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- Accepted College Essay -

## BEYOND PLUG-AND-CHUG MATH

I have always been a math-science girl. I sighed and sulked through classes on US History and French in eager anticipation of the formulas and applications I would be learning later in the day. I believe there are many factors which attribute to my success, two being my fascination and persistence.

When I was seven I once asked what math was good for and why I should learn it. The answer I received simply does not do math justice, "One day when you're in line at the grocery store the cashier will give you too little change and you'll be glad you learned this." now in calculus I see the application of all these once foreign symbols, formulas, and letters. I am often amazed by the calculations I am able to do using the cumulative information acquired from nearly 12 years of education, such as how to maximize the volume of a box given a certain surface area. Math is not just plug and chug as many view it but it requires creativity and thinking out of the box to solve the problems encountered in the real world. Beauty lies in its simplicity and in the fact that proofs and observations are what brought the golden rectangle from ancient greece, Pascal's triangle, and the Pythagorean Theorem as well as a host of other theorems, equations, and postulates. Math has made the impossible possible and the once long and tedious, simple and quick. The genius of it is amazing as well as the fact that any person is capable of applying and discovering it. I draw graphs and try to make shapes from functions for fun, count to 10 to calm down, and save money at the store, too. For all of these reasons and many more, I am fascinated by math.

I wasn't always good at math, contrary to what students in my classes might say. When I first showed interest in math in the 5th grade my parents laughed; middle school was even worse. Incoming 6th graders were given a test on the second day of school and depending on their scores were placed into a high or low speed math class. I was put in the slow speed math and missed a lot of class my first year, as a result my grade drifted from a B to a C to a C-, then I got help. I knew I liked math and I didn't want to do bad in it so I bought books and hired my older brother to help me. I eventually made it to a B+. Later, in the summer after my junior year, I took a course that covered nearly a year of Calculus. I was told that if I decided to take Calculus AB, I would be bored, so I went for a challenge. My strongest subject began to take up most of my time. I had to read review books, go online for help, and stay in during nutrition and lunch for extra instruction. It was hard, but my dedication paid off and I earned an A. This persistence and drive also help me excel in math.

## RAISING THE BAR

This past summer I had the opportunity to participate in a highly rigorous academic program at MIT called MITES, Minority Introduction to Engineering and Science. For six and a half weeks I lived with 68 other rising seniors and college undergrads. Though we were all warned about how hard the program would be, we were all at the top of our classes and refused to believe it- after all, who did they think we were? The first day we sat together in a small auditorium, unaware of each other and of what lay ahead. We were told that our confidence would be shattered, our minds blown away, and our lives changed forever. Still somewhat unmoved, we were not afraid.

By the second week of MITES valedictorians, nerds, bookworms, and techies alike were leaning on each other's shoulders at two in the morning crying over problem sets they had imagined only in nightmares. It is a well-known fact that hard times bring friends closer together, but I would have never expected for these strangers to become my best friends, my support system, or even my family. The 16 hours days I was accustomed to at home did not last long. I was getting an average of four hours of sleep per night, finishing a book per week, zooming through subjects once foreign to me, and constructing a semiautonomous robot from drill motors all at the same time.

We were each enrolled in 5 classes, my schedule consisted of Introductory Physics, Engineering Design, Chemistry, first year Calculus, and Humanities. In the month and a half, we completed a semester of Physics and Chemistry each, a full year of Calculus, the material equivalent to a semester in AP literature, and introductory level engineering. The work was so intense that when I entered school in the fall I enrolled in second year Calculus, and maintained the only A in AP Physics, having no physics experience prior to MITES.

Since this program I have not been satisfied with the regular coursework given at my school. I am constantly on the lookout for new programs to enroll in and other teams, clubs, and groups to join. This academic school year marks the peak of my involvement in educational opportunities. I have somehow managed to find time for the Speech and Debate team, ACE mentoring team, swim team, Science Bowl team, California Honors Society and Scholarship Federation, Play Production, Jewish Student Union, GEAR-UP Mentoring Program, and folkloric dancing.

