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**

- Identify the ways engineering affects your everyday life.
- Learn about the different fields of engineering.
- Build simple structures.
- Identify which shapes are the strongest for building.
- Research materials used to build structures.
- Explore different soil types and characteristics.
- Identify the four major types of dams.

**Challenge Activities**

- Build a tower that can support the weight of a textbook.
- Design a simple water filtration system.
- Design a dam turbine to create electricity.
- Construct a model landfill and see how it works.
- Make a model of a tornado-proof structure with simple materials.
- Identify the material properties of rocks, soils and minerals.
- Understand why dams are built.

**Investigation Activities**

- Investigate the different types of foundations.
- Investigate road building techniques.
- Learn how items are recycled.
- Research the evolution of transporting drinking water.
- Investigate the forces that act on large structures.
- Investigate the damage natural disasters cause to structures.
- Research local civil engineering projects - dams, flood control, roads, etc.

**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.

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

### 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: Junk Drawer Robotics

### Other Resources

- American Society of Civil Engineers
- Teach Engineering Curriculum
- PBS Building Big: Forces Lab
- PBS Design Squad - Build Try Engineering
- National Partners for After School Science

### Record Keeping

- 4-H Project Plan
- Planning for My Project Adventure (Ages 8-10)
- 4-H Plan of Action (Ages 11-18)
- ND 4-H Participation Summary for 11 to 19 year olds

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