

Log Writing Guidelines and Tips

New Learning (The body of the paper)

While there is no required order to the sections of a log, most logs start with information about the topic.

Things to do in the background section:

- Make sure that your explanations demonstrate that YOU have learned new science/engineering/or technology concepts. **The bulk of your paper needs to be about science and technology.** (Also, the learning should not be something that a high school student already knows.)
- Make sure that your explanations demonstrate depth of thinking. This is a math, science, and engineering class and **I want you to find out HOW things work.** You will likely run across terms that you have never encountered before. Don't avoid them, but be sure to explain them.
- Connect the new science learning to its impact on society, politics, the law, and yourself. This gives your paper meaning. **BUT AVOID MAKING THESE CONNECTIONS THE BULK OF YOUR PAPER.**
- Use credible sources and reference all statements that are neither opinion nor common knowledge. "science4kids.com" is not likely to be appropriate for this class. The credibility of your paper is enhanced by good quality sources from a variety of media. Look beyond websites to include periodicals, professional journals, books, etc.

Things to avoid in the background section:

- Plagiarism. Explain complex terms in your own words. If you use the term "unsaturated hydrocarbon", I expect you to explain what it means.
- Non-academic language. Examples:
 - This occurs most often in transitions. Example: "First off..."
 - It can also occur with thinking out loud situations. Example: "I was trying to think of a further development and.." This is not a diary. Organize your thoughts and present the further development in polished form. Do not include the process of discovering it.
 - It can also occur with general questions: "What do you think?" "Who can say what will happen in the future?" It's your paper, it is not a discussion with the reader.
- Extreme language. This occurs most often in the opening paragraph and would be considered a "hook" in your English class. This is a science/engineering course and *credibility and objectivity* are important here. Example: "Everyone knows that nuclear power plants are dangerous". Everyone is an absolute term (and would require a reference). The sentence does not lead the reader to believe that the author is being objective. Better alternatives:
 - 72 % of the American population believes that nuclear power plants are dangerous².
 - Many people believe that nuclear power plants are dangerous.
- Significant inaccuracies. While you are expected to have pursued a topic that was new to you with critical thinking and depth, it is likely that you will still have questions at the end. However, a paper that looks as if very little thought has been applied (as evidenced by many false statements) may not be considered to be "new learning".

Questions

These should be relatively easy, but don't forget to include a few. **Avoid the obvious.** We are looking for insightful questions that demonstrate that you have been interacting with the material. Look for the answer to your question and show what is known about it.

Further Developments

Further developments are a statement of the direction the field is headed or an application of the idea that is not obvious. It can be new research that is happening right now. It can be your idea for an application.

Things to do in further developments:

- Do not start the paragraph with: "One way to further develop poison dart frogs is...." A further development is an L2k construct that encourages you to organize your thoughts. I would bet a frog does not think that it needs to be developed in any way.
- A well reasoned further development must have references supporting the idea.
 - This is particularly easy if you are just reporting cutting edge research in a field.
 - If you are proposing a new idea.... for instance.... that gene therapy be used to cure an illness, then find another illness where gene therapy was used successfully. (This is creating plausibility by analogy.) Either way, you will need a reference to support your thinking.
- Check to see if your idea has been done before. It's okay if it has been done but make sure that you reference the prior work and explain how it relates to your idea. There are no 100% new ideas. Find the most similar work to yours and explain the similarities and differences.

Things to avoid in further developments:

- The obvious. (Obvious ideas are those that another high school student that did not do the research that you have done might have come up with.)
- Ideas that are not based in reality. (This is why you will need a reference.)
- Examples of poor further developments:
 - I propose that we do research and find a medicine that will cure the illness. (If you were to explain exactly HOW you were going to do that, then that would be much better.)
 - I propose that we make the technology smaller.
 - I propose that we get more money to fund research in this area.
- The further development must not be a topic that should have obviously been covered in the background section. For a log on burns, you can't use the treatment of burns as a further development. No discussion of burns would be complete without discussing treatments.
- Suggestions that foundations need to be created.... or that awareness needs to be raised.

Applications

Applications must involve you physically “doing” something. They will require literature searching but cannot be pure research. A few ideas are outlined below but don’t let these suggestions limit your creativity.

Ideas for applications:

Experiments – Must pertain to the topic, and data and graphs must be included. An explanation of the meaning of the results is needed. Doing a log on conductivity in metals? Do an experiment showing how temperature affects conductivity. You must include photos and a complete summary of the reasons behind and results from the experiment.

Projects – Build something related to your project. Doing a log on hydraulics? Build a simple hydraulic apparatus. Doing a log on turbines? Build a simple steam turbine. You must include photos and a complete summary of the reasons behind and results from the project.

Interviews - The interview must be with a professional or someone that would be considered an expert on the subject matter and you will need to provide credentials and any information that establishes their expertise. Avoid family members and friends unless they are employed in the field. A transcript must be included.

Other ideas that involve you doing something. Hopefully you do not view the previous 3 as an exhaustive list. Sometimes, the research part will give you inspiration to try something new.

Things to avoid in applications:

- Surveys or social experiments on friends and family.
- Interviews of individuals that have no expertise in the area.

Topics that are off limits

There are a few topics that are off limits. These topics, while very interesting, are more likely to cause you to avoid new learning in science/engineering and are more likely to tempt you into surveying your friends. Avoid them at all costs.

- Psychology topics (dreams, anxiety, sleep, education, stress, etc.)
- Sociology topics
- Anything to do with energy drinks.