authorship as a result of review, as you are conflating the roles.

Yours: Recuse yourself if there is a conflict that would prevent an impartial review. Although there are generally unambiguous examples of conflict, if in doubt, contact the journal or grant agency to review the situation.

Do not share the manuscript with others, and the sanctity of a proposal should be
protected in particular. A possible exception, for manuscripts, is to enlist a junior scientist to help (with your assistance) with the review, to reduce your load while giving them experience (again, check with the editor or program managers).
An author’s perspective: Responding to reviews

- Answer completely
  - Point by point
- Answer politely
  - Remember they’re volunteers
- Answer with evidence
  - Especially when you disagree

Remember the reviewers likely volunteered their time


If you think some reviewer’s comment is wrong, you still need to say so. Ignoring it will be a red flag to an editor, and if they question you about it, this could delay their decision.

If the recommendation is for minor revisions, you should focus on a prompt turn-around, to return a revised manuscript while this is still fresh in the editor’s mind. You should probably just accept their comments to make this easy. You still have the prerogative to disagree, but you will want to be clear and reasoned.

Major revision will need more time. Note the deadline, and if you need more time,
request it.

If the recommendation is not something you can agree with, you can argue with the editor or choose another journal.
Read through the comments to absorb the essence of the decision, but put it aside for a while (perhaps several days), before you respond. Haste is the enemy of reason at this moment.

A fatal flaw would be something unfixable. Often, however, that is not the case.
- A manuscript that framed the problem inadequately, or rambled on, or was littered with grammatical issues that made the reviewers confidence...these can all be corrected with revision.
- A misapplied statistical analysis can be adjusted and redone.

Re-submitting a revised manuscript to the same journal is possible, but Shramm and Miranda call this a ‘low-yield strategy’

Even if you resubmit to a different journal, you are well advised to revise accounting for the reviewer comments. There is some likelihood that you could get at least one of the same reviewers to read the revised draft!

Natural Resource Professionals. American Fisheries Society, Bethesda, MD, p 135-142

http://www.gutenberg.org/ebooks/37134  
https://www.bartleby.com/141/


http://writing.engr.psu.edu/ce.html

(The craft of editing)


https://www.elsevier.com/connect/how-to-review-manuscripts-your-ultimate-checklist

‘Science’ covers publishing ethics as a news story in nearly every issue, and often does special features on this topic.

Larger publishers, like Elsevier, has specific resources, too.
My aim for this presentation was to improve your ability to meet these learning objectives.