# Agricultural Science I

**Curriculum Guide:** *Agricultural Mechanics Unit for Agricultural Science I*

**Unit:** I. Common Hand Tools

**Unit Objective:**

Students will demonstrate an understanding of common hand tools used in woodworking and metalworking by designing, organizing, and participating in a tool identification contest.

**Show-Me Standards:** 1.8, CA6

**References:**

*Agricultural Mechanics Unit for Agricultural Science I*. University of Missouri-Columbia, Instructional Materials Laboratory, 2002.

Craftsman. Accessed November 7, 2003, from www.craftsman.com/.

*Missouri CDE Handbook.* Accessed November 6, 2003, from http://www.dese.mo.gov/divcareered/ag_cde_guidelines.htm.

Missouri FFA Agricultural Mechanics Career Development Event. Accessed November 19, 2003, from http://web.missouri.edu/~pavt0689/statecon.html.

Sears, Roebuck, and Co. Accessed November 25, 2003, from www.sears.com.

SK Hand Tool Corporation. Accessed November 7, 2003, from http://www.skhandtool.com/.

Snap-on Technologies, Inc. Accessed November 7, 2003, from http://www.snapon.com/.

Students may use additional outside sources to complete this activity.

**Instructional Strategies/Activities:**

- Students will engage in study questions in lessons 1 and 2.
- Students will complete AS 1.1, Identifying Common Woodworking Hand Tools; and AS 2.1, Identifying Common Metalworking Hand Tools.
- Additional activities that relate to the unit objective can be found under the heading "Unit I Activity" in the following location: p. I-59.

**Performance-Based Assessment:**

Students will work in groups to design, organize, and participate in a tool identification contest, similar to the tool identification portion of the Agricultural Mechanics Career Development Event. Each group will be responsible for a portion of the tools in the contest and will also compete as a team in the whole event.

Assessment will be based on the content and presentation of the assigned tool display and performance in the whole event.

## Agricultural Mechanics Unit for Agricultural Science I
## Unit I—Common Hand Tools
## Instructor Guide

**The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.**

1. Divide students into groups and assign each group a list of common woodworking and metalworking hand tools to collect for a tool identification contest.
   a. Each group will also compete in the whole event as a team.
   b. Lists should only include tools that have been discussed by the instructor with all the students as a group.

2. This activity will help prepare students for the tool identification portion of the Agricultural Mechanics Career Development Event.
   a. Explain or review event guidelines as needed.
   b. Refer to the *Missouri CDE Handbook* for guidelines regarding the Agricultural Mechanics Career Development Event. The *Missouri CDE Handbook* is available from the Missouri Department of Elementary and Secondary Education at http://www.dese.mo.gov/divcareered/ag_cde_guidelines.htm.

3. Have students collect their assigned hand tools and display them at a station in the event.

4. Students may consult the instructor for assistance if they have difficulty locating specific tools, but they must be responsible for the overall content and presentation of their portion of the event. Pictures may be substituted for actual tools, if desired.

5. Verify the students' identification of their assigned tools prior to the contest and suggest corrections as needed.

6. Have students identify the tools. Use the tool identification form and tool list found in the *Missouri CDE Handbook* or use a different tool ID form, if preferred.
   a. Have each student identify all the tools in the contest to determine the student's individual score.
   b. Combine the individual scores of the group members to determine the team score for each group.

7. The final assessment score will be based on the content and presentation of the assigned tool display and the student's individual contestant score.

8. Present an appropriate award to the high-scoring team and individual, if desired.

9. NOTE: The following units in this curriculum guide also include material and competencies that are addressed by the Agricultural Mechanics Career Development Event: Unit IV, Tool Sharpening and Reconditioning; Unit V, Arc Welding; and Unit VI, Oxyfuel Cutting. Some or all of the performance-based assessment activities for these units could be combined to form a mini Agricultural Mechanics Career Development Event, if desired. To conduct a mini Agricultural Mechanics Career Development Event, maintain the same student groups for all of the performance-based assessment activities. An expanded score sheet is included at the end of each of these units that can be used to track individual and group performance in the mini CDE.

10. ADDITIONAL ACTIVITIES:
    a. Have a scavenger hunt for tools. Give each student the name of a tool in the shop. Have students locate and present their assigned tool. Guide or correct students' tool selections as needed. Have students return the tools to their assigned location following the scavenger hunt.
    b. Have students locate pictures of tools in catalogs or from tool manufacturers' web sites. Have students paste the pictures onto index cards to make tool identification cards. Tool ID cards could be used as flash cards for review or in place of actual tools in the tool identification activity above.
    c. For further review, an additional unit-level activity, Woodworking and Metalworking Tool Collection, is included on p. I-59 of the Instructor Guide. This activity requires students to plan a hand tool collection for the shop based on a budget set by the instructor. Students must list the tools they would purchase, answer key questions about the tools, and stay within their budget. The purpose of this activity is to familiarize students with a variety of hand tools and to emphasize the importance of choosing tools wisely and taking care of the tools that are available. Answers will vary.

**Agricultural Mechanics Unit for Agricultural Science I**
**Unit I—Common Hand Tools**
**Student Handout**

1. You will work with a group to collect woodworking and metalworking hand tools for a tool identification contest.

2. Your group will also compete in the whole event as a team.

3. You will be responsible for the content and presentation of your portion of the contest.

4. Your final assessment score will be based on the content and presentation of your assigned tool display and your individual contestant score.

**Agricultural Mechanics Unit for Agricultural Science I**
**Unit I—Common Hand Tools**
**Scoring Guide**

**Name** _____

| Assessment Area | Criteria | 0 Points | 1 Point | 2 Points | 3 Points | 4 Points | Weight | Total |
|---|---|---|---|---|---|---|---|---|
| Thoroughness and Accuracy of Contest Display | Display includes all assigned tools and tools are correctly identified | Failed | Poor | Fair | Good | Excellent | X 10 | |
| Presentation of Contest Display | Display is well organized and eye-appealing | Failed | Poor | Fair | Good | Excellent | X 2.5 | |
| **TOTAL** | | | | | | | | /50 pts. |

| Assessment Area | Total |
|---|---|
| Tool Identification Contest | /50 pts. |

**Final Assessment Total** _____**/100 pts.**

**Comments:**

# Agricultural Mechanics I Score Sheet

| Team Members | Tool ID | Tool Sharpening/ Reconditioning | Arc Welding | Oxyfuel Cutting | Score |
|---|---|---|---|---|---|
| **Team A** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team B** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team C** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team D** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team E** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team F** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |

# Agricultural Science I

**Curriculum Guide:** *Agricultural Mechanics Unit for Agricultural Science I*

**Unit:** II. Common Power Tools

**Unit Objective:**

Students will demonstrate an understanding of the correct use of power tools by devising and giving a safety presentation for a power tool found in their class shop.

**Show-Me Standards:** 2.1, HP5

**References:**

*Agricultural Mechanics Unit for Agricultural Science I*. University of Missouri-Columbia, Instructional Materials Laboratory, 2002.

Cyr, D. L., & Johnson, S. B. *Power Tool Safety*. University of Maine Cooperative Extension. Accessed November 25, 2003, from http://www.umext.maine.edu/onlinepubs/htmpubs/2329.htm.

Hobar Publications. Finney-Hobar. Accessed November 10, 2003, from http://www.finney-hobar.com/hobar.html.

Machinery Safety. National Ag Safety Database. Accessed November 10, 2003, from http://www.cdc.gov/nasd/menu/topic/machinery_safety.html.

Tritt, S. W. *Hand and Power Tool Safety*. Safety Information Resources on the Internet. University of Vermont. Accessed November 25, 2003, from http://www.esf.uvm.edu/sirippt/handsafe/.

University of Missouri Outreach and Extension Rural Safety and Health Program. Accessed November 10, 2003, from http://www.fse.missouri.edu/ruralsafety/index1.html.

Students may use additional outside sources to complete this activity.

**Instructional Strategies/Activities:**

- Students will engage in study questions in lessons 1 and 2.
- Students will complete AS 1.1, Safety and Maintenance Procedures for Power Tools for Woodworking; and AS 2.1, Safety and Maintenance Procedures for Power Tools for Metalworking.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following location: p. II-9 (2).

**Performance-Based Assessment:**

Students will work in groups to develop a safety presentation that summarizes the main parts, uses, and safety and maintenance considerations for a power tool found in their class shop. Students will give the presentation to the class.

Assessment will be based on the overall thoroughness and accuracy of the presentation. Delivery of the presentation and use of supporting material, such as illustrations, also will be factors in the assessment.

## Agricultural Mechanics Unit for Agricultural Science I
## Unit II—Common Power Tools
## Instructor Guide

**The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.**

1. Divide the class into groups and assign each group a power tool in the class shop that is used for woodworking, metalworking, or both.

2. Have each group develop a safety presentation for its assigned tool. Presentations should address the following topics:
   - ❑ Main parts
   - ❑ Uses
   - ❑ Safety features of the tool and safe operating procedures, including wearing appropriate personal protective equipment and proper setup, shutdown, and cleanup procedures
   - ❑ Basic care and maintenance

3. **NOTE: This activity is designed as an informational presentation only; it is not a hands-on demonstration. This activity is *not* a substitute for instructor training and demonstrations, shop safety tests and safety agreements, or any other safety procedures. Students should not demonstrate or operate any equipment unless they have completed all required safety tests and agreements, mastered all relevant competencies, and have the instructor's permission.**

4. Have students incorporate appropriate supporting materials into their report, such as a poster or handout outlining safety practices, examples of personal protective equipment that should be worn when using the tool, a slide show using presentation software, or a combination of elements. Indicate to students what supporting elements are acceptable or preferred.

5. Students may use material found in the unit or discussed in class as well as additional outside material to complete their presentation.

6. Students may not use the source material word for word and must provide a complete bibliography of their sources following their presentation.

7. Review and approve each presentation before the students make their presentations to the class. Guide and correct the students' presentations as needed.

8. Have students give their safety presentations to the class.

9. Students should be prepared to answer questions about their presentations.

10. Guide and correct the students' presentations as needed.

11. The final assessment score will be based on the overall thoroughness and accuracy of the presentation. Delivery of the presentation and use of supporting material also will be factors in the assessment.

**Agricultural Mechanics Unit for Agricultural Science I**
**Unit II—Common Power Tools**
**Student Handout**

1. The instructor will divide the class into groups and assign each group a power tool found in the class shop.

2. Develop a safety presentation for your assigned tool. Your presentation should address the following topics:
   - ❑ Main parts
   - ❑ Uses
   - ❑ Safety features of the tool and safe operating procedures, including wearing appropriate personal protective equipment and proper setup, shutdown, and cleanup procedures
   - ❑ Basic care and maintenance

3. Include appropriate supporting materials in your report, such as a poster or handout outlining safety practices, examples of personal protective equipment that should be worn when using the tool, a slide show using presentation software, or a combination of these or other elements as indicated by your instructor.

4. You may use material found in the unit or discussed in class as well as additional outside material to complete your presentation.

5. You may not use the source material word for word and must provide the instructor with a complete bibliography of your sources following your presentation.

6. The instructor must review and approve your presentation.

7. Give your presentation to the class.

8. Be prepared to answer questions about your presentation.

9. Your final assessment score will be based on the overall thoroughness and accuracy of your presentation. Delivery of the presentation and use of supporting material also will be factors in the assessment.

