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**Sample essays 2023**

**California Institute of Technology**

**Photocopying Money Anonymous**

**Members of the Caltech community live, learn, and work within an Honor System with one simple guideline, 'No member shall take unfair advantage of any other member of the Caltech community.' While seemingly simple, questions of ethics, honesty, and integrity are sometimes challenging. Share an ethical dilemma that challenged you. What did you do?**

"Can you photocopy money?" my teacher asked. I shook my head, slowly reddening. No, I was not involved in some illegal money laundering scheme. But at that moment, my teacher accused me of a crime to the same punishable degree.

My junior English teacher graded essays harshly, but made up for harsh grading by rewarding each person "homework passes" worth 20 extra credit points at the end of the semester. My grade was borderline. With the end of the semester, I discovered that my passes were missing, after searching my English binder for the tenth time. When I found out from my friends that I had been late on the day everyone had received the passes, it was too late to ask for replacements. I planned on photocopying my friend's passes, because in theory, I was doing nothing wrong. However,one morning, I arrived early at school and decided to tell my teacher, just to make sure I wasn't doing anything wrong. My teacher flatly denied my right to copy the homework passes because they were like "money" in his class. When I told him I had been late, he answered with a nonchalant "Too bad" and told me to buy them off someone.

Swallowing my pride, I asked all those I met whether they were willing to sell their passes. All refused. I glumly resolved to receive my first "B" in my life.

Yet the day before my teacher collected homework passes, I explained my predicament to a friend. She spontaneously had a change of heart and offered one to me, free of charge with a smile. Humbled I remain.

**Hulahooping in Humanities Anonymous**

**Caltech students have long been known for their quirky sense of humor and creative pranks and for finding unusual ways to have fun. What is something that you find fun or humorous?**

While my classmates conversed in hushed tones about philosophy, I stood alone in the back corner of the room—hula hooping.

My Humanities teacher had asked me to hula hoop for the entire class period to prove my claim that I was the "best hula hooper in the world." And I had accepted because I enjoyed the hilarity of the situation. Imagine! Hula hooping for an entire class period!But after the first ten minutes, people lost interest and my fatigue caused the humor I had derived from the situation to wear off.

I entertained myself with the prospect of writing a philosophical treatise on what I had learned while hula hooping. I couldn't help but laugh at the idea of combining the solemn, sorrow-riddled worlds of Kierkegaard and Spinoza with the all-American, happy-go-lucky activity of hula hooping. I would make sure to include Kierkegaard's angst and questions such as What am I doing here on Earth? Why I am at school? Why am I hula hooping? As I racked my mind for more philosophy, I was knocked out of my reverie by one of my classmates, who spitefully stopped the hula hoop with his hand.

My philosophical treatise ended up condensing into a list, titled "Ten Things I Learned From 30 Minutes of Hula Hooping." I wrote each of my points in a different color of marker and topped it all of with a picture of myself hula hooping with arrows pointing to my sweat. To this day, my list and my legend remain on my Humanities teacher's wall.

**Herpetology Anonymous**

**Interest in math, science, or engineering manifests itself in many forms. Caltech professor and Nobel Laureate Richard Feynman(1918-1988) explained, 'I'd make a motor, I'd make a gadget that would go off when something passed a photocell, I'd play around with selenium'; he was exploring his interest in science, as he put it, by 'piddling around all the time.' In a page, more or less, tell the Admissions Committee how you express your interest, curiosity, or excitement about math, science or engineering.**

My mom stood in front of the cash register, waiting for the cashier to scan her credit card. Employees walked back and forth, shouting requests for price-checks or scanning items at lightning speed. But today, I didn’t notice these things. I didn’t even check to see the name of the cashier on their name tag. Instead, I had my head bent over my Audubon Field Guide of Reptiles and Amphibians, my eyes glued to the photograph of the whiptail lizard. I tried to absorb the pattern of dark stripes on its back and the tiny specks of white. The miniscule details such as the shape of its mouth, the muscularity of its hind legs, the texture of the tail, the length of its fourth toe did not pass my eyes without inspection.

