

# Engineering

Superintendent: TBD

Judging occurs the Saturday before Summer Fair in July

## Electricity

1. Members may enter all classes, two exhibits per class.
2. For State Fair: member can exhibit one item per appropriate age and accomplishment level class.
3. Each exhibit piece must be labeled with the member's name, county and class number.
4. If more than one article is contained in the exhibit each article must be labeled with the member's name, county and class number and number items 1 of 2, 2 of 2, etc. This may be done with masking tape, by attaching an index card, or writing directly on the back with a marker. All the articles that comprise the exhibit must be attached to each other or contained in a zip-closure bag.
5. To qualify for judging an Electric Energy Explanation Sheet (862-02 Revised 9/2016) must be attached to the exhibit. Forms are available at the county Extension offices and at the State 4-H website.
6. In addition, intermediates and seniors must include a schematic or circuit diagram of the electricity project. Refer to the 4-H Electric Series Level 2 book Investigating Electricity and the interactive e-learning modules for Activities 5 and 6 and Activities 7-9 on the state website. The Level 4 book Entering Electronics will also be a useful reference for this requirement.
7. The exhibit may be a poster or a three-dimensional display.
8. Individual exhibits are limited in size to 30" wide, 24" deep (front to back), and 36" high.
9. Club exhibits are limited in size to 60" wide, 24" deep and 36" high.
10. Education Poster information: The exhibit may be a poster or a three-panel two-fold display board. Posters may not exceed 22"x26". Individual exhibits are limited in size to 30" wide, 24" deep (front to back), and 36" high. Club exhibits are limited in size to 60" wide, 24" deep and 36" high. An Educational Display Explanation Card (000-01) must be attached. Judging criteria are outlined on 4-H Educational Display Check Sheet (40-463). Both these documents are available at the county Extension Office or on the state 4-H website under Communications.

**Note: Fill in blank in class number (\_\_\_) with one of the following numbers.**

**11 Junior, First year in this project area**

**21 Other Junior**

**12 Intermediate, First year in this project area**

**22 Other Intermediate**

**13 Senior, First year in this project area**

**23 Other Senior**

**34 Club Exhibit**

**862 100 1 \_\_ Electricity, Level 1**

An exhibit on any electricity topic youth learned about in Electric Excitement Level 1 Magic of Electricity addressing any of these themes: workings of an incandescent light bulb, workings of a switch, conductors, insulators, open/closed circuits, series or parallel circuit design, magnetism, workings of a compass, use of a galvanometer, workings of a motor.

**862 100 2 \_\_ Electricity, Level 2**

An exhibit on any electricity topic youth learned about in Electric Excitement Level 2 Investigating Electricity addressing any of these themes: direct and alternating current, workings of a Volt-Ohm meter, Ohm's Law, conductors, insulators, wiring diagrams, measuring voltage, circuits, momentary switches, three-way switches, soldering, "build a burglar alarm."

**862 100 3 \_\_ Electricity, Level 3**

An exhibit on any electricity topic youth learned about in Electric Excitement Level 3 Wired for Power addressing any of these themes: electrical tools, electrical meter, identify wire and cable symbols, light bulbs, appliance nameplate information, electricity usage, receptacles, circuits, grounded and non-grounded outlets, an explanation of wall switch replacement.

**862 100 4 \_\_ Electricity, Level 4**

An exhibit on any electricity topic youth learned about in Electric Excitement Level 4 Entering Electronics addressing any of these themes: identification of electronic parts, soldering and preparing a circuit assembly, demonstrate how a diode controls current flow, develop a circuit that shows the action of a transistor to regulate current flow, understand polarity and voltage limits of LEDs, use of a light sensitive semiconductor, assemble a circuit that gives a meter reading in response to light, show how a Silicon Controlled Rectifier (SCR) triggers an alarm, use an integrated circuit in an amplifier circuit.

**862 101 1 \_\_ Education Poster - Electricity, Level 1**

An educational poster on any electricity topic youth learned about in Electric Excitement Level 1 Magic of Electricity addressing any of these themes: workings of an incandescent light bulb, workings of a switch, conductors, insulators, open/closed circuits, series or parallel circuit design, magnetism, workings of a compass, use of a galvanometer, workings of a motor.

