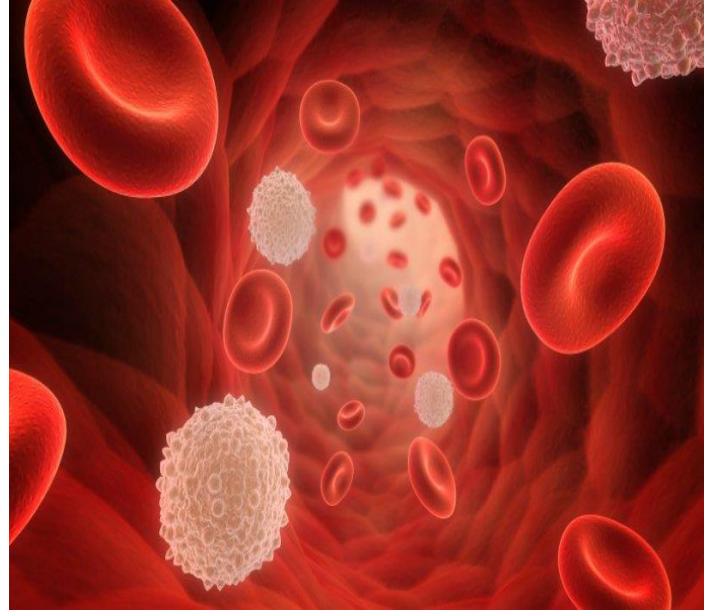


What is blood?

Blood is the liquid that circulates through the body to keep the cells in the body functioning. Blood delivers oxygen to cell tissues and takes carbon dioxide away from the tissues. Blood has multiple parts with different functions, and without it we wouldn't be alive.

Why is it important to know about blood? Many people don't know what's in our blood and the important role that each component plays to keep our bodies running. Red blood cells act as mail men that deliver oxygen to tissues around the body. They also take carbon dioxide and get rid of it from the body. White blood cells act as warriors to fight off any foreign infections or bacteria. Platelets help heal wounds, acting as building blocks to clot the blood and allow the tissues to rebuild around wounded areas.



Blood and Engineering

The more that scientists and engineers know what, how, and why blood works in the body, the better innovative technologies and methods can be developed to solve health issues. For example:

- Blood Transfusions

According to American Red Cross, 36,000 units of blood and 7,000 units of platelets are needed each day to perform blood transfusions. Red Cross uses Power Red donations as a way to efficiently and safely gather 2 units of blood, opposed to one, by separating the red blood cells from the plasma and platelets from one unit and returning the plasma and platelets back into the donors' bloodstream while collecting a second unit of blood.

- Bone Regeneration

When chemotherapy patients go through radiation treatments, their bone marrow temporarily stops producing new blood cells. Platelet transfusions aid to kickstart the bone marrow to reproduce more blood cells and regenerate the bone.

Recreate the Plasma Play Pit at home!

All you need is water, red water beads, red craft foam, and ping pong balls all put in a plastic tub!

What are prosthetics?

A prosthetic is an artificial body part. Engineers design prostheses for maximum strength, durability, longevity, and lifelikeness so that amputees can live full and normal lives. Prosthetics are typically made for the leg or the arm. Sometimes the entire leg is a prosthetic, sometimes just below the knee, and sometimes it is just the foot. Prostheses can be made for a specific individual to accommodate their height, weight, and what activities they want to perform. If you watch the Special Olympics, you will frequently see athletes who have prostheses that are tailor made for maximum athletic movements (such as running or swimming).

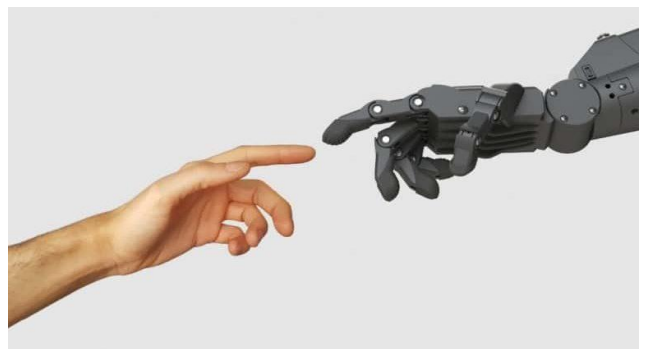


Why do we need prosthetics?

Prosthetics can help people who have lost their limbs live normal lives. Maybe someone got in an accident and lost a limb, maybe someone came back from war wounded, or maybe they developed a disease that required a limb to be amputated. There are many reasons why someone may have lost a limb, but the loss of a limb can make life incredibly challenging. Imagine trying to walk with only one leg. Imagine trying to make a sandwich with only one arm. As technology becomes more and more advanced, prosthetics continue to get better. They are becoming more life-like, stronger, comfortable, and presently scientists and engineers are working on getting a prosthetic to move and respond to what the brain tells it to do.

