



# Virginia 4-H Contest Guide- Electric Energy Challenge

*Developed by: Dan Swafford, 4-H Curriculum Specialist, and Andy Seibel, Associate Extension Specialist*

## Description of Contest

This event is designed to give 4-H members who are enrolled in the youth-based electric and electronics programs an opportunity to demonstrate their knowledge of electricity, the efficient use of electricity, care, maintenance, and safety of electrical equipment and apparatus found on the farm and in the home, including electronics. Safety will be stressed throughout the contest.

- Written Examination
- Presentation
- Identification of Electrical Equipment and parts.

One (1) 4-H participant from each county may participate in the state event. Designated judges will preside over the contest and the judge's decisions and placings are final.

## Levels of Competition

Unit (county), District, State, National

### Age Categories:

Senior contestants for the Virginia 4-H Electric Energy Challenge must be 14-18 years old as of January 1 of the competition year. This is in accordance with National Contest Guidelines.

## Awards to be Earned

Danish Awards: Blue Ribbon 400-300, Red Ribbon 299 and below.

Top senior individual (at least 14 years of age, but not older than 19 years of age as of January 1 of the present year) at the state contest is eligible to compete at the National Youth Engineering Challenge, Purdue University, West Lafayette, Indiana.

## Rules for this Contest

### 1. Written Examination

The written examination will consist of 25 multiple choice questions pertaining to the Electric program, care, maintenance and safety taken from the National 4-H literature. A time limit is announced when the examination is given. Each question is worth 4 points. Therefore, the number of questions missed x 4 = total number of points

to be deducted. 4-H members will bubble the correct answer on the OpScan sheet.

#### Rules

1) Four penalty points will be given for each question answered incorrectly.

Scoring: Question missed \_\_\_\_\_ x 4 = total Penalty Points \_\_\_\_\_

### 2. Visual Presentation

The presentation should involve a discussion and/or demonstration of some aspect of electrical energy such as generation, safe use, or conservation. Participants may use working equipment but must observe proper safety precautions when demonstrating any live electrical part. Participants must furnish their own demonstration materials. Visual aids should be readable from twenty feet. There is a fifteen minute time limit on the presentation.

### 3. Parts Identification

The Parts Identification event will consist of a group of 25 numbered parts or symbols which must be identified. Participant will place number by the most correct part name on a list of various electrical or electronic parts. 4-H members will bubble the correct answer on the OpScan sheet.

#### Rules

1) Four penalty points will be given for each question answered incorrectly.

2) Time Limit 15 minutes.

Scoring: Question missed \_\_\_\_\_ x 4 = total Penalty Points \_\_\_\_\_

## National Level Contest Rules

<http://www.ydae.purdue.edu/naengr/Electric.pdf>

## Educational Resources to Help Prepare for this Contest

Electricity 1-4 and Activity Guide, National 4-H Electric Series

<http://www.4-hmall.org/Category/4-hcurriculum-electric.aspx>

Virginia 4-H Electricity Curriculum

[http://pubs.ext.vt.edu/388/388-800/388-800\\_pdf.pdf](http://pubs.ext.vt.edu/388/388-800/388-800_pdf.pdf)

