ROBOTICS MERIT BADGE
Introductory Presentation

FIRST Team 461 Westside Boiler Invasion
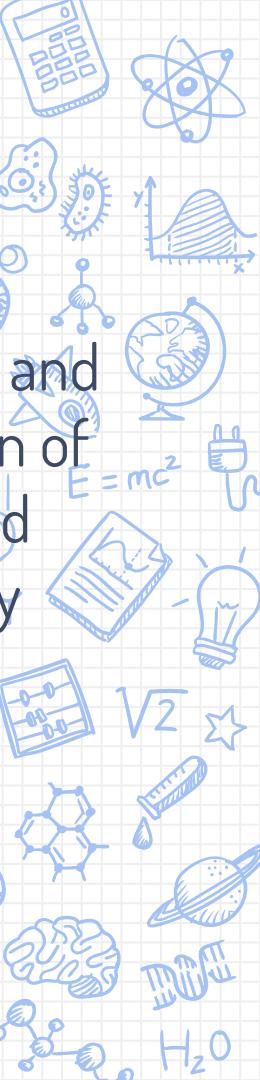
FIRST

- Founded 1989
- International Organization
- Spread and promote a love of science, technology, engineering, and mathematics
- Over 20 million dollars in scholarship money available each year

FIRST

For
Inspiration and
Recognition of
Science and
Technology

FIRST
SCHOLARSHIP PROGRAM

Youth Robotics Competitions
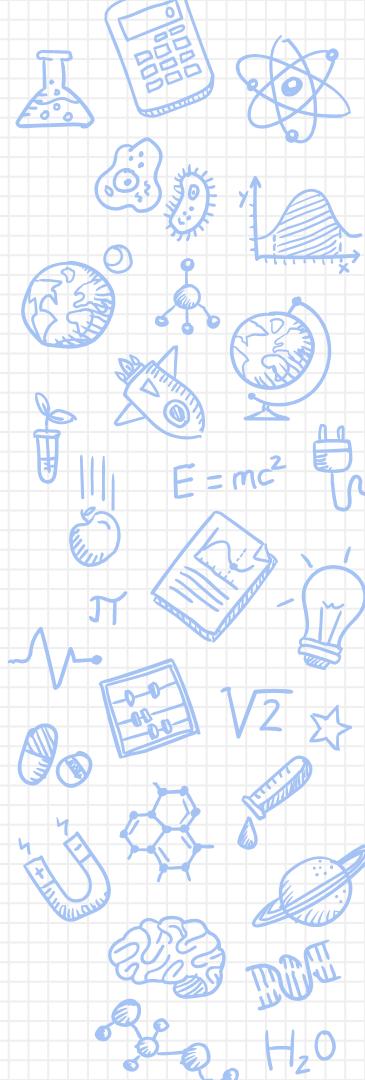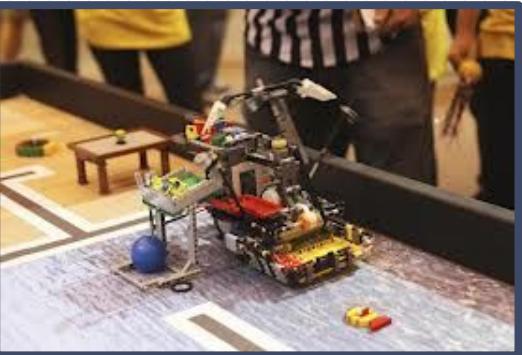
Jr. FLL

