

PROCEDURE SECTION

Your job in the procedure section is to convince your reader that you carried out the experiment carefully and knowledgeably enough that the reader should take your experimental results seriously. In describing your experimental procedure, you should think of the reader as someone who is unfamiliar with the particular experiment you are doing, but who is familiar with the pitfalls of working with the equipment you will be using. Furthermore, you should think of the reader as someone who is inclined to be skeptical about your results and hence will be picky about your procedure. (This doesn't sound very friendly, but professional physicists act just this way reading other authors' papers, especially about experiments they wish they'd thought of doing, or about experiments they were about to do themselves.)

Most procedure sections have a fairly standard format, which you should feel free to modify. A typical description of an experimental procedure starts with a description of the equipment used including the precision of measuring devices. (Do not give a numbered list of equipment.) Anything that isn't a standard device should be described somewhat quantitatively. Include a sketch of the apparatus. Sometimes this sketch will be schematic in nature, like a block diagram or a circuit diagram; in that case, a computer-drawn sketch is fine. In cases where you need to show fine detail, or where it's important to show the geometry accurately, a hand-drawn sketch is usually better. Unless you are very skilled or have very good drawing software, computer drawings don't normally look enough like the objects they represent to be useful. *Definitely*, do not get carried away with clever and unique fonts in a sketch. The objective is to concisely depict an apparatus, not to obscure it in fancy graphics. The sketch of the apparatus should be presented, numbered, and referred to as a figure, just as graphs of data in the analysis section.

Next, you tell what you did with the equipment. You should do this in a logical order, but not be too "step-by-step" about it. Specifically, avoid a numbered list of steps, which are difficult to read and hence inappropriate except for the rare reader who intends to repeat your experiment exactly. At the other extreme, you should avoid narratives like this, "First we did (whatever), but that didn't work, so then we tried (something else) to fix the problem with the first measurements." Refine your procedure to remove these false steps, and present it in enough detail so that the reader can clearly understand what you did without being overwhelmed by irrelevant tiny details. If you've made a revision in some seemingly obvious procedure that significantly improves the accuracy of your results, though, be sure to take credit for it.

You might also consider the following questions as you write this section: How did you determine the experimental uncertainties that you show? What (if anything) did you do to reduce them? Did you experience any difficulties with the apparatus, and if so, how did you