I devoured magazines like *Popular Science* and books about science and machine design, and everything I learned about engineering only made me more curious. When I was in fifth grade, I signed up for CTY’s summer Introduction to Robotics course. The next summer, I took Science and Engineering, and the summer after that, Electrical Engineering.

Of all the CTY courses, Investigations in Engineering, which I took last summer, was the most challenging. This college-level course provides a true test for students who think they might someday want to pursue a career in engineering. For me, the answer was clear: I was more convinced than ever that I wanted to be an engineer.

**Taking the Wide View**

When you think of engineering, you might think of inventing or perfecting everyday items, such as vacuum cleaners and dishwashers. Or you might think of designing satellites used in communications and exploration of the galaxies. Those are the same ideas I had when I showed up on the first day of Investigations in Engineering. My perspective was about to be broadened.

We started with detailed lectures on bridges, torque, and forces, and studied complex equations describing concepts such as bending and buckling of a beam under applied gravitational force. Confused by all the various equations and concepts being thrown at me, I realized that if I was to survive this course for another two weeks, I’d need to take better notes than I had in the past—and ask the instructor for help when I was confused.

Each new topic—logic circuits, molecular science, biological engineering, the calculation of errors in an experiment—kept the course engaging and revealed engineering’s reach into every aspect of our lives, from processing units to synthetic organs.

**More than Equations**

We completed our first assignment even before arriving at CTY. After reading one of two books (I chose *Engineering and the Mind’s Eye* by Eugene S. Ferguson), we had to write a three-page paper that would be turned in on the first day. That was the first indication that this engineering course wasn’t all about equations.

We gave various presentations throughout the course. I most enjoyed the one for which we researched a historical engineering problem and its solution. My partner and I chose to do our presentation on the Chernobyl disaster in Pripyat, Ukraine, formerly in the Soviet Union. My partner was a Russian student who was exceptionally
The Chernobyl crisis began on April 26, 1986, when one of the generators at a nuclear power plant overheated. This led to the world’s largest-ever nuclear accident: 56 people died from the accident and exposure to radiation, and thousands suffered health problems. Now, almost 25 years later, its effect on the environment and people’s health is still a major concern.

The best response to this accident was simple and obvious: Cover the reactor with a concrete structure and seal the reactor within the structure. Because radiation made it too dangerous for humans to build around the reactor, engineers devised a plan to build the cover and place it on top of the reactor in one move, making this the largest whole structure ever transported by man.

In addition to giving presentations, we wrote several essays throughout the course, which was a challenge for me because writing is not my strength. One assignment required us to research a new field of technology, such as robotics, and write an essay in three days. I decided to delve into the use of robots in the military. Working in the Johns Hopkins University library, I learned a lot from the vast collection of books and online resources. But because I had never done an extensive research project and did not have in-depth knowledge in engineering, I initially had difficulty organizing my findings into an easily understandable format using engineering terminology. My instructor’s constructive feedback gradually helped me improve my writing, and the skills I gained have been useful to me in writing and researching assignments in school.

Learning by Building
My favorite parts of the course were the projects that required us to complete certain tasks using limited supplies. For the first project, after dividing into groups of three or four, we had one day to develop a mousetrap using only paper, glue, and rubber bands. The goal was not only to implement an idea that worked using the items provided, but also to effectively communicate our design in the form of a blueprint.

Our team’s mousetrap consisted of a box with a rounded lid and a ramp that would tip as the mouse tried to grab the cheese attached to the top of the lid. Rubber bands attached to the ramp made it tip back to its original position, blocking the trapped mouse’s exit and allowing for another mouse to fall for the trick. My team’s mousetrap was successful in capturing and holding the ping-pong ball “mice,” and our blueprint was equally successful: By following our blueprint, another group created a perfect replica of our original.

The last week of the course involved extensive testing on the characteristics of spaghetti. We applied the equations and formulas for stress and strain we had learned early in the course and used lead balls, scales, and tools for suspending weight to measure the capabilities of spaghetti under different conditions. My class and I soon concluded that spaghetti can hold considerably more weight in tension (hanging from it) than in compression (when the weight is placed on top of it).

And then the competitions for bridge building began. The class was again divided into groups of three to four students to build bridges out of spaghetti. Intending to use the tension characteristics of the spaghetti to its greatest advantage, my team developed a radically different design from those of our competitors. I realized in mid-construction that the bridge would not hold, but time did not allow for drastic changes, so production continued. We later had to watch as our bridge came crashing down after the application of the smallest two available weights.

I left this course with more knowledge and new ideas than I ever had before. I discovered that every successful product requires hard work using skills from both the sciences and the humanities. I realize now that engineering is much more than formulating new ideas and trying to build something with them; it also takes extensive research and the ability to communicate one’s findings clearly. Becoming an engineer requires more than what I expected, but that only makes me more determined to meet the standards required to become one.

Yunus Tezcan is a sophomore at Coeur d’Alene Charter Academy in Idaho. A competitive swimmer, he also enjoys kite surfing, skiing, soccer, and robotics. Yunus has traveled extensively in Europe and lived in Spain for seven months. He plans to major in engineering in college.

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