



TOUCH TOMORROW

A FESTIVAL OF SCIENCE, TECHNOLOGY, AND ROBOTS

ACTIVITY INFORMATION & INSTRUCTIONS









ACTIVITY NAME: Creating a Wearable Exoskeleton Hand

EXPLANATION OF ACTIVITY:

Follow along to build an exoskeleton hand that moves! You will be tracing your hand, measuring and cutting the phalanges (bones) in each finger from straws, and running string through them to create a hand that has fingers that contract when you pull on the strings at the bottom.

PRESENTED BY: Alpha Eta Mu Beta

GATHER THESE SUPPLIES

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|  Tape |  5 Straws |
|  Scissors |  Marker or pen (something to trace with) |
|  1 Piece of Paper |  String or string substitute (ex. Mask straps) |

STEP BY STEP PROCESS

1. Trace your hand onto a piece of paper
2. Cut the hand out
3. Draw a line, starting where your thumb connects to your palm, across the center of your traced hand
4. Measure out straws from the length of the line to the tip of the fingers on the piece of paper
5. Cut each straw in half, and then cut one of those halves in half again
6. Tape one long and two short straws onto each finger (5) on the piece of paper, with the two shorter pieces of straw at the top just like your fingers. Do this for all fingers except the thumb
7. For the thumb, use one long and one small straw (since your thumb only has two phalanges/bones)!
8. Run the string through the straws on each individual finger, and tie a knot at the top or use another straw as a stopper so that the string does not pull through
9. You're done! Pull the strings coming out from the bottom of the straws and watch your exoskeleton hand move!

TROUBLESHOOTING

Engineers face challenges every day. It is important to be able to reassess and redesign! If the activity doesn't work try these steps.

- If your hand is too small, try tracing an adult hand to make it easier to attach the straws!
- If you're having trouble getting the string through the straws, try running it through them before taping the straws down onto the piece of paper.
- If your string is pulling through your straws, try tying a small piece of straw to the top end to create a bigger stopper.





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ACTIVITY INFORMATION & INSTRUCTIONS (CONT.)



THINGS TO THINK ABOUT?

Here are some guiding questions to help reflect on this activity.

- What kinds of engineers do you think do this?
- How does this work? What do the strings and straws represent?
- Why did we use two straws for the thumb, but three for the other four fingers?
- Do you think you could do this for any other parts of your body? Which parts?
- Do you understand how your fingers move better after watching this video? How do they move?

ACTIVITY VOCABULARY

You may have heard some new words during our activity . Try to match words to meanings!

Phelange a flexible but inelastic cord of strong fibrous collagen tissue attaching a muscle to a bone

Tendons a bone of the finger or toe

