What is Engineering?

Ferris wheels, tall skyscrapers, and snowboards; all these things that are part of our lives have one thing in common: they were made using **engineering**. Engineering is when people use science and math to develop something new, like a structure or a device. Engineers are people who use those ideas to make something that helps people as a whole and make all of our lives better in some way or the other.

There are a lot of different categories of engineering. The biggest five include chemical, which uses chemistry, civil, which has to do with public work projects, like roads and bridges, electrical, which is centered around electricity, material, which focuses on making new materials, and mechanical, which uses machinery.

Engineering is one of the four letters in STEM (science, technology, engineering, and math). This is not only because it's so important to our lives, but because it complements all the other letters so well. Science is what gives engineers the basis to make something, math is needed for them to run calculations and get measurements, and technology is used by engineers to get the job done.

When designing a project, engineers must remember the problem they are trying to solve with what they are making. Engineers also have to remember the criteria, the list of things that the engineered thing has to do well, and the constraints, which are the things and conditions that limit how the thing is being engineered. For example, when engineers are constructing a building, one of the criteria would be that it would have to withstand several weather conditions, and a constraint would be the budget.

Engineering is such a broad topic, and that makes it all the more exciting to dive into. People whose jobs are in any field of engineering have a very engaging career because there are so many ways they can help benefit society.

The Latest News!

Just a few weeks ago, on March 19th, 2025, biologists and engineers at UC Berkeley began studying the biomechanics (the study of mechanical systems) of how squirrels jump. They have started to design a robot based off of a squirrel. Considered to be one of nature's best athletes, squirrels have the talent to go through branches, leap across trees, and jump on very specific narrow spots with a perfect landing. In the

past, engineers have created robots that can crawl, swim, and fly, but they've never created anything that can jump far and land with such precision as a squirrel. This project was pioneered by Justin Yim, a former UC Berkeley graduate who had an interest in this topic. They are all hoping to create more agile robots to monitor the environment, as these robots will be more gentle and efficient. Engineers (as well as robotic teams) are hopeful that this invention will "take it to the next level." They are hopeful to explore Enceladus (a moon of Saturn). This proves precisely how advanced engineering and science is and how it possesses limitless possibilities when studying our natural world.

Fun Facts!

Engineering is, as explained before, a very interesting topic, and there are a lot of awesome things to come out of it. Here are some fun facts:

- A civil engineer helped make water slides have the slippery element to them
- Ferris wheels were made by engineering
- The structures at theme parks are very centered around engineering
- Computer engineers design special effects in movies
- Engineers made the snowboard
- The word 'engineer' comes from the Latin word for 'cleverness', *ingenium*
- The Pyramids of Egypt are some of the first massive showings of engineering at work
- Engineering is the main reason why space travel exists

History

Engineering goes back hundreds and hundreds of years, back to when the earliest lime structure (made from limestone) was constructed in the 9th century (BCE) in present day Turkey. Lime was a key ingredient to concrete, later invented by the Romans. This led to the Egyptians building pyramids and the Ancient Greeks building

machines for military use. Through time and development, humans developed designs and new products over time, such as the wheel, the telephone, the lightbulb, and the compass. The wheel was a revolutionary invention and changed the world of transportation. The telephone made communication quick and easy, especially over long distances. The light bulb provided an efficient and practical source of light. And lastly, the compass, invented in ancient China, allowed simple worldwide exploration. These inventions have been essential in laying the foundations for the impressive engineering feats of today.

What Does this Have to Do With Me?

Now the question is, what does engineering even do in our modern world? How does it help us lead better lives? Well, engineers improve our quality of life, through a tangible change, such as creating life-saving devices, providing clean water, making healthcare more successful, climate change, etc. Engineers also design and create new building structures and make current building designs better. Engineers focus on different categories in our world and work together to make change possible. Such categories include: Technology, industry, construction, and medicine. In the technology field, engineers research and design programs that can power our phones and computers. They also work to improve AI, making new systems to help machines work better. The industry involves engineers managing the supply chain (the process in how things are made) and using technological systems to create renewable energy sources. They also develop new materials with unique purposes. Other engineers work in construction, where they design buildings and roads. These engineers are here to make sure that structures are safe and long-lasting. Lastly, there are engineers who work in medicine–they work to improve healthcare and save lives using medical devices and equipment. Some examples include biomedical engineering (the making of medical tools) and personalized medicine (medicine custom to each person). As an engineer, *you* could be the one to create lasting change in our world!