

Ag Construction Content Outline

Course's Name: Ag Construction

Teachers Name: Mr. J. Curran

Credits: 1 credit for the full year.

Clock Hours: 182 days

Grade Level: 10-11-12

Prerequisites: Ag Tech Exploration and Animal Science

Teaching Resources: Textbook: Agricultural Mechanics, Author: Elmer L. Cooper; Copyright 1996, Also, use a wide variety of other teaching resources that have been collected over the years.

Course Description: Ag Construction is designed to advance the student's ability in Agricultural Mechanics. The first unit in the quarter will be spent reviewing Arc Welding. Upon this unit, the following units will be covered: Mig Welding, Cutting Torch, Plasma Torch Cutting, Tig Welding and Bill of Materials. Along with these units, students will become familiar with other tools in the shop such as: hand tools, grinders, cut off saws, power tools and all equipment needed to build and work on Agricultural Projects.

Skills will be done on each area so that student will be familiar with the equipment before starting on their own project. Students will be expected to fill out job sheets, plan and design drawings and estimate materials needed before starting on a project.

Students will have ample time to work on projects in the shop/lab setting. Other topics to be covered late in the year will be Electricity, Brazing, Metal Bending and Spray Painting.

Students are required to have safety glasses, tape measure, pliers and shop clothes while working in shop.

Ag Construction Curriculum Outline

Areas on Instruction/Topic Headings	Week
I. FFA/SAE	2 - 1st Quarter
A. Introduction of upcoming FFA events	
B. Building for your SAE	
C. Building for your community	
D. Student Activities: Participation in FFA Magazine Sales, Worksheet on what the student is going to build for their SAE and community	
II. Arc Welding	1.5 - 1st Quarter
A. What is Arc welding and why do we use it	
B. Types of electrodes and uses	
C. Polarities of the welder and their uses	
D. Arc welding safety	
E. Student Activities: Welding with different types of electrodes and polarities.	
III. Mig Welding	1 - 1st Quarter
A. What is Mig welding	
B. Equipment needed to Mig weld	
C. Advantages and disadvantages of Mig welding	
D. Types of wire and gases used in Mig welding	
E. Mig welding safety	
F. Student Activities: Welding different kinds of skills with the Mig welder, Operation and setup of the Mig welder	
IV. Oxyacetylene Cutting Torch	1 - 1st Quarter
A. Parts of the torch	
B. Use of the torch	
C. Cutting torch safety	
D. Student Activities: Demonstration of how to safely use the cutting torch by cutting a straight line, bevel and hole.	
V. Tig Welding	1 - 1st Quarter
A. What is Tig welding	
B. Equipment needed to Tig weld	
C. Aluminum welding	
D. Stainless steel welding	
E. Gases used	
F. Tig welding safety	
G. Student Activities: Welding on mild steel, aluminum and stainless steel with the Tig welder	
VI. Plasma Cutter	1 - 1st Quarter
A. How does the plasma cutter operate	
B. Advantages and disadvantages of the plasma cutter	
C. Plasma cutting safety	
D. Student Activities: Cutting ferrous and nonferrous metals with the plasma cutter safely.	

