E11 WRITTEN TECHNICAL COMMUNICATIONS IN ENGINEERING AND APPLIED SCIENCE

Research Paper Guidelines

Materials and Methods:
Detail novel methods so that they can be reproduced. Methods sections are typically written in the past tense and should be a description of what you did, not an instructional recipe.

Materials
Include exact technical specifications of the materials you used and their quantity.
Consult a style manual or your journal’s author guidelines for advice on how to refer to types of material (e.g. cell lines, microorganisms, etc).

Methods
Present methods chronologically and precisely so that your readers are not left wondering how or how much? Small mapping tricks will help keep your readers oriented: use subsections with headings parallel to those you use in the results.

DO NOT detail methods that have been described elsewhere, simply provide a citation. Even better, put the method in context and use a citation: “Kidney volume was measured using ultrasound apparatus.3”

Use an appropriate tone and include appropriate details. Avoid giving narrative details such as: “After waiting 12 hours for the epoxy to dry, it was time to walk down the hallway to the machine shop to drill holes,” or giving too much detail regarding design considerations: “at first we thought we would use a highly reflective substance, but on further consideration, we decided to use a substance with a higher melting point…” Give only the details your readers need.

Results
Keep the results section concise, use figures and tables to present representative data.

Use of figures
Don’t repeat information in the text that is clearly apparent from figures: just make a direct assertion that conveys the result and refer to the figure in parentheses. For example: “Drug 1 has high specificity (see Figure 2).” Similarly, do not use the text to tell readers how to read the figure: if explanation is needed, provide it in the figure caption.

Discussion
The discussion section can be combined with the result section for short papers, but is often a stand-alone section after the results have been presented. This section is where you interpret the results. Tell your reader the significance and implications of your data, explain the relationships your data shows and how your findings agree or contrast with previous work. This is also where you should point out any results that are inconclusive or unexpected. While it is important that you emphasize the significance of your findings, it is equally important that you clarify any doubt or room for improvement.

Research papers typically contain:
Title
Abstract
Keywords
Introduction
Results and discussion
Materials and methods
Conclusion
Bibliography

When you submit your first draft, it should be complete, including the abstract and bibliography. Your Introduction should include the references that will put your work in the context of previous work; this section should be targeted to your topic rather than a broad overview. Your Methods section should include references pertinent to the experimental / analytical / computational methods employed. Your Results & Discussion section should include references to work that presented results comparable to your own (note: there may be some overlap here with references cited in the Introduction). Read all the works that you include as references (including appropriate sections of books) before handing in the first draft of your paper.

Sources: