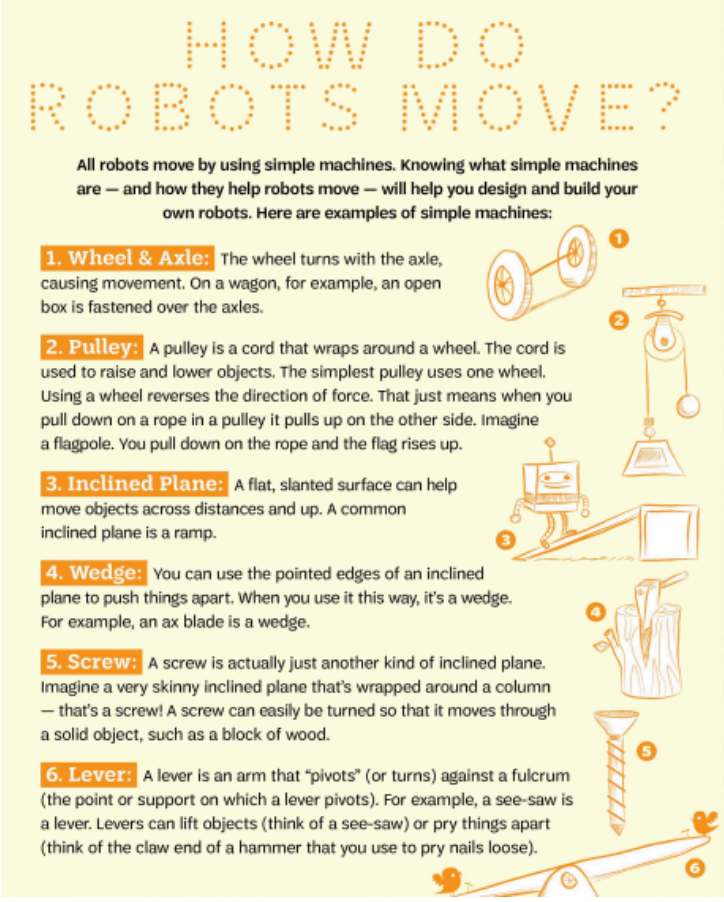
Brownie Robotics Journey

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

❑ PROGRAMMING ROBOTS

❑ Simple Machines: Read about simple machines below. Then, find 2 objects in your house that use simple machines to work. Write those objects below and what kind of simple machine they use!



1. _____

uses the simple machine _____.

2. _____
uses the simple machine _____.

❑ Test your robot senses: Robots, just like us, have to understand their surroundings. Robots need to see and sense what is around them to help them move and complete their tasks. For some robots, being able to understand their environment is crucial to doing their job. Test your "robot" senses through the activity below.

Write the following:

1. One emotion you're feeling: _____

2. Two things you can smell: _____ & _____

3. Three things you can hear: _____, _____, & _____

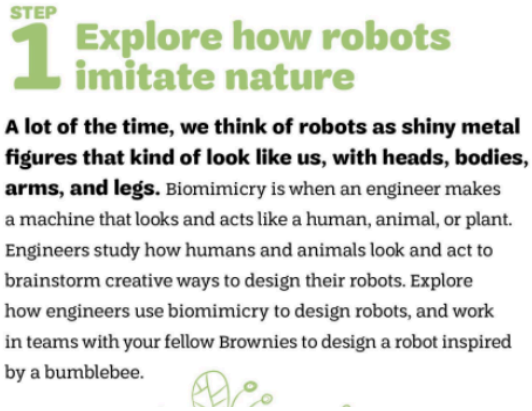
4. Four things you can touch: _____, _____, _____ & _____

5. Five things you can see: _____, _____, _____, _____, & _____.

❑ Learn about programming & coding: Play one of the games from the website below. *Make sure to look at what grade level it's meant for!*

https://hourofcode.com/us/learn Game I chose: _____

- **DESIGNING ROBOTS**
  - Explore how robots imitate nature:


STEP 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.

See how robots could be used to replace bees by watching the video below!

Robotic Bees to Replace Regular Bees

- Create a robotic arm: *Follow the directions on the website to complete the project. When you've finished, test it!*
  - https://www.instructables.com/Extending-Grabber/
  - For extra fun, decorate it!

- Plan Your Robot: Now that you've learned about robots, it's time for you to design one!

  When engineers build robots, they're looking for needs in our world and build robots that can solve those problems- both big and small.

  - Brainstorm 3 problems in the world that robots could solve or things that robots could help with to make our lives easier. (like feeding a pet, getting the mail, picking up dog poop, cleaning our rooms, etc.).
    1. _____
    2. _____
    3. _____
  - Pick ONE of your ideas above. Circle it.
    - If you could build a robot to solve that problem…
      - What would it do?

      - What parts would it need?

      - What would it look like? (sketch it below!)

- ❏ Create a prototype: Use materials you have at home or create a detailed drawing to create your prototype. If you use materials from home, see if you can make it work!

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 also need to create a step-by-step program for your robot prototype to "run".

- ❏ Get feedback on your robot:
  - ❏ Once engineers create a prototype, they test it to find ways to improve and redesign their new products. Work with a friend or family member to test your robot prototype. Tell your partner how to move the prototype according to your program so you can "debug" or fix problems.
  - ❏ Gather your feedback and ideas below on how to make it better:
    -
    -
    -
    -
    -
    -
    -
    -

So You Think You Can Dance?

Not all robots build cars, fly to outer space or dive to the bottom of the ocean. Some take on other challenges — like tangos, mambos and cha-cha-chas. A Japanese engineer created ballroom dancing robots that look like people. They even wear fancy dresses! The robots' sensors can follow the moves that their dancing partners make. And since the robots have wheels instead of feet, no one has to worry about stepping on the robots' toes!

Just for fun: Watch robots dance to "Do You Love Me" in the video below!

https://www.youtube.com/watch?v=fn3KWM1kuAw&ab_channel=BostonDynamics

❏ **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, it's time to create a presentation and share your design with others. After, learn about robotics teams and competitions and see a robot in action!

❏ 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 ONE way to share your prototype and explain how you designed it.***

1. Create a media presentation (video, photo collage)-

   One way to share your prototype is with photos, videos, and other media. Create a presentation using craft materials or technology. You might need help from others to film, edit, or gather materials for your presentation.

2. Write a story-

   Write a story about your experience creating your prototype. Be sure to include specific information and details so we can really visualize what you are explaining.

When you've finished, send your completed media presentation or story to Miss Catie!

❏ Tell Others how you designed your robot: 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 presentation with a friend, family member, teacher, or have a parent help you share it online for others to see.

I showed my presentation to _____.

❏ Learn about Robotics teams and Competitions: Did you know that you can join competitions to compete with robots? Watch the videos below to learn all about it!

- ❏ What is a robotics competition?
  https://www.youtube.com/watch?v=wSA6InzFAZE&ab_channel=OfficialFIRST

  It's like the olympics for robots!

- ❏ Best Moments with robots
  https://www.youtube.com/watch?v=hgMebpFuKhY&ab_channel=StrikeZoneFRC5460
- ❏ Watch a robot being built and what it does at the end!
  https://www.youtube.com/watch?v=Ca1IwUP7UNA&ab_channel=StrykeForce4-HFIRSTRoboticsTeam2767