Camp Invention®

DIY ORBOT™

Innovation Exploration Kit™, I Can Invent® Series

Your remote-controlled Do-It-Yourself (DIY) Orbots are ready to go for a spin! Design, experiment, test, and modify your very own DIY Orbots to take on one challenge after another.

Read prior to using the product.

SAFETY & HYGIENE

WARNING: Choking hazard–small parts. Not for children under 3 years.

- All activities require adult supervision.
- Ages 5+.
- Read and follow all instructions.
- Only use screwdrivers with an adult present.
- When using tools, like screwdrivers, safety glasses should be worn at all times.
- For safety and hygiene purposes, please be sure all children wash their hands after each activity.
- Demonstrate how to properly hold and use scissors. Do not run with scissors.
- Do not allow children to put materials in or near anyone's eyes, mouths, and ears.
- Do not play with or place plastic bags near the face or mouth.
- Ventilate the room when using markers.
- The DIY Orbot complies with Part 15 of the FCC Rules.
- Batteries are only to be installed under adult supervision.
- Insert batteries with the correct polarity.
- Remove the batteries during long periods of non-use. Always remove exhausted batteries from the robot. Battery leakage and corrosion can cause damage.
- Never short-circuit the battery terminals.
- Do not mix old and new batteries. Do not mix different types of batteries: alkaline, standard (carbon-zinc), or rechargeable (nickel cadmium).
- Remove all batteries prior to taking apart a robot.
- Dispose of batteries safely. Do not dispose of batteries in fire. The batteries may explode or leak.
- Button and coin batteries can be harmful if swallowed. Please take precautions to make sure they are not placed near the children's mouths.
- Do not allow button or coin batteries to touch when not in use.

Music, videos, and posters can be found online at **invent.org/i-can-invent/DIY-Orbot**

PASSWORD

Use this password to access your DIY Orbot experience:

spin

MATERIALS

- AAA batteries
- Button batteries
- Certification stickers
- Copy paper
- Craft sticks
- DIY Orbot Face stickers
- DIY Orbots with remotes
- Foam blocks
- Googly eyes
- Inventor Log
- Masking tape
- Pencils
- Pipe cleaners
- Safety glasses
- Scissors
- Screwdriver
- Table tennis ball

Is creativity one of your superpowers?

Activate it by coloring in your cardboard box!

INSTRUCTIONS

GET YOUR DIY ORBOTS READY

1. Are you ready to go for a spin? Before getting started, use masking tape and a pen or marker to label your DIY Orbots and remotes with their frequencies, so that you know which remote works with which DIY Orbot. The frequency is listed on the outside of the boxes.

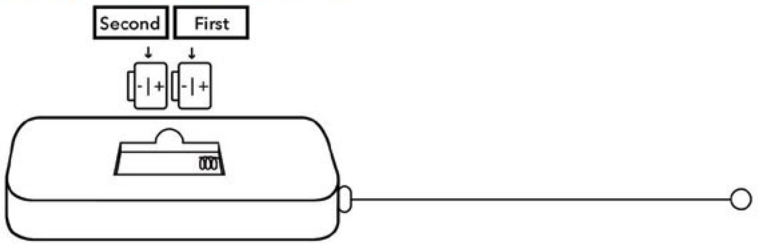
Make sure the battery compartments on the back of the remotes and Orbots do not get covered with masking tape.

2. Put on your safety glasses and grab your screwdriver, remotes, and button batteries.

3. Find the middle screw on the back side of each of the remotes. Line up your screwdriver so it fits into the screw and turn to the left. Set each screw to the side.

4. Have an adult help you open the compartment and insert two button batteries. Batteries need to be installed so the positive end (the plus sign) of the battery touches the positive connection of the remote.

Button batteries can be harmful if swallowed. Please take precautions to make sure they are not placed near children's mouths.



5. Put the covers back on and use the screwdriver to put the screws back in place.

6. Next, remove the battery cover on the bottom of each of your DIY Orbots.

7. Insert two AAA batteries into each battery compartment, aligning the positive end of the battery to the positive end of the compartment. Replace the battery covers.

8. Turn on each of your DIY Orbots by sliding the switch. Using the remotes, test your Orbots to make sure they are ready to go.

Arena

Congratulations! You have earned your Arena Certification. Your DIY Orbots are ready to roll!

TROUBLESHOOTING TIPS

If at any point a DIY Orbot does not work, use the following troubleshooting tips:

- Check that the remote is the same frequency as the DIY Orbot.
- Move the remote closer to the DIY Orbot.
- Give the robot a few minutes to cool down, and then try it again.
- Check that the batteries in the DIY Orbot and remote are installed properly and pressed completely into the compartment.
- Replace the batteries (make sure that the robot's switch is not left in the On position).
- Check that the wheels are not obstructed.
- Make sure the motor is secure in its casing. Remove the lid of the DIY Orbot, and then push the motor gently into the housing.

DECORATE YOUR DIY ORBOTS

1. Give your DIY Orbots some personality! First, select a name for each one.
2. Add Face stickers, googly eyes, and other materials. Attach craft sticks or pipe cleaners by pushing them through the slits in the side of each robot's lid.

Congratulations! You have earned your Designer Certification.

MEET A HALL OF FAMER

CHING TANG

Learn more about Tang here:
invent.org/inductees/ching-wan-tang

Watch the "Tang" video to hear from National Inventors Hall of Fame® (NIHF) Inductee Ching Tang (coinventor of the Organic Light-Emitting Diode) as he shares his Keys to Invention.

Tang helped to advance flat-screen displays found in televisions, cell phones, and computers to provide increased power efficiency, battery life, and display quality.