MITES was the most challenging experience of my life. The program is the single most pivotal point in my academic endeavors to date. The assistants we had had all gone through the program and agreed that even in college at Harvard, MIT, Caltech, and Princeton, nothing came close. The motivation and encouragement I gained from MITES has fueled my academic pursuits and pushed me to raise the bar.

## SCIENTIFIC SPARKS

Growing up with separated parents has not been the easiest life, but it has been my life. When I was younger, I'd hate going out to eat with my dad and seeing a family of four happily enjoying a meal. If my mother and father ever went out together to a restaurant, it was with me, once a year for my birthday, and was usually interspersed with various disagreements.

It was when I was in first grade that I began to realize that, although my parents had their differences and no longer loved each other, I was the one thing that united them. I had no basis to be envious of what I thought of as "complete" families.

Both my mother and father, wanting the best for me, recognized early on my love and fascination with all things scientific. They worked to create opportunities for me to pursue my interest. My mother would read at bedtime, at my request, nature field guides instead of nursery rhymes. The two of us often made long journeys at 3:00 A.M. to witness meteor showers in the clear skies of the mountains. She encouraged me to set up experiments around the house, which I happily did—measuring the growth of palm tree saplings and dissecting owl pellets to extract the mouse bones inside. An environmental scientist, my father could not wait to transfer all of his scientific knowledge into my young head. Needless to say, many of his spontaneous lectures were far above my grasp—I still vaguely remember a quantum physics talk he gave me when I was eight—but they inspired me to learn more on my own.

My thirst for scientific knowledge grew over the years, without limits in any one specific area. Then, in January four years ago, my Aunt Diane died after a five-year battle with breast cancer. It was during my aunt's illness that I realized I could use my natural love of science to benefit others facing similar challenges.

I have continually pushed myself closer to this goal by excelling in my AP science classes, studying biotechnology at UC Davis through the COSMOS program, and competing as a member of my school's Science Bowl Team. This past summer, I had the opportunity to intern at the Reijo Pera Lab at Stanford University through the Stanford Institutes of Medicine Summer Research Program. During this two-month internship, I worked with human embryonic stem cells to explore the function of PrDM1, a potentially-useful gene in the creation of regenerative medicines.

The scientific spark my parents recognized years ago has shaped my life, and with it, I wish to shape the lives of others. I aspire to become a biomedical researcher, a career that harnesses my long-time fascination of science and my commitment to improve the quality of life for those facing medical challenges. It would be a privilege to work alongside scientists, exploring new treatments and technologies to create exciting new options for patients and their families.

## A SUMMER OF STEM CELLS

“It appears all your cells are dead.”

Only shock prevented the tears from streaming down my face. My cells were dead. After being accepted into the competitive Stanford Institutes of Medicine Summer Research Program (SIMR), and spending approximately 170 hours of the past month manipulating human embryonic stem cells (hESCs), I was back to square one—with only one month of my internship remaining. How in the world was I going to make up for lost time?

As I asked myself the question, I thought back to exactly how I had spent those 170 hours, working to develop the stem cells which now, under the microscope, were hollow with the absence of life.

I started my internship a little overwhelmed by the fancy hoods, automatic pipettes, and high-speed centrifuges. But by the first of the 170 hours, I had familiarized myself with the equipment and begun my quest to find the function of PrDM1—a gene thought to control replication in hESCs. First though, I needed to make a growth medium for the hESCs. I painstakingly measured to the ten millionth of a liter, testing the accuracy of each measurement multiple times before finally dispensing it into the medium solution. After I had plated the hESCs on my new medium, I waited with bated breath for the results.

