Robotic elements can help improve human quality of life. Whether robots are used to explore dangerous environments, diffuse bombs, replace limbs, or just make life easier, the use of robots is becoming increasingly more common. In the robotics project, youth will learn about the interconnections of science, engineering, and technology.

- Learn about the basics of robotics, including platform, drive, and control systems.
- Engage in scientific inquiry around motion, forces, chemistry, electricity, etc.
- Design robotic solutions to engineering challenges.
- Build, construct, and test robotic contraptions, and redesign.

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- Learn about the vast variety of robots being used in the world.
- Explore the differences between form and function.
- Engage in the engineering design process with simple challenges.
- Learn about motion, forces, and electricity.
- Record designs and reflection in an engineering notebook.

- Explore 3-D space. Build robotic arms that can move and grip without direct physical control.
- Employ the engineering design process by designing, building, and testing a contraption to meet a design challenge.
- Learn about engineering constraints and tradeoffs.
- Build a robotic rover.
- Experiment with buoyancy and building an underwater robot.

- Explore mechantronics, the connection between electrical and mechanical systems.
- Learn about number systems and programming logic.
- Program a robotic controller for automatic guidance.
- Participate in robotics competitions.
- Employ a variety of sensors on your robot.

The activities above are ideas to inspire further project development. This is not a complete list.
Expand Your Experiences!

Science, Technology, Engineering, and Mathematics

- Experiment with friction by testing various rover wheels on different surfaces. Record results.
- Design and build an underwater ROV to collect water samples for water quality testing.
- Find a way to use robots in 4-H animal science or agricultural projects.
- Attach a GPS unit to a robotic rover and use it for GIS mapping.

Healthy Living

- Find out more about how robots are used in medical procedures and surgery.
- Explore how robotic sensors can test the nutritional value of food.
- Build a robotic rover to lead a workout routine.

Citizenship

- Design a service learning project that uses robotics elements in its implementation.
- Learn more about how robots have changed industry and the nature of work in the U.S.
- Find out more about federal laws that govern the use of robots.
- Program a robot to lead the flag salute.

Leadership

- Become a role model for others by taking the position of junior/teen leader.
- Lead a robotics workshop for younger members.
- Plan and implement a robotics educational event in your community.

Connections & Events

Presentation Days – Share what you’ve learned with others through a presentation.

Field Days – At these events, 4-H members may participate in a variety of contests related to their project area.

Contact your UC Cooperative Extension office to determine additional opportunities available, such as a field day.

Curriculum

4-H Robotics: Engineering for Today and Tomorrow

- Virtual Robotics—http://www.4-h.org/resource-library/curriculum/4-h-robotics/virtual-robotics/
- Junk Drawer Robotics—http://www.4-h.org/resource-library/curriculum/4-h-robotics/junk-drawer-robotics/
- Robotics Platforms—http://www.4-h.org/resource-library/curriculum/4-h-robotics/robotics-platforms/

4-H Record Books give members an opportunity to record events and reflect on their experiences. For each project, members document their experiences, learning and development.

4-H Record Books also teach members record management skills and encourage them to set goals and develop a plan to meet those goals.

To access the 4-H Record Book online, visit http://ucanr.edu/orb/

Resources

- 4-H Robotics Resources http://www.4-h.org/resource-library/curriculum/4-h-robotics/facilitator-resources/
- FIRST http://www.usfirst.org/
- California 4-H Robotics http://www.ca4h.org/Projects/SET/Tech/JDR/
- LEGO® Mindstorms® NXT www.mindstorms.lego.com
- GEAR-Tech-21 http://4hset.unl.edu/itest/index.php
- VEX® Robotics Design System http://www.vexrobotics.com/
- UC Davis C-STEM Center http://c-STEM.ucdavis.edu/

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