As I furrowed my eyebrows, concentrating, a voice brought me back to reality.

"Hey!” said an employee, smiling broadly, “I used to have the same book.” It took me a few seconds to process that he meant the field guide I was holding in my hand.

“Oh, really?” I asked.

“Yeah, I used to hunt down lizards all the time in my backyard.”

“Wow. I didn’t know that there were lizards around here?”

“Yeah, there are lizards everywhere. You just have to be fast enough to catch them.”

As the employee finished bagging the groceries, we turned to leave.

“Bye,” he said with a smile, “Have fun with the book.”

As I continued to study lizards in the car, I couldn’t help but think about the guy from Costco. Wow. I had just formed a bond with a stranger, because of our interest in lizards.

I studied the anatomy of snakes, turtles, lizards, and alligators for an event on the Science Olympiad Team. I had never considered myself an “animal” person, but I was ambitious, and I wanted to win. So I would study my handy Audubon guide while I exercised at the YMCA, when I followed my mom grocery shopping, and in the car coming home from serving at Reading for the Blind and Dyslexic. My ambition to do well soon transformed into a true obsession with reptiles. The pictures of spiky creatures, that had at first inspired horror and disgust in me slowly developed into comforting images for me. They were familiar images to me and these lizards and snakes had oddly crawled into a place in my heart. They had become my friends.

Studying different species of snakes, lizards, and turtles, it was only logical that I would feel a stronger connection to nature. But somehow, I also stumbled upon a way to connect with others. Discovering that I shared my passion for lizards with someone else, someone whom I might have otherwise passed in Costco without speaking a word, I realized how comforting and uplifting it is to find people who share the same passions that you do.

**Widow's Peak Anonymous**

**Evaluate a significant experience you have had and its impact on you.**

According to English folklore, a woman with a widow's peak will outlive her husband. Well tell that to a self-conscious fifth-grader and tell me how she responds.

In 5th grade, a girl in my class sidled up to me, grinning, and informed me, "You have a widow's peak, you know." No doubt there had been a couple times when I had lamented over the heart-shaped appearance of my head, but never had I explicitly said the word "widow's peak" out loud or mentioned this to anyone. I was mortified.

I went home that evening, eager to confess my embarrassment to my mom.

"Mom, I have a widow's peak," I said, then proceeded in explaining by rubbing the offending hair protruding below the rest of my hairline.

"What?" she asked.

"I have a widow's peak"

"Oh, that is called a widow's peak? If you had that a long time ago in Korea, it meant you were beautiful," she said.

I was unconvinced. In fact, I became so self-conscious that every time I went out, the first thing I noticed when I saw people was whether or not they had a widow's peak. Not content with imagining myself with a smooth hairline, I grabbed my mom's razor, crept into the bathroom and stood in front of the mirror. Holding the razor in one hand and a fistful of hair with the other, I felt each strand of hair give way, feeling a sense of relief as with the snapping of each strand.

Freshman year, I went through another "self-conscious phase" during which I felt uneasy walking down the hallways. I felt out of place and afraid to participate. I couldn't even concentrate. By the end of the first semester of my freshmen year, I felt as if I were trapped in a cage, confined by all the worries and fears circulating in my mind. In order to free myself, I decided to sacrifice my vanity. So I swept my hair off my face with a headband in order to emphasize my widow's peak. As I peered at myself in the mirror, I was struck with a pang of fear, imagining what others would think of my "new" appearance.Yet I didn't let myself back down. Instead of constantly worrying about my appearance or my reputation, I began to force myself to concentrate in class and to share my ideas with more confidence.

I have become accustomed to wearing my widow's peak and have succeeded in being less and less self-conscious throughout high school. In fact, by the end of junior year, I had forgotten about my widow's peak, completely. I only remembered when I was trying to order a Jamba Juice.

"I like your hair," said the cashier, before I could open my mouth.

I paused, puzzled. "What?" I asked.

"I like the way you've done your hair," she repeated. "You know, like over here," she said, tracing her hairline with her finger.

