Logbook

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Science Fair 2025-2026
August 8, 2025 -

Science Fair Logbook 2025-2026

Date	Daily Ideas/Notes
Before August, 2025	Over the summer break, we performed background research on several scientific world problems such as **environmental challenges**, **biodiversity loss**, and **biotechnology** and eventually decided to focus on **agricultural pollution/waste**. *Possible Project Ideas:* - Using Graphene-like material as a natural conductor from food waste (recent research from Rice University) - Design accessible filtration or absorption/chemical binding systems to prevent algae blooms, dead zones, overpopulation of nutrients, and eutrophication - Using accessible, everyday materials to create renewable and organic fuel sources - Alternative pesticides to minimize environmental impact on the biodiversity of areas near farms - More effective irrigation systems for maximizing agricultural water control

Saturday, September 6th, 2025	We decided on our project, **creating a filtration/absorption/chemical binding system to prevent eutrophication.**
	
	We compiled all of our previous knowledge as well as brainstormed ways to achieve our goal.
	
	Current Knowledge:
	- Eutrophication: when excess nutrients (nitrogen, phosphorus) enter bodies of water, cause algae blooms that deplete oxygen in the water
	  - Algae blocks sun from aquatic plants
	  - Organisms drain oxygen while eating algae
	  - Food chain collapses
	  - Dying organisms release Co2
	  - Water becomes a hypoxic dead zone
	- Caused by the nitrogen/phosphorus in:
	  - Sewage
	  - Fertilizer runoff

	- Food waste - Phosphate cleaners - To mitigate this, we could: - Create a filtration system - Either mobile (robotic?) or stationary - How would water enter/exit? - What materials filter? - Create an absorption system - What materials absorb nutrients? - Where do the nutrients go afterward? - Create a chemical binding system - What elements bind to nitrogen or phosphorus? - Would the chemicals be safe for water?
Sunday, September 7th, 2025	We created our research document and began thinking about necessary background information to get a better idea about what to create for our science fair project. We also formatted the research document into small sections such as “problem”, “method”, “conclusion” etc. This will allow us to form a timeline for when to complete each component.
Wednesday, September 10th, 2025	We brainstormed several guiding questions that we will research and analyze on a later date.
Friday, September 12th, 2025	Today we researched several of our background research topics, and are beginning to get a better sense on a more niche science fair topic. The background research has really helped us to get a better overall understanding of eutrophication and all the factors that come together to cause it.
Monday, September 15th, 2025	We researched more specific topics such as phosphorus and what materials may be used to bind, absorb or clump phosphates.
Monday, September 22nd, 2025	We researched more phosphate-related questions such as the phosphorus cycle, and how phosphorus is measured.
Tuesday, September 30th, 2025	We continued research background topics like what factors influence the removal of phosphates, and how to increase/maximize absorption/precipitation of phosphates.
Tuesday, October 14th, 2025	We did some more in-depth research on biochar and its abilities to enhance absorption of phosphates for eutrophication. Additionally we have decided that we should roughly try to finish the background research next month so we can plan our procedure and method to conduct a potential test/experiment during Christmas/Winter break.
Wednesday, November 19th,	We complete the Research, Conclusion, and Next Steps in the Course of Action section of our Method to the extent that we could (as we