- VII. Metal Bending** .5 - 1st Quarter
- A. How to use the metal bender
 - B. Limitations of the bender
 - C. Metal bending safety
 - D. Student Activities: Bending metal from 3/4" to 1 1/4" tubing.
- VIII. Bill of Materials** 1 - 1st Quarter
- A. Calculate linear feet, square feet, Lbs. of metal based off of unit price.
 - B. How to fill out the Girard Ag Department job sheet
 - C. Converting fractions to feet
 - D. Student Activities: Given the unit cost students should calculate linear feet, sq. Feet and lbs. of material using a job sheet
- IX. Blueprint Reading** .5 - 2nd Quarter
- A. Symbols of a drawing
 - B. Scale drawing
 - C. Accuracy of measurements
 - D. Student Activities: Students will draw a plan for their project they will construct in shop
- X. Student Lab/Shop** 3.5 - 2nd Quarter
- A. Skills will be done in each area covered
 - B. Student Activities: Students will perform skills in each area to the satisfaction of the instructor before starting on their project.
- XI. Student Lab/Project** 5 - 2nd Quarter
- A. Project construction of the student
 - B. Student Activities: Using all necessary equipment to build and construct the students project, Safety habit, Work Performance and Responsibility will be demonstrated by each student
- XII. Electricity** 2 - 3rd Quarter
- A. Electrical safety
 - B. Calculations of electricity
 - C. House wiring skills
 - D. Student Activities: Students will be using a wiring board to wire a variety of wiring skills ranging from an outlet to a 4-way switch, students will demonstrate safety while working on wiring boards
- XIII. Brazing** 1 - 3rd Quarter
- A. Purpose of brazing
 - B. Safety while brazing
 - C. Student Activities: A variety of brazing skills to be done
- XIV. Certification Welding** 1 - 3rd Quarter
- A. What is certification welding
 - B. Benefits of a certified welder
 - C. Careers in welding
 - D. Student Activities: Having a guest speaker as a certified welder, Use the web to determine how much more advancement in placement and money, certification welding has to offer; 3-pass weld certification style

XV. Spray Painting

.5 - 3rd Quarter

A. How to use the spray gun

B. How to mix paint

C. How to clean the spray gun

D. Student Activities: Students will use the spray gun or other methods of painting to paint their projects.

XV. Student Lab/Shop

13 - 4th Quarter

A. Students working on their projects

B. Student Activities: Using all skills necessary to complete a finished, quality project.

Girard High School

Name _____ SSN ____-____-_____

Instructor _____

RATING SCALE:
 3: Skilled, works independently
 2: Competent, may need assistance
 1: Received instruction, skill undeveloped
 0: No exposure, instruction or training

INTEGRATION:
 (M) Math (S) Science
 (E) Language Arts (C) Career Development Skill
 (L) Lab Activity

Ag Construction

Enrollment Date _____ Completion Date _____ Hours completed _____
 ____/____/____ ____/____/____ _____

I certify that the student received the training in the area indicated.