**862 101 2 \_\_ Education Poster - Electricity, Level 2**

An educational poster on any electricity topic youth learned about in Electric Excitement Level 2 Investigating Electricity addressing any of these themes: direct and alternating current, workings of a Volt-Ohm meter, Ohm's Law, conductors, insulators, wiring diagrams, measuring voltage, circuits, momentary switches, three-way switches, soldering, "build a burglar alarm."

**862 101 3 \_\_ Education Poster - Electricity, Level 3**

An educational poster on any electricity topic youth learned about in Electric Excitement Level 3 Wired for Power addressing any of these themes: electrical tools, electrical meter, identify wire and cable symbols, light bulbs, appliance nameplate information, electricity usage, receptacles, circuits, grounded and non-grounded outlets, an explanation of wall switch replacement.

**862 101 4 \_\_ Education Poster - Electricity, Level 4**

An educational poster on any electricity topic youth learned about in Electric Excitement Level 4 Entering Electronics addressing any of these themes: identification of electronic parts, soldering and preparing a circuit assembly, demonstrate how a diode controls current flow, develop a circuit that shows the action of a transistor to regulate current flow, understand polarity and voltage limits of LEDs, use of a light sensitive semiconductor, assemble a circuit that gives a meter reading in response to light, show how a Silicon Controlled Rectifier (SCR) triggers an alarm, use an integrated circuit in an amplifier circuit.

**Other Electricity Exhibit**

1. Each exhibit piece must be labeled with the member's name, county and class number.
2. **Exhibit:** An exhibit relating to electricity addressing a different theme or using a different combination of components from those addressed in 4-H Electricity Levels 1-4. The exhibit may NOT be a poster or a robot (see the exhibit classes for Junk Drawer Robotics). It may be made from a kit, from a pattern or plan not included in 4-H Electricity Levels 1-4, or an item designed by the member.
3. To qualify for judging an Electric Energy Explanation Sheet (862-02 Revised 9/2016) must be attached to the exhibit. Forms are available at the county Extension offices and at the State 4-H website.
4. In addition, intermediates and seniors must include a schematic or circuit diagram of the electricity project. Refer to the 4-H Electric Series Level 2 book Investigating Electricity and the interactive e-learning modules for Activities 5 and 6 and Activities 7-9 on the state 4-H website. The Level 4 book Entering Electronics will also be a useful reference for this requirement

**862 200 001\_\_ Junior Other Electricity Exhibit**

**862 200 002\_\_ Intermediate Other Electricity Exhibit**

**862 200 003\_\_ Senior Other Electricity Exhibit**

**862 200 004\_\_ Club Other Electricity Exhibit**

**Engineering Design**

1. Open to all 4-H members regardless of project enrollment.
2. The display must include two parts: (1) and engineering notebook that details all seven of the components listed below AND (2) an educational poster.
3. Posters are limited in size to 30" by 24".

4. Print the Engineering Display Component Check-off Sheet to complete and include as the first page of the engineering notebook. The Check-off sheet is available on the state 4-H web site for State Fair at the STEM and Industrial Arts Exhibit information page.
5. Exhibits that include pictures, models, diagrams and actual articles must meet the safety standards listed below. Drawings or photos which are an essential part of the display should be firmly attached to the board. Drawings or photos are **required** for the build, test and redesign report sections of the display. Loose materials like soil, bark or sand must be displayed in closed containers.
6. **The following materials will not be allowed on the display for safety reasons:**
  - a. **Living organisms-plants or animals**
  - b. **Any liquids**
  - c. **Aerosol bottles or other pressurized gases**
  - d. **Glass**
  - e. **Hazardous substances**
  - f. **Sharp items**
7. Display (all parts) should be able to last the duration of the fair in good repair.
8. An Educational Display Exhibit Card (000-01) must be attached to the poster. Judging criteria are outlined on the 4-H Engineering Display Evaluation Sheet. Both are available from the county Extension Office or on the state 4-H State Fair Exhibit Information website.
9. Club exhibits are to be entered under the club name and must include the names of all members and leaders. This may be on a separate paper securely attached to the back of the exhibit. A club exhibit will receive one ribbon per exhibit.
10. **Each piece of an exhibit must have the member's name, county and class number securely attached to it. All parts of the display should be attached to one another in some way to keep the exhibit together as a unit.** Single posters may be displayed by hanging or stapling to the wall. All other displays should be free standing.

