2024-2025 CYSF LOGBOOK
Contributor: Yatharth Trivedi

October 31, 2024

- Proposed goal: brainstorm testable questions for my science project
- Accomplishment: I decided to try something new as my science projects for the last few years have been related to biology. I am interested in the field of aviation and when I did some research on the new technologies in the field of aviation, I ran into ionic wind thrusters.

November 2, 2024

- Proposed goal: Investigate and understand the technology of ionic wind thrusters.
- Accomplishment: For this year's science fair I decided to start with the background research to better give me an idea for my testable question. To accomplish this, I divided my research into three chunks to address these three main questions: How does an ionic wind thruster scientifically function to produce wind? How does atmospheric pressure impact the output from an ionic wind thruster? How does electrode spacing impact the output from an ionic wind thruster? I focused on the first question for today and conducted some research. I cited all the sources that I used in the APA 7th ED format.

November 3, 2024

- Proposed goal: Research the remaining two focussing questions for my topic.
- Accomplishment: Researched the following questions: How does atmospheric pressure impact the output from an ionic wind thruster? How does electrode spacing impact the output from an ionic wind thruster? I researched the remaining questions, citing all my sources in the APA 7th ED format. There was a lot of information regarding these areas, so I prioritized and paraphrased the information concisely. Therefore, after reviewing my research, I concluded with the following testable question: By what distance decrements does the electrode spacing need to be adjusted with decreasing atmospheric pressure to maintain a constant wind speed produced by an ionic wind thruster?

November 4, 2024

- Proposed goal: Complete the science project proposal
- Accomplishment: I found a proposal template from last year. So I created a hypothesis, procedure, list of materials, and identified the different variables.

November 5, 2024

- Talked with my science teacher regarding my project and received approval
- Ordered all materials from the list so that once they arrive I can begin the construction of the ionic wind thruster and then begin testing in the functioning vacuum chamber.

November 6 and 7, 2024

- Set up a 30-minute meeting each day with Aum Trivedi, a cosmologist and expert in this field, to discuss and finalize how I would set up this experiment and construct the ionic wind thruster.
- To ensure that the information in my background research was valid and accurate, I also asked him some questions regarding the science behind atmospheric pressure, electrode geometry, and ionic wind thrusters.

November 8, 2024

- Materials arrived
- Constructed a fully functioning ionic wind thruster. Under control conditions (5 cm electrode gap and 100 kPa atmosphere) it produced 26 m/s
- Filled the vacuum chamber pump with oil and attached the inlet to the chamber hose. I can now adjust and maintain the pressure in a vacuum chamber.

November 11 and 12, 2024

- Proposed goal: Complete testing and data collection
- Accomplishment: Created tables including the manipulated and responding variables for each trial. I also Measured the control values for comparison. Next, I began testing as per the procedure and filled in the tables accordingly.

November 15, 2024

- Proposed goal: Complete quantitative data collection and start creating graphs
- Accomplishment: Completed qualitative data collection and performed some calculations to find the averages. I also created a scatter plot and bar graph using the raw data from the table. I am confused on whether I should keep the scatter plot or bar graph to display my data.

November 17, 2024

- Proposed goal: Complete qualitative observations and finalize graphs
- Accomplishment: Completed some qualitative observations using my five senses and finalized the bar graph. I constructed two graphs on Google Sheets, one displaying the data from the five trials, and the other displaying the average of all five trials.

November 24, 2024

- Proposed goal: Complete an evaluation of the experiment as part of the analysis
- Accomplishment: Competed the experiment evaluation and analysis of the trends in data

November 25, 2024

- Proposed goal: Identify and analyze outliers in the data

- Accomplishment: Found and explained two outliers present in the quantitative data. However, I will do the sources of error later.

December 3, 2024,

- Proposed goal: Complete conclusion
- Accomplishment: Completed the conclusion by answering my initial question and using data and background research to support my explanations.

December 4, 2024

- Proposed goal: Determine applications for my experiment and data
- Accomplishment: Determined two applications of my data so far in the aircraft and satellite industry.

December 6, 2024

- Proposed goal: Further research the applications
- Accomplishment: Discovered more about the benefits of ionic wind thrusters and explained how they are more beneficial in terms of maintenance and carbon footprint. Next, I would like to indicate further areas of study.

December 8, 2024

- Proposed goal: Indicate further areas of study as part of my extension
- Accomplishment: Explained a couple of other similar technologies that sounded interesting to me. I also clearly stated how I could perform my experiment better next time and what improvements I could bring to ionic wind thrusters. For example, I could develop an automated system that controls the electrode spacing of ionic wind thrusters already present in certain aircraft.

January 1, 2025

- Proposed goal: Attach references from background research into the lab report document and write my acknowledgment
- Accomplishment: Reviewed references to ensure all of them were included and formatted in APA 7th ed format. Next, I attached them to the lab report document and wrote my acknowledgments.

January 3, 2025

- Once the project was done, I had a quick voice call with Aum Trivedi. We scanned the lab report to review the data, information, and explanations. Aum thought all the information seemed accurate, and he had no suggestions.
- Printed out sheets to populate the trifold with and then arranged it in an orderly format. Once all the information looked good on the trifold, I glued it on.

March 5, 2025

- Recorded presentation video to upload on the CYSF platform. The video was roughly 15 minutes and 20 seconds long.
- Uploaded video, participant image, project image, project banner, and all other required components to the CYSF platform.

March 10, 2025

- Received the contact information of an experienced and professional pilot, Mr. Kevin van Gisbergen, from my science fair coordinator.
- Sent an email to the pilot regarding some questions on which he could provide insight.

March 12, 2025

- Heard back from Mr. Kevin van Gisbergen. He provided excellent information and insight on the limitations of ionic wind thrusters, and how they could be integrated into the aircraft industry.
- Added Mr. Kevin van Gisbergen to my acknowledgments on the CYSF platform.