

WRITING IN THE SCIENCES

The natural and applied sciences have a number of forms and conventions that distinguish their writing from that of the humanities or social sciences. Take, for example, the lab report. In the sciences, lab reports are the mother tongue of academic communication. If you wish to communicate effectively in a scientific context, learning the basic linguistics of lab reports is crucial.

1. IMRAD: Formatting Your Lab Report

IMRAD is an acronym that lays out the basic format of lab reporting: Introduction, Materials and Methods, Results and Discussion. Although some lab report formats will add to or adapt these headings, the IMRAD format remains the essential template for discussing lab results. It presents a problem or question, explains the method used to explore that question (in enough detail that someone else could replicate your experiment), reports the results of the investigation, and finally, considers the implications of those results in light of the initial question.

The chart below provides a roadmap of the essential questions addressed in each section.

Section	Purpose	Answers these questions
Introduction	Explains central question. Gives context for the investigation. Cites any relevant literature. Names chosen approach. States primary results.	What did you do? Why did you do it? Who else has done similar or related work? How did you do it? What happened?
Materials and Methods	Details the experimental procedure step by step.	How could someone else replicate your experiment?
Results	Reports, in detail, the results of the investigation.	What actually happened?
Discussion	Comments on the significance of the results. Suggests refinements, applications. Offers possibilities for further study.	Did the experiment do what you expected it to? Why or why not? How might the experiment be improved or adapted? What next?

It is important to note that the Discussion section does not merely re-state the Results section; it interprets the results.

The Discussion is your opportunity to evaluate your procedure, to emphasize its strengths or critique its weaknesses. It is also a chance for you to imagine where you might go next. What are the implications of your findings? How do they illuminate or contradict the results of other studies? What further applications might there be of your method, of your hypothesis? These are the kinds of questions your Discussion section should consider.

2. Passive Voice: It's Not All About You

Another distinctive feature of scientific writing is the use of the passive voice. The difference between active and passive voice lies in the relationship between the subject of a sentence and its verb. If the subject is the agent of action (i.e., if the subject does the action of the verb) the construction is active; if the subject receives the action of the verb (i.e., if the subject has the action done to it) then the construction is passive.

The researcher diluted the samples with 100 ml of H₂O.

This sentence is written in the active voice. The subject (researcher) performs the action of the verb (to dilute) on the object (samples). However, in science writing, this same action is usually voiced in a passive construction:

The samples were diluted with 100 ml of H₂O.

Here the subject (samples) *receives* the action of the verb (to dilute). The subject does not perform the action, but instead has the action performed upon it. The agent of the action (researcher) is invisible, at least grammatically.

The reasons for this shift are simple. The fact that a researcher performed this action is understood by the reader, so there is no need to include that detail in the sentence.

Furthermore, science writing needs to maintain an objective stance. It is intentionally impersonal. A good lab report will detail the experiment in such a way that anyone, in any lab, should be able to replicate the results, whether in Beijing or Barcelona. To this end, a lab report focuses on the experiment itself, not the people who performed it. For this reason, avoid the first person in lab reports. A Methods section would not state “I gathered 50 samples”; rather it would simply state that “50 samples were gathered.” The passive voice, in this case, sharpens the focus of the statement. The active voice would simply clutter the point with unnecessary, and self-evident, information. When reading your lab report, the reader needs to know what, how, and why things happened the way they did. Knowing who did what in the experiment is of no real concern – that is what the authorship credit is for.

3. Tone: Be Direct and Be Objective

Generally speaking, when writing in the sciences, try to maintain a direct and concise style. Focus on concrete details. Use plain-spoken, direct language to undergird any jargon and discipline-specific vocabulary. Your content will be sophisticated enough; don't clutter your prose with either extravagant or imprecise expressions. If the resulting solution of your experiment is a pale blue, opaque liquid then describe it as such, not as the “hazy blue of a Toronto sky.” Avoid all temptations to wax poetic.

Ultimately, like the researcher in the lab report, effective science writing does not draw attention to itself. Instead, it focuses on the matter under investigation – the procedures, the results, the implications – and explores this information as precisely and objectively as possible. Focus on the content – what you did, how you did it, what you discovered – and allow the formats and conventions of your discipline to help you communicate your findings.