#### **841 100 001 Junior Engineering Design Display**

#### **841 100 002 Intermediate Engineering Design Display**

#### **841 100 003 Senior Engineering Design Display**

#### **841 100 004 Club Engineering Design Display**

The purpose of this type of exhibit is for members to communicate the processes and outcomes of solving an engineering problem. The display must include two parts: (1) an engineering notebook that details all seven of the engineering design components AND (2) an educational poster.

The engineering notebook will be judged on readability, the inclusion of all seven of the required engineering design components and the Engineering Display Component Check-Off Sheet. Label the engineering notebook with exhibitor's name, county and class number. Intermediates and Senior members must include a bibliography or list of citations for their research in the journal.

The poster should communicate the member's work on engineering design components #(4) through #(7). The poster text must be illustrated with drawings and/or photos. The poster will be judged on the inclusion of the required four engineering design components and also on readability, design and workmanship. Review the Engineering Display Evaluation Sheet for a 2021 Jackson County 4-H Fair Exhibitor Rules, Last Updated May 23, 2021

complete list of judging criteria on the State Fair Exhibit Information page at the link for STEM projects.

### Engineering Design Components

1. A problem statement or need and justification. What is the problem or need? Why is it important to solve?
2. Background research. Who are the users or customers? Are there existing solutions to similar problems? What design mistakes have been made in the past? Intermediates and Senior members must include a bibliography or list of citations for their research.
3. A list of your proposed solutions to the design problem based on your research. A minimum of two proposed solutions is required. Explain why you chose a design to test.
4. A plan or design brief. Plan and outline the process of building your prototype. The design brief defines materials needed, a sketch of the prototype, and a description of how the prototype will function.
5. A build report. List your building steps. List any new problems you encounter. Include drawings or photographs of your process.
6. A test and re-design report. List your testing and redesign steps. The engineering design process may involve many test versions to get to a final prototype. Include drawings or photographs of your process.
7. An explanation of how your final prototype solves the original problem or need. If you were unable to solve the problem or need explain what else you think needs to be done to reach a solution.

# Industrial Arts

**Superintendent: TBD**

**Judging occurs the Saturday before Summer Fair in July**

You may enter ATV, automotive, bicycles, handyman, small engines, snowmobile, etc., projects in the Educational Display classes found in the Communications section of the fair book.

Members may enter all classes, two exhibits per class. For State Fair: one exhibit per class.

## Welding

Projects or exhibits in this class are designed for practical use, artistic purpose, or demonstration of skills. The techniques used can include Shielded Metal Arc Welding/Stick, Gas Metal Arc Welding/MIG, Gas Tungsten Arc Gas Welding/TIG, Flux-cored Arc Welding, Oxy-fuel Welding, or other metal joining techniques that require the heating of surfaces to the point of melting. . A completed "Welding Explanation Sheet" 861-01 is required to qualify the exhibit for judging. Judging criteria are outlined on 4-H Welding Criteria (861-03), available at the county Extension office or on the State 4-H website

**861 100 001 Welding Junior**

**861 100 002 Welding Intermediate**

**861 100 003 Welding Senior**

## Wood Science

### General Wood Exhibits

1. This project area is for an article or a pair of articles made by the 4-H member to form a functional or practical item. Musical instruments and furniture of any kind must be entered in their specific classes. Wood carvings & other artistic creations should be entered under "Carving" or "Casting, Modeling, Assembling" categories listed under Art.
2. A completed "Wood Science Explanation Sheet" 871-02 is required to qualify the exhibit for judging. Judging criteria are outlined on 4-H Wood Science Exhibit Evaluation Sheet (871-01 Revised 11/2016), available at the county Extension office or on the State 4-H website.
3. For County and State Fair: A maximum of three exhibits per member, one each in 871-100, 871-200 and 871-300 is allowed. If a member chooses to exhibit in a First year Junior, First year Intermediate or First year Senior class they may NOT also exhibit in the 871-100 Other class for that level.

**871 100 001 Wood Science Junior First Year**

**871 100 011 Wood Science Other Junior**

**871 100 002 Wood Science Intermediate First Year**

**871 100 012 Wood Science Other Intermediate**

**871 100 003 Wood Science Senior First Year**

**871 100 013 Wood Science Other Senior****871 100 034 Wood Science Club****Specialty Wood Science Exhibits**

1. These classes are for exhibiting musical instruments and furniture of any kind primarily made of wood by the 4-H member.
2. A completed "Wood Science Explanation Sheet" 871-02 is required to qualify the exhibit for judging. Judging criteria are outlined on 4-H Wood Science Exhibit Evaluation Sheet (871-01 Revised 11/2016), available at the county Extension office or on the State 4-H website.