✘ Junior FIRST Lego League
✘ Ages 6-9
✘ 4,500 Teams
✘ 27,000+ Kids
✘ Full day Competitions
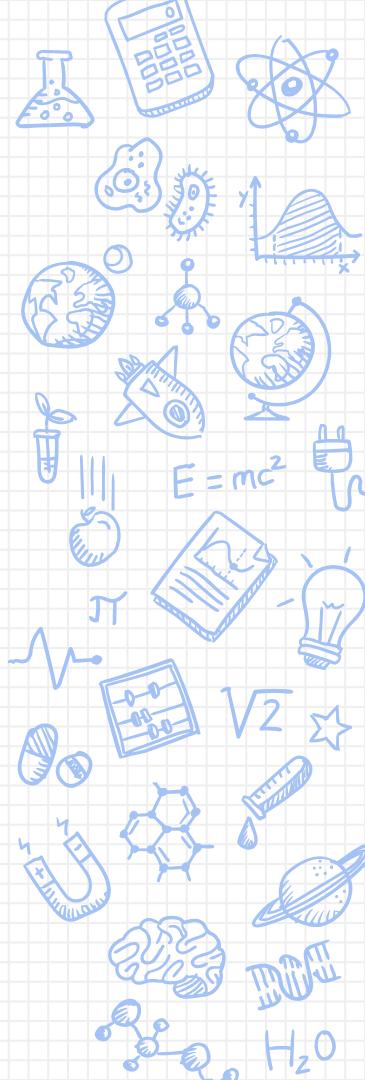
FLL

✘ FIRST Lego League
✘ Ages 9-14
✘ 26,000+ Teams
✘ 267,000+ Kids
✘ Full Day Competitions
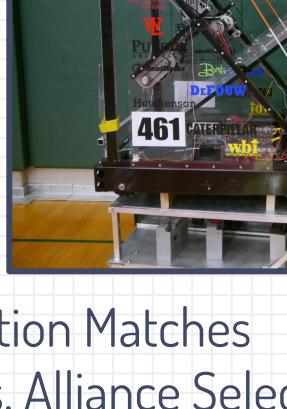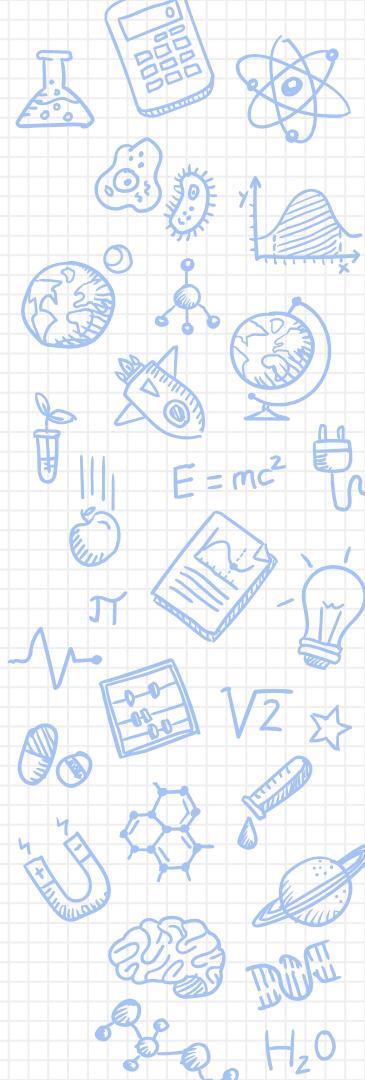
FIRST Tech Challenge (FTC)

- A FIRST Competition
- Ages 12-18 (High School)
- Over 4,500 teams with more than 44,500 students
- Full-day Competitions
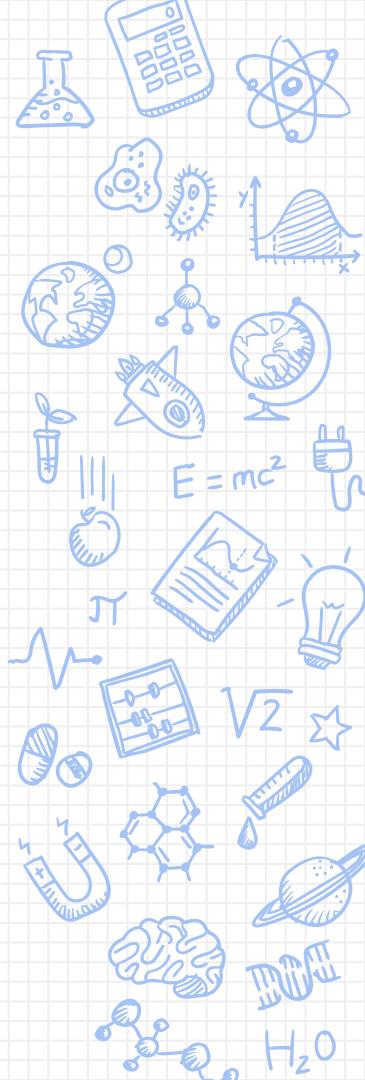
FIRST Robotics Competition (FRC)