To my joy, two days later, my cells were thriving and even outgrowing their new home. Known for their ability to quickly replicate, it was logical they would need to be frequently transferred. The difficult part was that, as part of my experiment to find the purpose of PrDM1, I had different strains of hESCs (some serving as “control” strains) which could not be mixed. Transferring hESCs is a process requiring great concentration and coordination. It took me about three hours the first time. By the end of the month, though, transferring was second nature and my cells were doing well—I had inserted a fluorescent protein into their DNA to verify the hESCs containing the resistant vector were living, as hypothesized. I had successfully created hundreds of stable hESC colonies of different strains. Everything seemed to be going so well . . .

But now was not the time to reminiscence. I snapped out of my daydream and refocused on the situation at hand.

“Ariela? I know taking the news the first time can be hard, but keep in mind, you probably didn’t do anything wrong. You know how sensitive they are . . . this sort of thing is common when working with stem cells.”

“I know,” I said, smiling genuinely this time, “I’m ready to try again.”

My project was not completed by the end of the summer, but through hard work, I was able to replicate parts of the experiment to produce valuable data. Although the experiment did not go as planned, I am proud of myself for persevering. As Thomas Edison said, “Our greatest weakness lies in giving up. The most certain way to succeed is always to try just one more time.”

## LESSONS FROM THE IMMIGRATION SPECTRUM

My family has taken living in the big city as a reason for why we should never give up. Here in Los Angeles there are countless individuals and families along all points on the immigration spectrum from recent arrivals to recent citizenship. Residing in this great city has provided me with diversity, opportunity, acceptance, and an abundance of role models to follow through all troubles- big and small.

I always thought that I had it the worst out of all my family members because I was never allowed to get anything lower than what my brother or a cousin had gotten in a class. My parents figured if they could do it, so could I, and if not on my own then with a little of their help. It was not until recently that I realized the truth in this. In my short life I have seen my father go from speaking no English, to excelling in it. I have heard countless stories about migrant farmers such as Cesar Chavez and my grandfather who had nearly nothing, yet persisted and succeeded.

Growing up hearing these stories of great injustices and misfortunes has truly influenced my long term goals. I am going to go far because there is no excuse for not doing my best, given all I have been blessed with. When I had trouble speaking Spanish and felt like abandoning my native tongue I remembered my mother and how when she came to the United States she was forced to wash her mouth out with soap and endure beatings with a ruler by the nuns at her school for speaking it. When I couldn't figure out tangents, sines, and cosines I thought about my father and how it took him nearly a year to learn long division because he was forced to teach it to himself after dropping out and starting to work in the 4th grade. And when I wanted to quit swimming because I was tired I remembered my grandfather and how no matter how his muscles ached if he stopped digging, or picking fruit, or plowing he risked not having enough food to feed his family. Pursuing technical fields such as math and engineering first seemed like work for men to me, but the times have changed. All these people, just from my family have been strong role models for me.

I feel that being labeled "underprivileged" does not mean that I am limited in what I can do. There is no reason for me to fail or give up, and like my parents and grandparents have done, I've been able to pull through a great deal. My environment has made me determined, hardworking, and high aiming. I would not like it any other way. This is how my Hispanic heritage, family upbringing, and role models have influenced my academic and personal long term goals.

## A YOUNG VOICE FOR SENIORS

November 23, two years ago: Thanksgiving. My mom and I celebrated the holiday as we had done for the last three years—by delivering turkey dinners to homebound senior citizens. After carrying the food to their kitchens, our brief visits with them were filled with laughter, hugs, and the sharing of family photo albums. In the midst of all the warmth and vitality, though, I couldn't help noticing the signs of loneliness and isolation: the windows with dust suggesting they hadn't been open in ages, the faded Christmas cards from 1995, and the tables with a single place setting. It was during these visits that I committed to find a way to better connect with the seniors in my community.

I discussed my desire with the mayor of Fremont in December two years ago. He agreed that a younger voice could prove to be beneficial and mentioned the Senior Citizen Commission for the City of Fremont (an advisory board to City Council that worked to directly address the needs of local seniors). I formally applied to the Commission and was unanimously appointed by City Council in February last year, becoming the youngest Commissioner in Fremont's history.

