



Error Analysis and Discussion

*What to say
or to write, and
what to avoid.
What is valid,
and what is not.*

Do not Criticize the Equipment

- Do NOT say
 - ✓ “Due to poor equipment, we didn't get good results.”
- No scientist ever has perfect equipment. The experimenter must learn the limitations of the equipment and how these affect the quality of the results.
- Sometimes experiments using very crude equipment have confirmed or rejected a law or theory.

Avoid Prove and True

- Do NOT say
 - ✓ "In this experiment we proved the law."
 - ✓ "We determined that the laws is true."
- This uses the words "prove" and "truth" in a questionable manner.
- Reserve "prove" for mathematical theorems.
- Avoid the word "true" entirely in scientific writing.
- An experiment may disprove a law, but no finite number of experiments can ever establish a law as absolutely true.

Avoid Personal Opinion

- Do NOT say
 - ✓ "I enjoyed this experiment very much and learned a lot from it."
- Save personal comments for other occasions. Don't include them in any comments or discussions about experiments.

Avoid Idle Speculation

- Do NOT say
 - ✓ “The hot room may have caused error.”
- To say that certain conditions of the experiment “may have caused error” communicates no useful information unless you cite some specific evidence or reason why such condition would cause error.
- You can say
 - ✓ The hot room might have caused the liquid to expand, increasing its volume, while not affecting the mass. This would cause the density to be smaller.

Avoid blaming Calculation Error

- Do NOT say
 - ✓ "Error in results could arise from calculation errors."
- If you mean your own blunders, this statement tells us nothing we didn't already know. We still don't know if a blunder actually occurred.
- If you knew that a blunder occurred, you should fix it and not admit to it.

Don't Blame Human Error

- Do NOT say
 - ✓ "The results may have "human error."
- We all know that human blunders, misperceptions, and misinterpretations can occur. We expect the experimenter to take every precaution to avoid them.
- The limitations of human observation of instruments goes without saying.