

NASA LEGO Robotics



Mid-Valley
STEM-CTE HUB



www.midvalleystem.org
midvalleystemctehub@linnbenton.edu
Linn-Benton Community College
Albany Campus - CC-212



NASA LEGO Robotics

NASA LEGO Robotics is a kit and program provided by NESSP. NESSP serves as a “virtual NASA center” for residents of the U.S.’s northwest — covering Washington, Oregon, Idaho, and Montana. NASA centers have traditionally acted as hubs for professional development for educators, access points for NASA educational materials, and on-site experiences for educators and students.

Grade Level

3rd - 12th

Group Size

2 - 4 students per group

Time Duration

1 hour - multiple sessions

Content of Kits

Components

- 10 Customized LEGO Spike Prime sets

Learning Standards

- MP1, MP2, MP3, MP4, MP5, MP6
- 3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3
- 4-ESS2-2
- 5-ESS1-1 and 5-ESS1-2
- 5-ESS2-1
- 5-ESS3-1
- MS-ESS1-3
- MS-ESS2-4 and MS-ESS2-5
- MS-ESS3-5
- MS-ETS1-1, MS-ETS1-2, MS-ETS1-3, MS-ETS1-4
- MS-PS2 and MS-PS3
- HS-ESS1-4
- HS-ESS2-2 and HS-ESS2-4
- HS-ESS3-5
- HS-ETS1-1, HS-ETS1-2, HS-ETS1-3
- HS-PS4-5



Usage

Getting Started

1. Familiarize yourself with NESSP's NASA programming at, <https://nwessp.org/>.



3. Ensure you have access to the LEGO Education Spike app and that you understand how it works. You will be using the Prime side of the app with this STEAM kit. <https://spike.legoeducation.com>

2. Ensure your LEGO Hubs and tech (Tablets, Chromebooks, etc.) are charged and up-to-date before the start of class.

4. Ensure all sets are complete and organized to help lessons run efficiently.

Storage

- **Organize and Keep Sets Together**

Ensure individual sets are reorganized to their original state and containers.

- **Store in a cool dry place.**

Troubleshooting

- **Robot not moving correctly:** Check that motors are securely connected to the correct ports and that code matches the motor setup.
- **Program not running:** Ensure the tablet is properly connected to the hub via Bluetooth and that the correct program is downloaded to the robot.
- **Robot stops unexpectedly:** Verify battery charge levels in both the hub and tablet.
- **Code not behaving as expected:** Review sequencing of blocks, especially timing, loops, and order of commands. Test in smaller steps.



Learning Extensions

STEAM Connections: Engineering - Math - Science

Learning Objectives:

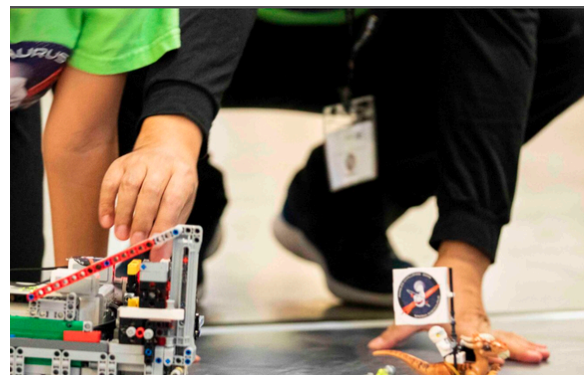
- Investigate Earth and space science concepts through NASA-inspired mission challenges.
- Compare planetary systems, atmospheres, surfaces, and environmental conditions using evidence and models.
- Analyze real or simulated data to identify patterns, make predictions, and support scientific claims.
- Apply the engineering design process by defining problems, building prototypes, testing solutions, and making improvements.
- Use measurement, observation, and data collection tools to complete mission-based investigations.

Career Connections:

- **Aerospace Engineer:** Designs spacecraft, rovers, satellites, and mission systems used in space exploration.
- **Planetary Scientist:** Studies planets, moons, atmospheres, and surface conditions to understand our solar system.
- **Data Analyst:** Interprets mission data, identifies patterns, and helps teams make evidence-based decisions.
- **Computer Scientist / Programmer:** Writes code for simulations, robotics, data analysis, or mission operations.
- **Remote Sensing Specialist:** Uses satellite or sensor data to study Earth, planets, and environmental conditions.
- **Mission Planner:** Coordinates goals, timelines, resources, and team roles for complex science and engineering projects.
- **Science Communicator:** Shares scientific discoveries with the public through writing, visuals, presentations, and media.

Essential Employability Skills:

- Critical Thinking
- Problem-Solving
- Creativity
- Teamwork
- Communication





Resources and Accessibility

Safety Guidelines

- Keep small pieces organized and away from mouths to prevent choking hazards.
- Ensure wires, motors, and sensors are properly connected before operating robots.
- Avoid forcing pieces together or pulling components apart roughly.
- Keep workspaces clear to prevent tripping hazards or loss of small parts.

Accessibility

- Provide step-by-step visual instructions and diagrams to support diverse learners.
- Offer flexible roles (builder, coder, tester, documenter) so students can engage based on strengths.
- Use color-coded pieces and labels to support organization and comprehension.
- Allow additional time for building, coding, and troubleshooting as needed.
- Provide guided practice and modeling before independent work.
- Offer alternative input methods (touch, stylus, or adaptive tools) for coding activities.
- Adjust build complexity (simpler models or pre-built components) to meet varying ability levels.
- Encourage peer support and collaborative problem-solving to build confidence and inclusion.

Library Catalog



Library Resources



Feedback

QR to feedback survey

