BROWNIES ROBOTICS

LESSON PLAN

*accompanies official GSLA GUIDE

THREE BADGES

Programming Robots

Designing Robots

Showcasing Robots

PROGRAMMING ROBOTS

Robots are simple machines that are programmed to run automatically. Programmers are the engineers that create step-by-step instructions, algorithms, that tell robots how to understand and respond to their environment. Start by engineering a simple algorithm then learn about programming on paper, before you program a "robot" Brownie friend on a device. When you've earned this badge, you will know how to create a program that could be run by a robot.

1. Create a simple machine ***(ROBOTIS kit)***

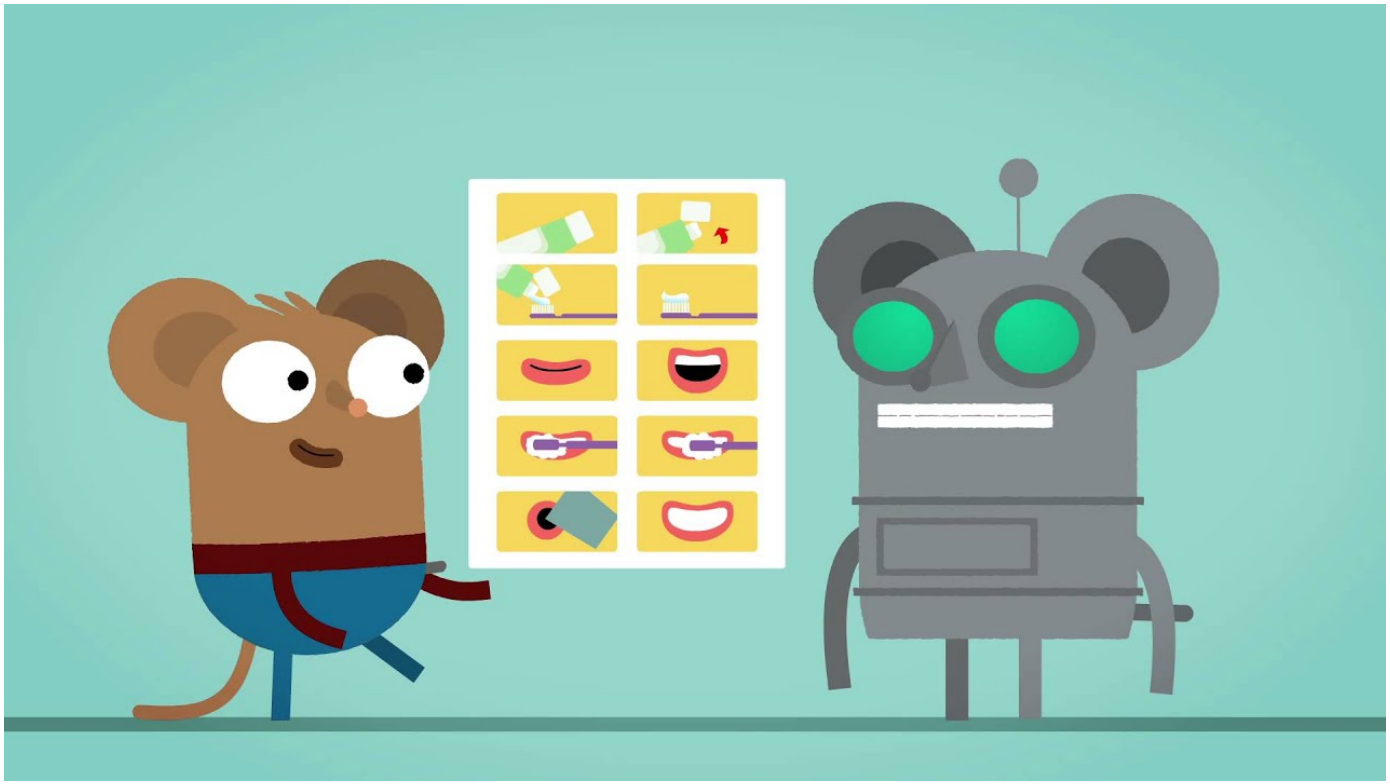
A robot is a machine that does task or a number of tasks automatically. Without a program, robots are just simple machines, made of many different parts, each with its own important job to help the robot to work. Some of these create the body, like its wheels, and others, like wires and sensors, help robots to understand their worlds. Explore the different parts that are used in a robot, and see what simple machines you can create.

2. Test your robot senses. ***(bag with items)***

Robots, just like us, have to use their senses to understand their surroundings. Robots need to see and sense what is around them to move and complete their tasks. For some robots, being able to understand their environment is crucial to doing their job. Test your "robot" senses to determine what snack is in your bag, and explore how robots use sensors to collect information about the world around them.

Bag of items: toothbrush, pen, fork, pencil, rubber bands, quarter, etc.

3. Learn about programming.



4. Create your own Algorithm

Dance Sequence (pencils + paper)

Create a few symbols to represent different dance movements for your troop. See my sample below in photo. Have your Brownies create a sequence (and additional "code" if they want" and direct a partner to follow it.