- ✖ Part of the FIRST Program
- ✖ Ages 14–18 (High School)
- ✖ 3,000 Teams
- ✖ 75,000 Students
- ✖ Two Day Competitions
    - ✖ Day 1– Practice and Qualification Matches
    - ✖ Day 2– Qualification Matches, Alliance Selection, Elimination Matches
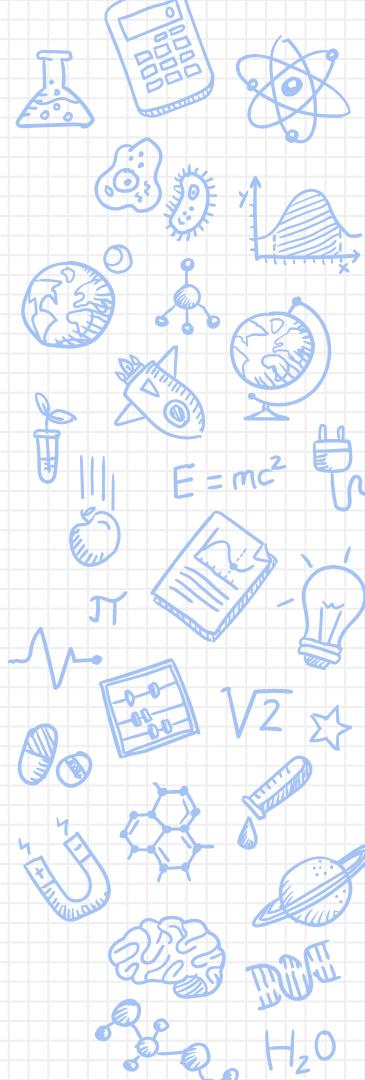
What is Robotics?

✘ Robotics– The branch of technology that deals with the design, construction, operation, and application of robots.

✘ Robots make tasks easier, safer, faster, cheaper, or possible.

How Robots are Used Today

✘ Manufacturing
  ✘ Factories
  ✘ Medicines
✘ Exploration
  ✘ Deep sea
  ✘ Space
✘ Military
  ✘ Bomb Disposal
  ✘ SAFFiR

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Hazards

Top 5 Hazards

1. Electrocution
2. Harmful projectiles
3. Burns
4. Mechanical injuries
5. Distractions
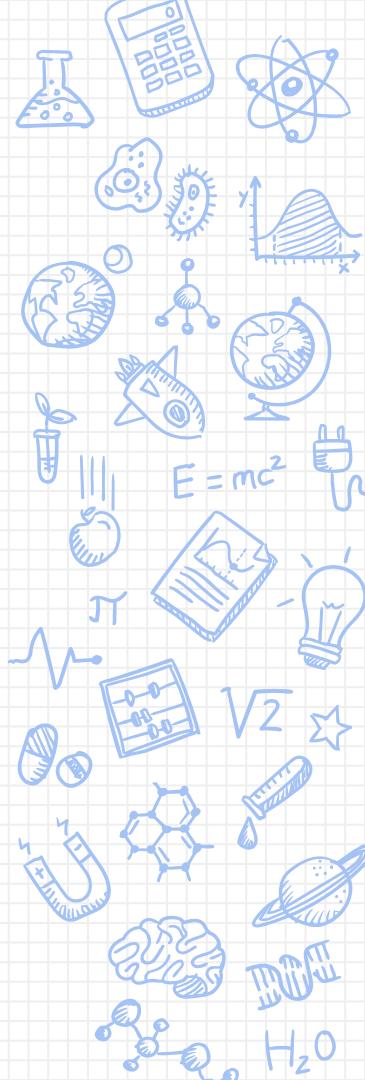
Preventing and Anticipating

- ✘ Make good choices
- ✘ Be aware of your surroundings
- ✘ Wear proper safety gear
- ✘ Communicate with those around you
- ✘ Use common sense

Responding

If anyone is seriously injured, perform first aid, get an adult, stay calm, and call 911.

