

## Science Research Fair Reflection

Why did you choose your topic and project? What advice would you give to next year's students (Or, yourself, should you choose to take this course again)?

I chose the project of air conditioning because I like working with electronics and having the ability to build something physical alongside research. Next year if I were to take this course again or give advice to students, I would have gotten all of the materials I needed cut the moment the materials arrived, taken everything home to finish earlier over a weekend (it's a little easier to build the bigger projects at home when can work on them anytime), and used class time specifically for research ideas, poster design, or practice for the big presentation. For projects that deal with bigger motors/electrical components, a big piece of advice is to plan out the physical wiring in terms of organization. Organization, something that I heavily overlooked, makes troubleshooting less tedious and should be planned during the research proposal.

What was the most challenging part of the process?

The most challenging part of the process was the beginning phase of deciding the scope of the project, along with the materials to keep the project research interesting while not making it overwhelming or too complicated.

What did you enjoy most about the process?

The most enjoyable part about the process was building everything, seeing everything that was planned come to life.

Did you face any obstacles? If so, how did you overcome them?

My biggest obstacle was picking out all of the parts, making sure that they were compatible with each other, since, especially for an engineering project, there are many options available. For example, with the water cooling portion, I had to make sure that the tubing and pipe size were compatible while also making sure everything was running at 12V and was able to be sufficiently powered by the 12V 20A power supply.

Did you learn any new skills or techniques?

I had to do a little extra research on electrical safety since this was my first project dealing with a more powerful voltage and current. I also learnt how to program for data collection (the temperature sensor itself, along with programming a Python script to read, log, and graph the temperature data that was being output from the microcontroller to my laptop). I also learnt a lot about how heat works with a bit of chemistry (the realization that heat itself is just fast particle movement, and the way fans work isn't by mystically defeating hot air with cold air, it's just moving the hot air (movement) away from the user's face. I also learnt about what phase change materials are, along with understanding the concept of latent heat fusion.

Other than that, one main skill I learnt is how to extract useful information out of research papers and actually use it in a project, which I am very grateful for.

How did you prepare for the presentation?

I spent 2 nights as soon as I got home practicing speeches back and forth with my friend. We gave each other feedback on each attempt, with new questions each time.

Did you feel confident during the presentation? Why or why not?

I felt really nervous in the moments leading up to the presentation, but actually during the presentation, I felt confident.

What feedback did you receive from judges and other participants?

Include error margins (predicted graph versus actual graph) and a little more math for graph analysis.

What could you have done differently?

I could have tested other phase change materials and used a little more data analysis techniques for the data I collected. Also could have spent more time cleaning up the poster presentation.

What did you learn from the science fair?

How to present information in a clearer way that makes others more interested and confident in the project data.

Did the experience inspire you to pursue science in the future?

100%, In the future in college, I do want to do research alongside engineering since I find it really applicable to designing actual products, and I believe research is a really good way to check if something theoretically works.

How can you continue to improve your scientific inquiry skills?

Using the whole research method of looking at what has been done before, researching something that might be better, and then actually implementing that project with actual data collection and analysis for more engineering projects will help me improve my scientific inquiry skills.