



# 4-H Engineering Project

## North Dakota 4-H Project Sheet

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!

Exploration Activities	Challenge Activities	Investigation Activities
<ul style="list-style-type: none"> <li>• Identify the ways engineering affects your everyday life.</li> <li>• Learn about the different fields of engineering.</li> <li>• Build simple structures.</li> <li>• Identify which shapes are the strongest for building.</li> <li>• Research materials used to build structures.</li> <li>• Explore different soil types and characteristics.</li> <li>• Identify the four major types of dams.</li> </ul>	<ul style="list-style-type: none"> <li>• Build a tower that can support the weight of a textbook.</li> <li>• Design a simple water filtration system.</li> <li>• Design a dam turbine to create electricity.</li> <li>• Construct a model landfill and see how it works.</li> <li>• Make a model of a tornado-proof structure with simple materials.</li> <li>• Identify the material properties of rocks, soils and minerals.</li> <li>• Understand why dams are built.</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate the different types of foundations.</li> <li>• Investigate road building techniques.</li> <li>• Learn how items are recycled.</li> <li>• Research the evolution of transporting drinking water.</li> <li>• Investigate the forces that act on large structures.</li> <li>• Investigate the damage natural disasters cause to structures.</li> <li>• Research local civil engineering projects - dams, flood control, roads, etc.</li> </ul>

**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.

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



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### 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 \(NDSU\)](#)



### 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.

### 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