Although I was initially met with skepticism from my fellow Senior Citizen Commissioners, I was committed to sharing my vision of the benefits of intergenerational interactions. For the next two months, my after-school hours were devoted to calling nursing homes, negotiating with movie theater managers, and recruiting teen volunteers. The resulting event was the Senior Movie Outing, which paired teenagers with wheelchair-bound seniors for a fun afternoon at the movies.

As a result of my hard work on the successful outing and the rave reviews from all who participated, my fellow Commissioners became more respectful of my contributions and open to my input. During the annual grant-reviewing period (when the Commission decides which non-profit organizations will receive City funding), I advocated to fund Lavender Seniors, an organization which supports gay and lesbian seniors. While it had not previously been funded by the City, I strongly believed it fell within the Commission's charter of "serving the needs of all seniors." After sharing my rationale for proposing to fund Lavender Seniors, I was proud that the Commissioners kept an open mind and the majority voted to grant the organization funding.

In the two years since my appointment, I have cherished the unique opportunities I have had to learn from people with different perspectives and backgrounds. My time on the Commission has taught me to be more confident when expressing my ideas, and to be more open to hearing others' thoughts. I am proud to be a trusted voice for seniors in my community.

# Envision High

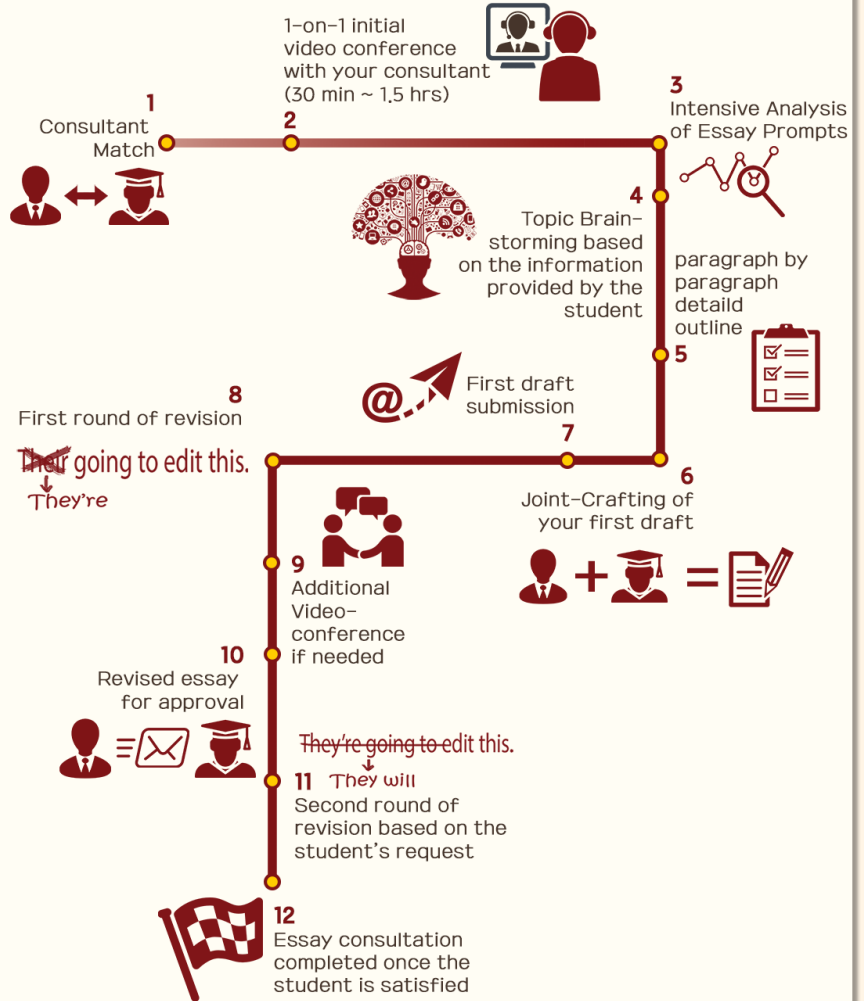
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