Ag Metals - 18412

Kansas Agricultural Education

Hours Completed _____ Competencies Completed _____/197

Verification Signatures:

Student:_____ Date: _____

Instructor:_____ Date: _____

Name: _____

Instructor: _____ School Year:_____

Key to Integrated Competencies

(CD)- Career Development
(L)- Leadership
(E) - Experienced Based
(LK) - LifeKnowledge Lessons
(LA) – Language Arts
(M) - Math
(S) – Science
(SS) – Social Science

Circle to indicate level of competency achieved:

3 - Skilled-Works Independently **2** Limited skill-Needs assistance **1** -Skill undeveloped-but received instruction **0** -No exposure

Career Options in Metal technologys

3 2 1 0 1. Identify several career opportunities in the metal technology field. (CD) (LK HS 123)
3 2 1 0 2. List the qualities that are essential for anyone pursuing a career in metal technology. (CD)
3 2 1 0 3. List the advantages and disadvantages of entrepreneurship. (CD) (LK HS 126)
3 2 1 0 4. Identify the benefits of outdoor metal technology certification. (CD)
3 2 1 0 5. Complete a personal information sheet. (CD) (LK HS 37)

Safety in the Metal technology Shop

3 2 1 0 1. Explain why a clean, well organized shop is extremely important. (LA, CD)
3 2 1 0 2. List dangers associated with working in a metal technology shop.
3 2 1 0 3. Explain the importance of maintaining and using tools properly. (LA, CD)
3 2 1 0 4. Describe methods for minimizing the risks involved in working with metal technology. (CD)
3 2 1 0 5. Explain the functions of OSHA. (LA)
3 2 1 0 6. Complete a Shop Safety Contract / Release form.(E)
3 2 1 0 7. Demonstrate knowledge of basic shop safety by satisfactorily completing Safety Orientation Exam (E)

Tools and Measuring Instruments

3 2 1 0 1. Explain why quality tools and measuring instruments should be used when servicing metal technology. (M, CD)
3 2 1 0 2. Use common hand tools properly. (E)
3 2 1 0 3. Summarize the reasons that metal technology components must be measured carefully. (M, LA)
3 2 1 0 4. Demonstrate several of the common measuring techniques. (M, E, CD)
3 2 1 0 1. Describe two-stroke cycle engine operation and explain the principles of two-cycle operation. (LA)
3 2 1 0 2. List the advantage and disadvantages of two-cycle and four-cycle engines.

Opportunities in FFA

3 2 1 0 1. Research and present a 4-6 minute speech on an agricultural topic.(L, LA, E) (LK HS 86 & 90)
3 2 1 0 2. Serve on a POA committee. (L, E) (LK AHS 47)
3 2 1 0 3. Participate in at least one activity above the chapter level.(L, E)
3 2 1 0 4. Demonstrate concise, impromptu speaking skills. (LA, L, E) (LK HS 84)
3 2 1 0 5. Conduct strengths assessment to determine possible career options. (L, CD, E) (LK HS 31)

SAE

3 2 1 0 1. Maintain records on income and expense. (M, CD, E) (LK HS 129)
3 2 1 0 2. Complete a cash flow statement. (M, CD, E)
3 2 1 0 3. Complete year end records. (M, CD, E)
3 2 1 0 4. Complete a SAE packet. (M, CD, E)
3 2 1 0 5. Complete a proficiency award application. (M, CD, E) (LK AHS 53)

Work Place Skills

Worth Ethics

1. Interpret workplace policies related to: (CD)
   - 3 2 1 0 a. Safety
   - 3 2 1 0 b. Personal hygiene
   - 3 2 1 0 c. Absence and personal leave
   - 3 2 1 0 d. Substance abuse
   - 3 2 1 0 e. Employee theft
   - 3 2 1 0 f. Sexual harassment
   - 3 2 1 0 g. Termination/Legal actions
   - 3 2 1 0 h. Punctuality and dependability
   - 3 2 1 0 i. Responsibility for position
   - 3 2 1 0 j. Accuracy
   - 3 2 1 0 k. Cost effectiveness
2. Understand and value effective work ethic attitudes and behaviors such as: (CD, L)
   - 3 2 1 0 a. Acceptance of the job requirement
   - 3 2 1 0 b. A willingness to take initiative with new challenges
   - 3 2 1 0 c. Take responsibility for decision and actions.

