



# Integrating Writing In Undergraduate Labs

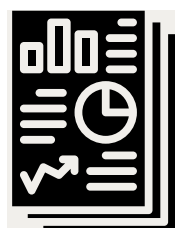
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In undergraduate labs, writing is an essential activity. Writing across undergraduate labs is done through lab reports, presentations, pre, and post-lab assignments, etc. These writing assignments are designed to teach students how to present their lab work. The lab work from data collection, analysis, and calculations should be presented in a standard manner to their peers and instructor. This guide will discuss strategies to integrate writing in undergraduate labs. This guide highlights writing in undergraduate labs, which will increase student engagement.

## Writing Assignments in Undergraduate Labs

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We will discuss three types of writing assignments in undergraduate labs: Lab Reports, Reflection Essays and Alternative Assignments.



Lab Reports  
Reflection Essays  
Alternative Assignments



## Lab Reports

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Students write a lab report to present their lab work. This writing assignment should include lab report writing guidelines, a sample lab report, and a grading rubric (if applicable).

### *Tips for designing lab report writing guidelines:*

- § It should mention relevant lab report sections (Cover Page, Abstract, Data and Equations, Graphs, Calculations, Conclusion, Error Analysis)
- § This should include a detailed breakdown of each lab report section. The guideline should clearly state what to include and what not to include in each section.

- § The guide should contain checklists for each section.
- § The guideline should address FAQs. This includes what unit to use for measurement, how to present data (data table formatting), or other common queries students might have.
- § Use colors, highlighters, and bullets/symbols to make the guidelines easier to follow.

# Reflection Essays




Another strategy to integrate writing in classrooms is in the form of reflection essays. In this assignment, students think about their learning experiences and analyze their learning process. In labs, this can be expanded to include writing about working with lab partners, the experience of using laboratory tools, etc. This assignment can be done weekly or after each experiment. In short, this assignment will help students keep track of the learning process and encourages them to think about their learning strategies and experiences. This will, in turn, facilitate student engagement and student ownership of their own learning journey.



**How to design Reflection essay assignments?** A reflection essay assignment should include the purpose of the assignment and sample question prompts.

### Sample Purpose for Reflection Essay Assignment

Reflections are intended for students to explore their learning experiences. You can use question prompts given in the reflection assignments or do a self-assessment of your learning experience.



## Sample Question Prompts!?

- § Did you come to the lab this week prepared to learn (in both your attitude and with all your supplies)?
- § What are some things you learned from this lab?
- § What lab activities or assignments help you learn the most?

- § What do you believe the TA could have done differently to help you learn better?
- § Reflect on your learning, thinking, and work this week. What were you most proud of?
- § Where did you encounter struggles this week, and what did you do to deal with them?
- § What made you curious in this lab?
- § How did your group work as a team?
- § What positive words did you use with each other?
- § How did you help your team?
- § What do you need to work on?
- § How did you feel while working in this lab with your group?

### Grading/Assessing Reflection Essays

The reflection grading scheme should be simple and effective. You can grade reflection essays on completion or have a simple grading rubric. You shouldn't grade reflection essays on grammar, writing style, or correctness.



### *Tips for integrating Reflection assignments in classrooms:*

- § The course syllabus should clearly state the purpose and schedule of reflection assignments. The instructors are encouraged to demonstrate sample reflection essays in the classroom to show their usefulness.
- § Instructors should note key points from reflection essay responses and try to incorporate them in the next lab.
- § To facilitate authentic student responses, you can make the assignment submission anonymous.
- § Modify reflection sample question prompts weekly to better fit the learning goals of that week/experiment.
- § For end-of-the-semester reflection essays, use sample prompts that ask for a summary of the student's learning process throughout the semester.

# Alternative Assignments

For most undergraduate labs, lab reports are default writing assignments. We can design alternative writing assignments to increase student engagement and facilitate creativity. It is shown that non-traditional assignments motivate students. It also benefits diverse student learners. This alternative assignment could be as simple as changing the writing genre or incorporating audio/visual elements. These assignments should include a detailed description of the assignment, relevant sample assignments, useful resources, and a grading rubric.



## Sample Alternative Assignment for Undergraduate Labs

For this lab you have a choice on how to present your work. You are required to present **Abstract, Data, Graphs, Calculations, Conclusion and Error Analysis** in the format you feel comfortable with. Here are few options:

- **Lab Posters** : You can design a poster to present your work. Here are some samples you can refer to [Sample Generic Poster Design](#) ➞ [Research Poster](#) ➞ Here are tools you can use to design your posters: PowerPoint, [Canva](#) ➞, [Adobe Express](#) ➞ , [Vista](#) ➞ etc.
- **Presentations** : You can submit a recorded presentation (**minimum 7 slides, 5-12 minute videos**) which clearly explains your experiment. Here are tools you can use : PowerPoint, Google Slides etc. [Record a Presentation in PowerPoint](#) ➞ (the record button is under Slideshow option), [Use Flip to Record Videos](#) ➞
- **PechaKucha** : *Pecha Kucha* is a presentation form of 20 slides for 20 seconds. The slides change automatically and the speaker must synchronise their speech with the images. Here are instructions on how to design [PechaKucha](#) ➞, [PechaKucha Template](#) ➞
- **Other Formats** : You can use other formats like YouTube videos, [Press Visualization](#) ➞, [Miro Charts](#) ➞, [Illustrator](#) ➞



## ***Tips for integrating alternative assignments in classrooms:***

§ It is important to extend the submission deadline when introducing alternative assignments.

§ Instructors should clearly define their expectations for these assignments. It is helpful to provide sample submissions.

§ For audio/visual designs, instructors should provide resources for students. These resources can either be open source or licensed by the university.

§ There should be a clearly defined grading rubric for these assignments. Since instructors/TAs will be grading a diverse range of submissions, grading should be general enough to include all potential submissions.

