



## What is Robotics?

Robotics is a field of technology and engineering where people create and control robots. A robot is like an intelligent machine that can do things on its own, following the instructions it's given. These robots can be as simple as essential tools or as complex as advanced systems with lots of abilities.

### Why is it important?

**Automation and Efficiency:** Robotics helps make things work automatically and smoothly in different industries. It makes tasks easier, saves human energy, and handles repetitive or risky jobs.

**Exploration and Discovery:** Robots are like our brave explorers. They go to places too tricky or dangerous for us, like outer space, deep oceans, or ancient sites. They help us learn new things and discover amazing stuff.

**Manufacturing and Industry:** In making things, robots are super-fast and super-precise helpers. They do jobs like putting things together, welding, and packaging, making everything faster and top-notch.

**Medical Advancements:** In medicine, robots are changing the game. They're used in surgeries, rehab, and health checks, giving doctors super-precise tools and making procedures less invasive.

### Fun Facts:



## What are Characteristics of a Robot

**Sensors:** Robots have special sensors to understand their surroundings. These sensors can be like their eyes (cameras), touch sensors, or heat sensors. They help the robot gather information about what's around them.



**Actuators:** Actuators are like the muscles of a robot. They help the robot move or do things based on what it senses. Examples are motors, which make the robot move, and servos, which help it pick up or put down things.

**Mobility or Manipulation:** Robots need to either move around or handle things. Some have wheels or legs to move, while others have arms to pick up and move objects. It depends on what the robot is meant to do.



**Programmability:** Robots can be taught what to do. You can give them instructions beforehand (pre-programming) or change their instructions later (reprogramming). This helps robots be flexible and do different tasks.



**Power Source:** Robots need energy to work. This can come from batteries, electricity, or other sources. Just like we need food to have energy, robots need power to do their tasks.

# DIY Robot Hand

## Activity Overview:

Our hands are marvels of complexity, composed of numerous bones, muscles, and ligaments. This intricate structure allows our hands to execute movements that other parts of our body cannot.

In this activity, we will showcase the vital collaboration of various hand components in facilitating movement. This demonstration emphasizes the role of bones, muscles, and tendons, illustrating how they enable us to move each finger independently or coordinate their movements simultaneously.

## What you need:

- Drinking straws (about 8-10)
- String or yarn
- Cardstock
- Tape (preferably masking tape)
- Scissors
- Hole punch (optional)
- Markers or decorations (optional)



## Instructions:

- Trace your hand and cut the outline or use the template provided
- Mark and bend the paper at the joints. Erase the marks on the paper if you wish.
- Cut the drinking straws into small pieces so they fit in the areas between the joints.
- Tape the straw pieces to the fingers. Make sure you leave a gap between the straws.
- Cut the drinking straws into 5 longer pieces (one for each finger) and tape them on the palm.
- Cut one section from the jumbo straw and tape it to the wrist.
- Cut a piece of yarn and run it through the straw sections of one finger through the palm and then the jumbo straw at the wrist. Do this for all fingers.
- Knot the end of the yarn at the fingertip.
- Pull the strings to make your robotic hand move!

## Discussion:

- How does the structure of the robot hand mimic the movement of a human hand?
- What changes can you make to improve the flexibility and functionality of the robot hand?
- How does the string mechanism allow the fingers to move, and how can you control these movements?
- What real-world applications could a robot hand like this have in assisting with tasks or operations?



