

# Writing a good protocol

The purpose of a protocol is simple: to make experiments easier to perform, easier to share, and easier to build on. However, a good protocol is more than just a record of how something is done. Good protocols directly improve reproducibility, efficiency, and collaboration. They also reduce mental clutter and make space for creative thinking (Anderson, 1982; Sweller et al., 1998).

Here you'll find practical tips for writing protocols that age well. The advice is format-agnostic: whether you write in Markdown, structured XML, or word-processor documents, the same discipline applies.

## Procedures

### >> Writing a protocol

- (1.) Sketch the structure first. At minimum: a unique identifier, a name, an abstract, a changelog, and one or more procedures. Add safety, analysis, or troubleshooting advice where applicable.


*This is why:* A consistent skeleton across your collection lets readers find “how do I troubleshoot this?” or “what changed in the latest version?” without rereading the whole document.

- (2.) Write each step as a single action in active voice.

- (3.) Be deliberate:

- Name equipment, reagents, and durations a new reader would need to execute the step without asking you. Assume nothing about prior knowledge — including your own, two years from now.
- Parameterize quantities, volumes, and ratios so the procedure scales. A protocol is not a lab notebook. Leave room for the next user to adjust without rewriting it.
- When an action is non-obvious or grounded in experience, attach a one-sentence rationale.



*This is why:* Stating the “why” raises adherence (Deci et al., 1994) and lets the next user adapt the step to new conditions instead of preserving it as cargo cult.

- (4.) **Critical:** Mark critical steps and decision points so they are visually distinct from routine ones. Readers scan; the moments that matter most should be impossible to skim past. 

- (5.) Track changes:

- Maintain a changelog. Append one line per substantive edit with the date, your full name, and a one-sentence summary of what changed.

*Hint:* Use full names (no initials). Minor corrections (patches) may not need to be logged. Backward-compatible additions and clarifications get a log entry. Incompatible changes get a new version, not an in-place edit.

- Version the filename. For incompatible changes, create a new file with an incremented version number and leave the retired version intact for reproducibility.
- **Optional:** Commit changes through version control  SOP0101. 

*This is why:* Version control records who reviewed what, when, and why. Such a paper trail is often essential when reproducing or auditing past work.

- (6.) Give credit:

- Audit AI-assisted content. If a language model drafted or revised any section, verify every factual claim and citation before publishing. Remove anything that can't be confirmed.
- Do not copy-paste copyright-protected material without permission or a compatible license. If you adapt content from another protocol, cite it and confirm its license is compatible with the one you intend to publish under.

- (7.) Review protocols regularly with users and collaborators. A second reader catches assumptions the writer is blind to.

### List of references

- J.R. Anderson, *Psychol. Rev.* **89**(4), 369–406 (1982).      J. Sweller, J.J.G. van Merriënboer, and F.G.W.C. Paas, *Educ. Psychol. Rev.* **10**(3), 251–296 (1998).  
E. Deci, H. Eghrari, B. Patrick, and D. Leone, *J. Pers.* **62**(1), 119–142 (1994).

### Change log

- 2025-04-02 Benjamin C. Buchmuller Initial version.  
2025-08-14 Benjamin C. Buchmuller Added sections on XML validation and organization using Git or GitHub; ChatGPT 5 (OpenAI) advised on XSD and Schematron use (XSLT-1 skeleton).  
2026-05-12 Benjamin C. Buchmuller Promoted to public; scope reduced to format-agnostic guidance. XML/ConTeXt-specific authoring content moved to an internal reference document. Guidelines block folded into the procedure as concrete writing actions.

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