

# **Final Reflection on My 2014 Summer Enrichment Experience in Physics at Northwestern University**

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This summer, I attended Northwestern University's Center for Talent Development. For three weeks, I was enrolled in an Honors Physics course dealing with subjects that included electricity, magnetism and mechanics.

## **In the Classroom**

Our instructor, Mr. Daniel Caldwell, would start topics off with an introduction, and, instead of laying down principles in a dogmatic manner, he would create a working "model" of what the class collectively understood about the topic. By doing this, Mr. Caldwell was able to prompt us into devising working theories of physics, exactly as scientists hundreds of years ago had done. After this guided introduction to a topic, we would then move to the lab, where we constantly challenged and altered our working model based on the results of our experiments.

On one particular day, we discussed electrostatics. We investigated static electricity and how different electric fields responded to each other using charged pieces of tape. Our labs ranged anywhere from pushing two magnets together to being swung around and around on a large hovercraft. After labs, we would complete worksheets focused on the subject matter at hand. If we hit any roadblocks, everyone in the class would put their heads together to solve the problem. After allowing us to grapple with these challenging assignments, Mr. Caldwell then would raise another relevant question that would lead us into the next topic, which would lead us into another lab. This pattern would repeat until we covered all of the material for the day.

In addition to the lessons and labs, online simulations were also valuable tools employed in the instruction. These simulations provided idealized lab scenarios and variables that could be quickly manipulated.

## **Outside of the Classroom**

Outside of class, we also had the opportunity to participate in a lot of really interesting and enjoyable opportunities. As soon as we got back from class, we could choose to go into Evanston, the town built around Northwestern University. I always enjoyed walking around downtown and visiting various shops and restaurants. My favorite place to go was Joy Yee's, a bubble tea joint.

My classmates and I would often discuss physics and the world in general over a fruit slush. On one particular weekend, I elected to go to the Museum of Science and Industry along with a few friends. I was overwhelmed by the sheer number of exhibits to see. A tornado simulation, hot air balloons and an enormous tesla coil were just a few of the amazing things on display there. Seeing how the progressive advances in technology exceeded the expectations of the previous

generation made me want to be a part of the new generation of scientists working to “wow” the world.

### **Building an Enhanced Knowledge Base**

Before participating in this enrichment experience, the only aspects physics that I could claim to understand were some very basic mechanics. But, after having completed the program, I can honestly say that I have built up a sturdy base of knowledge that will support me in my AP Physics class this coming school year.

### **Expanding My Worldview**

Moreover, participating in this summer enrichment experience also changed the way I see the world. Every time I get in an elevator, I can't help but think about the force applied by the elevator to keep me moving. And, when I plug in my phone charger into the wall outlet, I consider how a circuit is completed. Physics has truly become an integral part of the way I think about the world. Instead of approaching random hypothetical questions that pop into my head—such as where I would land if I jumped out of a plane with no parachute—by guessing, I can now reason about how factors, such as air resistance, play into the trajectory that I would take as I fell. I really enjoy physics because it is a very effective tool for answering such burning questions when they come to mind, and physics allows me to check my educated guesses with exact formulas if I want to determine whether my intuition was correct. As a result, my summer experience has furthered my interest in learning more about physics during the coming year, and I am definitely looking to pursuing physics in college . . . maybe even as a profession!

This summer program also helped me grow as a person. Over the course of the three weeks I was at Northwestern, I could feel myself maturing as a thinker and also becoming more accustomed to collaborative classroom problem solving. I understood the importance of teamwork prior to being in the Northwestern program, but not to the extent that I do now. Having the opportunity to constantly discuss problem-solving strategies and solutions has allowed me to embrace the power of group discussion fully. Aside from this, I also learned some of the valuable skills necessary for success in college, such as how to balance socializing, studying, and maintaining a habitable and healthful living environment (for everyone's benefit). Trash accumulates so quickly when you are the only one who is supposed to be picking it up!

### **Looking Forward**

This summer enrichment program was one of the best experiences of my life. Both academically and in terms of enjoyment and friendships, this enrichment opportunity was an invaluable experience. After being home for only a few days as I write this reflection, I already miss the program. I am sure that I and my new friends will all apply to the Equinox Program at Northwestern again next year.

Thank you for allowing me to have the time of my life, Garwin Family Foundation!