All of a sudden, it came to me that she was talking about my widow's peak. I nodded and laughed. As I politely said, "Thank you," I felt a little offended. Many of my memories flooded back of my self-consciousness. But as I began to reflect on my widow's peak, I remembered the purpose of emphasizing it was to help me sacrifice my self-consciousness and my vanity. If I had not accepted and proudly exposed my widow's peak, I would now have nowhere near the freedom I feel to participate and learn using my full potential.

**My Life On My Hands Anonymous**

**Topic of your choice. My choice: "Describe something you possess and its importance to you."**

My legs dangled high above the ground as I sat next to my mom on the train. As I fidgeted the way little children do, my mother spoke to me. “You have plump fingers, not thin and bony like mine.” I frowned at her as she held my then tiny hands in hers. She continued, “This is a very good thing. Round, full hands like yours do not do hard work. They are made to be pampered.” I doubtfully glared at my digits. She laughed and proceeded to tickle me silly with her long-fingered, sandpapery hands. Though time has proven my mother right about most everything else, I remain unconvinced about that one claim. Despite their appearance, my hands are not for show. They, like my eyes and mind, are my tools, but unlike the latter two, they showcase who I am to anyone who cares to look.

From a distance, my hands resemble those of a little girl. They fit the smallest-sized gloves and my fingers can’t stretch wide enough to palm a grapefruit. Mostly, people only notice my hands when I paint my nails. On special days, they are decked in bright colors and dramatic patterns to fit my mood. Sometimes those days are holidays, but more often, those days are special because of competitions or major tests. On nights when I stay up late studying, I keep myself alert for that extra hour by painting my nails between page turns. One nail to four pages, forty pages to one coat, read until the last layer is dry, and then I can go to bed. The next day, the flashing colors give me an extra boost of courage by reminding me of the time I’ve committed.

Closer inspection of my hands reveals permanent marks that record my bouts of enthusiasm. There’s a pale ragged scar along the left thumb where a craft knife slipped after cutting through a stubborn stick of balsawood, and my left pinky doesn’t straighten all the way, a memento of my junior high basketball days. The mistakes and injuries aside, my right hand also bears the brunt of fencing. The side of the index finger is one large callus from practicing parries, and there are layered dark scars just a centimeter away where my glove and weapon grinded until the skin broke.

However, most marks are transitory. When I took AP Chemistry last year, stains and burns from one lab never had time to fade before the next one earned me more. After an afternoon painstakingly building balsawood bridges or endurance flight planes, the tips of all ten of my digits are lightly coated with a flaky layer of blood and superglue, testament to the hot, red pain of glue burns and knife cuts.

My hands broadcast my moods and feelings when they are in motion,. When I’m relaxed, they tap softly to a cheerful beat, but when I’m solving a problem, they twirl pens or pencils, keeping rhythm with my hurried thoughts. When they adjust a microscope or paint a poster, they move fluidly, reflecting my own confidence, but when I feel driven --- be it during a fencing bout, buzzer competition, or game of Rockband --- they are tense and sometimes move impossibly fast. At their most expressive, they deftly draw diagrams in the air as I energetically explain and describe concepts, but they can also be very steady when I reach out to comfort a friend.

To remember who I am, all I have to do is hold my palms out in front of me. Some things about me, like the size of my hands, I can’t change, but when I reach out for a handshake that will engulf mine, I still keep my grip firm. When I try too hard (and even sometimes when I don’t), I get myself hurt, but I’m learning to smile and move on. My hands, like me, are unassuming from a distance and imperfect at close range, but the important thing is that they are always very capable. When I feel their underlying strength and versatility, I remember that my hands are important to me not because of what they look like, but because of what they’ve done, what they can do, and what they will learn to do in the years to come.

**Real Research Abubakar Abid**

**What has been your most profound or surprising intellectual experience? or, Tell us about an experience that has changed the way you view yourself.**

I arranged the bottles in front of me: 30% acrylamide, TEMED solution, ammonium persulfate, Tris buffer, and distilled water -- all of the materials I needed to run electrophoresis on the protein samples I had isolated earlier that morning. Oh, and isopropanol to even out the gel, I remembered. I reached for the bottle labeled “99% isopropanol,” but after angling it slightly, I realized that it was empty. I walked to the storage cabinets on the other end of the lab and peered inside. No isopropanol.