Student Signature _____ Date _____

Instructor Signature _____ Date _____

Administrator Signature _____ Date _____

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| <p>I. FFA/SAE</p> <p>3 2 1 0 1. Relates FFA/CDE to classroom</p> <p>3 2 1 0 2. Selects a proficiency area for SAE</p> <p>3 2 1 0 3. Assists in community service work for constructing projects</p> <p>3 2 1 0 4. Chooses materials that best fit the community project</p> <p>3 2 1 0 5. Performs a cost analysis to see if the project is worth building or buying. (M)</p> <p>3 2 1 0 6. Greets community members with magazine and fruit sales</p> <p>3 2 1 0 7. Prepares a proficiency award</p> <p>3 2 1 0 8. Assembles projects as related to SAE</p> <p>II. Arc Welding</p> <p>3 2 1 0 1. Describes SMAW</p> <p>3 2 1 0 2. Generates examples of where certain electrodes are used</p> <p>3 2 1 0 3. Calculates duty cycle of an Arc welder (M)</p> <p>3 2 1 0 4. Demonstrates safety habits of Arc welding (L)</p> <p>3 2 1 0 5. Outlines polarities and their uses (E)</p> <p>3 2 1 0 6. Chooses proper safety equipment (L)</p> <p>3 2 1 0 7. Discovers different welding techniques</p> <p>III. Mig Welding</p> <p>3 2 1 0 1. Reads Mig welding information (E)</p> <p>3 2 1 0 2. Matches the correct equipment needed</p> | <p>3 2 1 0 3. Compares and contrasts advantages and disadvantages of Mig welding</p> <p>3 2 1 0 4. Explains why chemical reactions are unique with different types of gases used (S)</p> <p>3 2 1 0 5. Gives examples of different types of wire used in the Mig welding process</p> <p>3 2 1 0 6. Performs safe working habits (L)</p> <p>3 2 1 0 7. Follows directions in setting up and maintaining the welder (L)</p> <p>3 2 1 0 8. Differentiates welding techniques in Mig as compared to SMAW</p> <p>IV. Oxyacetylene Cutting Torch</p> <p>3 2 1 0 1. Identifies the parts of the torch</p> <p>3 2 1 0 2. Writes out the safety procedures of using the cutting torch (E)</p> <p>3 2 1 0 3. Shows how to use the cutting torch safely (L)</p> <p>3 2 1 0 4. Summarizes how the cutting torch cuts metal (S)</p> <p>3 2 1 0 5. Points out when the cutting tip needs cleaned or when cylinders need to be changed (L)</p> <p>3 2 1 0 6. Operates the cutting torch to cut a straight line, bevel or hole (L)</p> <p>V. Tig Welding</p> <p>3 2 1 0 1. Defines Tig welding</p> <p>3 2 1 0 2. Identifies equipment needed to Tig weld</p> | <p>3 2 1 0 3. Practices safety habits while Tig welding</p> <p>3 2 1 0 4. Selects the right type of tungsten for the job (L)</p> <p>3 2 1 0 1. Chooses the correct polarity to aluminum weld (L)</p> <p>3 2 1 0 2. Matches the correct polarity to stainless steel weld (L)</p> <p>3 2 1 0 3. Prepares and cleans the metal thoroughly before welding (L)</p> <p>3 2 1 0 4. Identifies when the metal is contaminated</p> <p>3 2 1 0 5. Grinds the point correctly on the tungsten electrode before welding stainless steel</p> <p>3 2 1 0 6. Explains what type of gases can be used and why for the Tig welding process (S)</p> <p>VI. Plasma Cutter</p> <p>3 2 1 0 1. States how the plasma cutter operates</p> <p>3 2 1 0 2. Gives examples of advantages and disadvantages of using the plasma cutter</p> <p>3 2 1 0 3. Forms safe working habits while using the plasma cutter (L)</p> <p>3 2 1 0 4. Demonstrates how to change the cutting tip (L)</p> <p>VII. Metal Bending</p> <p>3 2 1 0 1. Listens to directions before using the bender</p> <p>3 2 1 0 2. Calculates the area to be bent before bending the material (M)</p> <p>3 2 1 0 3. Writes down steps before bending (E)</p> |
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- 3 2 1 0 4. Operates the metal bender safely
- 3 2 1 0 5. Recognizes the limitations of the bender

VIII. Bill of Materials

- 3 2 1 0 1. Converts fractions to a decimal (M,C)
- 3 2 1 0 2. Calculates linear feet (M,C)
- 3 2 1 0 3. Calculates square feet (M,C)
- 3 2 1 0 4. Calculates pounds of metal (M,C)
- 3 2 1 0 5. Creates cost of metal based on unit price (M,C)
- 3 2 1 0 6. Shows how to fill out the Girard Ag Department job sheet (M, E, C)
- 3 2 1 0 7. Performs responsibility by paying for materials when completing a project (C)

IX. Blueprint Reading

- 3 2 1 0 1. Illustrates symbols for a project plan
- 3 2 1 0 2. Prepares a project plan to a scale drawing (M)
- 3 2 1 0 3. Designs a plan to show accuracy of measurements (M)
- 3 2 1 0 4. Demonstrates a plan that is neat and well planned.

X. Student Lab Skills

- 3 2 1 0 1. Performs a t-weld with both 6011 and 6013 (L)
- 3 2 1 0 2. Assembles a square tubing skill with SMAW (L)
- 3 2 1 0 3. Demonstrates SMAW welding on round tubing or pipe (L)
- 3 2 1 0 4. Constructs a t-weld with GMAW (L)
- 3 2 1 0 5. Connects square tubing with GMAW (L)
- 3 2 1 0 6. Creates vertical welding with GMAW (L)
- 3 2 1 0 7. Performs use of the torch by cutting a straight line, hole and bevel (L)
- 3 2 1 0 8. Demonstrates aluminum and stainless steel welding with the Tig welder (L)
- 3 2 1 0 9. Uses the plasma cutter to cut a square piece of metal with a hole in the center (L)
- 3 2 1 0 10. Follows safe working habits while in shop (L)
- 3 2 1 0 11. Displays work performance and responsibility while in shop (L)