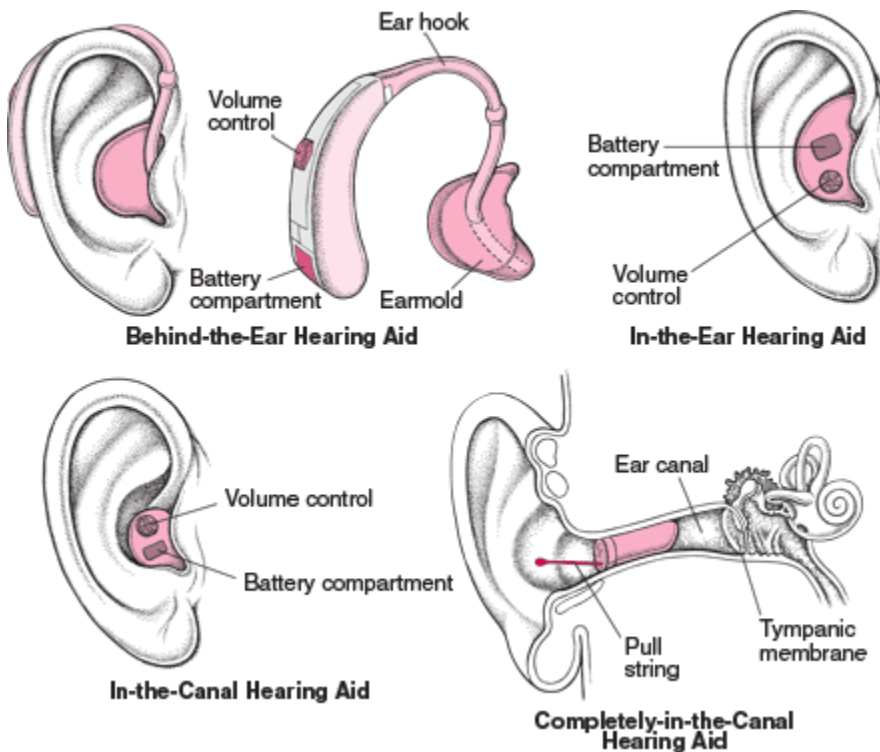
Want to try the Prosthetic Party at home?

Gather up any supplies you have laying around at home and try to design the strongest, most comfortable, and longest lasting prosthetic leg. Try using paper rolls, sticks, pipes, or maybe try something else. Use your imagination and see what happens when you build a prosthetic at home.



How do people hear?

The human ear acts like a funnel that collects and generalizes the sound waves produced by a noise. These sound waves then travel into the ear canal, pass the eardrum, pass the tiny ear bones, and into the cochlea. The cochlea is filled with tiny hairs that vibrate due to the waves and send electrical signals from the hair to the brain. Your brain then turns those signals into the noises that you hear.



Why are hearing aids important?

Hearing aids are used to allow people with hearing loss to better understand their surrounding environments. The hearing aid is a complex device made with simple parts, such as: microphone, amplifier, and speaker. The microphone collects the sound produced and changes the sound from waves to electrical signals. From here the signals go to the amplifier which increases the strength of the signal. The last step is to send these strengthened signals to the ear through a speaker.

Engineering and Hearing Aids

Hearing aids have been used commercially since the 17th century, being called the “Ear

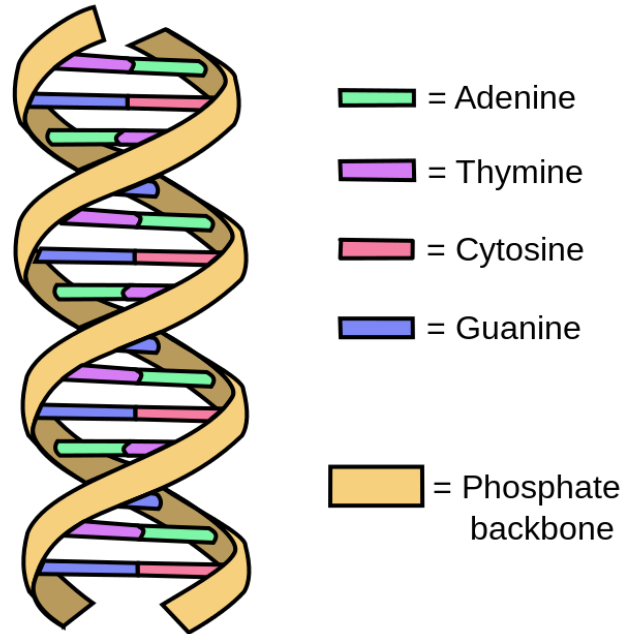
Trumpet.” These hearing aids were made from various materials and were found to look weird. The following designs focused on how the hearing aid looked until Miller Reese Hutchison created a hearing aid that creates electrical signals, like what we currently use. Over time, engineers attempted to increase the strength and design of hearing aids until the hearing aid was able to help a wider range of people and be placed in the ear, rather than being an at home machine.

Want to create Sounds All Around at home?

Creating your own hearing aid at home is simple! You can experiment with multiple objects like paper towel rolls and paper cups, as well as tape and cotton balls to make a device that amplifies sound. Be sure to use your imagination to achieve this high quality hearing aid.

What is DNA?

DNA is the building block of life. It is a long chain containing a sequence of code that has all the information about yourself, called genes – it's what tells your body to make your hair blonde or your eyes brown. DNA is made up of a phosphate backbone and four types of nucleotides, Adenine, Cytosine, Thymine, and Guanine. These four, abbreviated to A, C, T, and G, make up the instruction booklet for every living being.



DNA



What can we use DNA for?

DNA samples can be found in hair and skin cells left in a crime scene. These samples can be analyzed and compared to a suspect's DNA to find out who may have committed the crime.

Biomedical engineers create the processes, tools, and machines to accurately examine DNA evidence.

Someone's DNA can also be used to find out ancestry and some types of illnesses.