**Agricultural Mechanics Unit for Agricultural Science I**
**Unit II—Common Power Tools**
**Scoring Guide** **Name** _____

| Assessment Area | Criteria | 0 Points | 1 Point | 2 Points | 3 Points | 4 Points | Weight | Total |
|---|---|---|---|---|---|---|---|---|
| Information and Content of Safety Presentation | ❑ Presentation addresses main parts, uses, safety, and maintenance of the tool<br>❑ Information is complete<br>❑ Facts are accurate<br>❑ Good use of supporting materials | 0 criteria met | 1 criterion met | 2 criteria met | 3 criteria met | 4 criteria met | X 20 | |
| Delivery of Safety Presentation | ❑ Well organized<br>❑ Holds audience interest<br>❑ Speaks clearly and uses correct grammar<br>❑ Maintains good posture<br>❑ Needs little or no prompting from the instructor | 0 criteria met | 1–2 criteria met | 3 criteria met | 4 criteria met | 5 criteria met | X 5 | |
| **TOTAL** | | | | | | | | |

**Final Assessment Total _____/100 pts.**

**Comments:**

# Agricultural Science I

**Curriculum Guide:** *Agricultural Mechanics Unit for Agricultural Science I*

**Unit:** III. Woodworking

**Unit Objective:**

Students will apply basic woodworking skills by constructing an appropriate woodworking project.

**Show-Me Standards:** 2.5, CA3

**References:**

*Agricultural Mechanics Building Plans*. University of Missouri-Columbia, Instructional Materials Laboratory, 1994.

*Agricultural Mechanics Plans (Set)*. University of Missouri-Columbia, Instructional Materials Laboratory.

*Agricultural Mechanics Unit for Agricultural Science I*. University of Missouri-Columbia, Instructional Materials Laboratory, 2002.

Woodworking for Wildlife. Missouri Department of Conservation. Accessed November 13, 2003, from http://www.conservation.state.mo.us/nathis/woodwork/.

**Instructional Strategies/Activities:**

- Students will engage in study questions in lessons 1 through 4.
- Students will complete AS 1.1, Measurement Review; AS 1.2, Calculating Area and Board Feet; AS 2.1, Using a Crosscut Saw; AS 2.2, Using a Rip Saw; AS 2.3, Making a 45-Degree Miter Cut; AS 2.4, Making a Straight Cut With a Portable Circular Saw; AS 2.5, Making a Miter Cut With a Table Saw; AS 3.1, Using a Brace; and AS 3.2, Using a Portable Drill.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following locations: p. III-5 and pp. III-102–III-103 (1, 2, 3).

**Performance-Based Assessment:**

Students will use common woodworking tools and procedures discussed in class to lay out and construct an appropriate woodworking project.

Assessment will be based on the overall quality of the work and the ability to safely and correctly complete the project within the available time.

## Agricultural Mechanics Unit for Agricultural Science I
## Unit III—Woodworking
## Instructor Guide

**The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.**

1. Use or adapt the activity sheets found in the unit to assess student competency at performing basic woodworking procedures. Review or supplement these activities as needed, based on student mastery of the procedures and the tools the students will be using. **NOTE: Students should only complete this performance-based activity if they have mastered all the relevant competencies and have the instructor's permission to perform the activity.**

2. For the performance-based assessment activity, have students apply the skills and procedures discussed in the unit to construct an appropriate woodworking project.
   a. See the Unit III Activity, Woodworking Plans, pp. III-121–III-130, for a selection of project plans and additional details. Single-sheet plans are included for a boot jack, flower box, step stool, and tool box.
   b. For additional project plans, see *Agricultural Mechanics Building Plans* and *Agricultural Mechanics Plans (Set)*, available from the Instructional Materials Laboratory, University of Missouri-Columbia, accessed November 13, 2003, at http://www.iml.coe.missouri.edu/.
   c. Plans are also available from the Missouri Department of Conservation. See Woodworking for Wildlife, accessed November 14, 2003, at http://www.conservation.state.mo.us/nathis/woodwork/.

3. The student handout for this activity is a Project Completion Checklist and Project Evaluation Checklist. Students can use the checklists to track the progress of their project and evaluate their work. Supplement or modify the student handout to reflect actual projects as needed.

4. Have students turn in their completed projects.

5. The final assessment score will be based on the overall quality of the work and the ability to safely and correctly complete the project within the available time.

6. ADDITIONAL ACTIVITY: If all students are building the same project, a display board can be made as a teaching aid for the project. To make a display board, mount correctly made examples of each project piece on a board. Label each piece and indicate the number of pieces needed. Have students compare their project pieces with the correctly made examples. Students should make sure their pieces match the examples before proceeding.

**Agricultural Mechanics Unit for Agricultural Science I**
**Unit III—Woodworking**
**Student Handout**

**Name**_____

Use the Project Completion Checklist and Project Evaluation Checklist to track the progress of your project.

**Project Completion Checklist**

| **Procedure** | **Date Due** |
|---|---|
| ❑ Master all competencies necessary to complete the project. | |
| ❑ Receive instructor approval to build the project. | |
| ❑ Review safety precautions for the tools to be used. You can lose points for not following safety precautions and other assigned procedures. | |
| ❑ Perform a quality control inspection of the project during construction. Use the Project Evaluation Checklist. | |
| ❑ Complete project construction. | |
| ❑ Perform a quality control inspection of the project following completion. Use the Project Evaluation Checklist. | |
| ❑ Turn in the completed project. Your final assessment score will be based on the overall quality of the work and your ability to safely and correctly complete the project within the available time. | |

