

Understanding and contributing to the scientific literature

Chemistry 199L

Feb. 27, 2006

Dr. Leslie Klis McNeil

Organization of the Literature

- Primary
 - research reports
- Secondary
 - review articles
- Tertiary
 - academic texts
 - popular magazines or books

Primary Literature

- Reports of original research
 - methods used to collect data
 - data analyzed and summarized
 - graphs
 - tables
 - figures
- Relevance and conclusions fully supported by citations of other primary literature
- Peer reviewed
- Authors pay journal for publication

Secondary Literature

- Review of recent research
 - reprint published tables or figures—no original data
 - original diagrams or schemes
- Relevance and conclusions fully supported by citations of primary literature and some other secondary literature
- Peer reviewed
- Author invited by journal, so page charges waived

Magazine articles

- Methods not fully described
- Data and analysis not provided
- Illustrations of conclusions, author, or other; not data
- Few citations allowed in trade mags
- No citations usually allowed in popular mags
- Not peer reviewed
- Author paid by magazine
- Easy to read

Magazines listed on course site “ Journal List”

- Specialized audience, tech or trade
 - Chemical & Engineering News
 - The Scientist
 - Modern Drug Discovery
- General audience
 - Popular Science
 - Discover
 - National Geographic

Peer Reviewed Literature

- **Science** abstract, intro, results & discussion, references, methods described in figure legends and endnotes
- **Nature** short, timely, important research presented as “Letters” include a figure and no more than 10 references
- **PNAS** abstract, intro, methods, results and discussion
- **Major Society Journals**
 - American Chemical Society
 - American Society for Microbiology
 - American Society for Biochemistry and Molecu

Reading a Research Article

- Abstract
- Introduction
- Results, if you are familiar with the methods
- Discussion
- (optional—go back to Methods you are unfamiliar with, if you understood the results)
- Abstract again

Writing a Research Article

- **Methods**
 - past tense description of data collection—not a protocol
- **Results**
 - past tense description of outcome; analysis and summary of data—not raw data
- **Discussion**
 - conclusions supported by evidence of your data and other people's work
- **Introduction**
 - enough context to make audience care about the hypothesis, problem statement, solution
- **Abstract**
 - 150 to 250 word summary of hypothesis, methods, results, conclusions

Writing a Review

- Must have an organizing principle, focus, or “So What?” factor
 - **Method** Acc. Chem. Res. **2003**, 36, 453-461
 - Several different or complementary discoveries made using one method or technique
 - **Model** Acc. Chem. Res. **2004**, 37, 405-415 Or **Class** Acc. Chem. Res. **2004**, 37, 431-438
 - Development and predictive power of a current model, proposed mechanism or classification of compounds
 - **Innovation** Acc. Chem. Res. **2005**, 38, 146-156
 - Development and future applications of an innovative compound or experimental technique

Introduction

- Persuade the audience that your topic is important and interesting
- Provide context and support from primary and secondary sources
- State your organizing principle

Body

- Present examples from the primary literature to support your principle
- Illustrate the examples by borrowing one figure per case

Conclusion

- Summarize the examples
- Suggest future directions

Abstract

- One concise paragraph that summarizes the entire paper
- Can't summarize what is not yet written

Accounts of Chemical Research

“In short critical articles, this unique and popular journal offers an easy-to-read overview of basic research and applications chemists need to know about, covering all areas of chemistry and biochemistry.”

“Contributors to Accounts of Chemical Research are active, recognized investigators usually writing about their own work. Articles describe current developments, clarify controversies, and link the latest advances with past and future research.”

Accounts of Chemical Research

- Abstract

- At the beginning of each paper, there should be an abstract that is approximately 75-100 words in length describing the scope and focus of the article

- Length

- Manuscripts are limited to 6,000 words including the text, references (including article titles), author names, and biographical sketches

Your assignment

- Double-spaced with 1" margins on all sides
- About 10 pages or 3,000 words
- One page in 12 pt Times New Roman will contain approximately 300 words
- One page in 12 pt Arial will contain about 280 words.

Your topic

- Subject
- Focus or organizing principle
- Perspective, or “So What?”
- Who Cares? if you don't, your reader won't

Your writing

- Make an outline
- Use headers in the text like outline
- Use the most informative word
- Stay focused on the organizing principle
- Support your points with paraphrases or direct quotations of your references
- Make at least two drafts
- Format your citations after proofreading the last draft

Resources

- UIUC-proxied PubMed
- Biochem 460 library guide
- Guide to paraphrasing technical references
- Science of Science Writing



UNIVERSITY OF **ILLINOIS** AT URBANA-CHAMPAIGN