**871 200 001 Wood Science Musical Instrument, Junior****871 200 002 Wood Science Musical Instrument, Intermediate****871 200 003 Wood Science Musical Instrument, Senior****871 300 001 Wood Science Furniture, Junior****871 300 002 Wood Science Furniture, Intermediate****871 300 003 Wood Science Furniture, Senior**

# Science

**Superintendent: TBD**

## **Judging occurs the Saturday before Summer Fair in July**

The purpose of this type of exhibit is for members to communicate the processes and outcomes of a scientific investigation they design and conduct themselves. **The display must include:**

- a question or hypothesis
- an investigative procedure (What was done?)
- the data collection or observation method (How was it collected/ observed)
- a report of the data collected or observations made
- an analysis of the data collected or observations made (How do you interpret the data and evidence?)
- a conclusion addressing the original question or hypothesis (Does the evidence support or refute your claim?).

1. Open to all 4-H members regardless of project enrollment.
2. The exhibit may be a poster or a three-dimensional display. Individual three-dimensional exhibits are limited in size to 48" wide (measured when lying flat), 24" deep (front to back), and 36" high.
3. Club exhibits are limited in size to 60" wide, 24" deep and 36" high. Posters are limited in size to 30" by 24".
4. Exhibits may include pictures, models, diagrams and actual articles if they meet the safety standards listed below. Drawings or photos which are an essential part of the display should be firmly attached to the board. Loose materials like soil, bark or sand must be displayed in closed containers.

**No books or notebooks will be accepted as part of the display. The following materials will not be allowed on the display for safety reasons:**

- **Living organisms- plants or animals**
  - **Any liquids**
  - **Aerosol bottles or other pressurized gases**
  - **Glass**
  - **Hazardous substances**
  - **Sharp items**
5. Display (all parts) should be able to last the duration of the fair in good repair.
  6. An Educational Display Exhibit Card (000-01) must be attached to each exhibit. Each piece of an exhibit must have name, county and class numbers securely attached to it. All parts of the display should be attached to one another in some way to keep the exhibit together as a unit.
  7. Judging criteria are outlined on the 4-H Science Investigation Display Evaluation Sheet (840-100). Both are available from the county Extension Office or the state 4-H website.
  8. Club exhibits are to be entered under the club name but must include the names of all members and leaders. This may be on a separate paper securely attached to the back of the exhibit.
  9. Single posters may be displayed by hanging. All other displays should be free standing.



10. All information contained in the exhibit must be able to be viewed by the public by looking at the display.
11. Intermediate and Senior Exhibits must include a data chart and a graph or other visual representation of the data.

**840 100 001 Junior Science Investigation Display**

**840 100 002 Intermediate Science Investigative**

**840 100 003 Senior Science Investigation Display**

**840 100 004 Club Science Investigation Display**

# Technology

Superintendent: TBD

## Judging occurs the Saturday before Summer Fair in July

1. Members may enter all classes, two exhibits per class.
2. State Fair will allow one exhibit per class.
3. To be eligible for judging, the exhibit must complete the corresponding explanation card. The cards can be found at the local Extension Office or state 4-H website.
4. Exhibit may be a poster or a three-dimensional display.
5. Individual exhibits are limited in size to 30" wide, 24" deep (front to back), and 36" high.
6. Club exhibits are limited in size to 60" wide, 24" deep and 36" high.
7. Posters must not exceed 22"x 28".
8. Judging criteria are outlined on the 4-H Education Display Check Sheet (40-463) available from the county Extension Office or the state 4-H website.

