

STEM Journal Checklist

All mandatory and optional labs, activities, and investigations should be written in your STEM Journal. The following checklist will help to ensure all students meet my expectations for their lab reports.

Ask the Question:

- Ask a question based on a natural or scientific phenomenon. The questions can be developed or framed by the teacher, students, or as a class. The question should be written as the first thing in your STEM Journal.

Research:

- All data must be compiled in an organized data table. It is often possible to use the templates provided in lab originals and manuals; however, you are encouraged to create a data table that best fits your anticipated data set.
- Graphs are made by hand and must have a title, labeled axes with units, proper increments along each axis to ensure a maximum spread of data points, and must be at least $\frac{3}{4}$ of an entire page.
- Graphs that are linearized must include the modification used to linearize and the equation for the line.
- Variables must be clearly identified. Identify the dependent, independent and control variables.
- FOR CHEMISTRY AND PHYSICS ONLY - Percentage error and percentage difference must be completed on all applicable data sets. Show all work for full credit. Here are the equations for each calculation:

$$\text{Percent Error} = \frac{|measured - actual|}{actual} * 100\%$$

$$\text{Percent Difference} = \frac{|measured_1 - measured_2|}{\left(\frac{measured_1 + measured_2}{2}\right)} * 100\%$$

- Sources of error must be explicitly addressed in all labs. Please avoid the term “human error” and use the terms systematic and random error. Always acknowledge sources of error. [Click here](#) for the hand-out.
- Data excluded from analysis must be referenced along with a justification for the exclusion.
- The degree of uncertainty in all measurements should also be addressed along with the propagation of error.
- All data with decimals will need a zero preceding the decimal. (e.g., **0.52**)

Methods/Materials/Procedures:

- If designing your own experiment be sure to write a description of what steps you followed and include the information below in forth bullet.
- Includes a reference to the lab document or lab hand-out. For example, it is permissible to write: “The methods and materials for this lab were followed according to the protocol outlined in AP Chemistry Lab #5- Synthesis and Analysis of Alum”.
- All deviations and modifications from the outlined protocols must be explicitly addressed in this section. For example, a student may write: “I used 500 μL of the crystal violet solution, rather than the 400 μL called for in the lab protocol”. Another example, “I used a Vernier digital photogate to determine the final velocity of the steel ball, instead of the stopwatch and meter stick referenced in the lab manual.”
- Include labeled sketches of apparatuses utilized to collect data in the labs. For example, you may have sketches of a titration apparatus, gravimetric filtration, the color change of a chemical reaction, the conical pendulum scribed by a flying pig, electrical circuits, free-body diagrams, etc.

Make your claim

- State your claim after collecting evidence and data. This is a single sentence that shows a relationship between the independent and dependent variable based on your evidence and data.

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Summary:

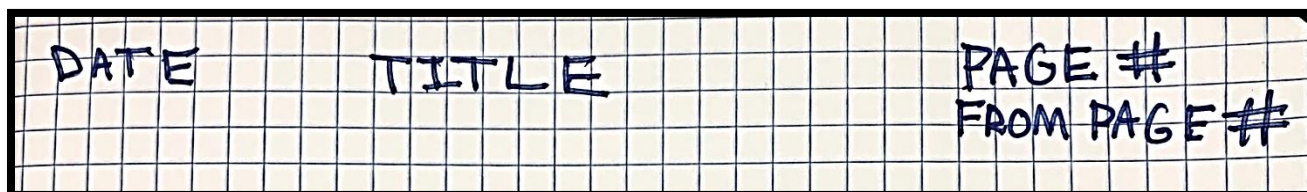
- At minimum, the conclusion should be 10-15 sentences in length. Your conclusion should always indicate the relationship to one or more scientific principles. Here are some topics you may choose to discuss in your conclusion: 1). Revisit the question and claim for the lab investigation; 2). Discuss your data and why the results support your claim; 3). Discuss how the results would be affected by changing the number of measurements, measurement techniques, or the precision of measurements; 4). Review and critique your experimental design or procedure and decide whether the conclusions can be justified based on the procedure and the evidence presented; 5). Propose suggestions that would limit your experimental sources of error; 6). Discuss new ideas and questions this lab may have generated for you; 7). Suggest how you could explore some of these new ideas and questions; 8). Explain how the investigation relates to your class standards.

Pre- and Post-lab Questions (if assigned)

- Pre-lab questions will be answered before the research portion of the investigation and Post-lab questions would be answered after the research portion and before the claim.
- All pre- or post-lab questions must be answered in complete sentences. Answers to questions requiring calculations should explicitly reference the calculations. Answers without calculations clearly referenced will not receive credit.
- The question numbers on the original lab document or lab manual should correspond with the numbers used in your lab notebook.

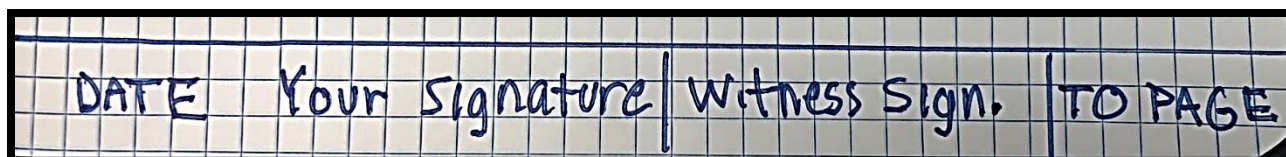
STEM Journal Standard Format:

- Update your table of contents before turning in your notebook.
- You should have two pages (front and back and another front and back) designated for the table of contents.
- Write in blue and black ink only. Refrain from using white-out.
- Incorrect or changed answers should be marked out with a single line.
- Check the top of each page to ensure you have a title, page number, and date (e.g., 20 AUG 2020).
- Use "To Page/From Page" pagination as you do in your STEM journals and biotech notebooks.



DATE	TITLE	PAGE #	FROM PAGE #
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- Place a single diagonal line through any unused spaces of the notebook exceeding 1/5 of a page. This also includes any blank pages and the section of a page that might be left at the very end of a lab.
- Double check to ensure I will be able to easily follow the flow of information required for the lab.
- Lab notebooks do not need to be neat and perfect. You will make mistakes in science. Please do not feel you ever need to rewrite your work.
- All students are required to be recording data in their own lab notebooks while conducting the lab.
- Include the date, your signature, and the witness signature at the bottom of the page with the To Page #.



DATE	Your Signature	Witness Sign.	TO PAGE
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