**Project Evaluation Checklist**

| Quality Control and Shop Procedures | Criteria |
|---|---|
| Quality of Work | ❑ Fasteners are correct type and size.<br>❑ Holes, cut edges, and surfaces are smooth.<br>❑ Measurements are correct.<br>❑ Cuts are accurate.<br>❑ Parts fit well for optimum strength.<br>❑ Project is square and straight.<br>❑ Work was completed on time. |
| Design and Suitability | ❑ Materials are well suited to the project.<br>❑ Project is well balanced, proportional, and pleasing to the eye.<br>❑ Project is the right size for its use.<br>❑ Project is suitable for its intended purpose.<br>❑ Project is good enough to sell. |
| Safety and Work Habits: Observe these safety procedures whenever you are in the shop. | ❑ Know how to use the equipment before you attempt to use it. Only use tools and materials the instructor has approved you to use.<br>❑ Wear appropriate personal protective equipment.<br>❑ Follow safety guidelines from your instructor and safety information on labels, equipment, and signs in the work area.<br>❑ Follow assigned setup, shutdown, and cleanup procedures.<br>❑ Return equipment and materials to their assigned places.<br>❑ Do not use equipment that does not function properly.<br>❑ Tell the instructor about any damaged or malfunctioning equipment. |

# Agricultural Science I

## Agricultural Mechanics Unit for Agricultural Science I
## Unit III—Woodworking
## Scoring Guide

**Name** _____

| Assessment Area | Criteria | 0 Points | 1 Point | 2 Points | 3 Points | 4 Points | Weight | Total |
|---|---|---|---|---|---|---|---|---|
| Quality of Work | ❑ Fasteners are correct<br>❑ Holes, cuts, and surfaces are smooth<br>❑ Cuts and measurements are accurate<br>❑ Parts fit well<br>❑ Project is square and straight<br>❑ Work was completed on time | Failed | Poor | Fair | Good | Excellent | X 20 | |
| Design and Suitability | ❑ Materials are well suited to the project<br>❑ Project is well balanced and pleasing to the eye<br>❑ Project is the right size for its use<br>❑ Project is suitable for its intended purpose | Failed | Poor | Fair | Good | Excellent | X 5 | |
| **Safety and Work Habits** | **Student followed all safety precautions** | **Passed** | | | | **Failed** | **X (-25)** | Negative Points * |
| | **Student followed all assigned procedures** | **Excellent** | **Good** | **Fair** | **Poor** | **Failed** | **X (-10)** | Negative Points * |
| **TOTAL** | | | | | | | | |

**Final Assessment Total _____/100 pts.**
*** Overall combined score cannot be lower than 0.**

**Comments:**

# Agricultural Science I

**Curriculum Guide:** *Agricultural Mechanics Unit for Agricultural Science I*

**Unit:** IV. Tool Sharpening and Reconditioning

**Unit Objective:**

Students will apply principles of tool sharpening and reconditioning by participating in a tool reconditioning contest.

**Show-Me Standards:** 2.5, CA3

**References:**

*Agricultural Mechanics Unit for Agricultural Science I*. University of Missouri-Columbia, Instructional Materials Laboratory, 2002.

*Missouri CDE Handbook*. Accessed November 14, 2003, from http://www.dese.mo.gov/divcareered/ag_cde_guidelines.htm.

Missouri FFA Agricultural Mechanics Career Development Event. Accessed November 19, 2003, from http://web.missouri.edu/~pavt0689/statecon.html.

**Instructional Strategies/Activities:**

- Students will engage in study questions in lesson 1.
- Students will complete AS 1.1, Reconditioning a Center Punch; AS 1.2, Sharpening a Cold Chisel; and AS 1.3, Reconditioning a Screwdriver.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following location: p. IV-3.

**Performance-Based Assessment:**

Students will be divided into groups. The groups will represent teams and will participate in a tool reconditioning contest that is similar to the tool sharpening and reconditioning portion of the Agricultural Mechanics Career Development Event. Each student will sharpen or recondition a common hand tool, such as a center punch, cold chisel, or screwdriver.

Assessment will be based on the ability to safely and correctly sharpen or recondition the assigned hand tool.

## Agricultural Mechanics Unit for Agricultural Science I
## Unit IV—Tool Sharpening and Reconditioning
## Instructor Guide

**The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.**

1. Use or adapt the activity sheets found in the unit to assess student competency at tool sharpening and reconditioning. Review or supplement these activities as needed, based on student mastery of the procedures and the tools the students will be using. **NOTE: Students should only complete this performance-based activity if they have mastered all the relevant competencies and have the instructor's permission to perform the activity.**

2. For the performance-based assessment activity, have students apply the skills and procedures discussed in the unit by participating in a tool reconditioning contest.

3. Divide students into groups and assign each student a hand tool to sharpen or recondition.
   a. Provide students with tools in need of sharpening or reconditioning or have students supply tools. If students supply tools, they must follow any and all school procedures for transporting tools to and from class. Inspect and approve any tools supplied by students prior to the activity.
   b. Assign students a sharpening or reconditioning procedure that they have mastered as part of the instructional activities for this unit.

4. This activity will help prepare students for the tool sharpening and reconditioning portion of the Agricultural Mechanics Career Development Event.
   a. Explain or review event guidelines as needed.
   b. Refer to the *Missouri CDE Handbook* for guidelines regarding the Agricultural Mechanics Career Development Event. The *Missouri CDE Handbook* is available from the Missouri Department of Elementary and Secondary Education at http://www.dese.mo.gov/divcareered/ag_cde_guidelines.htm.

5. Have students sharpen or recondition their assigned hand tool.
   a. Performance in the tool sharpening contest will determine the student's individual score.
   b. Combine the individual scores of the group members to determine the team score for each group.

6. The final assessment score will be based on the ability to safely and correctly sharpen or recondition the assigned tool.

7. Present an appropriate award to the high-scoring team and individual, if desired.

8. NOTE: The following units in this curriculum guide also include material and competencies that are addressed by the Agricultural Mechanics Career Development Event: Unit I, Common Hand Tools; Unit V, Arc Welding; and Unit VI, Oxyfuel Cutting. Some or all of the performance-based assessment activities for these units could be combined to form a mini Agricultural Mechanics Career Development Event, if desired. To conduct a mini Agricultural Mechanics Career Development Event, maintain the same student groups for all of the performance-based assessment activities. An expanded score sheet is included at the end of each of these units that can be used to track individual and group performance in the mini CDE.