First Aid and Prevention

	First Aid	**Prevention**
Cuts	1. Stop bleeding 2. Clean wound 3. Bandage	✖ Be careful around metal ✖ Use proper tools
Eye Injuries	1. No eye rubbing 2. Flush with water	✖ Wear safety glasses ✖ Have an eyewash
Chemical Burns	1. Remove chemical 2. Wash skin 3. Loosely bandage	✖ Use proper tools ✖ Secure all chemicals ✖ Wear safety gloves and eye protection
Heat Burns	1. Cool burn 2. Don't break blisters 3. Apply lotion	✖ Wear gloves ✖ Don't leave hot tools on
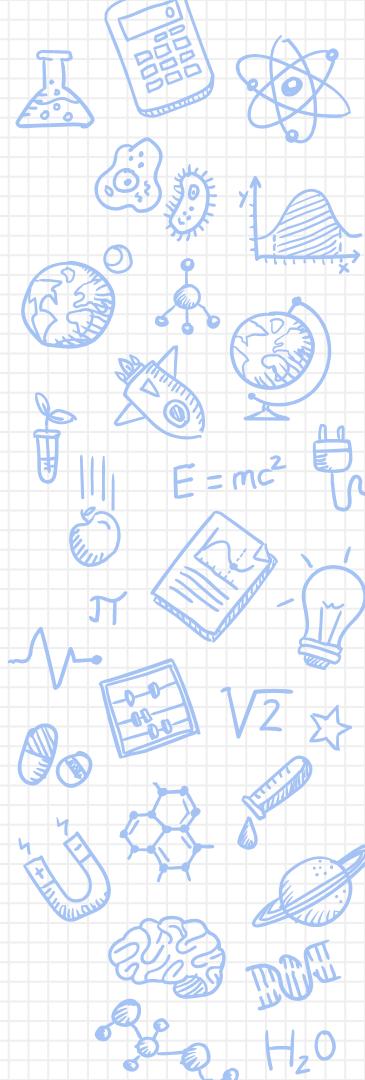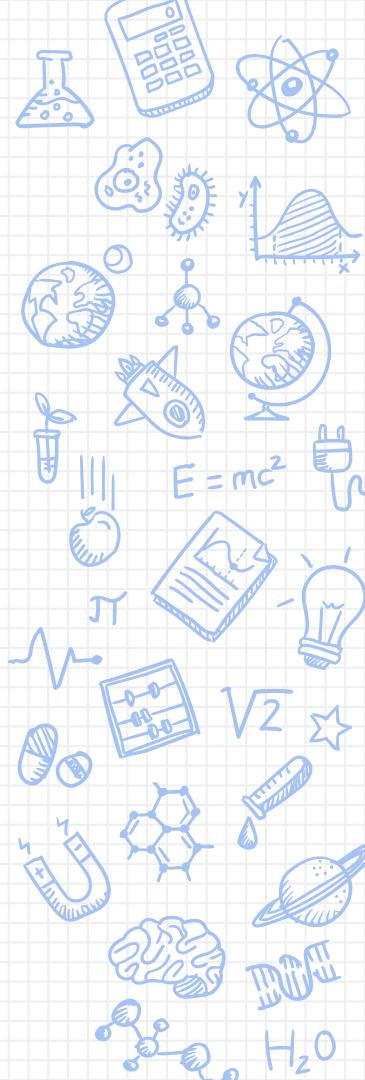
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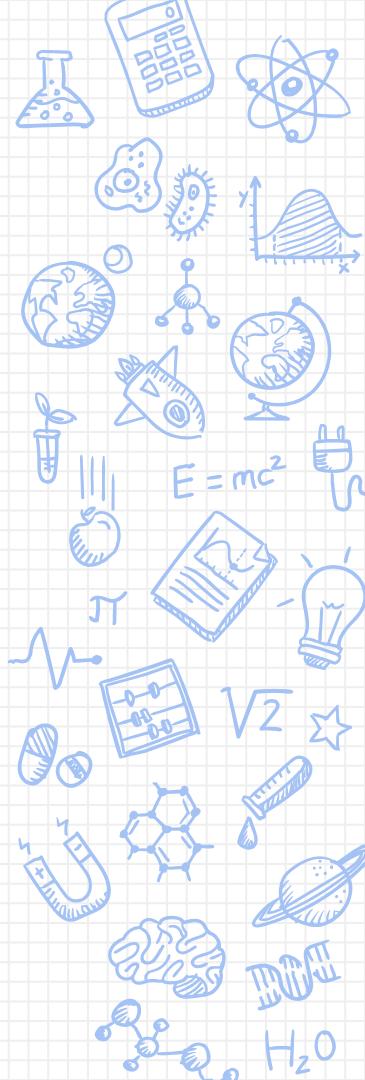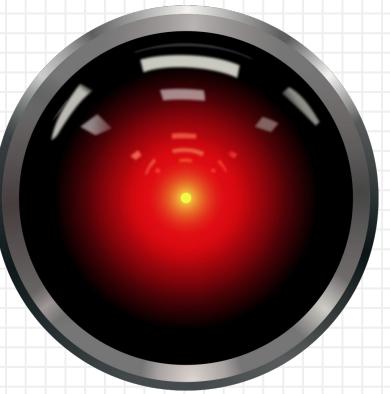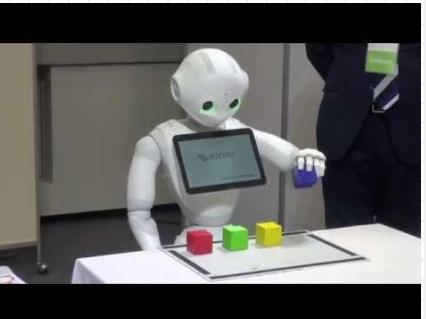
- ✘ Long Pants
- ✘ Hair Tied Back
- ✘ Safety Glasses
- ✘ Ear Protection
- ✘ No Baggy Clothing
- ✘ Closed Toed Shoes

