DEPARTMENT H – **SET WOODWORKING**

In this category, 4-H'ers have the opportunity to create exhibits about varying levels of woodworking. In addition, participants can also create informational exhibits about their woodworking projects. Through involvement in this category, 4-H'ers will be better educated about the topic and better their woodworking skills.

The ability to build objects as designed by another person is an important life skill. Professional woodworkers often are hired to build objects to exacting specifications as laid out in a written plan.

Requirements: All articles exhibited **MUST** include a plan (with drawings or sketch or blueprint) stating dimensions and other critical instructions a builder would need to know to build the project. Plans may include narrative instructions in addition to the dimension drawings and include any alterations to the original plan. Part of the score depends on how well the project matches the plans. If the plans are modified, the changes from the original need to be noted on the plans. All plans used for making the article **MUST** be securely attached and protected by a clear plastic cover. **TWO** articles per class may be entered in Class 1, 2, 3, and 4. All projects must have appropriate finish.

DIVISION 911
Class
UNIT 1 - Measuring Up

901. **First Woodworking Article** – Item made using skills learned in the Measuring Up project manual. Examples include: recipe holder, stilts or other skill level appropriate item. Items should be entered with construction plans.
902. **Second Woodworking Article** – Item made using skills learned in the Measuring Up project manual. Examples include: recipe holder, stilts or other skill level appropriate item. Items should be entered with construction plans.
903. **Third Woodworking Article** – Item made using skills learned in the Measuring Up project manual. Examples include: recipe holder, stilts or other skill level appropriate item. Items should be entered with construction plans.

UNIT 2 - Making the Cut

904. **Woodworking Article** – Item made using skills learned in the Making the Cut project manual. Examples include: birdhouse, foot stool, napkin or letter holder.

UNIT 3 - Nailing It Together

*1. **Woodworking Article** – Item should be made using either joints, hinges, dowels, or a dado joining using skills learned in the Nailing It Together project manual. Item is requited to be appropriately finished. Examples include: bookcase, coffee table or end table.
*2. **Woodworking Display** – Display exemplifying one of the principles learned in the Nailing It Together project manual. Examples include: measuring angles, wood lamination and joint types.
*3. **Recycled Woodworking Display** (SF91) – Article made from recycled, reclaimed or composite wood. Article **MUST** be appropriately finished and/or sealed and utilize one or more woodworking techniques from page 2 of the Unit 3 manual. Exhibit **MUST** include the woodworking plan and a minimum one-page report of how the engineering design process was used to develop the woodworking plan. **Engineering Design Process** (1) State the problem (Why did you need this item?) (2) Generate possible solutions (How have others solved the problem? What other alternatives or designs were considered?) (3) Select a solution (How does your solution compare on the basis of cost, availability, and functionality?) (4) Build the item (What was your woodworking plan, and what processes did you use to build your item?) (5) Reason for article finish (What type of finish, how did you finish or why you choose this finish?) (6) Evaluate (How does your item solve the original need?) (7) Present results (How would you do this better next time?)
*4. **Composite Wood Project –** 60% of the project **MUST** be wood and 40% made from other materials such as metal, rubber, resin, etc. All plans and plan alterations **MUST** be attached to the article. Protect plan with a cover. If project is designed to be outside, it is required to have appropriate outdoor finish.
*5. **Outdoor Wood Project Made With Treated Wood –** Treated wood projects do **NOT** have to have a finished coating. All plans and plan alterations **MUST** be attached to the article. Protect plans with a cover.

UNIT 4 - Finishing Up

*6. **Woodworking Article** – Item made using skills learned in the Finishing Up project manual. Examples include: dovetailing, making a pen using lathe, overlays, using a router, etc. Item is required to be appropriately finished.
*7. **Woodworking Display** – Display exemplifying one of the principles learned in the Finishing Up project manual. Examples include: career opportunities, types of finishes, or dovetailing.
*8. **Recycled Woodworking Display** (SF91) – Article made from recycled, reclaimed or composite wood. Article **MUST** be appropriately finished and/or sealed and utilize one or more woodworking techniques from page 2 of the Unit 4 manual. Exhibit **MUST** include the woodworking plan and a minimum one-page report of how the engineering design process was used to develop the woodworking plan. **Engineering Design Process** (1) State the problem (Why did you need this item?) (2) Generate possible solutions (How have others solved the problem? What other alternatives or designs were considered?) (3) Select a solution (How does your solution compare on the basis of cost, availability, and functionality?) (4) Build the item (What was your woodworking plan, and what processes did you use to build your item?) (5) Reason for article finish (What type of finish, how did you finish or why you choose this finish?) (6) Evaluate (How does your item solve the original need?) (7) Present results (How would you do this better next time?)