## Aerospace

1. Each exhibit piece must be labeled with the member's name, county and class number. If more than one article is contained in the exhibit each article must be labeled with the member's name, county and class number. This may be done with masking tape, attaching an index card, or writing directly on the back with a marker.
2. All the articles that comprise the exhibit must be attached to each other. The one exception to this is the Rocketry Engineering Journal, which must be included with the Rocket display, but is not required to be attached to it.
3. Each exhibit must include the current year's edition of the appropriate Project Description for the exhibit form filled out neatly and securely attached to the exhibit. *4-H Project Description* sheets are posted on the state 4-H website. Be sure to use the newest version of the Project Descriptions for each technology exhibit. Exhibitors should answer the description page carefully and in full sentences. This is the exhibitor's opportunity to tell the judge about their project.
4. Judging Evaluations: use the Aerospace-Rocketry Evaluation found on the state website. These provide valuable information to youth on creating their project displays.
5. For State Fair Eligibility: A Rocketry Engineering Journal is required. Include the date of each meeting, names of the persons present and a record of what was done. Include photos or illustrations. The information will be used to fill out the Aerospace-Rocketry Project Description sheet for fair. It is important that the member downloads the Aerospace-Rocketry Project Description sheet from 4-H Project Description sheets posted at the state 4-H website to know what is required in the Build Report and the Launch and Flight Reports in the Journal.

## Stage 2, Lift-off

### 851 100 010 Rocketry

Description: An exhibit of two parts: (1) a rocket made by the member from the Aerospace Adventures State 2 project kit, and (2) a Rocketry Engineering Journal. Rockets displayed in this class may only be made from the Estes Gnome™, Wizard™, or Mosquito™ rocket kits. Rockets included in a static display MUST be shown without engines or igniters. All the parts of the rocket and their function should be identified.

Rocket components which must be included and labeled are body tube, nose cone, engine hook, fins, recovery system (streamer or tumble method), launch lug, engine mount, and shock cord. On the display, list any items required to launch the rocket and their function such as the launch system, igniters and recovery wadding. List the appropriate engine size(s) for your rocket and your level of experience. The exhibit will be judged on neatness of labels and workmanship.

### **851 100 020 Educational Poster- Aerospace**

An educational poster on any aerospace or aeronautics topic youth learned about in Aerospace Adventures, stage 2, except rockets. Display should demonstrate knowledge gained in one of these topics: space, kites, hot air balloons, weather or aerospace careers.

## **Stage 3, Reaching New Heights**

### **851 101 010 Rocketry**

Description: An exhibit of two parts: (1) a rocket made by the member from the Aerospace Adventures Stage 3 project kits, and (2) a Rocketry Engineering Journal. In Stage 3 the Rocketry Engineering Journal must include a rocket launch and flight report. Rockets displayed in this class may only be made from the Estes Monarch™, Alpha™, or Alpha III™ rocket kits. Rockets included in a static display MUST be shown without engines or igniters. All the parts of the rocket and their function should be identified. Rocket components which must be included and labeled are body tube, nose cone, engine hook, fins, recovery system (parachute), launch lug, engine mount, and shock cord. On the display, list any items required to launch the rocket and their function such as the launch system, igniters and recovery wadding. List the appropriate engine size(s) for your rocket and your level of experience. The exhibit will be judged on neatness of labels and workmanship.

### **851 101 020 Educational poster- Aerospace**

An educational poster on any aerospace or aeronautics topic youth learned about in Aerospace Adventures, stage 3, except rockets. Display should demonstrate knowledge gained in one of these topics: rocket stabilization methods, airplanes, helicopters, gliders, pilot training, kites, or aerospace careers.

## **Stage 4, Pilot in Command**

### **851 102 010 Rocketry**

Description: An exhibit of two parts: (1) a rocket made by the member from the Aerospace Adventures Stage 4 project kits, and (2) a Rocketry Engineering Journal. In Stage 4 the Rocketry Engineering Journal must include a rocket launch and flight report. Rockets displayed in this class may be made from the Estes Viking™ rocket kit, or other skill level 1 rocket kit where the member designs, constructs and tests the fin configuration. Rockets included in a static display MUST be shown without engines or igniters. All the parts of the rocket and their function should be identified. Rocket components which must be included and labeled are body tube, nose cone, engine hook, fins, recovery system (parachute), launch lug, engine mount, and shock cord. On the display, list any items required to launch the rocket and their function such as the launch system, igniters and recovery wadding. List the appropriate engine size(s) for

your rocket and your level of experience. The exhibit will be judged on neatness of labels and workmanship.

### **851 102 020 Education poster- Aerospace**

An educational poster on any aerospace or aeronautics topic youth learned about in Aerospace Adventures, stage 4, except rockets. Display should demonstrate knowledge gained in one of these topics: construction and use of altitude tracker, pilot training requirements, aerospace science and technology, astronaut training, box kites, helicopters, or aerospace careers.

