

## **2024 SCIENCE, ENGINEERING AND TECHNOLOGY**

All exhibits must be labeled. Label each item with the exhibitor name, project division, exhibit class number and years in the project before entering at county fair. The name and county of each exhibitor should appear separately on the back of each board, poster or article and on the front cover of the notebooks so owner of exhibit may be identified if the entry tag is separated from the exhibit. Each individual is limited to one exhibit per class. All static exhibits must have received a purple ribbon at the county fair to advance to the State Fair.

Several classes require a display board which should be a height of 24 inches and not to exceed 1/4" in thickness. A height of 23 7/8" is acceptable to allow for the saw kerf (width) if two 24-inch boards are cut from one end of a 4' X 8' sheet of plywood. Nothing should be mounted within 3/4" of the top or bottom of the board. (Example: Woodworking & Electricity.) For the safety of the models, models must be brought to the fair on a steady surface. Board such as plywood, composition board, or particle-type lumber must be used for demonstration displays and LEGO models.

Fabricated board such as plywood, composition board, or particle-type lumber may be used for demonstration displays.

Demonstration boards should be sanded and finished to improve their appearance. The finish on a demonstration board will be judged as a woodworking exhibit. Demonstration boards should include an overall title for the display, plus other necessary labeling.

Reports should be written using the scientific method whenever possible (background, the question or hypothesis, what you plan to do and what you did, method used and observations, results: what you learned. All reports should be computer generated and enclosed in a clear, plastic cover. The reports should be attached securely to the display.

4-H'ers can exhibit in only one level, and once they have progressed to a higher level they cannot exhibit or enroll in a lower project level. This does not apply to Aerospace Model Rockets Levels 3 and 4 and Woodworking Levels 3 and 4.

\*H930001. Careers Interview – Interview someone who is working in any field associated with science, engineer and technology and research that career (i.e. computer programmer, architect, engineer, pilot, etc.). Interviews can either be written or in a multimedia format (CD/DVD). Written interviews should be in a notebook. Written reports should be 3 to 5 pages, double spaced, 12-point font, and 1" margins. Multimedia reports should be between 3 to 5 minutes in length.

### **SMALL ENGINES**

**Purple, \$4; Blue, \$3.50; Red, \$3; White, \$2.50**

#### **UNIT 1**

H890001 Small engines display/item — Show an application of one of the concepts learned in the Crank It Up project. Examples: small engine parts, tools, sources of power, lubrication, air filters, cooling systems, plugs and safety. Exhibit could be a poster display or an actual item.

#### **UNIT 2**

H890002 Small engines display/item — Show an application of one of the concepts learned in the Warm It Up project. Examples: comparison of engine oil types, transmissions or safety related to engines. Exhibit could be a poster display or an actual item.

#### **UNIT 3**

H890003 Engine display/item — Display/Item should exemplify one of the lessons learned in the Tune It Up project. Examples: diagnostic tools, fuel systems, ignition systems. If a complete engine is exhibited it will not be started. However, display needs to report process of building/rebuilding engine and how/where engine will be utilized (i.e. lawn mower, weed eater, snow blower, etc.).

### **RESTORED VEHICLE**

**Purple, \$4; Blue, \$3.50; Red, \$3; White, \$2.50**

All entries in Class 891001 or 891002 must be approved by the county office at least five days before pre-entry of county fair to reserve space for the exhibit. A report must be included, covered by clear plastic, describing source, cost, repair parts list and what was done.

A before and after photo story should be included. It will be the exhibitor's responsibility to protect the display from the general public.

H891001 Automobile, motorcycle, tractor or multi-cylinder engine that has been restored and/or overhauled in a 4-H petroleum power project to original specifications.

H891002 Automobile, motorcycle, tractor or multi-cylinder engine that has been customized from original specifications.

#### **4-WHEELIN'**

**Purple, \$3; Blue, \$2.50; Red, \$2; White, \$1.50**

H895001 Tool Box — Put together using guidelines from the 4 Wheelin' manual. Include a description of the kit's purpose and a list of individual contents.