NO OPEN TOE SHOES
BEYOND THIS POINT

Five Fields of Robotics
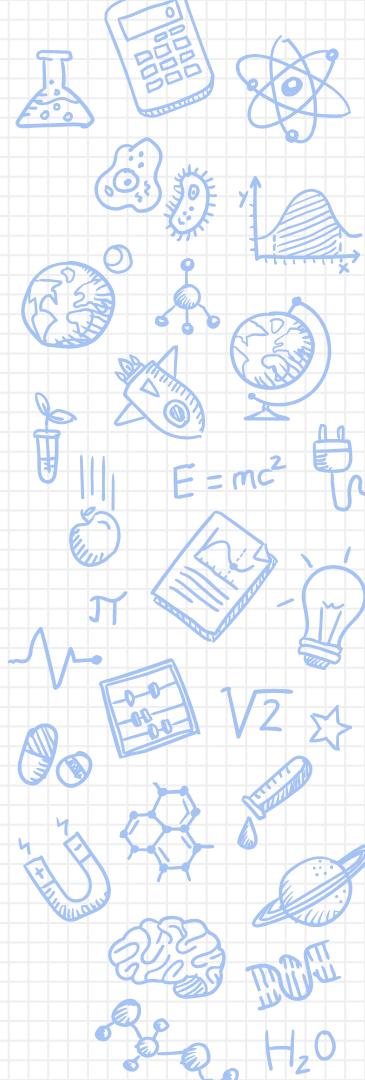
1. Human Robot Interface

