The 4-H electricity project is designed to help you learn and practice electrical skills, science process skills and life skills.

- Develop the knowledge of safe practices and procedures.
- Develop an understanding of the basic principles and theories of electricity.
- Increase knowledge and concern regarding the generation, transmission and distribution of electric energy.

Here’s what you can do all year!

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Magic of Electricity</th>
<th>Level 2</th>
<th>Investigating Electricity</th>
<th>Level 3</th>
<th>Wired for Power</th>
<th>Level 4</th>
<th>Entering Electronics</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Identify how you use electricity.</td>
<td>- Identify alternating and direct current circuits.</td>
<td>- Understand local electrical code.</td>
<td>- Identify electrical and electronic parts and devices.</td>
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<tr>
<td>- Identify electrical materials.</td>
<td>- Record data collected using a Volt-Ohm meter.</td>
<td>- Learn to read an electrical meter.</td>
<td>- Find needed electronic parts at a low cost.</td>
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<tr>
<td>- Wire a simple circuit.</td>
<td>- Learn about Ohm’s Law.</td>
<td>- Evaluate different light bulbs.</td>
<td>- Solder a neat, strong connection.</td>
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<tr>
<td>- Understand open and closed switches.</td>
<td>- Identify conductors and insulators.</td>
<td>- Read appliance nameplate information.</td>
<td>- Choose the correct part for a circuit.</td>
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<tr>
<td>- Test materials for electric conductivity.</td>
<td>- Learn basic symbols used in circuit diagrams.</td>
<td>- Measure electricity usage.</td>
<td>- Demonstrate how a diode controls current flow.</td>
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<tr>
<td>- Recognize closed and open circuits.</td>
<td>- Measure voltage in various light bulbs and batteries.</td>
<td>- Identify three receptacles.</td>
<td>- Assemble circuits.</td>
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<tr>
<td>- Trace the path electrons follow.</td>
<td>- Build a circuit with a momentary switch and three-way switch.</td>
<td>- Test for electrical power.</td>
<td>- Understand polarity and voltage limits of LEDs.</td>
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<tr>
<td>- Understand magnetism and magnetic poles.</td>
<td>- Build a burglar alarm.</td>
<td>- Test grounded outlets.</td>
<td>- Learn how to use a light-sensitive semiconductor in a control circuit.</td>
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<tr>
<td>- Demonstrate a magnetic field when electricity is present.</td>
<td>- Build an electric motor.</td>
<td>- Locate your home wiring system.</td>
<td>- Show how an SCR triggers an alarm.</td>
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</tbody>
</table>

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

**Communication**
- Present a demonstration at your 4-H club or local communication arts contest.
- Give a speech about electrical safety to your school class, local community group or 4-H club.

**Citizenship**
- Check friends’ homes for electrical safety issues.
- Volunteer to be a judge’s assistant for the engineering and technology exhibits at your local 4-H achievement days/fair.

**Leadership**
- Organize a safety workshop.
- Plan, conduct and participate in an electric quiz bowl.

**Entrepreneurship**
- Build quiz boards for local schools and community groups.
- Job shadow an electrician or electrical engineer.

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

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Opportunities to explore electricity:

- Give a presentation or working exhibit at your club meeting and county communication event.
- Ask your club leader to check out the Electronic Snap Kits Educational Trunk.
- Plan, conduct and participate in an electric quiz bowl or skillathon.
- Tour an electrical facility.
- Contact your local power supplier for educational opportunities.
- Interested in a college education in electrical engineering or other fields related to electricity? Schedule a visit with North Dakota State University’s Engineering Department, [www.ndsu.edu](http://www.ndsu.edu).

### 4-H Resources

- **National 4-H Electricity Curriculum:**
  - Level 1: Magic of Electricity (HCE151)
  - Level 2: Investigating Electricity (HCE152)
  - Level 3: Wired for Power (HCE153)
  - Level 4: Entering Electronics (HCE154)
  - Electricity Leader Guide (HCE251)
- Educational Trunk
- Electronic Snap Kits *(Reserve through your county Extension office)*

### Other Resources

- ND State Electrical Board
- US Energy Information Administration
- Virginia Cooperative Extension 4-H Electricity School Enrichment Program
- Activity Lessons from Wisconsin 4-H
  - Bright Lights
  - Circuit Sense
  - Control the Flow
  - Earth Attractions
  - Fork in the Road

### Recordkeeping

- ND 4-H Project Plan (PA093)
- Planning for My Project Adventure (PA095) *(Ages 8-10)*
- ND 4-H Plan of Action (PA096) *(Ages 11-18)*
- ND 4-H Participation Summary for 11- to 19-year-olds (PA098)

### Exhibit Ideas

- Build a homemade flashlight.
- Create a simple switch.
- Build a circuit with two batteries and a light bulb.
- Build an electromagnet, galvanometer or compass.
- Create circuit diagrams with explanations.
- Build a circuit or switch.
- Display a soldered connection.
- Display electrical tools and supply kit.
- Create a display of symbols on wires and cables and their meanings.
- Create a display of light bulbs and the jobs they do best.
- Create a poster on how to read an appliance nametag.
- Develop a chart showing the electrical usage of appliances.
- Create a poster on how to replace a switch.
- Build a diode or transistor.
- Build an LED flasher or light meter.
- Build a photocell alarm or silicon-controlled rectifier (SCR) intruder alarm.
- Build a 6- to 8-watt amplifier with an integrated circuit.