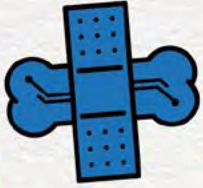


ROBOTIC PET VET™





SAFETY AND 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.
- 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.



TRAINEE VET

NAME

DATE JOINED



Camp Invention®

INSTRUCTIONS

MUSIC, VIDEOS, and POSTERS
can be found online at



[invent.org/
i-can-invent/
Robotic-Pet-Vet](http://invent.org/i-can-invent/Robotic-Pet-Vet)

Use this password to
access your Robotic
Pet Vet experience.

vet

Is creativity one of
your superpowers?
Activate it by coloring in
your cardboard box!



ROBO-PET SURGERY



You are about to discover how engineering, technology, and pet care come together! Perform surgery to explore the inside of a robotic dog and compare its mechanics to the anatomy of a real dog.

MATERIALS

- Inventor Log
- Operation Table sheet
- Pencil
- Robotic dog
- Safety glasses
- Scissors
- Screwdrivers

TAKE APART A ROBO-PET

1. Today, you are going to be a **Robo-Pet Veterinarian** as you take apart a robotic dog to discover how it works! Before beginning to operate on your Robo-Pet:

- Review how to safely use the tools with an adult.
- Wear safety glasses at all times.
- There are two sizes of Phillips-head screwdrivers that match the screws in the Robo-Pet. Be sure to use the right screwdriver to fit each screw.
- To loosen a screw, turn the screwdriver to the left (counterclockwise). To tighten a screw, turn the screwdriver to the right (clockwise).

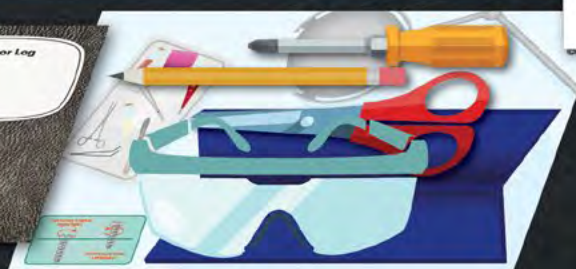
- Do not use screwdrivers to pry pieces off of your Robo-Pet.
- Save all of the pieces and parts you remove from the Robo-Pet.

2. Gather the **Operation Table sheet**, screwdrivers, and scissors.

3. Set aside one robotic dog to customize later. Place the other robotic dog on top of the **Operation Table sheet**.

4. Watch the **"Surgery"** video and follow along to take apart your robotic dog.

!
Check to make sure that batteries have not been installed in the dog before taking it apart.



SURGERY



MEET A HALL OF FAMER

Many of the National Inventors Hall of Fame® (NIHF) Inductees tell stories about taking apart machines, watches, radios, and other devices when they were younger. Taking devices apart is called reverse engineering. It can be very helpful to see how components work together.

Check out NIHF Inductee **Al Langer's** amazing biomedical innovation here: invent.org/inductees/alois-langer



INVESTIGATE MECHANICS AND ANATOMY

1. Check out the robotic dog's mechanics by looking at the **Simple Machines Dog poster**.

- Lever = rod connecting the head and body
- Wheel and axle = gearbox components
- Wedge = squeaker
- Screw = several screws to connect components such as the tail

2. Investigate and compare the **Real Dog Anatomy posters** and **Robotic Dog Anatomy poster**.




3. Test your veterinary skills by matching as many parts as you can between your robotic dog and real dogs. Record the data in your **Inventor Log**.

4. Finish your surgical exploration by watching the **"Contraline"** video about a team of **Collegiate Inventors Competition®** Finalists who invented a gel that helps pets avoid a surgical procedure.





I WONDER...

-  Have you ever taken apart a machine before? If so, what kinds of parts did you find?
-  What did the inside of your robotic dog look like? Did it remind you of anything you have seen?
-  Did anything inside your robotic dog surprise you? If so, what?



MORE TO EXPLORE

Can you imagine what you would do if you fell and scraped your knee or cut your finger, but adhesive bandages did not exist? It is hard to think of a time before this essential first-aid product was available, but 100 years ago, it was not. People have used everything from leaves to honey to leeches (blood-sucking worms) to help protect and heal wounds. NIHF Inductee Earle Dickson wanted a better, more practical solution to an everyday problem, so he invented BAND-AID® Brand Adhesive Bandages. Thanks to him, our wounds are now easily covered in clean, soft cotton held in place by sticky tabs!

Learn more about Dickson here:
[invent.org/inductees/earle-dickson](https://www.invent.org/inductees/earle-dickson)

EARLE DICKSON



*BAND-AID® is a registered trademark of Johnson & Johnson.



FUR-EVER YOURS



Adopt a Robo-Pet and make it your own by giving it a fur coat.