## Virginia 4-H Electrical Presentation Rubric – 200 Points

Participant: \_\_\_\_\_

The Presenter (20 points)					
Indicators	Very strong evidence skill is present 5-4	Moderate evidence skill is present 3-2	Strong evidence skill is not present 1-0	Total Score	Constructive Comments
A. Appearance	The 4-H member is dressed in a professional business manner and is exhibiting desirable professional behavior.	The 4-H member is dressed in a ca business casual attire and is caring themselves in a professional manner.	The 4-H member is dressed in a manner that does not communicate professional attire.		
B. Voice/Tone	Voice is upbeat, impassioned and under control. Emitted a clear, audible voice for the audience present.	Voice is somewhat upbeat, impassioned and under control. Emitted a somewhat clear, audible voice for the audience present.	Voice is not upbeat; lacks passion and control. Emitted a barely audible voice for the audience present.		
C. Poised	Is extremely well poised. Poised and in control at all times.	Usually is well poised. Poised and in control most of the time; rarely loses composure.	Isn't always well poised. Sometimes seems to lose composure		
D. Pronunciation/ Grammar	Pronunciation of words is very clear and intent is apparent.	Pronunciation of words is usually clear, sometimes mumbled.	Pronunciation of words is difficult to understand; unclear.		
Presentation (35 points)					
A. Introduction	Strong introduction and is able to effectively articulate information.	Good introduction and is able to, for the most part, articulate information.	Weak introduction, but is unable to articulate information.		
B. Mannerisms/ Appropriate method	Does not have distracting mannerisms that affect effectiveness. No nervous habits and the member conducted an illustrated presentation.	Sometimes has distracting mannerisms that pull from the presentation. Sometimes exhibits nervous habits or ticks, and the member attempted to conduct an illustrated presentation.	Have mannerisms that pull from the effectiveness of the presentation. Displays some nervous habits – fidgets or anxious ticks. Presentation was more like a demonstration.		
C. Verbal Presentation	The speaker clearly explains the steps, and the explanation is coordinated and well thought out. The speaker is able to keep the audience engaged.	The speaker attempts to explain the steps, and the speaker uses filler material thought out the presentation. The audience was not totally engaged.	The speaker fails to explain the steps, and the speaker uses a lot of filler material thought out the presentation. The audience was not engaged.		
D. Teaching Aids	Teaching aids look professional and are used in a purposeful manner an effectively assist in communicating information.	Teaching aids are look neat and are used and they help assist in communicating information	Teaching aids are not neat and are used in an ineffective manner and they do not assist in communicating information.		

**Virginia 4-H Electrical Presentation Rubric (Continued)**

E. Organization	Is able to stay fully detail oriented. Always provides details which support the topic; is well organized.	Is mostly good at being detail oriented. Usually provides details which are supportive of the topic; displays good organizational skills.	Has difficulty being detail oriented. Sometimes overlooks details that could be very beneficial to the issue; lacks organization		
F. Audience View	Speaker uses power of presentation to engage and captivate the audience with the message of the speech.	Speaker presents speech as mere repeating of facts and speech comes across as a report	Speaker bores the audience with lack of enthusiasm and power to deliver the speech.		
G. Summary	Speaker summarizes the presentations major points and the conclusion, is thoughtful and relates them back to introduction and key points.	Speaker attempts to summarize the major points and the conclusion does fully relate back to introduction and key points.	Speaker does not summarize the major points and the conclusion does not relate back to introduction and key points.		
<b>Subject Matter 15 points</b>					
Reason for Choice	The speaker clearly articulated the reasoning behind selecting this topic. Examples utilized demonstrated a clear understanding of the topic.	The speaker attempted to articulate the reasoning behind selecting this topic. Examples utilized demonstrated an understanding of the topic.	The speaker did not communicate the reasoning behind selecting this topic. Examples utilized did not demonstrate understanding of the topic.		
One Basic Theme	The content was limited to a single topic area that can be effectively covered during the allotted time frame.	The content was covered somewhat effectively during the allotted time frame.	The content was broadly covered during the allotted time frame.		
Practical	Complete knowledge and application of the subject matter is demonstrated. The application of the knowledge is conveyed through the content of the speech.	Knowledge of the subject is evidenced, but the speaker fails to relate and convey a clear understanding of the content.	Minimal knowledge of the subject is evidenced in the speech; the content does not support the participant's understanding of the topic.		
<b>Information Presented 20 points</b>					
Accurate	The speaker always provides details which support topic.	The speaker usually provides details which are supportive of the topic	The speaker sometimes overlooks details that could be very beneficial to the topic.		
Up-to -Date	The speaker's information is up to date and realistic examples are clearly communicated.	The speaker's information is current but the examples used do not demonstrate understanding.	The speaker's information is not current and the member does not demonstrate understanding.		
Complete	The speakers examples where original, logical, relevant and clearly explained.	The speaker's examples where effective, but need more originality or thought and clarification.	The speaker's examples where sometimes confusing, leaving the listeners with questions.		

