

MIT Student

Dear Mr. Galileo,

I decided to take a class about you, your life, and your history because I thought it might be interesting. Admittedly, I didn't really know what I was getting myself into. This class has made me stop and think- think about the world, about the people in it, about the way I learn, and about science. We covered an unbelievable amount and breadth of material in four short weeks- it was both informative and yet extremely overwhelming! It is astonishing to me just how much you accomplished in your lifetime, and the work we did only made me respect you more for it. I would love to tell you more about the class and both my and my classmates' experiences.

I went to class on the first day not really knowing what to expect. I was delighted to find a wide variety of people, from different places and with different backgrounds. I admit I was a little surprised that our first investigation was into perspective. Although I find the topic interesting, I didn't really see how this was related to Galileo or to what we would be studying- I also thought the exercise would be easy. I couldn't have been more wrong. Although I didn't know it at the time, this exercise framed the rest of the class, and kept coming up in conversation and in later experiments. Not only that, but the exercise was surprisingly challenging! But I think my favorite part of that first class was that no group (we were paired in teams of two for the exercise) interpreted the assignment in the same way. Everyone did something incredibly interesting, but there were no two things alike. This continued to be true for the rest of the class.

Next we worked more on perspective, sight lines, and drawing. My group worked to try and recreate a perspective drawing technique in a picture we were given. This exercise was incredibly informative! Again, we went in thinking it would be easy, but every time we thought we had figured out what was going on, it turned out to be wrong. I loved working through this challenge- even though we never did figure out exactly how the apparatus worked, we learned so much trying to work it out from the picture.

A large portion of the class was dedicated to explorations of lenses, glass, and light. This was a humbling experience for a multitude of reasons. Before this class, I figured I had a pretty good handle on how lenses worked and what they were used for. I know now that I really have no idea what is going on. I sat with one of my classmates for nearly a whole class period, and we realized that this had us stumped. Every time we thought we had figured out what was happening, something popped up that absolutely refuted our supposed explanation. In this particular exploration, We used a biconvex lens, a flashlight, and a board as a backdrop. Depending on the setup, different numbers of flashlight reflections appeared in the lens, and the manner in which the light appeared on the board changed. It was unclear to us what was happening, so the first thing we tried was putting a piece of tape on part of the flashlight. This did somewhat help us differentiate, but in the end simply raised more questions. After we had been working on this for awhile to no avail, we were given by our teacher a light box and glass lens-like pieces. The light box consisted of three distinct light rays, with one of these rays colored red. This helped prove to us that the light did in fact cross once through the lens, but did not answer all of our questions. What happens inside the lens? Why, in either convex or

concave lenses does the light bend the same way through both sides, even though the lens itself bends in opposite directions if viewed from the light's path's perspective? How did you figure these things out? Later on in the class, we played again with this light box, this time in a bigger group. This brought on the discovery of many new and interesting things, but unfortunately did not really answer any of our questions. We played with the glass pieces of different shapes and watched how the light paths bent and changed- we combined different shapes to see what happened. We even combined a convex and concave lens to try and see in a visual, accessible way how your telescope works- while we didn't really come to any concrete conclusions, we did all feel a little more knowledgeable about the subject afterwards. I would love to hear your explanation of your telescope. Also, how did you first think of this? And did you understand exactly what would happen when you combined the lenses you did, or did the process of creating your series of telescopes help you understand lenses? Do you think that the way you didn't do it would have been better or worse? Do you think it would have changed the outcome in any way? I can't believe that something I have used and learned about for so long is actually something I don't really understand at all. In that way, it was both comforting to go and try to work through these questions myself, and extremely uncomfortable to realize I didn't understand my world as well as I thought. Did you ever feel that way when you were observing your world and doing your experiments?

The last main set of experiments we did in class was in motion. This is yet another instance where I was happy to be working through things myself, but also disturbed by what I discovered to be my own extreme lack of real knowledge in this area.

I read an excerpt from your Dialogue on Motion, and spent the whole next class trying to recreate and do my own experiments based on your inclined plane experiments. I will say, the inclined plane I used was probably too short, but it was interesting nonetheless. I also loved reading this part of your writings (in my version, pages 23-25) because the conversation between Salviati and Simplicio so closely mirrored some of my own thoughts and musings. I almost felt as though I was working with people and talking to them as well. I must tell you though, I had the most difficult time letting go of what I had learned on this subject in school and found myself trying to fit what I observed into this pre-existing knowledge I had. Did you ever find yourself doing that same thing- neglecting to just observe the world as it is and instead trying to make it fit into what you thought it should be?