**Agricultural Mechanics Unit for Agricultural Science I**
**Unit IV—Tool Sharpening and Reconditioning**
**Student Handout**

1. The instructor will divide the class into groups and assign each member of your group a tool to sharpen or recondition in a tool reconditioning contest.

2. Your group will compete in the contest as a team.

3. Sharpen or recondition your assigned hand tool.
   - ❑ Wear appropriate safety equipment at all times.
   - ❑ Follow all assigned safety procedures. You can lose points for not following safety precautions and other assigned procedures.
   - ❑ Inspect the equipment, materials, and work area to ensure safe and correct operation.
   - ❑ Sharpen or recondition the hand tool using the assigned procedure.
   - ❑ Inspect your work.
   - ❑ Follow cleanup procedures and return all tools and materials to their assigned places.
   - ❑ Turn in your work to the instructor.

4. Your final assessment score will be based on your ability to safely and correctly sharpen or recondition your assigned hand tool.

# Agricultural Science I

**Agricultural Mechanics Unit for Agricultural Science I**
**Unit IV—Tool Sharpening and Reconditioning**
**Scoring Guide**

**Name** _____

| Assessment Area | Criteria | 0 Points | 1 Point | 2 Points | 3 Points | 4 Points | Weight | Total |
|---|---|---|---|---|---|---|---|---|
| Tool Sharpening and Reconditioning | Tool is properly sharpened or reconditioned | Failed | Poor | Fair | Good | Excellent | X 25 | |
| **Safety and Work Habits** | **Student followed all safety precautions** | **Passed** | | | | **Failed** | **X (-25)** | Negative Points * |
| | **Student followed all assigned procedures** | **Excellent** | **Good** | **Fair** | **Poor** | **Failed** | **X (-10)** | Negative Points * |
| **TOTAL** | | | | | | | | |

**Final Assessment Total _____/100 pts.**
*** Overall combined score cannot be lower than 0.**

**Comments:**

# Agricultural Mechanics I Score Sheet

| Team Members | Tool ID | Tool Sharpening/ Reconditioning | Arc Welding | Oxyfuel Cutting | Score |
|---|---|---|---|---|---|
| **Team A** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team B** | | | | | |
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| | | | | | **Total:** |
| **Team C** | | | | | |
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| | | | | | **Total:** |
| **Team D** | | | | | |
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| | | | | | **Total:** |
| **Team E** | | | | | |
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| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team F** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |

# Agricultural Science I

**Curriculum Guide:** *Agricultural Mechanics Unit for Agricultural Science I*

**Unit:** V. Arc Welding

**Unit Objective:**

Students will apply principles of shielded metal arc welding by making common flat position welds as part of a welding contest.

**Show-Me Standards:** 2.5, CA3

**References:**


*Agricultural Mechanics Unit for Agricultural Science I*. University of Missouri-Columbia, Instructional Materials Laboratory, 2002.

American Welding Society. Accessed November 18, 2003, from http://www.aws.org/.

ESAB Knowledge Centre. ESAB. Accessed November 25, 2003, from http://www.esab.com/.

Hobart Institute of Welding Technology. Accessed November 17, 2003, from http://www.welding.org/.

Lincoln Electric. Accessed November 18, 2003, from http://www.lincolnelectric.com/.

Machinery Safety: Welding. National Ag Safety Database. Accessed November 17, 2003, from http://www.cdc.gov/nasd/menu/topic/machinery_welding.html.

Miller Electric. Accessed November 18, 2003, from http://www.millerwelds.com/.

*Missouri CDE Handbook*. Accessed November 14, 2003, from http://www.dese.mo.gov/divcareered/ag_cde_guidelines.htm.

Missouri FFA Agricultural Mechanics Career Development Event. Accessed November 19, 2003, from http://web.missouri.edu/~pavt0689/statecon.html.

**Instructional Strategies/Activities:**

- Students will engage in study questions in lessons 1 through 3.
- Students will complete AS 1.1, Arc Welding Safety Presentation; AS 3.1, Running a Bead Using a Shielded Metal Arc Welder; AS 3.2, Welding a Butt Joint in Steel Plate in Flat Position; AS 3.3, Welding a Butt Joint in Round Stock in Flat Position; AS 3.4, Welding a Lap Joint in Steel Plate in Flat Position; and AS 3.5, Welding a Tee Joint in Steel Plate in Flat Position.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following locations: p. V-5 (2, 3), p. V-21 (2, 3), and p. V-37 (2, 3, 5).

**Performance-Based Assessment:**

Students will be divided into groups. The groups will represent teams and will participate in a welding contest that is similar to the welding portion of the Agricultural Mechanics Career Development Event. Each student will use a shielded metal arc welder to make common flat position welds presented in the unit and discussed in class.

Assessment will be based on the ability to safely and correctly perform common welding procedures using a shielded metal arc welder.

## Agricultural Mechanics Unit for Agricultural Science I
## Unit V—Arc Welding
## Instructor Guide

**The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.**

1. Use or adapt the activity sheets found in the unit to assess student competency at welding. Review or supplement these activities as needed, based on student mastery of the procedures and equipment the students will be using. **NOTE: Students should only complete this performance-based activity if they have mastered all the relevant competencies and have the instructor's permission to perform the activity.**

2. For the performance-based assessment activity, have students apply the skills and procedures discussed in the unit by participating in a welding contest.

3. Divide the class into groups and assign students a series of welding procedures to perform, such as welding a butt joint, lap joint, and tee joint in steel plate in flat position.
   a. Each student should perform all of the assigned procedures.
   b. Assign students welding procedures that they have mastered as part of the instructional activities for this unit.

4. This activity will help prepare students for the arc welding portion of the Agricultural Mechanics Career Development Event.
   a. Explain or review event guidelines as needed.
   b. Refer to the *Missouri CDE Handbook* for guidelines regarding the Agricultural Mechanics Career Development Event. The *Missouri CDE Handbook* is available from the Missouri Department of Elementary and Secondary Education at http://www.dese.mo.gov/divcareered/ag_cde_guidelines.htm.

5. Have students perform the assigned welding procedures.
   a. Performance in the welding contest will determine the student's individual score.
   b. Combine the individual scores of the group members to determine the team score for each group.

6. The final assessment score will be based on the ability to safely and correctly perform the assigned welding procedures.

7. Present an appropriate award to the high-scoring team and individual, if desired.

8. NOTE: The following units in this curriculum guide also include material and competencies that are addressed by the Agricultural Mechanics Career Development Event: Unit I, Common Hand Tools; Unit IV, Tool Sharpening and Reconditioning; and Unit VI, Oxyfuel Cutting. Some or all of the performance-based assessment activities for these units could be combined to form a mini Agricultural Mechanics Career Development Event, if desired. To conduct a mini Agricultural Mechanics Career Development Event, maintain the same student groups for all of the performance-based assessment activities. An expanded score sheet is included at the end of each of these units that can be used to track individual and group performance in the mini CDE.

9. ADDITIONAL ACTIVITIES:
   a. Create a display board using correctly made examples of each type of weld to be performed by the class. Have students compare their welds with the correctly made examples.
   b. Create a display board using the students' best welds. Possible display board themes include the following: each student's best weld, the best example of each type of weld performed by the class, and the best weld of the week.
   c. Perform destructive tests to check the strength and soundness of welds students have made.

**Agricultural Mechanics Unit for Agricultural Science I**
**Unit V—Arc Welding**
**Student Handout**

1. The instructor will divide the class into groups and give you a series of welds to perform in a welding contest.

2. Your group will compete in the contest as a team.

3. Perform the assigned welds.
   - ❑ Wear appropriate safety equipment at all times.
   - ❑ Follow all assigned safety procedures. You can lose points for not following safety precautions and other assigned procedures.
   - ❑ Inspect the equipment, materials, and work area to ensure safe and correct operation.
   - ❑ Perform the welds using the assigned procedure.
   - ❑ Inspect your work.
   - ❑ Follow shutdown and cleanup procedures and return all equipment and materials to their assigned places.
   - ❑ Turn in your work to the instructor.

4. Your final assessment score will be based on your ability to safely and correctly perform the assigned welding procedures.

# Agricultural Science I

**Agricultural Mechanics Unit for Agricultural Science I**
**Unit V—Arc Welding**
**Scoring Guide**

**Name** _____

| Assessment Area | Criteria | 0 Points | 1 Point | 2 Points | 3 Points | 4 Points | Weight | Total |
|---|---|---|---|---|---|---|---|---|
| Electrode and Amperage Selection | Electrode was appropriate and amperage was correctly set for all welds | Failed | Poor | Fair | Good | Excellent | X 5 | |
| Distortion | Welds are free of distortion | Failed | Poor | Fair | Good | Excellent | X 6 | |
| Appearance | Appearance indicates correct speed of travel, amperage setting, and arc length for all welds | Failed | Poor | Fair | Good | Excellent | X 7 | |
| Strength | Welds are strong and sound | Failed | Poor | Fair | Good | Excellent | X 7 | |
| **Safety and Work Habits** | **Student followed all safety precautions** | **Passed** | | | | **Failed** | **X (-25)** | Negative Points * |
| | **Student followed all assigned procedures** | **Excellent** | **Good** | **Fair** | **Poor** | **Failed** | **X (-10)** | Negative Points * |
| **TOTAL** | | | | | | | | |

**Final Assessment Total _____/100 pts.**
*** Overall combined score cannot be lower than 0.**

**Comments:**

# Agricultural Mechanics I Score Sheet

| Team Members | Tool ID | Tool Sharpening/ Reconditioning | Arc Welding | Oxyfuel Cutting | Score |
|---|---|---|---|---|---|
| **Team A** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team B** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team C** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team D** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team E** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team F** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |

# Agricultural Science I

**Curriculum Guide:** *Agricultural Mechanics Unit for Agricultural Science I*

**Unit:** VI. Oxyfuel Cutting

**Unit Objective:**

Students will apply principles of oxyfuel cutting by making basic cuts with an oxyfuel outfit as part of a class-wide contest.

**Show-Me Standards:** 2.5, CA3

**References:**

*Agricultural Mechanics Unit for Agricultural Science I*. University of Missouri-Columbia, Instructional Materials Laboratory, 2002.

American Welding Society. Accessed November 18, 2003, from http://www.aws.org/.

Hobart Institute of Welding Technology. Accessed November 17, 2003, from http://www.welding.org/.

Machinery Safety: Welding. National Ag Safety Database. Accessed November 17, 2003, from http://www.cdc.gov/nasd/menu/topic/machinery_welding.html.

*Missouri CDE Handbook*. Accessed November 14, 2003, from http://www.dese.mo.gov/divcareered/ag_cde_guidelines.htm.

Missouri FFA Agricultural Mechanics Career Development Event. Accessed November 19, 2003, from http://web.missouri.edu/~pavt0689/statecon.html.

Thermadyne. Victor. Accessed November 18, 2003, from http://www.thermadyne.com/vec/index.asp?div=vec.

**Instructional Strategies/Activities:**

- Students will engage in study questions in lessons 1 and 2.
- Students will complete AS 2.1, Cutting a Straight Line Using an Oxyfuel Outfit; AS 2.2, Cutting a Bevel Using an Oxyfuel Outfit; and AS 2.3, Cutting a Circle Using an Oxyfuel Outfit.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following location: p. VI-4 (2).

**Performance-Based Assessment:**

Students will be divided into groups. The groups will represent teams and will participate in a contest that is similar to the oxyacetylene competency portion of the Agricultural Mechanics Career Development Event. Each student will use an oxyfuel outfit to make common cuts presented in the unit and discussed in class.

Assessment will be based on the ability to safely and correctly make the assigned cuts using the oxyfuel outfit.

## Agricultural Mechanics Unit for Agricultural Science I
## Unit VI—Oxyfuel Cutting
## Instructor Guide

**The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.**

1. Use or adapt the activity sheets found in the unit to assess student competency at cutting with oxyfuel. Review or supplement these activities as needed, based on student mastery of the procedures and equipment the students will be using. **NOTE: Students should only complete this performance-based activity if they have mastered all the relevant competencies and have the instructor's permission to perform the activity.**

2. For the performance-based assessment activity, have students apply the skills and procedures discussed in the unit by making basic cuts with an oxyfuel outfit as part of a class-wide contest.

3. Divide the class into groups and assign students a series of cutting procedures to perform using the oxyfuel outfit, such as making a straight cut and a 45° bevel cut and cutting out a circle.
   a. Each student should perform all of the assigned procedures.
   b. Assign students cutting procedures that they have mastered as part of the instructional activities for this unit.

4. This activity will help prepare students for the oxyacetylene portion of the Agricultural Mechanics Career Development Event.
   a. Explain or review event guidelines as needed.
   b. Refer to the *Missouri CDE Handbook* for guidelines regarding the Agricultural Mechanics Career Development Event. The *Missouri CDE Handbook* is available from the Missouri Department of Elementary and Secondary Education at http://www.dese.mo.gov/divcareered/ag_cde_guidelines.htm.

5. Have students perform the assigned cutting procedures.
   a. Performance in the oxyfuel competency contest will determine the student's individual score.
   b. Combine the individual scores of the group members to determine the team score for each group.

6. The final assessment score will be based on the ability to safely and correctly make the assigned cuts using the oxyfuel outfit.

7. Present an appropriate award to the high-scoring team and individual, if desired.

8. NOTE: The following units in this curriculum guide also include material and competencies that are addressed by the Agricultural Mechanics Career Development Event: Unit I, Common Hand Tools; Unit IV, Tool Sharpening and Reconditioning; and Unit V, Arc Welding. Some or all of the performance-based assessment activities for these units could be combined to form a mini Agricultural Mechanics Career Development Event, if desired. To conduct a mini Agricultural Mechanics Career Development Event, maintain the same student groups for all of the performance-based assessment activities. An expanded score sheet is included at the end of each of these units that can be used to track individual and group performance in the mini CDE.

9. ADDITIONAL ACTIVITY: Create a display board using the students' work. Possible display board themes include the following: each student's best work using the oxyfuel outfit, the best example of each type of procedure performed by the class, and the best work of the week.

**Agricultural Mechanics Unit for Agricultural Science I**
**Unit VI—Oxyfuel Cutting**
**Student Handout**

1. The instructor will divide the class into groups and give you a series of oxyfuel cutting procedures to perform as part of a class-wide contest.

2. Your group will compete in the contest as a team.

3. Perform the assigned cuts using the oxyfuel outfit.
   - ❑ Wear appropriate safety equipment at all times.
   - ❑ Follow all assigned safety procedures. You can lose points for not following safety precautions and other assigned procedures.
   - ❑ Inspect the equipment, materials, and work area to ensure safe and correct operation.
   - ❑ Perform the cuts using the assigned procedure.
   - ❑ Inspect your work.
   - ❑ Follow shutdown and cleanup procedures and return all equipment and materials to their assigned places.
   - ❑ Turn in your work to the instructor.

4. Your final assessment score will be based on your ability to safely and correctly make the assigned cuts using the oxyfuel outfit.

**Agricultural Mechanics Unit for Agricultural Science I**
**Unit VI—Oxyfuel Cutting**
**Scoring Guide**

**Name** _____

| Assessment Area | Criteria | 0 Points | 1 Point | 2 Points | 3 Points | 4 Points | Weight | Total |
|---|---|---|---|---|---|---|---|---|
| Equipment Setting | Torch flame was properly adjusted | Failed | Poor | Fair | Good | Excellent | X 5 | |
| Uniformity | All cuts are uniform | Failed | Poor | Fair | Good | Excellent | X 5 | |
| Straight Cut | Cut is straight | Failed | Poor | Fair | Good | Excellent | X 5 | |
| Bevel Cut | Bevel is 45° | Failed | Poor | Fair | Good | Excellent | X 5 | |
| Circle Cut | Cut is properly positioned and the correct diameter | Failed | Poor | Fair | Good | Excellent | X 5 | |
| **Safety and Work Habits** | **Student followed all safety precautions** | **Passed** | | | | **Failed** | **X (-25)** | Negative Points * |
| | **Student followed all assigned procedures** | **Excellent** | **Good** | **Fair** | **Poor** | **Failed** | **X (-10)** | Negative Points * |
| **TOTAL** | | | | | | | | |

**Final Assessment Total _____/100 pts.**
*** Overall combined score cannot be lower than 0.**

**Comments:**

# Agricultural Mechanics I Score Sheet

| Team Members | Tool ID | Tool Sharpening/ Reconditioning | Arc Welding | Oxyfuel Cutting | Score |
|---|---|---|---|---|---|
| **Team A** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team B** | | | | | |
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| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team C** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team D** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team E** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |
| **Team F** | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | **Total:** |

# Agricultural Science I

**Curriculum Guide:** *Agricultural Mechanics Unit for Agricultural Science I*

**Unit:** VII. Painting

**Unit Objective:**

Students will apply principles of painting by finishing a project using paint and a paintbrush.

**Show-Me Standards:** 2.5, CA3

**References:**

*Agricultural Construction Volume II*. University of Missouri-Columbia, Instructional Materials Laboratory, 1989.