3 2 1 0 3. Compare and complete various examples of job application forms (CD, LA)
3 2 1 0 4. Demonstrate personal characteristics that lead to job satisfaction.
3 2 1 0 5. Maintain an opening to lifelong learning.
3 2 1 0 6. Create a portfolio or resume' or other means that display academic and technical skill and accomplishments. (E, LA, CD)

Mathematics

3 2 1 0 1. Estimate, apply and solve problems involving fraction, decimals, percentages, and real numbers. (M)
3 2 1 0 2. Decide whether a problem situation is best solved using computer, calculator, paper and pencil, or mental arithmetic/estimation techniques.(M)
3 2 1 0 3. Translate written and /or verbal statements into mathematical expressions.(M, LA)
3 2 1 0 4. Convert common units of measurement within and /or across measurement systems (metric/English, etc.).(M)
3 2 1 0 5. Construct and interpret tables, charts, maps, and/or graphs.(M)
3 2 1 0 6. Apply measurement concepts of distance, direction, rate, time, and acceleration.(M)
3 2 1 0 7. Interpret measures of central tendency mean, median, mode, and variance.(M)

Time Management

3 2 1 0 1. Identify influences on use of time. (LK HS 41)
3 2 1 0 2. Set priorities or the order in which several tasks will be accomplished.
3 2 1 0 3. Identify and eliminate time traps and time wasters.
3 2 1 0 4. Develop strategies to meet deadlines and budget time for completing tasks.
3 2 1 0 5. Demonstrate stress management skills.

I. DESIGN PROCESS

3 2 1 0 1. Identify design process
3 2 1 0 2. List five qualifications for a good design
3 2 1 0 3. Identify problem
3 2 1 0 4. Contribute to preliminary ideas
3 2 1 0 5. Contribute in a positive way to refinement process
3 2 1 0 6. Contribute in a positive way to analysis of preliminary ideas
3 2 1 0 7. Contribute in a positive way to decision making process
3 2 1 0 8. Demonstrate implementation of design
3 2 1 0 9. Understand and contribute to team presentation of designs

II. WELDING AND CUTTING

3 2 1 0 1. Set up oxyacetylene equipment
3 2 1 0 2. Adjust oxyacetylene torch observing the various flames
3 2 1 0 3. Turn off the torch and oxyacetylene unit
3 2 1 0 4. Braze with brass rod (butt, tee, lap, plub)
3 2 1 0 5. Set up equipment and light and adjust the oxyacetylene torch for cutting
3 2 1 0 6. Make a 90 degree cut and restart a cut
3 2 1 0 7. Make a beveled cut and a hole cut
3 2 1 0 8. Demonstrate solder and heating techniques
3 2 1 0 9. Cut out spot welds with plasma arc cutter
3 2 1 0 10. Prepare metal for welding
3 2 1 0 11. Set up MIG welding equipment and run a bead
3 2 1 0 12. Weld joints using MIG welder (butt, tee, lap, plug)
3 2 1 0 13. Trouble shoot a MIG welder
3 2 1 0 14. Remove weld on cosmetic panels
3 2 1 0 15. Fix up and install weld on cosmetic panel

III. PERFORM BENCHWORK OPERATIONS

3 2 1 0 1. Cut threads with taps and dies
3 2 1 0 2. Remove threaded fasteners and repair threads
3 2 1 0 3. Deburr parts
3 2 1 0 4. Polish parts using coated abrasives
3 2 1 0 5. Sharpen and polish tools using abrasive stones
3 2 1 0 6. Finish parts with hand grinders
3 2 1 0 7. Determine high spots using pigment
3 2 1 0 8. Remove high spots
3 2 1 0 9. Polish and buff parts with portable hand tools
3 2 1 0 10. Lap and fit parts
3 2 1 0 11. Disassemble, fit, and reassemble parts
3 2 1 0 12. Plan assembly operations
3 2 1 0 13. Work materials with hand tools
3 2 1 0 14. Bend metal with box and pan brake
3 2 1 0 15. Bend sheet metal with cornice brake
3 2 1 0 16. Bend metal with power brake
3 2 1 0 17. Cut metal with power shear
3 2 1 0 18. Notch materials
3 2 1 0 19. Roll Cylindrical metal shapes
3 2 1 0 20. Work materials with hydraulic iron worker