In addition to having discussions and performing our own observations and investigations, we also took several field trips. One of my favorite things I did in this class was a trip to our university's glassblowing lab. There we had the privilege of observing one of the master glassblowers at work; specifically that day we watched him do Roticello. It was amazing, and it made me think of so many things. I wondered how difficult it must have been to make lenses in the shape they needed to be, because today we have computers and machines to make them, and they make each and every lens exactly the same every time. I also felt like something had been lost in the world- so few people today know how to actually craft glass, whether it be for utility or for art. I feel like many of these types of craftsmanship have suffered such losses in today's world. Before that class, we had been asked to read several pieces on lenses and their

manufacture and use in your time. One of these was called “Eyeglasses Through the Ages”. This piece described the evolution of eyeglasses. I was struck by how commonplace and widespread they were even when I first read it, but after seeing the glassblowing demonstration, I thought about how amazing this really is. I know people who made the glass for spectacles were probably very practiced and good at making these lenses, but it is still amazing to me.

We also took a trip to a nearby university’s museum and rare books collections. In the museum, we saw many instruments and objects from your time. While many of the instruments fascinated me, I was most taken with the models of the solar system. Most of these were made after your time, but while looking at them I thought of how little used to be known of the solar system, and of how much you yourself discovered and saw in the night sky with the aid of your telescope. In the rare books collection, we looked at copies of your *Starry Messenger*, as well as your *Dialogue on Motion*, and books on everything from Sunspots to perspective drawing by contemporaries of yours. The whole time, I wished I could read Italian! But even though I couldn’t understand the words in what I was looking at, the meaning of it was not lost on me. I can’t even tell you how amazing it was to see your own handwriting in an inscription in one of your books! I felt so connected to you at that point, even though in reality we are separated by hundreds of years.

Earlier in the class, we played with your compass. This was very rewarding for me, because it was an instrument I had never seen before, but I sat and read through your instructions, and slowly I figured out how to use it. I am amazed that just one instrument

can be used to calculate so much- everything from equally segmenting lines to calculating compound interest! The reason I bring this up now is because the last of our field trips was to our university museum to explore the world of slide rules. While slide rules differ from your compass in many ways, they are alike in that they can be used to calculate many different things and are very adaptable. I also included this now, because I feel as though I had similar experiences and feelings about these two instruments. I played with a slide rule both before and at the museum, and, at first, I was frustrated because it was something I wasn't used to using and was something I was not previously very familiar with. Learning to use both tools was slow going at first, but eventually I started getting the hang of things. Then we tried to make our own slide rules. This was incredibly difficult! I was not expecting this at all, but the exercise of attempting to make my own slide rule made me appreciate this instrument, and subsequently yours as well, so much more. How do you think of these things?

Throughout all of this class, there were a few things that remained constant. I continued to find everything much more difficult than I thought it should be upon starting. I also found that I knew a whole lot less than I thought I did. And I continued to be amazed by two things: one- how much you managed to accomplish in your lifetime, and two- how thoughtful and wonderful the people around me (classmates and instructors) were. These people thought of things in ways that would have never occurred to me, challenged my thoughts and opinions, and contributed to my knowledge and explorations. With these people, I felt safe asking “dumb” questions, I was okay with the fact that I didn't understand everything, and I was okay with sharing my

difficulties and frustrations with these people, because I knew they were having their own, and through our own individual trials and tribulations, we came together and learned from one another. Did you have people like this in your life? Who did you discuss your ideas with? With whom did you share your insecurities and frustrations? Although I loved doing experiments and going on fieldtrips, my absolute favorite part of the class, the things I loved most, were the discussions with my class. I truly believe that no single one of us would have been able to get as far or discover as much had we not been working together. As I said earlier, not one of us thought in exactly the same way or tried the same things first. A perfect example of this is when we were all playing with the light box together. We often found the same discoveries exciting, but when exploring those discoveries further, we would each choose to add a different piece, or we would move glass piece we were using in different ways. This is a simple example, but many times I find the simplest example is the one best used for illustrating. We fed off one another extraordinarily well.

As my last offering to you, I would like to try and explain in a succinct manner what taking this class, what in a way being your student through this class, means to me- what its done for me. I am in school to become an engineer. In my training, and in my job, I am a systems person. I like to be able to look at the individual pieces and figure them out independently, and then put each of those pieces back into the bigger picture; putting the pieces back together is my favorite part. This class was applying those same principles I use in my job to my whole world. The individual pieces were the individual instruments- frames, lenses, telescopes, slide rules, compasses, yourself as a person, the

historical perspective, and each one of us. Any one of those things is interesting on its own, but together they offer new and interesting way of looking at and understanding my world. I grew up with parents who encouraged imagination and investigation. However, this was the first time since I was little that I have been encouraged in that same way. And this time I was also asked to think about it as I was doing it. I can't find the words to explain how this has changed how I view the world. As I mentioned before, all throughout the class, I had trouble just observing and forgetting what I had previously been taught. As a result, I have been thinking about my world in a different way. This class has also challenged what I thought I knew and how I came about that knowledge. I now see the value in this sort of learning and exploration, and wish it was practiced in more places.

Thank you for sharing your knowledge and discoveries with the world, and thank you for indirectly being my teacher for this past month. Thank you for making so many things in the modern world possible. But most of all, thank you for your unique perspective on the world.

Citations:

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