DEPARTMENT H – **SET WELDING**

This category helps 4-H'ers learn the basics of welding. In addition, 4-H'ers get the opportunity to present their knowledge on the topic and display what they have made. Involvement in SET Welding gives 4-H'ers a first-hand experience in a skill that can be used for a lifetime. For help getting started with this project, contact the extension office.

(All metal welding processes accepted.) All welds exhibited in Class 1 or 2 **MUST** be mounted on a 12" high x 15" long display board **NOT** to exceed 3/8" thickness. Attach each weld on a wire loop hinge or equivalent, so judge can look at the bottom side of the weld when necessary. Each weld **SHOULD** be labeled with information stating (1) type of welding process (stick, MIG, TIG, Oxy-Acetylene, etc.); (2) kind of weld; (3) welder setting; (4) electrode/wire/rod size; and (5) electrode/wire/rod ID numbers. **Attach a wire to display board so it can be hung like a picture frame. NO picture frame hangers accepted.** If no plans are included with welding article or welding furniture, **item will be disqualified**.

4-H Welding Project Tips & Suggestions:

Class 1 – (1) All welds should be made with the same electrode/wire/rod size and number. (2) Welds should be made only on one side of metal so penetration can be judged. (3) Welds should be cleaned with chipping hammer and wire brush. Apply a coat of light oil (penetrating oil) to the metal to prevent rusting. Wipe off excess oil. (4) It is suggested that all welds be on the same size and thickness of metal. These pieces, referred to as coupons, should be 1½ " to 2" wide and 3½" to 4" long. A good way to get this size is to buy new cold rolled strap iron and cut to length. The extra width is needed to provide enough metal to absorb the heat from the welding process and prevent the coupons from becoming too hot before the bead is completed. Narrower coupons will become very hot, making an average welder setting too cold at the bead start, just about right in the middle, and too hot at the end. The correct way to weld narrow strips is to make short beads and allow time to cool, however this project requires a full-length bead.

Stick Welding – Suggested coupon thickness is 1/4" if using 1/8" rod. Suggested rod is AC and DC straight or reverse polarity – first E-7014, second E-6013.

MIG Welding – Suggested coupon thickness is 1/4" if using .035 wire and 1/8" if using .023 wire.

Oxy-Acetylene – Suggested coupon thickness is 1/8". Suggested rod is 1/8" mild steel rod.

Class 2 – (1) It is suggested that all welds be on same size and thickness of metal. These pieces are referred to as coupons. The welds can be on one coupon that is about 4"x4" or on individual coupons that are about 2"x4" and 1/4" thick. Suggested rods for this class of position welds for AC and DC straight or reverse polarity is, first E-6013, second E-7014 and E-6010 for DC reverse polarity only. (2) Welds should be cleaned with a chipping hammer and wire brush. Apply a coat of light oil (penetrating oil) to the metal to prevent rusting. Wipe off excess oil.

Class 3 & 4 – (1) All welds should be cleaned or protected from rust with paint or light oil. Plans are to be complete enough that if they were given to a welding shop, the item could be made without further instructions. Bill of materials should include a cost for all items used including steel, electrodes, paint, wheels, etc.

DIVISION 920

Class

*1. **Welding Joints** – A display of one butt, one lap, and one fillet weld.

*2. **Position Welds** – A display showing three beads welded in the vertical down, horizontal and overhead positions.

*3. **Welding Article** – Any shop article where welding is used in the construction. 60% of item **MUST** be completed by 4-H'er and notes regarding laser welding or machine welding **MUST** be included. All plans, plan alterations, and a bill for materials **MUST** be attached to the article. Protect plans with a cover. If project is designed to be outside, it is required to have appropriate outdoor finish.

*4. **Welding Furniture** – Any furniture with 75% welding is used in the construction. 60% of item **MUST** be completed by 4-H'er and notes regarding laser welding or machine welding **MUST** be included. All plans, plan alterations, and a bill for materials **MUST** be attached to the article. Protect plans with a cover. If project is designed to be outside, it is required to have appropriate outdoor finish.

*5. **Plasma Cutter/Welder Design** – Plasma cutters/welders allowed for detailed design(s) to butt cut into metal. 4-H'ers will create a notebook describing the design process to create the "artwork" to butt cut into the metal. **This Exhibit Is Not Eligible for Entry at the State Fair.** In the notebook include: (1) A photo (front and back) of the finished project. Also, include detailed photographs of the project to allow judge to examine cuts. (2) Instructions on how the design was created. This allows for replication of the project. (3) Lessons learned or improvements to the project.

*6. **Composite Weld Project** – 60% of the project **MUST** be welded and 40% made from other materials such as wood, rubber, etc. All plans, plan alterations, and a bill for materials **MUST** be attached to the article. Protect plans with a cover. If project is designed to be outside, it is required to have appropriate outdoor finish.