OR the following activity:

https://www.girlscouts.org/en/activities-for-girls/brownies/brownie-coding-basics-badge-activity.html

5. Hour of code via hourofcode.com/us/learn

DESIGNING ROBOTS

Robots are made of many different parts - each with its own job to help the robot. Sometimes, engineers design robots that are inspired by humans, animals, and nature. Team up with your fellow Brownies to design a robot inspired by a bumblebee and engineer a robotic arm. After, plan, build, and share your own robot prototype that helps other people or animals. When you have earned this badge, you will know how to design a robot that helps other people and animals.

1. Explore how robots imitate nature

A lot of the time, we think of robots as shiny metal figures that kind of look like us, with heads, bodies, arms, and legs. Biomimicry is when an engineer makes a machine that looks and acts like a human, animal, or plant. Engineers study how humans and animals look and act to brainstorm creative ways to design their robots,. Explore how engineers use biomimicry to design robots, and work in teams with your fellow Brownies to design a robot inspired by a bumblebee.

Imagine any kind of robot you're familiar with.

What does it look like?

What do other robots look like?

What makes a robot different from a human?

What makes you different from a robot?

What can robots do that you can do?

What can you do that robots cant?

Engineers study how humans and animals do certain actions when they'e deciding what they want their robots to do. This helps engineers think of creative ways to design their robots. For example, an engineer might sketch how humans form different poses or look at how an animal moves

2. Design a robot inspired by biomimicry

Blank paper + pencils

Next you're going to design a robot inspired by a bumblebee.

First, look at the sky and imagine you're a bumblebee. Think about all the different things they do. For example, they fly, make honey, might sting humans!

Did you know that one of the most important things bumblebees do is pollinate flowers and plants? Pollen is the powdery stuff on a flower that comes off if you touch it. Bees carry the pollen from one plant to another. By moving pollen between plants, bumblebees help plants grow new plants.

Create a robot inspired by the bumblebee that can help us pollinate plants.

As you draw your robot, ask yourself -

-what will the robot look like?

-what would the robot have to be able to do?

-how would a robot pollinate a plant?

Great job. You just worked like an engineer to design a robot inspired by a bumblebee. You brainstormed solutions and created a model that features biomimicry. Not only did your robots look like bumblebees, they also helped do the job of them too!

3. Plan your robot

Engineers look for needs in our world and build robots that solve problems both big and small. If you could build a robot that solves a problem for other people or animals, what would your robot do? What would it look like? What parts would it need? Brainstorm and and sketch your ideas for robots that can help others.

5 ROBOTS BASED ON REAL ANIMALS

If you're trying to solve a problem, you may find a clue in nature — if you look closely enough.

Want to fly? Study how birds, bats and butterflies take to the air. Want to make buildings that stay cool? Take a look at how termites build their homes.

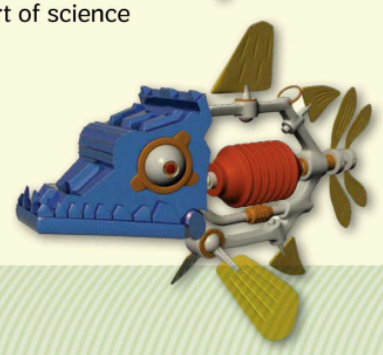
Robotics engineers have studied animals to come up with ideas about how their robots could move. Here are a few examples:

1. JellyBots: These robots move like jellyfish and blink light codes to each other. Because of the robots' natural movement, they can get close to real animals in the wild and help scientists study them.

2. Robotic Roach: This collapsible robot can squish down and crawl into tiny crevices to look for damage in buildings or find people trapped in tight spaces.

3. RoboBee: This tiny robot is modelled after flying insects like bees and flies. It was designed to zoom and hover over disaster sites and find people who need to be rescued.

4. Sticky Bot: This robot is based on a gecko, a small lizard that is an amazing climber. Using the same sort of science that allows a real gecko to climb slippery surfaces, this robot can climb walls.



5. Robofish: These robots look like fish and move with fins. They're built to track patches of ocean pollution or hard-to-find fish.

4. Create a prototype

Engineers create prototypes, a quick way to show an idea to others or to try it out. It can be as simple as a drawing or created with common materials, such as cardboard, paper, and string. Now is your chance to build a prototype of your robot. Remember, you're creating a robot, not a simple machine, so you'll need to create a step-by-step program for your robot prototype to "run".

5. Get feedback on your robot

Once engineers create a prototype, they test into find ways to improve and redesign their new products. Work with fellow Brownie to test your prototype. Tell your partner how to move the prototype. Tell your partner how to move the prototype according to your program so you can "debug" or fix problems before you share your prototype with your Troop. After you share, gather feedback and ideas, like an engineer, on how to improve your robot's design and make it even better!

