

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 at <http://oregon.4h.oregonstate.edu/node/1858>.

See additional exhibit requirements, above, for Computer classes. Evaluation: Use Computer Hardware Evaluation available at: <http://oregon.4h.oregonstate.edu/node/1858>

ROBOTICS

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. All the articles that comprise the exhibit must be attached to each other.

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 at <http://oregon.4h.oregonstate.edu/node/1858>. 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 at: <http://oregon.4h.oregonstate.edu/node/1858>. These provide valuable information to youth on creating their project displays.

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. Club exhibits are limited in size to 60" wide, 24" deep and 36" high.** Posters must not exceed 22"x 28".

- 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/ Lego 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

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

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.

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. Club exhibits are limited in size to 60" wide, 24" deep and 36" high.** Posters must not

exceed 22"x 28". 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 at <http://oregon.4h.oregonstate.edu/node/1853>. An *Educational Display Exhibit Card* (000-01) must be attached to each exhibit.

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.

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. Club exhibits are limited in size to 60" wide, 24" deep and 36" high.** Posters must not exceed 22"x 28". 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 at <http://oregon.4h.oregonstate.edu/node/1853>. An *Educational Display Exhibit Card* (000-01) must be attached to each exhibit.

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.

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. Club exhibits are limited in size to 60" wide, 24" deep and 36" high.** Posters must not exceed 22"x 28". 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 at <http://oregon.4h.oregonstate.edu/node/1853>. An *Educational Display Exhibit Card* (000-01) must be attached to each exhibit.

863 103 1 __ Robotics / Lego 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. 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 submitting clear directions on how judges can access the files and make robot function. Robot and a full description of what it is meant to accomplish must be included.

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 the fair. It is important that the member downloads the Robotics Project Description sheet from 4-H Project Description sheets posted at <http://oregon.4h.oregonstate.edu/node/1858> 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? See additional exhibit requirements, above, for robotics classes. Evaluation: Use Robotic Evaluation available at <http://oregon.4h.oregonstate.edu/node/1858>

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 Handbook.

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 Handbook.

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 Handbook.

Engineering ELECTRICITY

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 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.

To qualify for judging an Electricity 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: <http://oregon.4h.oregonstate.edu/special-events/state-fair/cm-set>

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 posted at <http://oregon.4h.oregonstate.edu/projects/sci-tech-eng/electricity>. The Level 4 book *Entering Electronics* will also be a useful reference for this equipment.

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. Club exhibits are limited in size to 60" wide, 24" deep and 36" high.

- 862 100 1 __ Electricity, Level 1**
862 100 2 __ Electricity, Level 2
862 100 3 __ Electricity, Level 3
862 100 4 __ Electricity, Level 4
862 101 1 __ Education Poster - Electricity, Level 1
862 101 2 __ Education Poster - Electricity, Level 2
862 101 3 __ Education Poster - Electricity, Level 3

862 101 4 __ Education Poster - Electricity, Level 4

Note: Fill in the blank (__) 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, magnesium, 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, magnesium, workings of a compass, use of a galvanometer, workings of a motor. 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 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 <http://oregon.4h.oregonstate.edu/special-events/state-fair/cm-communication>

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