## **Computers**

1. These classes are open to all 4-H members without being enrolled in the 4-H computer project. See additional exhibit requirements, above, for Technology classes.
2. Each exhibit piece must be labeled with the member's name, county and class number.
3. If more than one article is contained in the exhibit each article must be labeled with the member's name, county and class number. This may be done with masking tape, attaching an index card, or writing directly on the back with a marker. All the articles that comprise the exhibit must be attached to each other.
4. Each exhibit must include the current year's edition of the appropriate Project Description for the exhibit form filled out neatly and securely attached to the exhibit. *4-H Project Description* sheets are posted on the state website. Be sure to use the newest version of the Project Descriptions for each technology exhibit. Exhibitors should answer the description page carefully and in full sentences. This is the exhibitor's opportunity to tell the judge about their project. Judging Evaluations can be found on the state website. These provide valuable information to youth on creating their project displays.
5. In some cases, the exhibit may be a poster or a three-dimensional display. Individual exhibits are **limited** in size to 30" wide, 24" deep (front to back), and 36" high.
6. Club exhibits are limited in size to 60" wide, 24" deep and 36" high. Posters must not exceed 22"x 28".
7. A print version of the program must be submitted unless otherwise noted in the class description below. Youth are responsible for submitting clear directions on how judges can access the files, read code and start programs. You may include a disk, CD or thumb/travel drive as part of your exhibit. All files must be compatible with use on a PC. Submit only one exhibit per disk, CD or thumb/travel drive.
8. Value is placed on youth that can model the learning process, or show how their skills have increased while completing the project.
9. The youth exhibitor should identify a problem to solve or create a work application involving technology. Possible ideas might include: applying existing software programs to a 4-H project area, composing music, developing a game, drawing landscape scenes, designing buildings, publishing club newsletters, creating a website, editing a video, working with photographs, etc.
10. Online projects using Google applications or other Web 2.0 software are acceptable. Youth must make sure clear directions are given in the project explanation so the judges can find and access the project online. Website exhibits must be viewable online or on a disk, CD or thumb/travel drive. Submit a 8 ½ by 11" piece of paper that has a screen shot of the website, title, and URL.

11. Exhibits entered in the “Programming” class must be a program written, translated, or substantially (at least 30%) altered by the 4-H member. In the programming projects please submit a hard copy or thumb/travel drive for programs with excessive pages such as GameMaker software and working files so the judge can see the code. Submit a URL that points to the development software so it can be downloaded. If youth are submitting more than one exhibit or class using a disk, CD or thumb/travel drive each exhibit **MUST** be on a separate drive in a self-closing bag with the associated exhibit tag.

**Note: Fill in blank in class number (\_\_) with one of the following numbers.**

**11 Junior**, First year in this project area

**21 Other Junior**

**12 Intermediate**, First year in this project area

**22 Other Intermediate**

**13 Senior**, First year in this project area

**23 Other Senior**

**34 Club Exhibit**

**861 100 1\_\_ Computer Software Application, Word Processing**

Description: Projects created by youth that show learning in the area of word processing. Project should be an original creation by the participant that shows their word processing skills. See additional exhibit requirements, above, for Computer classes. Evaluation: Use Computer Software Application Evaluation on the state website.

**861 101 1\_\_ Computer Software Application, Excel/Spreadsheet**

Description: Projects created by youth that show learning in the area of spreadsheet design and usage. The exhibit should be a spreadsheet or chart within an Excel document, not a chart imported in to a word processing program. Project should be an original creation by the participant that shows their spreadsheet skills. Intermediate and Senior members are expected to have some formula usage in their project. See additional exhibit requirements, above, for Computer classes. Evaluation: Use Computer Software Application Evaluation found on the state website.

**861 102 1\_\_ Computer Software Application, Presentation Software**

Description: Projects should be created by youth to show learning in the area of presentation design skills. Software can be any current presentation software including online versions like Google applications or voicethread.com. Project should be created by the participant to show their presentation design skills. Youth can also submit video clips of how the presentation was used. (For example: A video clip of the youth using the presentation in a group activity.) See additional exhibit requirements, above, for Computer classes. Evaluation: Use Computer Software Application Evaluation found on the state website.