IV. PERFORM PRECISION MEASUREMENT

3 2 1 0 1. Measure parts with semi-precision measuring tools
3 2 1 0 2. Inspect parts with precision measuring tools
3 2 1 0 3. Inspect parts with comparison measuring tools
3 2 1 0 4. Inspect parts using go/no go gauges
3 2 1 0 5. Inspect assemblies
3 2 1 0 6. Measure parts using dial calipers
3 2 1 0 7. Measure parts using vernier measuring tools
3 2 1 0 8. Measure parts using outside micrometers
3 2 1 0 9. Measure parts using inside micrometers
3 2 1 0 10. Measure parts with height gauge
3 2 1 0 11. Measure threads
3 2 1 0 12. Inspect surface finish of parts
3 2 1 0 13. Calibrate and use indicating micrometers
3 2 1 0 14. Clean and store precision measuring tools
3 2 1 0 15. Inspect parts according to quality control and inspection standards and procedures
3 2 1 0 16. Verify dimensions
3 2 1 0 17. Verify clearances
3 2 1 0 18. Inspect machined parts

V. PERFORM LAYOUTS

3 2 1 0 1. Analyze specifications
3 2 1 0 2. Compute layout dimensions
3 2 1 0 3. Plan layout operations
3 2 1 0 4. Calculate reference points
3 2 1 0 5. Calculate angles from reference point
3 2 1 0 6. Calculate arcs from reference point
3 2 1 0 7. Calculate locations from reference point
3 2 1 0 8. Verify workpiece specifications
3 2 1 0 9. Lay out reference points
3 2 1 0 10. Lay out angles, arcs, and locations from reference point
3 2 1 0 11. Label workpiece
3 2 1 0 12. Perform semi-precision layouts
3 2 1 0 13. Perform precision layouts from blueprints
3 2 1 0 14. Transfer layouts from models
3 2 1 0 15. Verify layouts

VI. OPERATE DRILLING MACHINES

3 2 1 0 1. Select drills using drill chart
3 2 1 0 2. Use and maintain coolant system for drilling
3 2 1 0 3. Change drills and tool holders
3 2 1 0 4. Calculate and set drilling speeds, feeds and depth of cut
3 2 1 0 5. Center drill and drill holes to size
3 2 1 0 6. Drill blind holes to specifications
3 2 1 0 7. Drill deep holes to specifications

3 2 1 0 8. Thread parts using tapping attachment
3 2 1 0 9. Ream holes to size
3 2 1 0 10. Sharpen drills
3 2 1 0 11. Perform basic drilling machine maintenance
3 2 1 0 12. Plan sequence of drilling operations
3 2 1 0 13. Set up drill press

VII. OPERATE BENCH GRINDERS
3 2 1 0 1. Change and dress bench grinding wheels
3 2 1 0 2. Sharpen and recondition hand tools
3 2 1 0 3. Rough grind materials
3 2 1 0 4. Perform basic bench grinder maintenance

VIII. SELECT MATERIALS
3 2 1 0 1. Interpret color, codes, numbering systems, and classification systems of materials (i.e. AISI, SAE)
3 2 1 0 2. Select material for job
3 2 1 0 3. Identify metals using spark test
3 2 1 0 4. Identify metals using variety of tests
3 2 1 0 5. Identify materials

IX. PERFORM HEAT TREATMENT OF METALS
3 2 1 0 1. Test hardness of metals
3 2 1 0 2. Perform non-destructive testing
3 2 1 0 3. Perform destructive testing
3 2 1 0 4. Harden metals to job specification
3 2 1 0 5. Temper metals to job specifications
3 2 1 0 6. Anneal metals to job specifications
3 2 1 0 7. Normalize metals to job specifications
3 2 1 0 8. Case harden metals to job specifications