MATERIALS

- AA batteries
- Adhesive fur
- Fur Templates
- Robotic dog (not taken apart)
- Scissors



INSTRUCTIONS

MUSIC, VIDEOS, and POSTERS can be found online at



[invent.org/
i-can-invent/
Robotic-Pet-Vet](http://invent.org/i-can-invent/Robotic-Pet-Vet)

ADOPT YOUR ROBO-PET

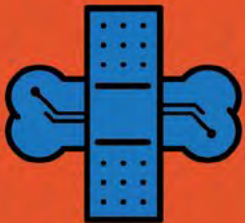
1.

Watch the "Adoption" video. With an adult, insert the AA batteries into the battery compartment. Align the positive end of the battery to the positive end of the compartment.



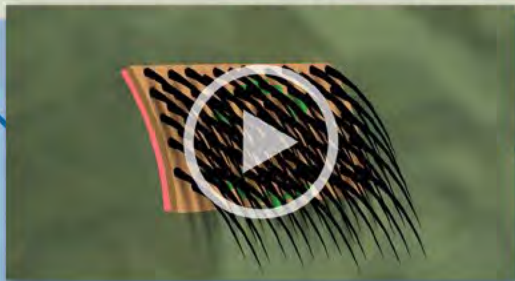
2.

Turn on your Robo-Pet and celebrate!



CUSTOMIZE YOUR ROBO-PET

1. Think about why fur is important for a dog, then play the **"Fur"** video to learn more.



4. Cut out the **Fur Templates** and use them to trace and cut out shapes of fur. Alternatively, cut small squares or strips of fur, sticking them on your Robo-Pet in a patchwork quilt-like fashion to cover the body.

5. Make ears to improve your pet's sense of hearing, then give it a hairstyle.

6. The fur should be applied section-by-section, unpeeling a small amount, sticking, and then unpeeling more.

!
As you apply the fur, make sure it does not cover the battery holder and switch because it will prevent the dog from moving freely.

7. Play the **"Nonspec"** video to watch a **Collegiate Inventors Competition®** team talk about making an invention that used dog fur.



2. Watch the **"Fur Examples"** video to see examples of different styles of fur you might want to consider for your Robo-Pet.



3. Locate the fur and keep its sticker backing on until you are ready to apply it.

MORE TO EXPLORE

Animals have many different kinds of fur, all specialized for each animal's unique environment and needs. Otters' fur contains natural oils to help them glide easily through the water. Polar bears and arctic foxes have white fur, which helps them blend into their snowy environment.



PLAYFUL PUPS



Design and build a dog park and accessories for your pet.

MATERIALS

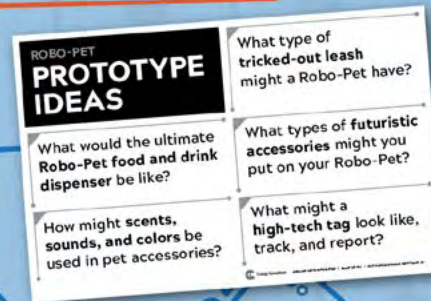
- Adhesive gems
- Craft sticks
- Foam blocks
- Inventor Log
- Masking tape
- Pencil
- Pieces and parts removed from the disassembled robotic dog
- Scissors



CREATE ROBO-PET ACCESSORIES



1. Take a look at the **Robo-Pet Prototype poster** to find ideas for accessories you can make.



? *What type of a tricked-out leash might a Robo-Pet have?*

? *What would the ultimate Robo-Pet food and drink dispenser be like?*

? *What types of futuristic accessories might you make for your Robo-Pet?*

? *How might scents, sounds, and colors be used in pet accessories?*

? *What might a high-tech tag look like, track, and report?*

2. Write or draw your ideas in your **Inventor Log**.

3. Use the adhesive gems, craft sticks, foam blocks, pieces and parts from the disassembled robotic dog, and other craft items or objects from around your home to create your Robo-Pet's accessories.

INSTRUCTIONS

MUSIC, VIDEOS, and POSTERS
can be found online at



invent.org/
[i-can-invent/
Robotic-Pet-Vet](http://i-can-invent/Robotic-Pet-Vet)



BUILD THE ULTIMATE DOG PARK

1. Design a dog park and think about including simple machines like: levers, wheels and axles, inclined planes, and pulleys. Many dog parks have teeter-totters, which are levers.

Simple machines are devices that make work easier by either changing the size or direction of a force.

A lever is a bar that rests on a fixed point, called a fulcrum. When a force is applied to one end of the lever, it pivots on the fixed point, and the other end of the lever moves. Levers allow heavy objects to be lifted with less work.



2. Sketch your ideas in your **Inventor Log**. Then use craft sticks, foam blocks, tape, pieces and parts from the disassembled robotic dog, and upcycled items from around your home to build your pet the perfect place to play!