**861 103 1\_\_ Computer Software Application, Graphic Design/Digital Imaging**

Description: Projects created by youth that show learning in the area of graphic design or digital imaging. Software can be any current presentation software including online versions. Project should be created by the participant to show their graphic design or digital imaging skills. See additional exhibit requirements, above, for Computer classes. Evaluation: Use Computer Software Application Evaluation found on the state website.

### **861 104 1\_\_ Computer Software Application, Database Management**

Description: Projects created by youth that show learning in the area of database management. Project should be an original creation by the participant that shows their spreadsheet skills. Intermediate and Senior members are expected to have apply their projects to real world scenarios. Youth are responsible for submitting clear directions on how judges can access the files. See additional exhibit requirements, above, for Computer classes. Evaluation: Use Computer Software Application Evaluation on the state website.

### **861 105 1\_\_ Computer Software Application, Multimedia Projects**

Description: Projects created by youth that show learning in the area of Multimedia Projects. Software can be any current software including online versions. Project should be created by the participant to show their multimedia skills. In general, multimedia includes a combination of text, audio, still images, animation, video, or animation. Multimedia combines multiple content forms. Youth are responsible for submitting clear directions on how judges can access the files. See additional exhibit requirements, above, for Computer classes. Evaluation: Use Computer Software Application Evaluation available on the state website.

### **861 100 2\_\_ Computer Programming**

Description: Projects created by youth that show learning in the area of programming. Project should be created by the participant to show their programming skills. Hard copy or travel/thumb drive (for programs with excessive pages, such as GameMaker software) of the program must be submitted. It is up to the youth to ensure the program will function or display at Fair. Youth are responsible for submitting clear directions on how judges can access the files. Submit information that allows a judge to look at the programming code in order to evaluate your work on the Computer Programming Project Description Form. If only an executable (compiled) product is submitted the project cannot be judged in the computer programming class. See additional exhibit requirements, above, for Computer classes. Evaluation: Use Computer Programming Evaluation found on the state website.

### **861 100 3\_\_ Computer Hardware Design**

Description: Projects created by youth that show learning in the area of hardware. Project should be an original creation by the participant that shows their computer hardware skills. It is up to the youth to ensure the hardware and project will function or display at Fair. Intermediate and Senior members are expected to have apply their projects to real world scenarios. Youth are responsible for submitting clear directions on how judges can access the files. See additional exhibit requirements, above, for Computer classes. Evaluation: Use Computer Hardware Evaluation.

## 861 100 4\_\_ \_\_ Computer 3D Printer Application

Description: Projects created by youth that show learning in the area of 3D design and printing on a 3D printer. Project should be an original creation by the participant that shows their skills. Each exhibit must include the item created with the 3D printer and a series of screen shots from the design software that show the (1) early stages, (2) middle stages and (3) final stages of the design process. Application Project Description for the exhibit form filled out neatly and securely attached to the exhibit. *4-H Project Description* sheets are posted on the state website. See additional exhibit requirements, above, for Computer classes. Evaluation: Use Computer Software Application Evaluation.

## Robotics

1. Each exhibit piece must be labeled with the member's name, county and class number.
2. If more than one article is contained in the exhibit each article must be labeled with the member's name, county and class number. This may be done with masking tape, attaching an index card, or writing directly on the back with a marker. All the articles that comprise the exhibit must be attached to each other.
3. Each exhibit must include the current year's edition of the appropriate Project Description for the exhibit form filled out neatly and securely attached to the exhibit. *4-H Project Description* sheets are posted on the state website. Be sure to use the newest version of the Project Descriptions for each technology exhibit. Exhibitors should answer the description page carefully and in full sentences. This is the exhibitor's opportunity to tell the judge about their project. Judging Evaluations can be found on the state website. These provide valuable information to youth on creating their project displays.
4. Judging criteria for Educational Posters are outlined on the 4-H Education Display Check Sheet (40-463) available from the county Extension Office or the state 4-H website. An Educational Display Exhibit Explanation Card (000-01) must be attached to each exhibit.
5. See additional exhibit requirements, above, for Robotics classes. Evaluation: Use Robotic Evaluation on state website.