SHOWCASING ROBOTS

After engineers build their robots, they show them to others and enter them into challenges and competitions. Now that you have built your robot prototype, its time to create a presentation and share your design with others. After, learn about robotics teams and competitions and see a robot in action! When you earn this badge, you will know how to share your robot with others.

1. Create a present action to share how you designed your robot

After an engineer creates a prototype, she shares it with others. This is important because it gives her a chance to share her work, get feedback, and teach others how to build their prototype. Choose a way to share your prototype and explain how you designed it.

Create a media presentation

Create a show and tell presentation

2. Tell others how you designed your robot

Once you've created your presentation, it's time to share what you've made with an audience. Whether you've made a media presentation or prepared for a show-and-tell, demonstrate your robot prototype and explain how you designed it. Sharing your work is

an important part of being an engineer. It's your chance to teach, inspire, and get feedback to improve your robot.

Share your video or presentation at a troop celebration for friends and family.

Give a show-and-tell presentation at a school or community event.

3. Learn about robotics competitions

There are lot of places where you can meet people who design robots.

Choose a way to learn more about robotics competitions.

-Go to a competition or science fair

-Talk to someone who has competed

-Learn about competitions online

4. Learn about robotics teams

-Join or create a robotics team in your area

-talk to someone who has been part of a team

-Learn about robotics teams online

5. See robots in action

Robots exists all around our everyday world. See a robot in action and reflect on everything you’e learned.

-go on a field trip to see a real robot

-talk to someone who has been in a lab or used a robot

-see a robotics lab online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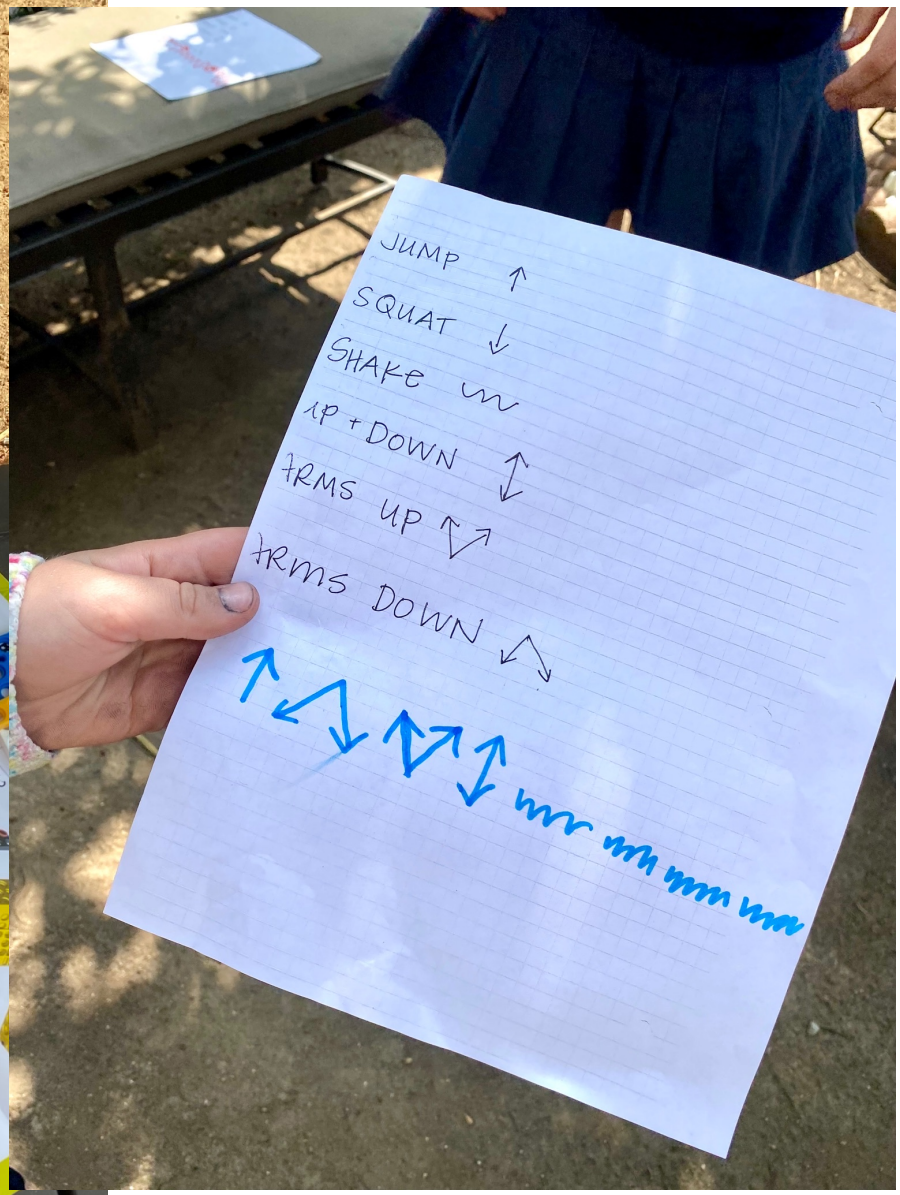
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