2025	have yet to create a procedure for our experimentation). Overall our method is a guideline and a rubric for us to follow to stay on track and have a clear idea of what to do in any given stage of our project.
Friday, December 5th, 2025	We have developed a more clear view of our project as we have narrowed it down from phosphorus removal to phosphorus removal using biochar beads that can be deposited in water. We planned our materials and applied for a Youth Central Microgrant so that we can buy a colorimeter. Additionally, we completed the Innovation/experimentation section in our Method and filled up the Materials & Equipment section to the best of our knowledge.
Saturday, December 6th, 2025	We completed our Basic Project Info and Ethics and Due Care 2A on the CYSF project platform. Now we just have to wait to get approved to be able to transfer our research to the platform!
Thursday, December 18th, 2025	We are now able to use the CYSF platform however we also got a response from Youth Central stating that we are not currently able to receive the microgrant. Instead, we will split the costs between us. Afterwards, we finished our material list and researched potential locations to buy our supplies from, and while doing so we decided to stop researching aluminum to make our project more specialized and to regulate our budget.
Friday, December 19th, 2025	We researched videos on sodium alginate gels and how people make popping boba to develop a process for making our beads. Then we finished our creation process and filled out a list of materials and step-by-step instructions for bead creation. We also readjusted our document's format to better suit that of the CYSF platform, and completed the Variables, Hypothesis, and Procedure section. Finally we began thinking about ways to collect data to show growth and progress.
Saturday, December 20th, 2025	We bought the materials and equipment needed for our experiment and planned the exact amounts we will use (may be subject to change).
Sunday, December 21st, 2025	All of our needed materials and equipment arrived from Amazon and totaled to be ~$100 (this included pH meter, phosphate test strips, biochar, calcium chloride, sodium alginate, iron oxide powder).
Monday, December 22nd, 2025	The phosphate fertilizer arrived and we have collected some eggshells for our calcium carbonate. We also calculated how to create our phosphate stock solution with the proper concentration. To mix this, we will first create a stock solution with 100 mg of phosphate and 1 L of water, then take 2.5 mL of this stock and mix it into our final test solution alongside 497.5 mL of water (we used the dilution formula of $C1\ V1 = C2\ V2$ to calculate how much of the stock was needed). Tomorrow, we will meet at Eden's house and set up the experiment!

Tuesday, December 23rd, 2025	Today we met at Eden's house to prepare all of our materials and set up our experiment. First, we cleaned and crushed eggshells and ground the biochar chips into a fine powder. We then prepared the Calcium-Biochar-Alginate beads and allowed them to gel, then left them in the fridge with some water while we repeated the recipe with Iron Oxide. Although our beads resulted in a slightly unexpected colour and consistency, there were no large problems from these steps. Next, we prepared our Stock Solution with 100 mg/L of phosphate and added it into our final test solution. We calibrated our pH metre and tested the phosphate levels from each container to get a starting measurement and to ensure that the yeast strips and metre work properly. Over the next few weeks, we will record pH and phosphorus measurements daily.
Wednesday, December 24th, 2025 — Sunday, January 4th, 2026	Testing period.
Sunday, January 11th, 2026	We collected our experiment data into a line graph on Google Sheets. The graph includes the amount of days (x) proportionate to the amount of phosphate (y) in each container.
Sunday, January 18th, 2026	We met again at Eden's house to prepare a second batch of beads. Then, we set up our second experiment to confirm the credibility of our results. There were no changes to our variables.
Monday, January 19th, 2026 — Wednesday, January 28th, 2026	Second testing period.
Monday, February 2nd, 2026 — Tuesday, February 10th, 2026	Third and last testing period. We should have a comprehensive sample size by this point.
Tuesday, February 17th, 2026	We attended the Science Fair club at school for some information on the CYSF platform and registration. Then, we compiled the data from our second and third experiments into graphs on Google Sheets, and filled out the Hypothesis, Research, Procedure, and Variables on the CYSF platform.
Monday, February 23rd, 2026	We planned a schedule for when we should meet up to work, as well as the due dates for the rest of the sections we have left to complete, such as the Analysis, Conclusion, Script, Slideshow, Video, and Trifold. Then, we wrote part of our Analysis to go along with our graphs.
Wednesday,	We finished our analysis for each graph for the 3 trials we completed

February 25th, 2026	as well as started some more detailed analyses on factors like cost, effort, etc.
Thursday, February 26th, 2026	We finished our analysis and uploaded it, our citations, and acknowledgement to the CYSF platform.
Friday, February 27th, 2026	We finished our Conclusion and Application and added them to the CYSF platform, then started on our slideshow presentation.
Saturday, February 28th, 2026	We finished our slideshow presentation and our script.
Sunday, March 1st, 2026	We recorded the audio for our presentation video that we plan to put on the CYSF website.
Tuesday, March 3rd, 2026	Finished our video and submitted everything to the CYSF platform.
Wednesday, March 4th, 2026	Today we met up at Eden's house to practice our presentation and print the slides to paste on our trifold. Since it is the deadline for submitting everything to the CYSF platform, we can no longer add any logbook entries after today, however we roughly plan to finish our trifold (if we aren't able to today) and practice our presentation until our school science fair on March 12th.