

How to Write a Methods Section

Where does it fit? – The methods section generally follows the introduction. The methods section describes the analysis, modeling or experimentation used to achieve each of the issues identified in the statement of objectives.

Before Writing – The methods section is a clear and concise explanation of how you conducted your study, and it provides readers with the information needed to evaluate the quality of your work and to replicate your work. Carefully consider each of the following issues in preparation for writing the methods section.

- **Details** – Provide sufficient quantitative information and specifics about the procedures or protocols such that the experiments, analysis or simulations can be replicated.
- **Balance** – Maintaining the required balance between brevity and completeness is challenging, so developing a detailed outline for the methods section is essential. Ask the question: what is essential for someone to repeat the results obtained? If it order, time, or person is not essential then they should not be listed. If the result is dependent on the order, time or person, then they should be listed.
- **Flow** – The logical flow of the experiments, analyses or models must be apparent to the reader, so the methods section must be highly-structured and easily followed. Generally, this may be accomplished by describing the procedures chronologically or by developing a classification system for the procedures. A detailed outline is also helpful in maintaining flow in the methods section.

While Writing – Systematically state what was done, how it was done, how the data was collected, and how the data was analyzed. Think about responding to questions such as ‘what was done?’, ‘why was it done?’, ‘how often was it done?’, ‘how was the start of the process identified?’, ‘how was the end of the process identified?’, or ‘how was the data collected?’ as you write. The following are specific tips for writing an effective methods section.

- **Style** – Since you are describing what was done, you should use past tense. Use a third person perspective and a passive voice to place emphasis on what was done instead of who did it.
- **Experimental design** – Include a brief description of the hypothesis that motivated the design of each experiment, process and analysis you performed. Include sufficient details regarding the equipment and materials used. If available in a prior publication, lengthy descriptions of the design of an experiment, process or analysis may be included by reference.
- **Measurements** – Clearly state the measurements made with an estimate of the uncertainty in each measurement. Describe how the uncertainty was estimated.

After Writing – Consider the following questions after completing a draft of the document, and use these considerations to revise and improve the methods section.

- **Structure** – Is the organizing principle (i.e., chronological, categorical, functional, etc...) readily apparent to a reader?
- **Level of detail** – Would a reader be able to replicate your study using only the information included in the methods section? Did you avoid unnecessary details? For example, did you include the ambient temperature and humidity when they have no bearing on the experiment?

- **Content** – A common error is to include results in the methods section. Make sure that you are describing processes and procedures and that you have not included results or a discussion of the results in the methods section.
- **Tense** – Another common error is to switch from the past tense to the present tense. Make sure you are writing about what you did and not what you are doing or what you will do.