CENTRE FOR WRITERS
C4W You can write. We can help.

SCIENCE WRITING

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1. **What is science?**
   From Latin *scientia*, meaning "knowledge"; the systematic study, explanation, and organization of the structure and behavior of the physical and natural world through observation, experiments, and predictions.

2. **What is science/scientific writing?**
   - Reports of original research in academic/scientific journals, for an audience of peers (= scientific writing) (e.g. *Nature* and *Science*).
   - Communications to the larger public about discoveries (through magazines, newspapers, executive summaries, press releases, museums, radio, websites, etc.) (= science writing) (e.g. *National Geographic*).
   - Grant proposals, conference presentations, posters, etc.
   - Which ones are you doing in your various classes?

3. **What do scientists write?**
   a. Field notes
   b. Posters
   c. Executive summaries
   d. Electronic messages
   e. Instructions
   f. Theses and dissertations
   g. Letters
   h. Summaries
   i. Presentations
   j. Proposals
   k. Abstracts
   l. Reports
   m. Academic papers
   n. Grant applications
   o. Press releases
   p. Letters of applications
   q. Resumés and CVs
   r. Case histories
   s. Data sheets
   t. Articles
   u. Books
   v. Procedures, manuals, specifications
   w. Progress reports

4. **Why do scientists write?**
   a. To *remember* (do the readings ahead of time. Take good notes of lectures, presentations, experiments, etc. Taking good notes is an aid to concentration.)
   b. To *observe* (from general observations to the details. Keep good records. Make accurate drawings and complete accurate data sheets.)
   c. To *think* (be organized, capture your thoughts and questions. Make writing part of the investigation, it will help organize, plan, and clarify thoughts, steps, and statements of the problem or question; don't wait until the end of the investigation.)
   d. To *share* new information, participate in a conversation of experts in your field, and become known for your contributions.

5. **Characteristics of good science writing**
   a. *Audience* (needs, previous knowledge, purpose or writing, requirements, etc.).
   b. *Completeness* (show awareness of all sides of the issue).
   c. *Impartiality* (make assumptions and underlying arguments clear, indicate how data was obtained, specify limitations of results, etc.).

d. *Objectivity* (conclusions based on evidence and not on unsupported opinions, mention of need for further investigation, nothing should be implied).
e. *Clarity* (application of the scientific method in the statement of a problem, the formulation of hypotheses, the planning of an investigation, and its execution; illustrations, charts, graphs, etc.).
f. *Accuracy* (precision in observations, measurements, records, data analysis, use of words and terminology, etc. Every investigation should be replicable.)
g. *Precision* (exact definitions, accurate measurements, etc.).
h. *Simplicity* (choose the simplest explanation in accordance with the evidence; write direct, straightforward prose, free from distracting elaborations).
i. *Appropriateness* (to the subject, the reader, and the context).
j. *Brevity* (keep things brief and concise. Go to the point quickly.)
k. *Control* (pay attention to arrangement, presentation and timing so that you re always in control—affecting the reader in a chosen way).
l. *Consistency* (in the use of names, terms, jargon, abbreviations, numbers, symbols, etc.).
m. *Order and coherence* (readers should find the message easy to understand and presented in a logical order, especially when describing an experiment or giving directions).

6. **What typical mistakes do science students make?**
   a. Lack of concision (not paying attention to word count limits)
   b. Too pretentious, not simple and clear enough (meaning is obscured by complicated words)
   c. Poor paraphrasing/summarizing/citing skills
   d. Not following the assignment description and instructors' instructions
   e. Not using and/nor reading rubrics carefully
   f. Too much interpretation and not enough fact-based information
   g. Poor writing habits: write *results FIRST* for a report, and *discussion NEXT. Introductions* and *conclusions* are less important and should be done at the end. Don't waste time and energy on small things that are worth fewer points. Be strategic.

7. **Examples of a BIO 107 assignment:**
   a. *Explain why the experiment was done (goal of the experiment and importance of the topic).*
   b. *Write a 2-4 sentence summary of the procedure.*
   c. *Main findings: summarize your results in comparison to the control group.*
   d. *Interpretation of main findings: explain the results in context of background information and directly compare the results to published research.*
   e. *Recommend changes based on the results of this experiment. Suggest a follow-up experiment.*

8. **Example of a BIO 107 rubric:**
   a. *Summary accurately and concisely conveys top two or three most important aspects of findings in comparison to the control group (up to 6 points).*
   b. *In one paragraph, gives background (and cites) material supporting or contrasting significant findings (up to 6 points).*
   c. *In a second paragraph, relates results via a direct comparison to other research findings (up to 3 points).*
   d. *Gives suggestions on better handling of beets/produce/relevant resources based on above findings (up to 3 points).*
   e. *Suggests future experiments or avenues of investigation (up to 3 points).*
   f. *Includes raw data table and sample calculation of dilution (up to 1 point).*

References and resources:

Barrass, R. (2002). *Scientists must write.* London: Routledge.
Canadian Science Writers' Association: http://sciencewriters.ca/
Day, R. A. and Gastel, B. (2006). *How to write and publish a scientific paper.* Westport, Connecticut: Greenwood Press.
The Science Writers' Handbook: http://pitchpublishprosper.com/science-writers-handbook/