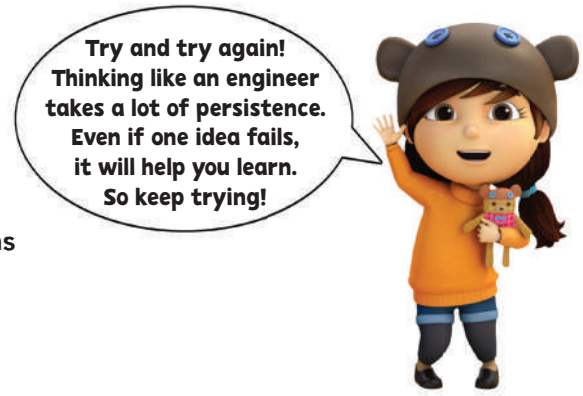
Robotic Arm Challenge

Solve an Out-of-Reach Problem with Your Own Robotic Arm

Sean loses his Neil Armstrong action figure in a deep hole, prompting the friends to create their own "robot-arm-grabber-thingy." Now it's your turn! Whether it's retrieving a small toy under the couch or a ball too high on a shelf, robotic arms can help us grab something unreachable. Use the Engineering Design Process to create your own robotic arm!

Materials

- Printable Robotic Arm Template
- Printable Robotic Arm Instructions
- Engineering Design Process Wheel
- Empty cereal box or cardboard
- Recycled straw
- String
- Packing tape or other strong tape
- Crayons or markers
- Various household items (optional)



Create Your Robotic Arm

1. Print the Robotic Arm Template (following page). Tape the template to cardboard to use as a pattern. With an adult's help, cut along the dashes. Use crayons or markers to decorate your robotic arm.
2. Tape the fingers to the arm and fold as directed in the Robotic Arm Instructions (following page).
3. With an adult's help, cut 12 half-inch pieces from the straw. Tape each straw segment to the robot fingers, in-between the finger joints, as directed. Cut four 10-inch strips of string and weave them through the straws, taping the string securely at the top.
4. Attach the support strap to the robotic arm, wrap it around your hand, and secure with tape. With an adult's help, tie the strings to your fingers so there is enough tension to pull the robotic fingers, and then put your creation to work!

Use and Improve Your Robotic Arm

1. ***Test*** your robotic arm! Find a small, light object that is out of reach. If needed, have a friend place a marshmallow or small toy in a difficult spot for you. Use your new robotic arm to help get the item.
2. The Engineering Design Process includes the step to ***improve***. How could your paper robotic arm be even better? What if you used different materials, added more fingers or adjusted the length, for example? Make a plan and create something new and improved and then ***share*** it with your friends.
3. Define an out-of-reach problem that might need a different solution. With your friends, combine various household items—maybe kitchen tongs, a tennis racket and shoe laces, for example—to ***imagine, plan*** and ***create*** your own "robot-arm-grabber-thingy...." Put it to use in grabbing hard-to-reach items. Compare the cardboard robotic arm with this new creation. Which works better? Why?

pbskids.org/readyjetgo

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ARM

Robotic Arm Template

SUPPORT STRAP

FOUR FINGERS

FOLD HERE

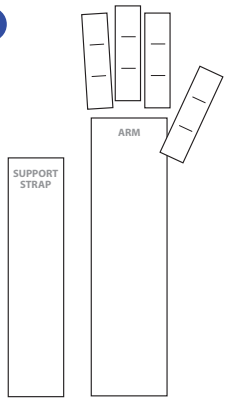
FOLD HERE

FOLD HERE

FOLD HERE

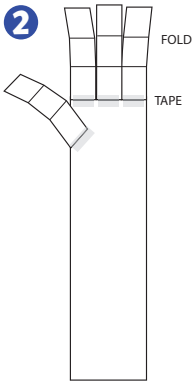
Robotic Arm Instructions

1



◀ CUT OUT FINGERS, ARM AND SUPPORT STRAP.

2

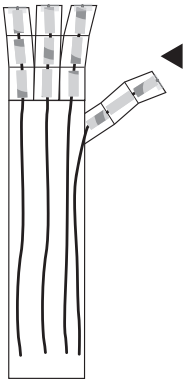


◀ TAPE FINGERS TO BACKSIDE OF ARM. FOLD FINGERS DOWN ON FOLD LINES.

3

◀ CUT STRAW INTO 12 HALF-INCH PIECES.

4

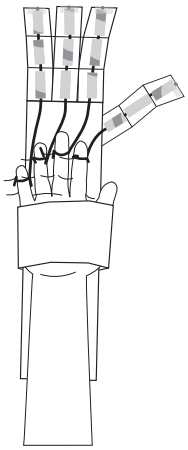


◀ TAPE STRAW PIECES BETWEEN FINGER FOLDS.

WEAVE STRING THROUGH THE STRAWS.

SECURE THE STRINGS TO THE TOP OF THE FINGERS WITH TAPE.

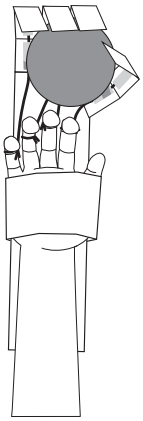
5



◀ ATTACH THE SUPPORT STRAP TO THE ROBOTIC ARM. WRAP AROUND YOUR ARM AND SECURE WITH TAPE.

TIE THE STRINGS AROUND YOUR FINGERS SO THE STRING HAS TENSION AND MOVES THE ROBOTIC FINGERS AS YOU MOVE.

6



◀ NOW PUT YOUR ROBOTIC ARM TO WORK!

Engineering Design Process Wheel