Engineering is a systematic and iterative approach to addressing human needs and wants, by designing, building, and testing tools, processes, and systems. Through engineering projects, youth learn about the iterative engineering design process, attributes of design, impacts of systems, and effects of technology on the environment.

- Identify and define a problem, its constraints, and goals/criteria a solution must meet
- Develop possible solutions; test and optimize the design solution

<table>
<thead>
<tr>
<th>Starting Out</th>
<th>Learning More</th>
<th>Exploring Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginner</td>
<td>Intermediate</td>
<td>Advanced</td>
</tr>
<tr>
<td>Experience the engineering design process</td>
<td>Learn about engineering fields and careers</td>
<td>Identify real-life issues and their constraints and design a tool to help solve the issue</td>
</tr>
<tr>
<td>Record designs and testing in an engineering notebook</td>
<td>Make connections between human issues and how engineering can help provide solutions</td>
<td>Explore engineering in context of disciplines: agriculture, energy, medical, and others</td>
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<tr>
<td>Learn about the types and safety considerations of tools and equipment.</td>
<td>Start to think about systems thinking and how individual parts of a system work together</td>
<td>Explore the interactions of technology (created using engineering) and their effects on the world</td>
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<tr>
<td>Learn about form and function and the role of materials in engineering design</td>
<td>Learn about the</td>
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The activities above are ideas to inspire further project development. This is not a complete list.
Expand Your Experiences!

Science, Technology, Engineering, and Mathematics
- Go on a field trip of an engineering company or organization
- Build your own measurement tool in order to conduct a scientific investigation
- Research and discuss with other members the relationship between science and

Healthy Living
- Learn about the safety of a tool or equipment and present to the other project members
- Identify a health-related need in your home or community and then design,

Citizenship
- Select one tool and trace its lineage. When was that tool first introduced? Who created it and for what purpose? What affect has adoption of that tool had on society?

Leadership
- Serve as a Junior or Teen Leader for the Engineering project
- Lead an engineering activity at a 4-H club meeting for younger members

Connections & Events

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

Contact your county 4-H office to determine additional opportunities available, such as a field day.

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

School Days
- 4-H Robotics: Engineering for Today and Tomorrow
  www.4-h.org/robotics/
- TechXcite: Discover Engineering
  techxcite.pratt.duke.edu/
- 4-H The Power of the Wind
  www.4-h.org/curriculum/wind/
- Design It!
  npass2.edc.org/resources/design-it
- Exploratorium, the Tinker-

Curriculum

4-H Record Books

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.

Resources

- National 4-H Engineering & Technology
  www.4-h.org/youth-development-programs/4-h-science-programs/engineering-technology/
- International Technology and Engineering Educators Association (ITEEA)
  http://www.iteaconnect.org/
- 4-H Clover Safe Notes
  safety.ucanr.org/4-H_Resources/
- Design Squad (PB)
  http://pbskids.org/designsqad
- Maker Education Initiative
  http://www.makered.org/
- eGFI: Dream Up the Future
  http://www.egfi-k12.org/
- Engineer Girl
  http://www.engineergirl.org/
- Autodesk Education
  http://www.autodesk.com/education/student-software
- National Center for Women and Information Technology
  https://www.ncwit.org/
- Techbridge: Inspire a girl to

University of California Agriculture and Natural Resources

Light Your Spark
Flex Your Brain
Reach Your Goals
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UC ANR 4-H Youth Development Program (2016) • http://4h.ucanr.edu

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