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8th Grade Robotic WU

Prosthetic Prototype Robotics - After a patient has had a limb surgically removed because of a traumatic event or disease, the limb is replaced with a prosthetic, which acts as the limb that the patient has lost. In order to design these prosthetics, biomedical engineers first design a prototype, or model, and then create the prosthetic that the patient will use.

Congratulations!

You have been hired by WJMS Medical & Robotics as a biomedical engineer to help design a prosthetic prototype using the Engineering Design Process. Remember, to help amputee patients, the prosthetic should be durable, comfortable, and life-like. Use your creativity to research and first sketch your prototype below, then build your prototype using the given materials.

Materials:

- 2 q-tips
- 2 rubber bands
- 2 toothpicks
- 3 cotton balls
- 3 pipe cleaners
- 2 Post-it Note
- 2 craft sticks
- 2 Straws
- 1 note card
- 1 plastic spoon

Group #_____

Student Names (First, Last)

Design Your Prosthetic Prototype Here:

Who is your patient? _____

Which prosthetic limb are you designing?

_____

Design Tips to Consider:

- How can you create joints in your prototype?
- How can you make your prototype comfortable for your patient?
- How can you ensure that your prototype will hold the weight of your patient?
- What materials might you use when you're turning your prototype into a prosthetic for your patient?

Prosthetics & Technology:

Scientists have found a way to use Bluetooth technology to regulate stride, pressure, and speed between sets of prosthetic legs.

Scientists have engineered "robotic" knees, called microprocessor knees, which contain a computer within the prosthetic that allows amputees to have better control when walking, stopping, and moving on inclines.

Medical Advances:

For many years, prostheses were made of wood, but now scientists have started using a material called carbon fiber, a much more life-like material. Titanium is also being used in prosthetics today, making them more durable and giving them a longer life.

Scientists today are improving a technology called Targeted Muscle Reinnervation. This technology allows amputees to control their prosthetics using their brain, just like it was their own limb.

Prosthetics & Technology Refection:

Each group must complete this sheet with a single design drawing and an individual 100-word essay on how the EDP was used and why the design was chosen.

Create a Single View Orthographic Drawing of your design with all annotations (what do these instructions mean?)