I found my mentor in the cell culture room, hunched over a microscope. Spraying antiseptic alcohol on my latex gloves, I hurried over.

“Dr. Wang, we’re out of isopropanol in the lab,” I announced after waiting several seconds.

Still staring into her culture medium, Dr. Wang replied, “Did you sterilize yourself before entering?”

“Yes, I did, with -- with the alcohol over there.” I pointed to a green plastic bottle that lay next to the electronic pipettes.

“The isopropanol is in the cabinets. I showed you yesterday,” Dr. Wang stated.

“I checked there and there’s no bottle of isopropanol. There’s just propanol, but--”

“Really? We’re out of isopropanol?” Dr. Wang finally looked up. “Remind me to place an order.” She returned to her cell culture.

I remained standing there. “So should I--”

“Try using something else. Maybe methanol or ethanol.” She pointed to the green plastic bottle I had used to sterilize my latex gloves. “That might work. Tell me what happens.”

Suddenly curious, I asked, “What about glycerol?” I remembered seeing a tinted glass bottle of glycerol at my work station.

“Sure,” she replied, too busy to notice my exuberance.

That was my second week interning at the Winship Cancer Institute and the third time I had been able to dabble with a standard procedure. The methods I improvised usually did not work. Nonetheless, I enjoyed every opportunity to reinvent laboratory procedures and observe the results.

I have been involved in lab work in biology and chemistry classes since the beginning of my freshman year. However, the experiments in these classes were prepackaged and bland. I was always handed the precise instructions and exact materials beforehand; I invariably knew what results to expect; and consequently, I never discovered anything new. Before long, the excitement I associated with conducting experiments diminished. But the “investigations” in my high school classes were nothing like the research I experienced in the Emory-Winship Summer Scholars Program.

At Winship, I jumped into research with no idea of what results to expect. I met researchers who dug into the unknown for eight hours a day every day, often only to be stumped with indeterminate or self-contradictory data. The postdoctoral researcher who worked across from me once described an occasion on which he analyzed four cells from the same cell line using the same immunofluorescent dye to stain the same protein -- and finished with four entirely different sets of data, not knowing which, if any, was correct. Astonished, as I listened to him, I remembered an experiment from my AP Biology class in which my teacher promised extra credit to whichever group obtained the “best” data regarding the effect of osmotic pressure on diffusion rates.

At Winship, I realized that improvising and compromising were inherent in research, as the ideal materials and procedures were not always known and not always available. Before I even began research into metastatic cell receptors, my mentor informed me that because of financial constraints, I would not be able to use quantum dots to stain the receptors. Instead, I had to rely on the less expensive and less precise dye-coupled antibodies. Although the antibodies initially spat out inconclusive data, by fine-tuning the serum in which I grew the cancer cells, I was able to minimize stain interference and obtain positive immunofluorescence results. But as I labored through the calculations required to produce the correct serum concentrations, I thought back to my AP Chemistry labs, for which we had memorized procedures line-by-line as if they were hallowed scripts. And I realized how little I knew of research before that summer.

Most importantly, at Winship I came to understand the importance of research as a means of gathering scientific information. Before my internship, I always preferred the textbook to the beaker, the conclusion to the hypothesis, and knowledge to speculation. Without a doubt, I had had the scientific method imprinted upon the folds of my brain ever since elementary school, but only after working at Winship did I realize that lab work was required to produce every paragraph of every science textbook I had ever read.

I have always enjoyed learning scientific facts and concepts. But the Emory-Winship Summer Scholars Program instilled in me a love of scientific research: I realized that only by plowing the grounds of research could true knowledge ultimately be reaped.

