The 4-H project is designed to help you explore building large structures like bridges, dams, roads.

- Learn about different materials and shapes and how they are used to build structures.
- Build and test different structures.
- Develop skills in the engineering design process.
- Understand the ethical, social and environmental and economic impacts of engineering solutions.

Here’s what you can do all year!

<table>
<thead>
<tr>
<th>Exploration Activities</th>
<th>Challenge Activities</th>
<th>Investigation Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify the ways engineering affects your everyday life.</td>
<td>Build a tower that can support the weight of a textbook.</td>
<td>Investigate the different types of foundations.</td>
</tr>
<tr>
<td>Learn about the different fields of engineering.</td>
<td>Design a simple water filtration system.</td>
<td>Investigate road building techniques.</td>
</tr>
<tr>
<td>Build simple structures.</td>
<td>Design a dam turbine to create electricity.</td>
<td>Learn how items are recycled.</td>
</tr>
<tr>
<td>Identify which shapes are the strongest for building.</td>
<td>Construct a model landfill and see how it works.</td>
<td>Research the evolution of transporting drinking water.</td>
</tr>
<tr>
<td>Research materials used to build structures.</td>
<td>Make a model of a tornado-proof structure with simple materials.</td>
<td>Investigate the forces that act on large structures.</td>
</tr>
<tr>
<td>Explore different soil types and characteristics.</td>
<td>Identify the material properties of rocks, soils and minerals.</td>
<td>Investigate the damage natural disasters cause to structures. - Research local civil engineering projects-dams, flood control, roads, etc.</td>
</tr>
<tr>
<td>Identify the four major types of dams.</td>
<td>Understand why dams are built.</td>
<td></td>
</tr>
</tbody>
</table>

Pass it on! Now that you know how, share it with others. Here are ideas to get you started.

**Communication**

- Prepare an exhibit that explains the different types of bridges.
- Give a demonstration on how buildings move during an earthquake.

**Citizenship**

- Join a Habitat for Humanity building project.
- Start a recycling project.

**Leadership**

- Conduct a bridge building contest for your club.
- Setup a tour with your local county or city engineer.

**Entrepreneurship**

- Job shadow a construction or civil engineer.
- Build bird or other animal houses.
Here are other opportunities to explore in 4-H Engineering:

- Learn about local road or building projects.
- Design an experiment and share the results at your school science fair.
- Attend a Marketplace for Kids event.
- Tour a local engineering firm.
- Give a presentation at a club meeting or Communication Arts event.
- Interested in a college education in the area of Engineering? Schedule a visit with North Dakota State University to explore these majors: [Engineering - Academic Majors (NDSU)](http://www.ndsu.edu/)

### 4-H Resources

- National 4-H Curriculum
- Lego Robotics with EV3

### Other Resources

- American Society of Civil Engineers
- Teach Engineering Curriculum
- PBS Building Big: Forces Lab
- PBS Design Squad: Build Try Engineering

### Record Keeping

- Planning for My Project Adventure (PA093)
- ND 4-H Project Plan (PA095)
- ND 4-H Plan of Action (PA096)
- ND 4-H Participation Summary for 11- to 19-year-olds (PA098)

Learn more at [www.ndsu.edu/4h/](http://www.ndsu.edu/4h/) or contact your county NDSU Extension Office

### Exhibit Ideas

- Build a model of a local building.
- Create a piece of art based on bridge designs.
- Create a poster about different types of roads.
- Create a photo journal of a local road or building project.
- Develop a display on different types of dams.
- Make a working model of a turbine.
- Create a poster that shows how aquifers work.
- Make a poster explaining your local soil types.
- Create a display on the different types of concrete.
- Build a simple water filtration system.
- Build a model of a famous bridge.