- ✘ Human–Computer Interaction
- ✘ Artificial Intelligence (AI)
  - ✘ Intelligence of machines
- ✘ Natural Language Understanding
  - ✘ Perception of language
- ✘ Social Sciences
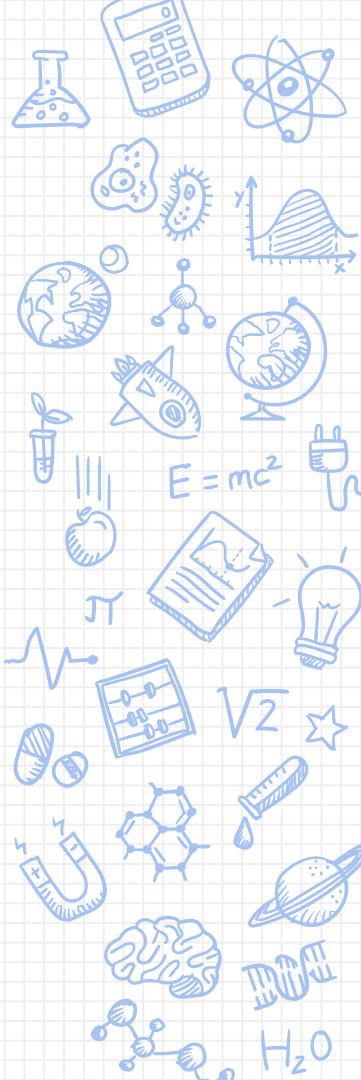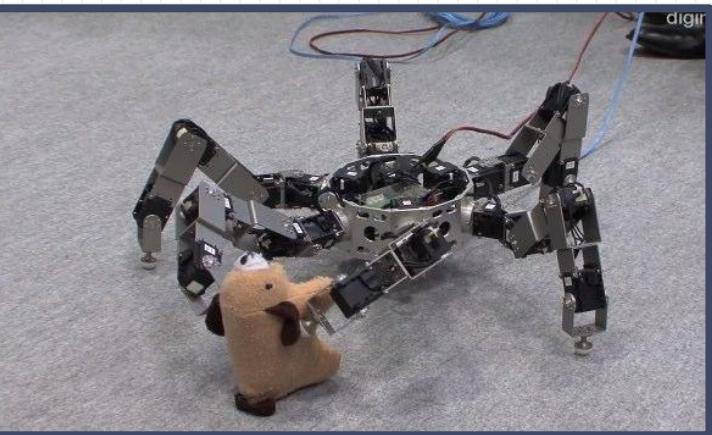
2. Mobility

✘ Types
  ✘ Wheel
  ✘ Walking Robots
  ✘ Walking (Hexapod)– very stable
  ✘ Flying
  ✘ Swimming
✘ Often modeled after nature
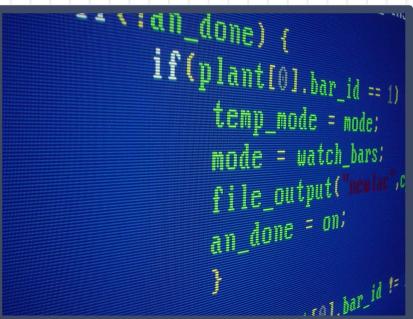
3. Manipulation

- ✘ Uses
  - ✘ Grabbing Objects
  - ✘ Moving Objects
  - ✘ Placing Objects
- ✘ Examples
  - ✘ Arms
  - ✘ Gripping Mechanisms
  - ✘ Pushers
  - ✘ Etc.
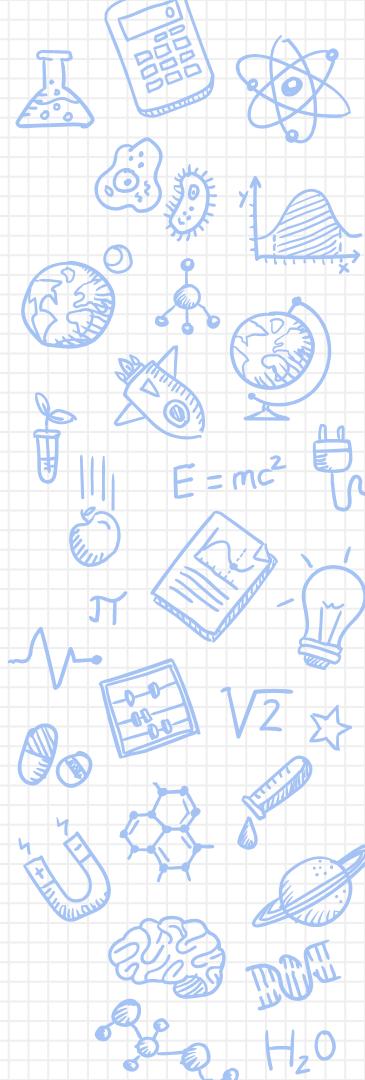
4. Programming

✖ Commands or instructions given to the robot to perform tasks

✖ Autonomous robots run automatically

✖ Teleoperated robots are manually controlled by a human and provide sensory feedback to the controller

