

Alexander Li  
Junior

### **Hobbies**

Integration bees, Cello, Problem-writing, Running

### **Clubs**

FLSAM, Mu Alpha Theta, SNHS, Orchestra, Swim Team

### **Experience**

US Physics Team (2022-2023); USAPhO+ (2021); USAPhO (2021-2023); NAC Top 16 (2022); AIME (2019-2023); USAMO (2022-2023); HMMT February overall individual 17th place (2023), Combinatorics 5th place (2023), and overall individual 20th place (2022); HMIC Qualifier (2022-2023); RSI program Invitee (2023); MIT PRIMES-USA individual math research track (2023); Ross Camp Invitee (2022); CMIMC Integration bee top 5 (2023); CMIMC Individual Top 50 (2022); USABO Online Open Exam Honorable Mention (2023); USNCO National Exam (2022)

### **Bio**

When I was in elementary school, I first encountered physics through the smart talk of my 1st grade peers, hearing of blue, red, white, even GREEN stars. The first time I learned about work, simple machines, and light spectra was in 5th grade with my science teacher Mr. Dolan, a school-wide-known enthusiast of all things science. For reviews before tests, the class would play a game called Whack-A-Ball, a dodgeball-like game where you can avoid sitting out by answering a review question correctly. I remember I managed to memorize and correctly identify the OBAFGKM colors of stars in one of these games.

Physics has helped me immensely in developing an appreciation for calculus to a far greater degree than when I solely focused on math competitions. I especially like clever integrals that show up on Mu Alpha Theta tests and integration bees. From physics, I have seen a huge variety of ways that calculus can be used, to find maxima, minima, turning points, velocities, accelerations, compute moments of inertia, see where the bending moment of a rod is the greatest, find the highest charge before a cell membrane collapses, etc. Calculus just gives a natural, intuitive way to explain physical concepts. Where's the maximum? Take a derivative. What's the optimal amount? Take a derivative. Just as the founders of calculus intended.

In the time before the 10th grade competition cycle, I read through Morin's Mechanics and Purcell and Morin's Electricity and Magnetism books, as well as Schroeder's Thermal Physics. I also worked more on problems similar to those found in Puzzling Physics Problems. During the 11th grade competition cycle, I've focused on Kevin Zhou's handouts and Wang and Ricardo's olympiad physics books. These were astounding as being so simple and difficult at the same time, and they reminded me a lot of nice competition math problems. Ultimately, physics has been a nice companion to sit down with and muller to.

Physics Camp last year was a great experience, and I hope to meet more people this year! Thank you to my family, teachers, and friends for the support along the way.