

DIVISION 911 – WOODWORKING

See General Information / Rules at beginning of Department: Science, Engineering and Technology.

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. 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 how to build the project. Plans may include narrative instructions in addition to the dimension drawings and include any alternations to the original plan. Score depends on how well the project matches the plan. If plans are modified, 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.

MEASURING UP - UNIT 1

H911-901 Woodworking Article using skills learned in the Measuring Up Project.

H911-902 Woodworking Display – show an application of one or more of the concepts learned in the project. Display could be a poster or an actual item.

H911-903 One additional item made in the project

MAKING THE CUT - UNIT 2

H911-904 Woodworking Article using skills learned in the Making the Cut Project.

H911-905 Woodworking Display – show an application of one or more of the concepts learned in the project. Display could be a poster or an actual item.

H911-906 One additional item made in the project

NAILING IT TOGETHER-UNIT 3

H911-001* Woodworking Article - Item should be made using either joints, hinges, dowels or a dado joining made using skills learned in the Nailing it Together manual. Item is required to be appropriately finished. Examples include: bookcase, coffee table or end table.

H911-002* Woodworking Display - Display exemplifying one of the principles learned in the Nailing It Together project. Examples include: measuring angles, wood lamination and joint types.

H911-003* Recycled Woodworking Display - 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.

Engineer Design Process:

1. State the problem (Why did you need this item?)
2. Generate possible solutions (How have others solved this problem? What other alternatives or designs were considered?)
3. Select a solution (How does our 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 our item?)
5. Reason for article finish (What type of finish, how did you finish or why you chose this finish?)
6. Evaluate (How does your item solve the original need?)
7. Present results (How would you do this better next time?)

H911-907 One additional item made in the project

FINISHING UP - UNIT 4

H911-004* Woodworking Article - Item made using skills learned in the Finishing It Up Project. Examples include: dovetailing, making a pen using a lathe, overlays, using a router, etc. Item is required to be appropriately finished.

H911-005* Woodworking Display - Display exemplifying one of the principles learned in the Finishing It Up Project. Examples include: career opportunities, types of finishes, or dovetailing.

H911-006* Recycled Woodworking Display - 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 design and engineering process was used to develop the woodworking plan.

Engineer Design Process:

1. State the problem (Why did you need this item?)
2. Generate possible solutions (How have others solved this problem? What other alternatives or designs were considered?)
3. Select a solution (How does our solution compare on the basis of cost, availability and functionality?)
4. Reason for article finish (What type of finish, how did you finish or why you chose this finish?)
5. Build the item. (What was your woodworking plan, and what processes did you use to build our item?)
6. Evaluate (How does your item solve the original need?)
7. Present results (How would you do this better next time?)

H911-010* Careers Interview – Interview someone who is working in the field of woodworking and research that career. 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.

H911-908 One additional item made in the woodworking project

DIVISION 920 – WELDING

See General Instructions, Science, Engineering and Technology. All metal welding process accepted. All welds exhibited in Class 1 or 2 must be mounted on a 12" high x 15" long display board of thickness not to exceed 3/8". Attach each weld on a wire loop hinge or equivalent, so the judge can look at the bottom side of the weld when necessary. Each weld should be labeled with information stated:

- 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. If no plans are included with the welding article or welding furniture, item will be disqualified.

ARCS AND SPARKS

4-H welding project tips and 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 1.5 to 2 inches wide and 3.5 to 4 inches 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 - 1/4" if using 1/8" rod.
- Suggested rod - AC and DC straight or reverse polarity - first E-7014, second E-6013

MIG Welding:

- Suggested coupon thickness - 1/4" if using .035 wire and 1/8" if using .023 wire.

Oxy-Acetylene:

- Suggested coupon thickness - 1/8". Suggested rod - 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" x 4" or on individual coupons that are about 2" x 4" 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 and 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.

H920-001* Welding Joints - A display of one butt, one lap, and one fillet weld.

H920-002* Position Welds - A display showing three beads welded in the vertical down, horizontal, and overhead positions.

H920-003* Welding Article - Any shop article where welding is used in the construction. 60% of item must be completed by 4-Her 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 clear cover. If project is designed to be outside, it is required to have appropriate outdoor finish because project may be displayed outside.

H920-004* Welding Furniture - Any furniture with 75% welding is used in the construction. 60% of item must be completed by 4-Her and notes regarding laser welding or machine welding must be included. All plans, plan alternations, dimensions 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 because project may be displayed outside.

H920-005 Plasma Cutter/Welder Design - Plasma cutters/welders allowed for detailed design(s) to butt cut into metal. 4Hers 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:

- a) A photo (front and back) of the finished project. Also include detailed photographs of the project to allow judges to examine cuts.
- b) Instructions on how the design was created. This allows for replication of the project.
- c) Lessons learned or improvements to the project.

H920-901 One additional item made in the welding project