**STEM Education Anonymous**

**Scientific exploration clearly excites you (otherwise you wouldn’t be applying to Caltech). What is it about Caltech’s opportunities and resources that will best fuel your intellectual curiosity and develop your passion for science, technology, math or engineering? (500 words max)**

“It focuses 201 precise beams of radiation directly on the tumor. Scary isn’t it?” As I deliver my prepared presentation about the Gamma Knife during the TSA National Conference, I can't help but wonder if I have really done justice to the power and complexity of this innovation. The Technology Student Association has fueled my interest in engineering and research; from Biotechnology Design to VEX Robotics, TSA provided me with many opportunities to explore STEM based activities. For three years, I have helped design organic batteries, modeled new inventions, and created robots. From these unique experiences, I have fostered my interest in technology based careers. Notably, TSA has encouraged an ideology of engineering that has completely changed the way I think. I believe that engineering is about servant leadership, gracious professionalism, and failures that are not terminal but necessary to personal growth.

Cut to another scene. Pyrosequencing the different patient samples, my dad and I take a lunch break while the machine beeps and groans to its programmed instructions. By the end of my ten week internship, I had become familiar with the routines. Whether mixing electrophoresis gel or categorizing samples from nearby hospitals, I knew the procedure by heart. While lab work may be repetitive and daunting at some times, it is also an opportunity for me to apply the concepts I learned in the classroom. Studying epigenetics with my dad, I contributed my summer break not only to developing my love for science but also to finding a cure to cancer.

Without doubt, my involvement in TSA and my summer internship expanded my passion for research and science, a passion that will carry over into my studies in bioengineering. I am especially interested in the biomedical devices division. Specifically, I want to intern under faculty mentors to eventually start my own research projects. I am enchanted by the summer research programs that are offered by Caltech: the university encourages undergraduate research and individualism. Caltech emphasizes individual STEM education, an ideology that is similar to that of TSA. During the second half of my freshman or sophomore year, I want to explore the Kavli Nanoscience Institute. With state-of-the-art equipment for advance nanofabrication at my disposal, I can experiment and create my own nanoscopic devices.

For me, Caltech bestows the opportunity to continue the research experience that I began with my dad. I would once again be familiarized with the accustomed lab routines. And I would have another chance to contribute back to society with the research that I participate in. Furthermore, Caltech allows me to have an early start on my graduate and professional courses, and defrays research costs to let me have an easier time doing what I love. The university epitomizes what I learned from TSA and my internship: “the quality of life improves when humans realize the importance of working together; a people as a whole only advances when it leaves behind commercial interests and upholds humanitarian ones.”

**The World's A Stage Anonymous**

**Some students have a background, identity, interest, or talent that is so meaningful they believe their application would be incomplete without it. If this sounds like you, then please share your story.**

I feel myself jump as the ground shakes, and Horace Vandergelder storms out. My heart beats, and all I can think is to wait for it, wait for it—dialogue, more dialogue, finally singing… “And now that we’re dancing who cares if we ever stop!” That’s our cue. I dart from my position behind a set piece and turn the wrench, bracing my ears for the grating screech the set makes as it splits in half. Scene change time. As us stagehands push the set offstage, then ensemble streams into the middle of the stage to continue the number. Having removed the set, we know quietly sing along in the wings, watching the flourish of costumes as the cast begins to dance. It was opening night, and everything was paying off: from the hours painting and assembling the set, running through the show, and for me, the initial decision to join theater.

I wouldn’t have expected it to happen. Prior to theater, my robustness in class quickly morphed into timidness the instant I stepped into something unfamiliar. So when my friend asked me to join theater, I inevitably declined. “But it’ll be fun, and we need more boys!” “Eh, but I don’t have the time…” Yeah right. More like you’re not willing to sing and dance on stage. “Okay, then how about be a stagehand? You’d help move sets and stuff, and you wouldn’t even need to come to all of the rehearsals” “Let me think about it…” Working behind the scenes proved to be more tenable for me, and a few days later, I showed up at rehearsal thinking “Well, why not?”.

At first, it was as awkward as I had feared; I stumbled around, only knowing two people. But as I worked on the set, two grew to ten, until by opening night, I’d met and worked with all the cast and crew. And while it was more demanding than I expected, between the twelve-hour weekend rehearsals and running around moving props during the show, it more than paid off, though both the audience’s praise and the friends I made. I acclimated to the environment—and I loved it. What’s more, after hanging out with enthusiastic thespians, I become more willing to explore the performing arts. When the show ended, I ended up joining chorus half-way through the year, and next year, I actually auditioned for the musical, getting several small roles. I’d found an activity, totally different from the math and computer science that I was used to, that I thoroughly enjoyed.