3. Watch the **"Dog Joke"** video for a laugh!



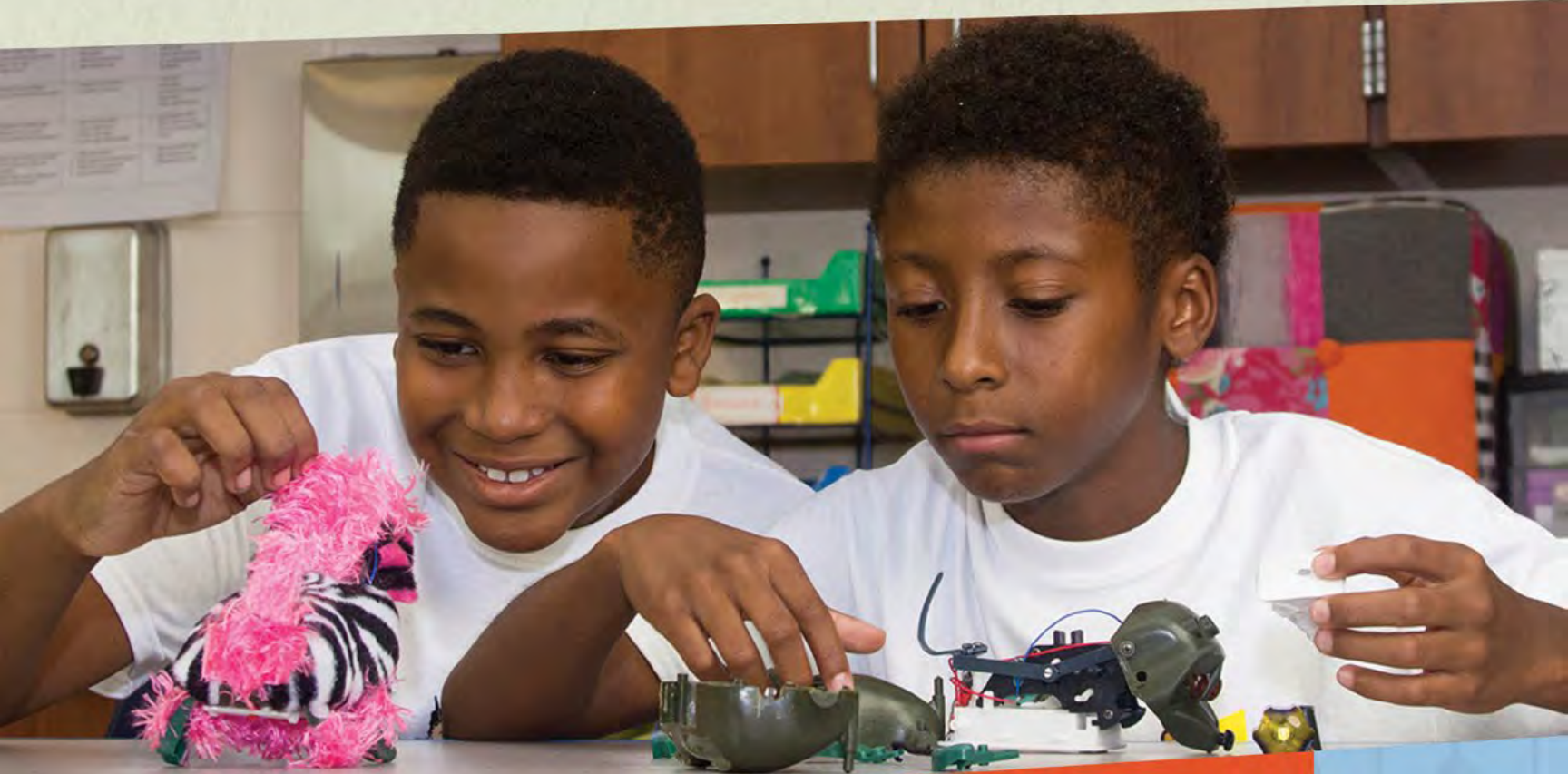
MEET A HALL OF FAMER

Learn more about **Birdsill Holly, Jr.** (the NIHF Inductee mentioned in the video) at [invent.org/inductees/birdsill-holly-jr](https://www.invent.org/inductees/birdsill-holly-jr)



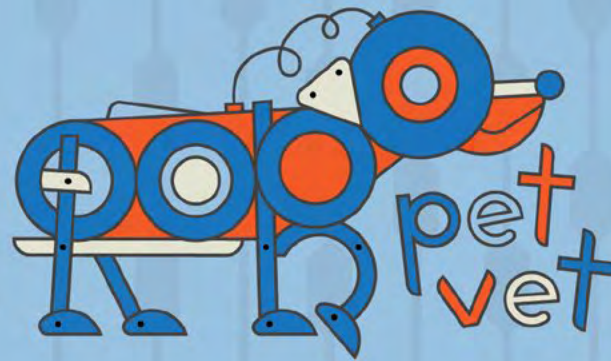
MORE TO EXPLORE

What are some of your favorite things to do at a playground? Do you think a dog would like to do those same things? If you wanted to climb a wall or ladder, hang from monkey bars, or swing from a swing, you might be out of luck if you were a dog! A dog's four-legged body and lack of hands with thumbs to grip onto handles, ropes, or rungs make it difficult for a dog to try any of those activities. The good news is that dog parks are specially designed with dogs in mind, so they're sure to offer the kinds of activities dogs can enjoy!



For more hands-on STEM activities, visit [invent.org/at-home-learning-resources](https://www.invent.org/at-home-learning-resources)





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