✖ Remote-Controlled robots are controlled real time
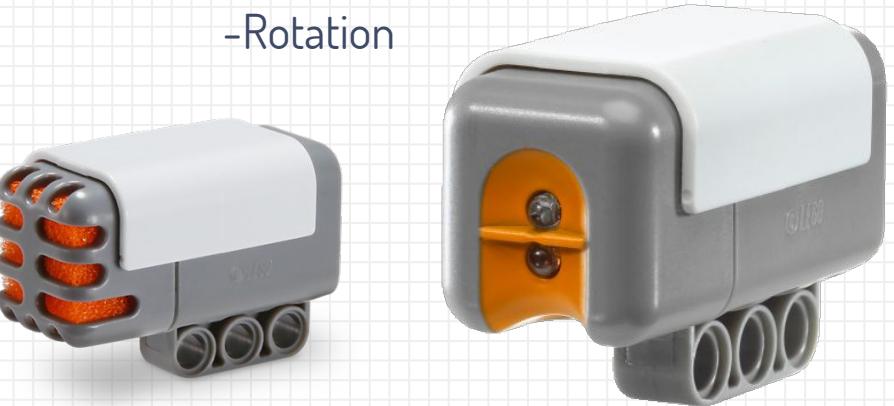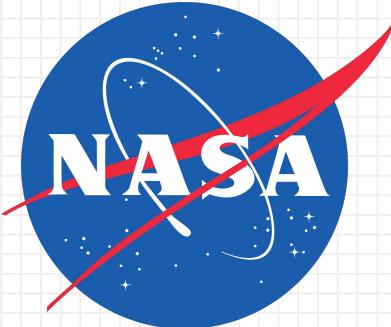
5. Robotic Sensors

✘ Sensor– What a robot uses to discern its surroundings

✘ Types of sensors:
   –Motion
   –Ultrasonic
   –Rotation

   ✘ Light
   ✘ Color
   ✘ Sound
   ✘ Touch

Career Opportunities In Robotics
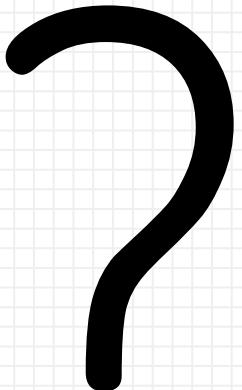
✘ Possible Jobs
   ✘ Robotics Engineer
   ✘ Robotics Technician
   ✘ Software Engineer

✘ What can my robots do?
   ✘ Exploration
      ■ Sea
      ■ Space
   ✘ Military
   ✘ Medical

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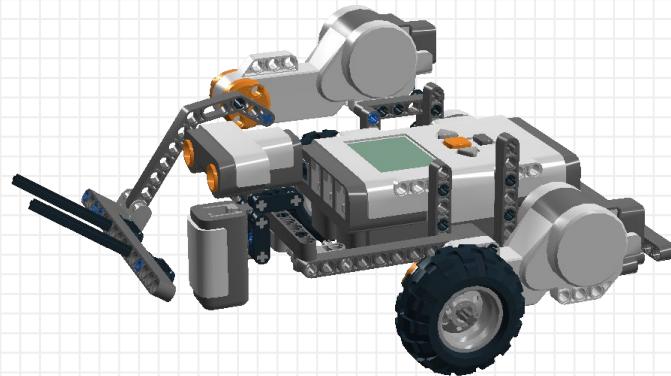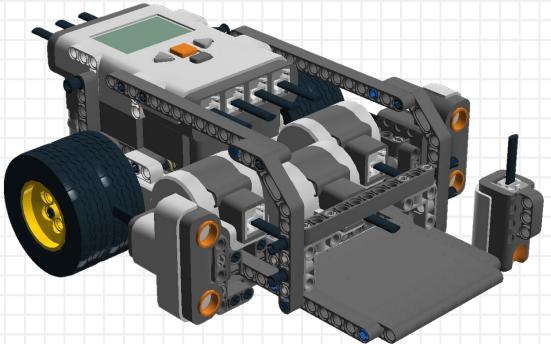
Questions?

Sumo Bots

1 Brick, 2 Motors, 1 Light sensor facing the ground