X. MANUFACTURING PROCESSES
3 2 1 0 1. Identify purposes of manufacturing processes
3 2 1 0 2. Identify types of drawings
3 2 1 0 3. Identify casting terms
3 2 1 0 4. List drawing procedures for casting
3 2 1 0 5. Identify casting and machine dimensions
3 2 1 0 6. List drawing procedures for a forging
3 2 1 0 7. Identify machine processes
3 2 1 0 8. Identify numerical control machinery
3 2 1 0 9. Identify sheet metal processing
3 2 1 0 10. Identify sheet metal hems, joints and bends
3 2 1 0 11. Construct a casting drawing
3 2 1 0 12. Construct a forging drawing
3 2 1 0 13. Construct a welded drawing

XI. FASTEN AND/OR JOIN SHEET METAL
3 2 1 0 1. Rivet sheet metal with trimmers
3 2 1 0 2. Rivet sheet metal with pop rivets
3 2 1 0 3. Fasten materials using sheet metal screws

XII. FABRICATE SHEET METAL
3 2 1 0 1. Construct single hem
3 2 1 0 2. Construct double hem
3 2 1 0 3. Construct single lap seam
3 2 1 0 4. Construct double lap seam

XII. PERFORM RELATED ACTIVITIES
3 2 1 0 1. Cut material using power cut off shears
3 2 1 0 2. Cut material using power/saw abrasive wheel
3 2 1 0 3. Cut pipe to length using pipe cutter
3 2 1 0 4. Identify type of metal to be welded
3 2 1 0 5. Prepare metal for welding
3 2 1 0 6. Secure parts for welding using clamps and fixtures
3 2 1 0 7. Apply hard surfacing material
3 2 1 0 8. Tack material into position for welding
3 2 1 0 9. Pre and post heat carbon steel for welding using heating torch
3 2 1 0 10. Finish surface of weldment
3 2 1 0 11. Locate cracks using proper technique
3 2 1 0 12. Demonstrate use of welding codes
3 2 1 0 13. Read blueprints
3 2 1 0 14. Demonstrate robotic skills

CAREER DEVELOPMENT SKILLS

I. LISTENING SKILLS
1. Follow oral instructions
3 2 1 0 2. Draw conclusions or make generalizations from another's oral communication.

II. ORAL COMMUNICATION
3 2 1 0 1. Organize notes and ideas for presentations.
3 2 1 0 2. Prepare and deliver a presentation appropriate to subject matter, purpose, and audience.
3 2 1 0 3. Participate in group communication activities.
3 2 1 0 4. Give oral directions.

III. MATHEMATICS
3 2 1 0 1. Estimate, apply, and solve problems involving fractions, decimals, percentages, and real numbers.
3 2 1 0 2. Decide whether a problem situation is best solved using computer, calculator, paper and pencil, or mental arithmetic/estimation techniques.
3 2 1 0 3. Translate written and/or verbal statements into mathematical expressions.
3 2 1 0 4. Convert common units of measurement within and/or across measurement systems (metric/English, etc.).
3 2 1 0 5. Interpret tables, charts, maps, and/or graphs.
3 2 1 0 6. Apply measurement concepts of distance, direction, & rate

IV. WRITING
3 2 1 0 1. Use language, organization, and format appropriate to the subject matter, purpose, and audience.
3 2 1 0 2. Check, edit, and revise for correct information, appropriate emphasis, grammar, spelling, and punctuation.
3 2 1 0 3. Compile and maintain records, logs, lab notebooks, and other documents.

V. COMPUTER LITERACY
3 2 1 0 1. Define, understand, and use common computer technology terminology
3 2 1 0 2. Compose, organize, and edit information using a computer.
3 2 1 0 3. Use functions to store, retrieve, and sort data.
3 2 1 0 4. Select and use subject-specific and industry-specific software.
3 2 1 0 5. Access, navigate, and use on-line services
3 2 1 0 6. Apply ethical considerations to the operation and management of information systems c

VI. HUMAN RELATION SKILLS
1. Perform a self-assessment:
3 2 1 0 a. Personal goals
3 2 1 0 b. Standards and values
3 2 1 0 c. Needs/wants
3 2 1 0 d. Strengths/weaknesses
3 2 1 0 e. Interests/talents
3 2 1 0 2. