

Agricultural Science II

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

Unit: I. 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 II. 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/htmlpubs/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.

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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. I-10 (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 II
Unit I—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.

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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 II
Unit I—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.

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Unit I—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	<ul style="list-style-type: none"> <input type="checkbox"/> Presentation addresses main parts, uses, safety, and maintenance of the tool <input type="checkbox"/> Information is complete <input type="checkbox"/> Facts are accurate <input type="checkbox"/> 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	<ul style="list-style-type: none"> <input type="checkbox"/> Well organized <input type="checkbox"/> Holds audience interest <input type="checkbox"/> Speaks clearly and uses correct grammar <input type="checkbox"/> Maintains good posture <input type="checkbox"/> 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								

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Final Assessment Total _____/100 pts.

Comments:

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

Unit: II. Arc Welding

Unit Objective:

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

Show-Me Standards: 2.5, CA3

References:

Agricultural Mechanics Unit for Agricultural Science II. 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>.

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Instructional Strategies/Activities:

- Students will engage in study questions in lessons 1 through 5.
- Students will complete AS 1.1, Arc Welding Safety; AS 4.1, Identifying Ferrous Metals Using Spark Testing; AS 5.1, Welding a Butt Joint in the Horizontal Position; AS 5.2, Making a Downhill Fillet Weld; AS 5.3, Making an Uphill Fillet Weld; and AS 5.4, Welding a Butt Joint in the Overhead Position.
- Additional activities that relate to the unit objective can be found under the heading “Other Activities” in the following locations: p. II-5 (2, 3), p. II-24 (2), p. II-42 (1, 2), p. II-60, and p. II-74 (1, 3, 4).

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 out-of-position welds presented in the unit and discussed in class.

Assessment will be based on the ability to safely and correctly make out-of-position welds using a shielded metal arc welder.

Agricultural Mechanics Unit for Agricultural Science II Unit II—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 out-of-position welds to perform.
 - 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.

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7. Present an appropriate award to the high-scoring team and individual, if desired.
8. NOTE: If desired, this activity can be combined with the performance-based assessment activities from Unit III, Oxyacetylene Welding, and Unit IV, Tool Sharpening and Reconditioning, to form a mini Agricultural Mechanics Career Development Event. 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.
 - d. Create a display board that identifies different metals and their characteristics. Have students contribute samples.

Agricultural Mechanics Unit for Agricultural Science II
Unit II—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.

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**Agricultural Mechanics Unit for Agricultural Science II
Unit II—Arc Welding
Scoring Guide**

Name _____

Assessment Area	Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Positioning	Metal was properly positioned	Failed	Poor	Fair	Good	Excellent	X 5	
Electrode and Amperage Selection	Electrode was appropriate for the weld and amperage was correctly set	Failed	Poor	Fair	Good	Excellent	X 4	
Distortion	Welds are free of distortion	Failed	Poor	Fair	Good	Excellent	X 5	
Appearance	Weld appearance indicates correct speed of travel, amperage setting, and arc length	Failed	Poor	Fair	Good	Excellent	X 6	
Strength	Welds are strong and sound	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								

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

Comments:

Agricultural Mechanics II Score Sheet

Team Members	Arc Welding	Oxyacetylene Welding	Tool Sharpening/ Reconditioning	Score
Team A				
				Total:
Team B				
				Total:
Team C				
				Total:
Team D				
				Total:
Team E				
				Total:
Team F				
				Total:

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

Unit: III. Oxyacetylene Welding

Unit Objective:

Students will apply principles of oxyacetylene welding by making basic welds with an oxyacetylene outfit as part of a class-wide contest.

Show-Me Standards: 2.5, CA3

References:

Agricultural Mechanics Unit for Agricultural Science II. 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>.

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Instructional Strategies/Activities:

- Students will engage in study questions in lessons 1 through 3.
- Students will complete AS 2.1, Running a Continuous Weld Pool With and Without Welding Rod; AS 2.2, Welding a Butt Joint in Flat Position Using Welding Rod; AS 2.3, Welding an Edge Weld in a Flanged Butt Joint Without Welding Rod; AS 2.4, Welding an Outside Corner Joint With and Without Welding Rod; AS 3.1, Running a Bead With Brazing Rod; and AS 3.2, Braze Welding an Outside Corner Joint in Mild Steel.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following locations: p. III-5 (2, 3) and p. III-55.

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 oxyacetylene outfit to make common welds presented in the unit and discussed in class.

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

Agricultural Mechanics Unit for Agricultural Science II Unit III—Oxyacetylene 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 and braze welding with the oxyacetylene outfit. 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 welds with an oxyacetylene outfit as part of a class-wide contest.
3. Divide the class into groups and assign students a series of welding procedures to perform using the oxyacetylene outfit, such as welding a butt joint in flat position using welding rod, welding an outside corner joint with or without welding rod, and braze welding an outside corner joint in mild steel.
 - 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 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.

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5. Have students perform the assigned welding procedures.
 - a. Performance in the oxyacetylene 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 make the assigned welds using the oxyacetylene outfit.
7. Present an appropriate award to the high-scoring team and individual, if desired.
8. NOTE: If desired, this activity can be combined with the performance-based assessment activities from Unit II, Arc Welding, and Unit IV, Tool Sharpening and Reconditioning, to form a mini Agricultural Mechanics Career Development Event. 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 oxyacetylene 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 II
Unit III—Oxyacetylene Welding
Student Handout

1. The instructor will divide the class into groups and give you a series of oxyacetylene welding 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 welds using the oxyacetylene 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 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 make the assigned welds using the oxyacetylene outfit.

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**Agricultural Mechanics Unit for Agricultural Science II
Unit III—Oxyacetylene Welding
Scoring Guide**

Name _____

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Assessment Area	Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Positioning	Metal was properly positioned	Failed	Poor	Fair	Good	Excellent	X 5	
Filler Rod and Equipment Setting	Filler is appropriate for procedure and torch flame was properly adjusted	Failed	Poor	Fair	Good	Excellent	X 5	
Distortion	Welds are free of distortion	Failed	Poor	Fair	Good	Excellent	X 5	
Appearance	Weld beads are uniform	Failed	Poor	Fair	Good	Excellent	X 5	
Strength	Welds are strong and sound	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 II Score Sheet

Team Members	Arc Welding	Oxyacetylene Welding	Tool Sharpening/ Reconditioning	Score
Team A				
				Total:
Team B				
				Total:
Team C				
				Total:
Team D				
				Total:
Team E				
				Total:
Team F				
				Total:

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

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 II. 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, Dressing a Grinding Wheel; AS 1.2, Sharpening a Twist Drill; AS 1.3, Sharpening a Lawn Mower Blade; and AS 1.4, Maintaining a Chain Saw Chain.

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 perform a sharpening or reconditioning procedure presented in the unit or discussed in class, such as sharpening a twist drill or lawn mower blade or maintaining a chain saw chain.

Assessment will be based on the ability to perform the assigned sharpening or reconditioning procedure safely and correctly.

Agricultural Mechanics Unit for Agricultural Science II 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 sharpening or reconditioning procedure to perform. Procedures covered in the unit include sharpening a twist drill and a lawn mower blade and maintaining a chain saw chain.
 - 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.

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5. Have students sharpen or recondition their assigned 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: If desired, this activity can be combined with the performance-based assessment activities from Unit II, Arc Welding, and III, Oxyacetylene Welding, to form a mini Agricultural Mechanics Career Development Event. 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 II
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 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 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 perform the assigned sharpening or reconditioning procedure safely and correctly.

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**Agricultural Mechanics Unit for Agricultural Science II
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								

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

Comments:

Agricultural Mechanics II Score Sheet

Team Members	Arc Welding	Oxyacetylene Welding	Tool Sharpening/ Reconditioning	Score
Team A				
				Total:
Team B				
				Total:
Team C				
				Total:
Team D				
				Total:
Team E				
				Total:
Team F				
				Total:

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

Unit: V. Cold Metal Work

Unit Objective:

Students will apply principles of cold metal work by constructing an appropriate metalworking project.

Show-Me Standards: 2.5, CA3

References:

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

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 II. University of Missouri-Columbia, Instructional Materials Laboratory, 2002.

Instructional Strategies/Activities:

- Students will engage in study questions in lesson 1.
- Students will observe instructor demonstrations of the following activities and perform the activities at the instructor's discretion: AS 1.1, Techniques for Bending Cold Metal; AS 1.2, Fastening Metal With Rivets and Pop Rivets; and AS 1.3, Using a Tap and Die Set.

Performance-Based Assessment:

Students will use common metalworking tools and procedures discussed in class to lay out and construct an appropriate metalworking 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 II
Unit V—Cold Metal Work
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 activity sheets to demonstrate techniques for working with cold metal. Adapt these sheets as needed and use them to assess student competency at performing basic metalworking 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 metalworking project.
 - a. See the Unit V Activity, *Metalworking Plans*, pp. V-43–V-44, for a project plan and additional details. The activity includes a plan for a small shelf bracket.
 - 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/>.
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.

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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 II
Unit V—Cold Metal Work
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
<input type="checkbox"/> Master all competencies necessary to complete the project.	
<input type="checkbox"/> Receive instructor approval to build the project.	
<input type="checkbox"/> Review safety precautions for tools to be used. You can lose points for not following safety precautions and other assigned procedures.	
<input type="checkbox"/> Perform a quality control inspection of the project during construction. Use the Project Evaluation Checklist.	
<input type="checkbox"/> Complete project construction.	
<input type="checkbox"/> Perform a quality control inspection of the project following completion. Use the Project Evaluation Checklist.	
<input type="checkbox"/> 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	<ul style="list-style-type: none"><input type="checkbox"/> Fasteners are correct type and size.<input type="checkbox"/> Holes and cut edges are deburred and there are no sharp edges.<input type="checkbox"/> Measurements are correct.<input type="checkbox"/> Cuts are accurate.<input type="checkbox"/> Parts fit well for optimum strength.<input type="checkbox"/> Project is square and straight.<input type="checkbox"/> Work was completed on time.
Design and Suitability	<ul style="list-style-type: none"><input type="checkbox"/> Project is well balanced, proportional, and pleasing to the eye.<input type="checkbox"/> Project is the right size for its use.<input type="checkbox"/> Project is suitable for its intended purpose.<input type="checkbox"/> Project is good enough to sell.
Safety and Work Habits: Observe these safety procedures whenever you are in the shop.	<ul style="list-style-type: none"><input type="checkbox"/> Know how to use the equipment before you attempt to use it. Only use tools and materials the instructor has approved you to use.<input type="checkbox"/> Wear appropriate personal protective equipment.<input type="checkbox"/> Follow safety guidelines from your instructor and safety information on labels, equipment, and signs in the work area.<input type="checkbox"/> Follow assigned setup and cleanup procedures.<input type="checkbox"/> Return equipment and materials to their assigned places.<input type="checkbox"/> Do not use equipment that does not function properly.<input type="checkbox"/> Tell the instructor about any damaged or malfunctioning equipment.

Agricultural Science II

Agricultural Mechanics Unit for Agricultural Science II Unit V—Cold Metal Work Scoring Guide

Name _____

Assessment Area	Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Quality of Work	<input type="checkbox"/> Fasteners are correct <input type="checkbox"/> Holes and cut edges are deburred and there are no sharp edges <input type="checkbox"/> Cuts and measurements are accurate <input type="checkbox"/> Parts fit well <input type="checkbox"/> Project is square and straight <input type="checkbox"/> Work was completed on time	Failed	Poor	Fair	Good	Excellent	X 20	
Design and Suitability	<input type="checkbox"/> Project is well balanced and pleasing to the eye <input type="checkbox"/> Project is the right size for its use <input type="checkbox"/> Project is suitable for its intended purpose <input type="checkbox"/> Project is good enough to sell	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								

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

Comments:

Agricultural Science II

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

Unit: VI. Material Selection, Plan Reading, and Interpretation

Unit Objective:

Students will demonstrate an understanding of material selection and plan reading and interpretation by devising a plan of procedure, cutting list, and bill of materials for a project.

Show-Me Standards: 1.8, CA3

References:

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

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 II. University of Missouri-Columbia, Instructional Materials Laboratory, 2002.

Pastoret, J. *Measurements and Pricing of Primary Wood Materials.* MU Extension. University of Missouri-Columbia. Accessed November 26, 2003, from <http://muextension.missouri.edu/explore/agguides/forestry/g05506.htm>.

Instructional Strategies/Activities:

- Students will engage in study questions in lessons 1 through 3.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following locations: p. VI-14 and p. VI-30 (1, 2).

Performance-Based Assessment:

Students will develop a plan of procedure, cutting list, and bill of materials for a project based on a working drawing.

Assessment will be based on the thoroughness and accuracy of the plan of procedure, cutting list, and bill of materials.

**Agricultural Mechanics Unit for Agricultural Science II
Unit VI—Material Selection, Plan Reading, and Interpretation
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. Have students develop a plan of procedure, cutting list, and bill of materials for a project based on a working drawing.
 - a. See the Unit VI Activity, Preparing a Plan of Procedure, Cutting List, and Bill of Materials, pp. VI-45–VI-46, for a project plan and additional details. The activity includes a working drawing for a feed bunk. The plan of procedure, cutting list, and bill of materials for the feed bunk are included on p. VI-31 of the Instructor Guide.
 - 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. This activity could also be adapted for use with students' class projects, if desired.
2. The student handout for this activity is a cutting list work sheet, a bill of materials work sheet, and a plan of procedure work sheet.
 - a. The student handout work sheets are adapted from WS 3.1, Estimated Bill of Materials, p. VI-33, and WS 4.1, List of Tools and Procedures, p. VI-45, of *Agricultural Construction Volume I*, available from the Instructional Materials Laboratory, University of Missouri-Columbia, accessed November 13, 2003, at <http://www.iml.coe.missouri.edu/>.
 - b. For additional work sheets, handouts, and related material, see Unit VI, Project Construction, of *Agricultural Construction Volume I*.
3. The final assessment score will be based on the overall thoroughness and accuracy of the plan of procedure, cutting list, and bill of materials.
4. **ADDITIONAL ACTIVITY:** Divide the class into groups. Have the groups draw up a purchasing bill of material for the same project but assign each group different materials for the project. Variations in materials could include different types of material and different grades or dimensions of lumber. Have students present their findings to the class. Lead a discussion comparing the bills of materials. Ask students to explain which materials they would use and why.

**Agricultural Mechanics Unit for Agricultural Science II
Unit VI—Material Selection, Plan Reading, and Interpretation
Student Handout**

Date _____

Name _____

Project Title _____

Cutting List

Develop a cutting list from a working drawing.

Number of Pieces	Dimensions	Stock	Part and Use

Agricultural Science II

Agricultural Mechanics Unit for Agricultural Science II
Unit VI—Material Selection, Plan Reading, and Interpretation
Scoring Guide

Name _____

Criteria	0 Points	1 Point	2 Points	3 Points	4 Points	Weight	Total
Cutting list includes all necessary materials in their final dimensions	Failed	Poor	Fair	Good	Excellent	X 7.5	
Bill of materials includes all necessary materials in standard dimensions, as well as any fasteners and finish	Failed	Poor	Fair	Good	Excellent	X 7.5	
Plan of procedure includes all steps needed to complete the project	Failed	Poor	Fair	Good	Excellent	X 10	

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Final Assessment Total _____/100 pts.

Comments:

Agricultural Science II

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

Unit: VII. Painting and Finishing

Unit Objective:

Students will apply principles of painting by finishing a project using air spray or airless spray equipment.

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 II. 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/cpsc/pub/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.
- Students will complete AS 1.1, Spray Painting.
- Additional activities that relate to the unit objective can be found under the heading "Other Activities" in the following location: p. VII-8.

Agricultural Science II

Performance-Based Assessment:

Students will finish a project using air spray or airless spray equipment. Acceptable projects would include those made for the Agricultural Science II 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 II
Unit VII—Painting and Finishing
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 AS 1.1, Spray Painting, to assess student competency at painting with spray equipment. 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 spray painting equipment.
 - 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 Agricultural Science II class, 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 II
Unit VII—Painting and Finishing
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
<input type="checkbox"/> Master all competencies necessary to complete the project.	
<input type="checkbox"/> Receive instructor approval for the materials and equipment you plan to use. Are they appropriate for the project?	
<input type="checkbox"/> Review safety precautions for the materials and equipment you will use. You can lose points for not following safety precautions and other assigned procedures.	
<input type="checkbox"/> Prepare the project surface.	
<input type="checkbox"/> Apply the primer coat.	
<input type="checkbox"/> Paint the project.	
<input type="checkbox"/> 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.	
<input type="checkbox"/> Perform a quality control inspection of the project following completion. Use the Project Evaluation Checklist.	
<input type="checkbox"/> 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	<ul style="list-style-type: none"><input type="checkbox"/> Primer is appropriate for the project.<input type="checkbox"/> Primer is properly applied.<input type="checkbox"/> Paint is appropriate for the project.<input type="checkbox"/> Paint is properly applied.<input type="checkbox"/> Paint job is of high quality and pleasing to the eye: no runs, streaks, or orange peeling.<input type="checkbox"/> Project is good enough to sell.<input type="checkbox"/> Work was completed on time.
Safety and Work Habits: Observe these safety procedures whenever you are in the shop.	<ul style="list-style-type: none"><input type="checkbox"/> Know how to use the equipment and materials before you attempt to use them. Only use equipment and materials the instructor has approved you to use.<input type="checkbox"/> Wear appropriate personal protective equipment.<input type="checkbox"/> Follow safety guidelines from your instructor and safety information on labels, equipment, and signs in the work area.<input type="checkbox"/> Do not use primers, finishes, or other products with missing or unreadable labels.<input type="checkbox"/> Follow assigned setup and cleanup procedures.<input type="checkbox"/> Return equipment and materials to their assigned places.

Agricultural Science II

**Agricultural Mechanics Unit for Agricultural Science II
Unit VII—Painting and Finishing
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							

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

Comments:

