



Why Our Hands are Super Handy

Our hands are pretty amazing structures. They are made up of a combination of bones, muscles, joints, and tendons and together they provide us with some super effective tools. You probably already know that bones provide structure and support for the body and that joints provide places for things to bend. But did you know that there are 27 different bones in each human hand? There are also a few muscles in the hand that help move our fingers apart and together. But, surprisingly, the muscles that provide most of the force to your hands are located in your forearm. When you make a fist with your hand you can feel the muscles in your forearm contracting. These muscles can work from a distance because they are attached to the bones in your fingers by long string-like cords known as tendons. So your bones, joints, muscles, and tendons work together so you can do complicated stuff like texting on your phone, playing an instrument, or brushing your beautiful hair.

But what happens if you get in an accident and lose one of your hands. Sadly, it happens to thousands of people each year most often due to accidents and sometimes due to disease. Fortunately, we have groups of scientists, engineers, and doctors that work together to develop artificial body parts, including hands, that act as replacements for lost limbs. The science of developing robotic hands, along with other artificial limbs, is called prosthetics. Prosthetics are intended to restore as many normal functions as possible for the missing body part.

A person's artificial limb (prosthesis) is designed to enhance both the function and lifestyle of the patient. Some of the most important qualities for a good prosthetic limb include strength, durability, longevity, shock absorption, lifelikeness and comfort. Biomedical engineers research and design new ways to create prosthetic limbs that incorporate as many of these characteristics as possible. In addition, new cutting edge materials such as Kevlar, titanium, and carbon fibers provide excellent strength and durability while keeping the prosthetic limbs as light as possible. Thanks to lots of hard work and ingenuity, prosthetic limbs are continually improving.



Do you know anyone who has had a hand or an arm injured in an accident? What if you could build them a robotic hand to help them accomplish everyday tasks like writing, picking up a glass, or opening a door? In robotics, the part of the robot that interacts with the environment is called an end effector. End effectors are designed very differently depending on the task they are intended to perform. In this STEM Challenge, your task is to design a simple robotic hand that can grasp and pick up a small object.