## Virginia 4-H Electrical Presentation Rubric (Continued)

Appropriate for Age and Experience	The topic and information are challenging but appropriate for speaker's age and skill level.	The topic and information are somewhat appropriate for speaker's age and skill level.	The topic could be more challenging for speaker.		
<b>Knowledge of Subject 10 points</b>					
Principals	The speaker shows passion, and obviously has firsthand experience that was effectively communicated.	The speaker shows enthusiasm, and provided examples of the experience.	The speaker shows little enthusiasm, and did not provide examples of the knowledge gained.		
Application	The speaker demonstrated real world application throughout the presentation.	The speaker demonstrated some ability for application during the presentation.	The speaker failed to demonstrate an understanding of the application of the knowledge gained.		
		Total points for the Presentation Multiplied X 2 = Total Score			
			Rank		
<p>Items under the major divisions I, II and III should be scored. Space under "Constructive Comments" is for additional suggestions and ideas. First place will be determined by high score.</p> <p>Time limit is 15 minutes maximum; 10 to 12 minutes preferred.</p>					

## Symbols – Electrical & Electronic

101	Antenna, aerial	123	Outlet, floor
102	Antenna, loop	124	Outlet, lighting
103	Battery, multiple cell	125	Outlet, weather proof
104	Battery, single cell	126	Relay, DPDT
105	Capacitor	127	Relay, SPST
106	Capacitor, variable	128	Resistor
107	Connected wires	129	Resistor, potentiometer
108	Diode	130	Resistor, variable or adjustable
109	Ground	131	Speaker
110	Head phones	132	Switch and outlet combination
111	Inductor, adjustable core	133	Switch, double pole or DPST
112	Inductor, air core	134	Switch, rotary
113	Inductor, iron core	135	Switch, single pole or SPST
114	Junction box	136	Switch, three-way or SPDT
115	Lamps in parallel	137	Switch, weatherproof
116	Lamps in series adjustable	138	Transformer, air core
117	Outlet equipped with drop cord	139	Transformer, iron core
118	Outlet for ceiling lighting or recessed fixture	140	Transistor, FET
119	Outlet for clock	141	Transistor, NPN
120	Outlet, combination radio or TV and power	142	Transistor, PNP
121	Outlet, duplex	143	Transistor, silicon controlled rectifier (SCR)
122	Outlet, fan	144	Transistor, TRIAC
		145	Unconnected wire

## Parts and Equipment – Electrical & Electronic

201	Ammeter Antenna,	248	Plug, polarized
202	aerial Antenna, loop	249	PC board
203	Battery, multiple cell	250	Plug, 240V 20A
204	Battery, single cell	251	Plug, 240V 30A
205	Bell	252	Plug, 240V 50A
206	Capacitor, electrolytic	253	Plug, grounded type
207	Capacitor, non-electrolytic	254	Plug, grounding
208	Capacitor, variable	255	Plug, polarized
209	Circuit breaker, 120V	256	Relay, DPDT
210	Circuit breaker, 240V	257	Relay, SPST
211	Circuit fault indicator	258	Resistor
212	Connector, split bolt	259	Resistor, potentiometer
213	Connector, wedge grip	260	Soldering gun
214	Connector, wire nut	261	Soldering iron
215	Crimp lug	262	Speaker
216	Diagonal cutters	263	Splice, rat tail
217	Diode	264	Splice, Western Union
218	Fuse, cartridge	265	Spring clip
219	Fuse, plug	266	Switch and outlet combination
220	Ground fault circuit interrupter (GFCI)	267	Switch, dimmer
221	Head phones	268	Switch, double pole or DPST
222	Indicator light	269	Switch, four-way
223	Inductor, adjustable core	270	Switch, push button
224	Inductor, air core	271	Switch, rotary
225	Inductor, iron core	272	Switch, single pole or SPST
226	Integrated circuit	273	Switch, three-way or SPDT
227	Junction box	274	Switch, weatherproof
228	Lamp holder	275	Thermostat
229	Lamp holder with pull string	276	Transformer, iron core
230	Lamp socket for three-way bulb	277	Volt meter
231	Lamp socket, normal on/off	278	Volt-Ohm meter or multimeter
232	Lamp, fluorescent	279	Watt meter
233	Lamp, high-pressure sodium	280	Watt-hour meter
234	Lamp, incandescent	281	Wire stripper
235	Lamp, mercury vapor		
236	Lamps in parallel		
237	Lamps in series		
238	Lineman's pliers		
239	Microphone		
240	Needle nose pliers		
241	Outlet, 240V 20A		
242	Outlet, 240V 30A		
243	Outlet, 240V 50A		
244	Outlet, combination radio or TV and power		
245	Outlet, duplex		
246	Outlet, floor		
247	Outlet, weatherproof		

# Example of OpScan that will be used for the Parts Identification Section

		Identification																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Number of Specimens	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Specimen	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Identification																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Number of Specimens	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Specimen	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0