**Note: Fill in blank in class number (\_\_) with one of the following numbers.**

**11 Junior, First year in this project area**

**21 Other Junior**

**12 Intermediate, First year in this project area**

**22 Other Intermediate**

**13 Senior, First year in this project area**

**23 Other Senior**

**34 Club Exhibit**

**863 102 1\_\_ Education poster- Junk Drawer Robotics Level 1**

**863 102 2\_\_ Education poster- Junk Drawer Robotics Level 2**

**863 102 3\_\_ Education poster- Junk Drawer Robotics Level 3****863 103 1\_\_ Robotics****863 104 1\_\_ Junk Drawer Robotics Level 1****863 104 2\_\_ Junk Drawer Robotics Level 2****863 104 3\_\_ Junk Drawer Robotics Level 3****863 102 1\_\_ Education poster- Junk Drawer Robotics Level 1**

An educational poster on any robotics topic youth learned about in Junk Drawer Robotics, Level 1, Give Robots a Hand, addressing the theme robotic arms, hands and grippers.

**863 102 2\_\_ Education poster- Junk Drawer Robotics Level 2**

An educational poster on any robotics topic youth learned about in Junk Drawer Robotics, Level 2, Robots on the Move, addressing the theme moving, power transfer and locomotion.

**863 102 3\_\_ Education poster- Junk Drawer Robotics Level 3**

An educational poster on any robotics topic youth learned about in Junk Drawer Robotics, Level 3, Mechatronics, addressing the theme the connection between mechanical and electronic elements.

**863 103 1\_\_ Robotics**

Description: An exhibit of two parts: (1) a robot made by the member, and (2) a Robotics Engineering Journal. Projects should be a robot created by youth. For the purposes of this project exhibit, a robot is defined as a machine that is electrical and mechanical and is guided by a computer program. They can be created from kits or from miscellaneous parts. For county fair all robots will be returned immediately after face to face judging. For State Fair: all robots will be returned after fair. More weight is given for youth designed projects. Robots will be judged on structural stability, creativity, functionality. Youth are responsible for sharing/submitting clear directions on how judges can access the files and make the robot function. Robot and a full description of what it is meant to accomplish must be submitted for State Fair eligibility.

**For State Fair Eligibility:** A Robotics Engineering Journal is required. Include the date of each meeting, names of the persons present and a record of what was done. Include photos, illustrations and examples of software code developed or changed. The journal information will be used by the member to fill out the Robotics Project Description sheet for fair. It is important that the member downloads the Robotics Project Description sheet from *4-H Project Description* sheets posted on the state website to know what is required in the Journal. Be sure the Journal includes the problem/task you choose to solve or what you hoped to accomplish. What were the goals of this project? What is the robot programmed to do? List the steps you used to solve the problem or accomplish your task. What materials (software, books, online resources, kits) did you use? Explain your results and provide a thoughtful evaluation of the project. If you were to do it again, how/what would you do differently or how would you improve your project? Who was



involved in this project? How did you come up with the idea for this project? What was the most difficult aspect of this project?

**863 104 1\_\_ Junk Drawer Robotics Level 1**

An exhibit on any robotics topic youth learned about in Junk Drawer Robotics, Level 1, Give Robots a Hand, addressing the theme robotic arms, hands and grippers or trebuchet-type catapult design. An exhibit of two parts: (1) an exhibit made by the member and (2) a photocopy of the corresponding design and build pages from the Junk Drawer Robotics Youth Robotics Notebook.

**863 104 2\_\_ Junk Drawer Robotics Level 2**

An exhibit on any robotics topic youth learned about in Junk Drawer Robotics, Level 2, Robots on the Move, addressing the theme moving, power transfer and locomotion. Design, build project options are the Clipmobile, Can-Can Robot, Es-Car-Go or Sea Hunt. An exhibit of two parts: (1) an exhibit made by the member and (2) a photocopy of the corresponding design and build pages from the Junk Drawer Robotics Youth Robotics Notebook.

**863 104 3\_\_ Junk Drawer Robotics Level 3**

An exhibit on any robotics topic youth learned about in Junk Drawer Robotics, Level 3, Mechatronics, addressing the theme the connection between mechanical and electronic elements. Design, build project options are Forward and Reverse, Wall Follower Design, Breadboard, Say What? or "Build Your Robot." An exhibit of two parts: (1) an exhibit made by the member and (2) a photocopy of the corresponding design and build pages from the Junk Drawer Robotics Youth Robotics Notebook.