



## Engineering and Mechanics

Georgia 4-H Project Achievement empowers young people with skills for a lifetime. Through a competitive process, students explore their interests, unleash their creativity, share their work, and celebrate their achievements! This guide provides 9th—12th graders with examples for getting started with their project exploration.

### Description of Project:

4-H'ers may explore the application of scientific, economic, and practical knowledge for designing, building, and maintaining structures, machines and systems. Through this project 4-H'ers may:

- learn about the basic principles and theories of engineering, including chemical, civil, electrical, and mechanical engineering
- study engine systems and the conversion of power and energy involved
- explore creative applications of design principles in the development of structures, machines, apparatuses, manufacturing processes, or works
- promote the knowledge of safe practices and procedures to protect against personal injury and property damage in engineering applications
- acquire knowledge of the efficient utilization of energy through the production of heat, light, power, and communication
- explore the economics of the efficient purchase and operation of powered equipment, including the ability to keep/interpret a record of operational and ownership costs
- learn about the effects of energy on humankind and the environment
- explore careers associated with engineering and mechanics

### Overview:

- ⇒ Choose project
- ⇒ Develop skills in:
  - Project
  - Leadership
  - Service
- ⇒ Prepare portfolio for work completed from January 1—December 31
- ⇒ Prepare presentation
- ⇒ Practice
- ⇒ Compete
- ⇒ Reflect

### Examples of Project Development Experiences:

- Tour an engineering college, technical school, and/or maker's lab
- Enroll in a mechanics or STEM class in school
- Identify a solution to a need, create a plan, and test it
- Interview or shadow an engineer or mechanic
- Research companies that employ engineers and find out about their job requirements
- Consider participating in a robotics team or 4-H Mission Make-It day
- Join the Georgia 4-H Communications and Technology Team
- Solve a problem by designing files and using a 3-D printer
- Participate with 4-H in National Youth Science Day

## Project Sharing and Helping Examples:

- Serve as a teen lead at the Georgia 4-H Mission Make-It event
- Mentor a younger 4-H'er in the Engineering and Mechanics project
- Create an engineering and/or mechanics project club
- Coordinate a group of youth to visit a robotics competition
- Exhibit an Engineering and Mechanics-related mini-booth at a fair or event
- Schedule a tour of a local industry, technical school, and/or college to expose younger 4-H'ers to machinery and careers
- Present a booth at a school's STEM night
- Conduct a STEM activity at 4-H club meetings or summer programs
- Start a junior robotics team in your county
- Create a Leadership in Action project related to STEM
- Serve as a teen leader for National Youth Science Day
- Construct a simple machine to assist someone with an everyday task or problem
- Present your inventions to 4-H Club members, school classes, and/or civic clubs and discuss mechanical and design principles

## Recommended

### Resources:

- [Georgia4h.org/ProjectAchievement](http://Georgia4h.org/ProjectAchievement)
- [Georgia4h.org/set/education.com/science-fair/engineering](http://Georgia4h.org/set/education.com/science-fair/engineering)
- [sciencebuddies.org/science-fair-projects](http://sciencebuddies.org/science-fair-projects)
- [all-science-fair-projects.com/category89.html](http://all-science-fair-projects.com/category89.html)
- [enr.uga.edu](http://enr.uga.edu)
- [4-h.org/parents/national-youth-science-day](http://4-h.org/parents/national-youth-science-day)

## Special Considerations:

- Youth should practice internet safety when communicating with new people online. A best practice is to take a friend or parent to shadow your interview or copy your parent/guardian on online communications with adult mentors.
- Remember to learn and abide by federal, state, and local laws and codes regarding powered equipment operation.
- When teaching safety, remember to reference official guides in creating presentations and exhibits.
- Please use best safety practices when handling tools and equipment.

## At Competition:

*Engineering and Mechanics 4-H projects may use posters, artifacts, biofacts, and/or technology to support their presentation. The time limit for these presentations is 12 minutes. Computers, projectors, screens, and other technological devices may be used.*

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Sources:

The University of Georgia CAES. 2016. Project Achievement. <http://www.georgia4h.org/projectachievement/>

The University of Georgia CAES. 2016. Science, Engineering, and Technology. <http://www.georgia4h.org/set/>