*Agricultural Mechanics Unit for Agricultural Science I*. University of Missouri-Columbia, Instructional Materials Laboratory, 2002.

*Healthy Indoor Painting Practices*. U. S. Consumer Product Safety Commission. Accessed November 25, 2003, from http://www.cpsc.gov/cpscpub/pubs/456.pdf.

*Safe Use, Storage and Disposal of Paint*. Household Hazardous Waste Project. MU Extension. University of Missouri-Columbia. Accessed November 20, 2003, from http://muextension.missouri.edu/explore/wasteman/wm6001.htm.

**Instructional Strategies/Activities:**

- Students will engage in study questions in lesson 1.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following location: p. VII-5 (1, 3, 4).

**Performance-Based Assessment:**

Students will finish a project using paint and a paintbrush. Acceptable projects would include those made for the Agricultural Science I class or outside projects that the instructor determines are appropriate for the curriculum. Students will choose the appropriate primer, paint, and other necessary supplies.

Assessment will be based on the overall quality of the work and the ability to safely and correctly complete the project within the available time.

## Agricultural Mechanics Unit for Agricultural Science I
## Unit VII—Painting
## Instructor Guide

**The instructor should assign the performance-based assessment activity at the beginning of the unit. Students will work toward completing the activity as they progress through the unit lessons. The assessment activity will be due at the completion of the unit.**

1. Use the lesson 1 assessment, Finishing With Paint, p. VII-9, to assess student competency at identifying safe and correct painting procedures. Review or supplement the lesson as needed, based on student mastery of these procedures and the equipment the students will be using. **NOTE: Students should only complete this performance-based activity if they have mastered all the relevant competencies and have the instructor's permission to perform the activity.**

2. For the performance-based assessment activity, have students apply the skills and procedures discussed in the unit to finish a project using paint and a paintbrush.
   a. Choose projects based on the skill level of the students and the time available to work on the project. For example, if students built projects for the woodworking unit of this curriculum guide, have them paint these projects.
   b. If students bring in outside projects to be painted, screen these projects to determine if they are appropriate for the curriculum and can be completed in the time available.

3. Have students choose appropriate primer, paint, and other necessary supplies. Review and approve students' material and equipment selection before they begin working.

4. The student handout for this activity is a Project Completion Checklist and Project Evaluation Checklist. Students can use the checklists to track the progress of their project and evaluate their work. Supplement or modify the student handout to reflect actual projects as needed.

5. Have students turn in their completed projects.

6. The final assessment score will be based on the overall quality of the work and the ability to safely and correctly complete the project within the available time.

**Agricultural Mechanics Unit for Agricultural Science I**
**Unit VII—Painting**
**Student Handout**

**Name**_____

Use the Project Completion Checklist and Project Evaluation Checklist to track the progress of your project.

**Project Completion Checklist**

| Procedure | Date Due |
|---|---|
| ❑ Master all competencies necessary to complete the project. | |
| ❑ Receive instructor approval for the materials and equipment you plan to use. Are they appropriate for the project? | |
| ❑ Review safety precautions for the materials and equipment you will use. You can lose points for not following safety precautions and other assigned procedures. | |
| ❑ Prepare the project surface. | |
| ❑ Apply the primer coat. | |
| ❑ Paint the project. | |
| ❑ Clean all equipment using the appropriate cleaner. Return the equipment and materials to their proper place and dispose of rags and other hazardous materials properly. You can lose points for not following assigned cleanup procedures. | |
| ❑ Perform a quality control inspection of the project following completion. Use the Project Evaluation Checklist. | |
| ❑ Turn in the completed project. Your final assessment score will be based on the overall quality of the work and your ability to safely and correctly complete the project within the available time. | |

**Project Evaluation Checklist**

| Quality Control and Shop Procedures | Criteria |
|---|---|
| Quality of Work | ❑ Primer is appropriate for the project.<br>❑ Primer is properly applied.<br>❑ Paint is appropriate for the project.<br>❑ Paint is properly applied.<br>❑ Paint job is of high quality and pleasing to the eye.<br>❑ Project is good enough to sell.<br>❑ Work was completed on time. |
| Safety and Work Habits: Observe these safety procedures whenever you are in the shop. | ❑ Know how to use the tools and materials before you attempt to use them. Only use tools and materials the instructor has approved you to use.<br>❑ Wear appropriate personal protective equipment.<br>❑ Follow safety guidelines from your instructor and safety information on labels, equipment, and signs in the work area.<br>❑ Do not use primers, finishes, or other products with missing or unreadable labels.<br>❑ Follow assigned setup and cleanup procedures.<br>❑ Return equipment and materials to their assigned places. |

**Agricultural Mechanics Unit for Agricultural Science I**
**Unit VII—Painting**
**Scoring Guide**

**Name** _____

| Criteria | 0 Points | 1 Point | 2 Points | 3 Points | 4 Points | Weight | Total |
|---|---|---|---|---|---|---|---|
| Primer is appropriate and properly applied | Failed | Poor | Fair | Good | Excellent | X 5 | |
| Paint is appropriate and properly applied | Failed | Poor | Fair | Good | Excellent | X 5 | |
| Paint job is of high quality and pleasing to the eye | Failed | Poor | Fair | Good | Excellent | X 5 | |
| Project is good enough to sell | Failed | Poor | Fair | Good | Excellent | X 5 | |
| Work was completed on time | Failed | Poor | Fair | Good | Excellent | X 5 | |
| **Student followed all safety precautions** | **Passed** | | | | **Failed** | **X (-25)** | Negative Points * |
| **Student followed all assigned procedures** | **Excellent** | **Good** | **Fair** | **Poor** | **Failed** | **X (-10)** | Negative Points * |
| **TOTAL** | | | | | | | |

**Final Assessment Total _____/100 pts.**
***Overall combined score cannot be below 0.**

**Comments:**