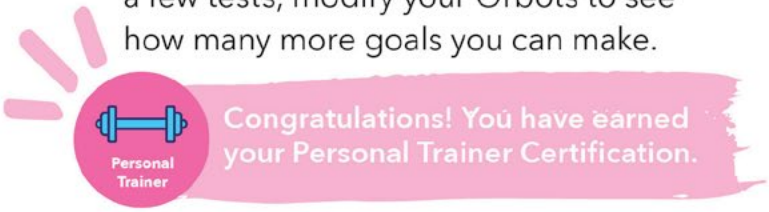
MODIFY

GET READY FOR A GAME OF SOCCER

1. Use Tang's Keys to Invention to solve your first challenge—modifying your DIY Orbots for a game of soccer! Create a way to move the table tennis ball by adding craft sticks or pipe cleaners to your DIY Orbots. Check out the **Things to Think About: DIY Orbot Soccer poster** for some inspiration.

2. Find an open space, like a large table or a smooth floor, and create a soccer goal using masking tape.

3. When your DIY Orbots are ready, see how many goals you can score solo or play a game of soccer with someone. After a few tests, modify your Orbots to see how many more goals you can make.



TURN YOUR DIY ORBOTS INTO BOT-DOZERS

1. For your next challenge, use the foam blocks along with items from your home, like building bricks or other toys, to create a tower for your DIY Orbots to knock down.

2. Modify your DIY Orbots using craft sticks and other materials. Remember to experiment, test, observe, and modify as you build and knock down the towers. Check out the **Things to Think About: Bot-dozer poster** for some inspiration.


3
CAMP INVENTION

CELEBRATE

CELEBRATE WITH A DIY ORBOT DANCE PARTY

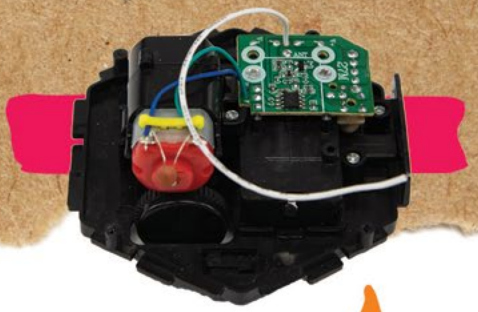
1. Start by creating costumes, accessories, or party decorations for the event. Use the remaining paper, craft sticks, and pipe cleaners, along with other craft items like markers or stickers, to create the perfect party.

2. Consider sketching your designs in your Inventor Log. Then, pick a "Bot Bops" video or your favorite song to play.

After your dance party, award yourself the Artist and Choreographer Certifications.

CHECK OUT THESE PARTY-READY ORBOTS

TAKE APART



Many of the NIHF Inductees tell stories about taking apart machines, watches, radios, and other devices when they were children. Taking devices apart is called reverse engineering. Get ready to reverse engineer one of your DIY Orbots to explore what's inside!

Before taking apart your DIY Orbot:

- ✓ Review how to safely use the tools with an adult.
- Wear safety glasses at all times.
- To loosen a screw, turn the screwdriver to the left (counterclockwise).
- To tighten a screw, turn the screwdriver to the right (clockwise).
- ✗ Do not use the screwdriver to pry pieces off of your DIY Orbot.

1. Gather one of your Orbots, its remote, scissors, and the screwdriver. Remove the batteries from the battery compartment on the bottom of the DIY Orbot.

2. Watch **"The Workshop" video** and follow along to take apart your DIY Orbot.

3. Use the **What's in a DIY Orbot? poster** to further explore the parts of your Orbot.

Mechanic

Congratulations! You have earned your Mechanic Certification.

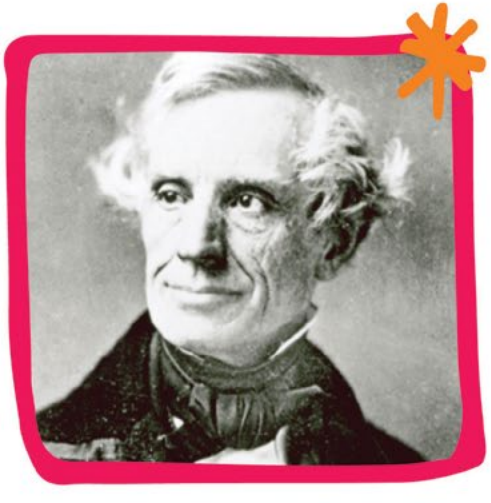
4. You have been thinking like an inventor and using Tang's Keys to Invention to experiment, test, observe, and modify your DIY Orbots. What other challenges could your DIY Orbot take on? An obstacle course? Painting a masterpiece? Have fun experimenting!

MORE TO EXPLORE

Many inventors draw inspiration for their ideas from other hobbies and talents they practice. NIHF Inductee **Radia Perlman**, inventor of Robust Network Routing and Bridging, has a passion for playing the piano. **Samuel Morse**, who invented Morse Code and the Telegraph, was a portrait painter. **Hedy Lamarr** was a famous actress, and her coinvention of a Frequency-Hopping Signal was a stepping stone on the path to modern wireless communication. Inventing can be one of many aspects of your life, and often, the various activities you engage in can influence each other and spark inspiration.

RADIA PERLMAN

Learn more about Perlman here:
invent.org/inductees/radia-perlman



SAMUEL MORSE

Learn more about Morse here:
invent.org/inductees/samuel-f-b-morse

HEDY LAMARR

Learn more about Lamarr here:
invent.org/inductees/hedy-lamarr

For more hands-on STEM activities, visit
invent.org/at-home-learning-resources

Camp Invention is an educational program from the National Inventors Hall of Fame.

Learn more at **invent.org**

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