XI. Project Construction

- 3 2 1 0 1. Builds project neatly and accurately (L)

- 3 2 1 0 2. Uses proper equipment to construct projec (L)
- 3 2 1 0 3. Exhibits safe working habits while constructing project (L)
- 3 2 1 0 4. Completes the project in a timely fashion (L)

XII. Electrical Wiring

- 3 2 1 0 1. Plans for safety when electrical wiring
- 3 2 1 0 2. Calculates ohms law (M)
- 3 2 1 0 3. Connects a 2-way switch (L)
- 3 2 1 0 4. Writes down steps in performing a 3-way switch (E)
- 3 2 1 0 5. Demonstrates wiring a 3-way switch (L)
- 3 2 1 0 6. Assembles a 4-way switch (L)
- 3 2 1 0 7. Performs how to hook up a duplex outlet (L)
- 3 2 1 0 8. Hooks up a duplex switch (L)
- 3 2 1 0 9. Explains how electricity passes through a conductor (S)

XIII. Brazing

- 3 2 1 0 1. Describes how capillary action works in brazing (S)
- 3 2 1 0 2. Forms safe working habits while brazing (L)
- 3 2 1 0 3. Identifies positive and negative characteristics of the braze weld (E)
- 3 2 1 0 4. Performs metal preparation before braze welding (L)

XIV. Certification Welding

- 3 2 1 0 1. Describes certification welding
- 3 2 1 0 2. Researches different resources of benefits of being a certified welder (E)
- 3 2 1 0 3. Locates a certified welder to find out more about the occupation
- 3 2 1 0 4. Demonstrates a 3 pass weld using 6010 and 7018 (L)

XV. Spray Painting

- 3 2 1 0 1. Exhibits preparation of metal before painting (L)
- 3 2 1 0 2. Shows safety before spray painting (L)
- 3 2 1 0 3. Mixes paint properly before spray painting (L)
- 3 2 1 0 4. Demonstrates how to use the paint gun before painting project
- 3 2 1 0 5. Paints project with the spray gun (L)

- 3 2 1 0 6. Cleans the paint gun thoroughly after using (L)

XV. Project Evaluation

- 3 2 1 0 1. Constructs a project following directions (L)
- 3 2 1 0 2. Completes the project in a timely fashion (L)
- 3 2 1 0 3. Builds the project in a safe manner (L)

XVI. Career Development Skills

- 3 2 1 0 1. Listens for steps or actions to be performed
- 3 2 1 0 2. Participates in group communication activities
- 3 2 1 0 3. Estimates, applies, and solves problems involving fractions, decimals, percentages and real numbers
- 3 2 1 0 4. Compiles and maintains records, logs, lab notebooks, and other documents
- 3 2 1 0 5. Uses functions to store, query, retrieve, and sort data
- 3 2 1 0 6. Demonstrates interpersonal skills for the respect of others
- 3 2 1 0 7. Applies the steps in the decision making process
- 3 2 1 0 8. Participates in team tasks for establishing a team goal
- 3 2 1 0 9. Determines cost, time, and resources needed to complete a task within an industry or occupation
- 3 2 1 0 10. Identifies and controls personal "time wasters"
- 3 2 1 0 11. Interprets standard workplace policies related to safety
- 3 2 1 0 12. Accesses and uses information to develop educational and career options

XVII. Life Knowledge Skills

- 3 2 1 0 1. Practices honesty (HS 12)
- 3 2 1 0 2. Understands career clusters (HS 31)
- 3 2 1 0 3. Accepts being responsible and accountable (HS 13)
- 3 2 1 0 4. Understands the use of time (HS 41)

