



# Texas 4-H Robotics Project

## Project Description

The Texas 4-H Robotics project engages youth in the dynamic world of robotics, fostering innovation and critical thinking as they design, build, and program machines to tackle real-world challenges.

In the 4-H Robotics project, members will learn a variety of skills related to robotics, coding, and engineering. Some specific skills they may learn include: robotics design, problem-solving, teamwork, and presentation skills. Overall, the 4-H Robotics project offers a comprehensive learning experience that prepares youth for future careers in STEM fields, while also teaching them valuable life skills.

### Basic

- Introduction to basic robotics components (sensors, actuators, controllers).
- Understanding the principles of mechanical design.
- Basic programming for robot movements using block-based languages.
- Introduction to simple robotic tasks (e.g., line following, obstacle avoidance).
- Familiarization with popular robotics platforms like LEGO Mindstorms.

### Intermediate

- Intermediate mechanical design and kinematics.
- Exploration of more complex sensors and their integration.
- Introduction to robotic arms and their applications.
- Programming robots using languages like Python or Java.
- Designing robots for specific tasks or challenges (e.g., maze navigation).
- Basics of robot communication and wireless control.

### Advanced

- Development of multi-robot systems.
- Advanced programming for autonomous navigation and decision-making.
- Understanding of human-robot interaction and its ethical implications.
- Exploration of cutting-edge robotics fields like soft robotics and bio-inspired robots.
- Advanced robot simulations and real-world testing.

# TAKE ROBOTICS FURTHER

## *Project Learning Opportunities:*

- Participate in robotics workshops
- Participate in the Texas 4-H Roundup Robotics Challenge
- Participate in the Texas Tech University GEAR Contest
- Participate at major livestock show AgRobotics Contests
- Tour nearby businesses or speak to professionals who work in STEM-related fields.
- Join Texas 4-H STEM Ambassador program

## *Resources:*

- Robotics Explore Guide
  - [texas4-h.TAMU.edu/projects/robotics/](http://texas4-h.TAMU.edu/projects/robotics/)
- National 4-H STEM Challenge
  - [4-h.org/programs/stem-challenge/](http://4-h.org/programs/stem-challenge/)
- National 4-H Robotics Curriculum
  - [4-h.org/programs/robotics/](http://4-h.org/programs/robotics/)
- Carnegie Mellon Robotics Academy
  - <https://www.cmu.edu/roboticsacademy/>
- LEGO Engineering
  - <http://www.legoengineering.com/>

## *Did you know?*

4-H is a club for kids and teens to develop life skills and make friends. Youth can join 4-H in all 254 counties. Everybody ages 8-18 and in 3rd-12th grades can join 4-H. Kids in Kindergarten to 2nd grades can join as Clover Kids. There are 43 different project areas in five project categories: Agriculture & Livestock, Family & Community Health, Leadership & Citizenship, Natural Resources, and STEM.

## *Want to get started?*

First...Contact your County Extension Agent!

- Contact information can be found at [texas4-h.tamu.edu](http://texas4-h.tamu.edu) > contacts information at the bottom of the page > county offices

**Explore more at [texas4-h.tamu.edu](http://texas4-h.tamu.edu)**