After moving to Oregon though, I could not longer participate; my classes at Portland State conflicted with rehearsals, so my theatrical activities were limited to playing improv games during lunch, or acting out “Rosencrantz and Guildenstern are Dead” with friends. Yet, though I haven’t recently reveled in the thrill of singing and dancing on the stage, I nevertheless consider theater to be one of my most valuable experiences. Though I was initially reticent, the way that ultimately bloomed into enthusiasm has helped me find confidence and a willingness to try new things. It’s the reason why, whether competing in Academic Decathlon or rising to speak during Debate, I’m filled with self-confidence. It’s what allowed me to easily adapt to the new, and very different environment in Portland. And it’s the root of my confidence that no matter what happens in the future, I will approach new opportunities fearlessly, and thrive.

**Books I Love Anonymous**

**Please list three books, along with their authors, that have been particularly meaningful to you. For each book, please include a sentence explaining their influence upon you (200 characters max). Please note that your response is not limited to math, science or school-assigned texts.**

Book 1: Jurassic Park

This was the first book I read that combined math with action and portrayed the mathematician as a hero, which made me hopeful about my professional future—but did give me unusual, dinosaur-infested nightmares.

Book 2: Der Struwwelpeter.

When I visited my grandmother when I was younger, she taught me to read and speak some German using this book, which she'd had as a child. It’s creative, cautionary, and gruesome.

Book 3: The Annotated Alice

I’ve read this book so much it’s falling apart; it’s more Annotation than Alice, full of math facts, chess metaphors, and literary analysis. It started me reading even childish books analytically.

**Curing All Cases of Moodiness Anonymous**

**Caltech students have long been known for their quirky sense of humor, whether it be through planning creative pranks, building elaborate party sets, or even the year-long preparation that goes into our annual Ditch Day. Please describe an unusual way in which you have fun. (200 word max)**

*Is she moody... or just broody? An obstacle course game should do the trick. Let’s also add some dried mealworms to the mix!*

Every day, my pet chickens surprise me with their unique personalities and quirky behaviors, whether they are gracefully grooming their feathers, luxuriously bathing in dust, or madly sprinting for mealworms. To accommodate these unusual family members in my small, suburban backyard, I work on many creative projects including entertaining obstacle courses made from Christmas tree boxes, grand lettuce wreaths constructed with excess chicken wire, and mesmerizing food platters consisting of the healthiest leftovers in our fridge.

My hens’ broodiness has become opportunities for me to create whimsical and cost-effective contraptions for their entertainment and for my own. Having raised pet chickens for the past two years, I have learned the art of simplifying fun. Watching them roam the same 15’ x 30’ space every day with unwavering enthusiasm inspires me to be innovative with my resources, however limited, and seek out new, daily adventures as well.

**Small in Size but Big in Heart Anonymous**

**If you could meet a character from a book or a historical figure, who would it be and what would you ask them? (200 words)**

“Oh d-d-d-d-dear, dear!”

Among the lush trees of the Hundred Acre Woods, a little stuffed pig named Piglet searches for his friends. Despite being a tiny ball of anxiety, he displays remarkable amounts of compassion and fortitude whenever his friends are in distress.

I would like to meet Piglet from A. A. Milne’s *Winnie‑the‑Pooh* because even though he is the smallest among his friends, Piglet has the biggest heart and displays exceptional loyalty to those around him. Since self-perception is so important in how one overcomes challenges in life, I would ask him about how he learned to embrace his quirks and remain courageous even when facing his harshest critic: himself.

Whether he is helping his friends capture frightening Heffalumps and Woozles, or rescuing them out from under a fallen treehouse, Piglet shows that true love and heroism can come in tiny packages. His personality fascinates me because although he quivers and stutters often, Piglet demonstrates a profound sense of bravery through both his acts of kindness and his many exciting adventures.