H895002 4 Wheelin' Vehicle — The vehicle needs to be mounted on a ¾-inch-thick base that is equal to (or less than) 12 inches by 12 inches. Make the vehicle stable. Do not attach side boards or backdrops to the display.

A report, protected with a clear plastic cover, needs to be included with this exhibit and should include the following information:

1. Vehicle specification.
2. Results of driving, pulling and climbing tests.
3. Track diagram.
4. Pictures.

H895003 Track or Course Designs Drawing — Scale drawing to actual track or course design. Indicate the direction the course is used with arrows. Display on a 14-inch by 22-inch poster.

**Purple, \$2; Blue, \$1.50; Red, \$1; White, \$0.50**

H895004 Poster should exemplify one of the lessons learned in the 4 Wheelin' project. Posters can be any size up to 28 inches by 22 inches.

#### **STEM ENERGY**

This category provides 4-H exhibitors a way to present their ideas about energy. Through participation in this category 4-H'ers will learn more about physics, friction, energy, and elasticity. In addition, participants will make a display to go along with their findings.

The name and county of each exhibitor should appear on the back of each board or article and on the front cover of the notebooks so the exhibit may be identified if the entry tag is separated from the exhibit. Each exhibitor is limited to one exhibit per class.

Display boards should be a height of 24 inches and not to exceed ¼ inches in thickness. A height of 24 7/8 inches is acceptable to allow for the saw kerf if two 24-inch boards are cut from one end of a 4-foot by 8-foot sheet of plywood. Nothing should be mounted within ¾ inch of the top or bottom of the board. Fabricated board such as plywood, composition board, or particle-type lumber may be used for demonstration displays. Demonstration boards should be sanded and finished to improve their appearance. Demonstration boards should include an overall title for the display, plus other necessary labeling.

Reports should be written using the scientific method whenever possible (background, the question or hypothesis, what you plan to do and what you did, method used in observation, results: what you learned.) All reports should be computer generated and enclosed in a clear, plastic cover. The reports should be attached securely to the display.

Posters can be any size up to 28" inches by 22" inches when ready for display. Example: tri-fold poster boards are not 28 inches by 22 inches when fully open for display.

\*Denotes State Fair Entry

**Purple, \$3; Blue, \$2.50; Red, \$2; White, \$1.50**

\*H900001. Create and Compare Energy Resources Poster – Poster should explore 2 alternative/renewable energy resources. Compare and contrast the 2 resources including two of the following information: amount of energy created, costs of production, usability of the energy, pros/cons of environmental impacts, etc. Posters can be any size up to 28 inches by 22 inches.

\*H900002. Experiment Notebook – Notebook will explore the scientific method involving alternative/renewable energy sources. Information required. 1.) Hypothesis 2.) Research 3.) Experiment 4.) Measure 5.) Report or Redefine Hypothesis.

\*H900003. Solar as Energy Display/Poster - Item should be the original design of the 4-Her. Include the item, or a picture if item is in excess of 6' tall or 2' X 2'. Include a notebook of why the item was designed and how it harnesses the power of the sun. Examples include solar ovens, solar panels, etc.

\*H900004. Water as Energy Display/Poster - Item should be the original design of the 4-Her. Include the item, or a picture if item is in excess of 6' tall or 2' X 2'. Include a notebook of why the item was designed and how it harnesses the power of water.

\*H900005. Wind as Energy Display/Poster – Item should be the original design of the 4-Her. Include the item, or a picture if item is in excess of 6' tall or 2' X 2'. Include a notebook of why the item was designed and how it harnesses the power of wind.

\*H900006. Other Nebraska Alternative Energy –Notebook should explore Nebraska an alternative energy source besides wind, water, and solar power. Include information on type of power chosen, infrastructure for distribution, what resources are needed to create this alternative resource, cost of production, and potential uses of bio-products. Examples include geothermal, biomass, ethanol, bio-diesel, methane reactors, etc.