



4-H Robotics: Engineering for Today and Tomorrow

The 4-H Robotics curriculum uses robotics as a means of engaging youth and developing interesting and challenging experiences with science, engineering and technology. It also uses a variety of media and means to engage youth. It is a much broader project than most of the robotic curriculums currently available, which often focus on a single platform or mode of delivery.

As they participate in *4-H Robotics: Engineering for Today and Tomorrow*, youth:

- Build understanding of basic science concepts related to robotics;
- Apply the processes of scientific inquiry and engineering design;
- Build skills in science, engineering and technology;
- Use the tools of technology to enhance their learning;
- Explore related careers; and
- Apply the skills and knowledge they are developing to new challenges.

It is comprised of three separate tracks; each designed to meet the diverse requirements of 4-H clubs, after-school programs, individual youth and school enrichment activities.

- **The *Virtual Robotics* track** of the project will provide youth with opportunities to build and test virtual robots. Participants will enjoy the challenges of interacting in a virtual environment as they learn basic science and robotics concepts without investing in expensive materials or supplies. This track will make use of videos, simulations, animations and other media to convey content in a meaningful and engaging manner. The *Robotics Notebook* for this track will be a real-world notebook in which students record their designs and respond to questions as they work and learn in the virtual environment.
- **The *Junk Drawer Robotics* track** will challenge participants to build robots from everyday items. In each module youth will learn about a different aspect of robotics and then design and build a robot using what they have learned. This track emphasizes developing knowledge and developing skills, as well as applying what they have learned as participating youth design and build their own robots. Youth will use their *Robotics Notebook* to record their learning experiences, robotic designs and data from their investigations.
- **In the *Robotics Platforms* track**, youth will use a commercial robotics kit to explore the world of robots. The activities developed for this track can be used with a variety of commercial kits, but for this review, the NXT kit will be used. Other platform options will include TETRIX, CEENBoT and Vex. As participants experience each module in a level, they will develop scientific knowledge and technological understanding that will enable them to master the challenge presented at the culmination of that level. As they progress through each module, the *Robotics Notebook* will help youth to keep a record of their progress and serve as an important learning tool. Each level will build upon the prior level as youth develop a broader and deeper understanding of robotics.

Strong Partnerships:

This initiative is built upon a strong network of partnerships across the U.S. led by the University of Nebraska. Partners in the project include: University of Nebraska, University of California, Global Design Challenge Award, University of Idaho, Montana State University, University of Connecticut, University of Maryland, and Iowa State University Extension.