

# Writing an effective research proposal

- Explain **what** you intend to do, **why** you are doing it, and **how** you will do it.
  - What: Be as specific as possible.
  - Why: Your **literature review** will help show why your research is necessary.
  - How: Methods and data to be used, including whether you have access to the data and other resources needed.
- Tell what you plan to do near the beginning of the proposal so the reader knows the context for the rest of your material. It's OK to say what you plan to do in the first sentence!
- Everything in the proposal should point toward the work you will be doing. Avoid including things that aren't directly relevant to your proposed research.

# What is a literature review?

- A literature review is a narrative that tells a story.
  - How we arrived at our current understanding of the topic.
  - Where gaps in our knowledge remain.
  - How your work fits into this body of knowledge.
- A literature review is **not**:
  - a list summarizing one article after another.
  - an in-depth summary of one or two articles.
  - a compilation of random facts from many papers.

# Steps toward building a literature review

- Summarize the state of the literature on your topic.
  - Focus on the most important and relevant papers.
- Build your narrative by showing **relationships** between different studies. Examples:
  - "Lennon and McCartney (1967) found that [something]. Jagger and Richards (1969) extended this finding by considering [something else]."
  - "Grohl (2009) showed [some result]. This differs from earlier findings by Cobain (1991) in that [reasons]."
- Show how prior papers relate to your work.

# Scientific writing

- Scientific writing uses a **formal** style.
  - This does not imply using big words or complex sentences!
- **Write clearly**, with correct grammar, punctuation, and spelling.
- **Organize** your writing so that it flows naturally. **Section headings** help alert the reader to a change of focus.
- **Cite references** in an appropriate format:
  - Examples are formats used by journals of the AMS and AGU.
  - Every citation in your text should be listed in your references, and vice versa.
  - [Some good advice on referencing.](#)
- **Most important: Your first draft should not be your final copy!**

# Some of the most important advice on writing you will see

**Vigorous writing is concise.** A sentence should contain no unnecessary words, a paragraph no unnecessary sentences, for the same reason that a drawing should have no unnecessary lines and a machine no unnecessary parts. This requires not that the writer make all his sentences short, or that he avoid all detail and treat his subjects only in outline, but that every word tell.

– William Strunk Jr., *Elements of Style*