



4-H ROBOTICS PROJECT



4-H THRIVE

Help Youth:

Light Their Spark

A spark is something youth are passionate about; it really fires them up and gives them joy and energy. Help youth

Flex Their Brain

The brain grows stronger when we try new things and master new skills. Encourage youth effort and persistence to

Reach Their Goals

Help youth use the GPS system to achieve their goals.

Goal Selection: Choose one meaningful, realistic and demanding goal.

Pursue Strategies: Create a step-by-step plan to make daily choices that support your goal.

Shift Gears: Change strategies if you're having difficulties reaching your goal.

Reflect

Ask project members how they can use their passion for this project to be more confident, competent and caring. Discuss ways they can use their skills to make a contribution in the

Robotic elements can help improve human quality of life. Whether robots are used to explore dangerous environments, diffuse bombs, as replacement 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 motions, forces, chemistry, electricity-

Starting Out *Beginner*

- Learn about the vast types 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

Learning More *Intermediate*

- 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

Exploring Depth *Advanced*

- Explore mechatronics, 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

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

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.

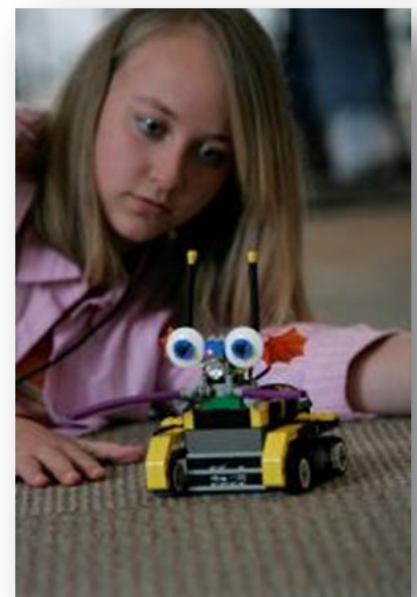
Leadership

- 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.

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/>

Connections & Events	Curriculum	4-H Record Book
<p>Presentation Days – Share what you’ve learned with others through a presentation.</p> <p>Field Days – At these events, 4-H members may participate in a variety of contests related to their project area.</p> <p>Contact your county 4-H office to determine additional opportunities available, such as a field day.</p>	<p>4-H Robotics: Engineering for Today and Tomorrow</p> <ul style="list-style-type: none"> • 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/ 	<p>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.</p> <p>4-H Record Books also teach members record management skills and encourage them to set goals and develop a plan to meet those goals.</p>



University of California Agriculture and Natural Resources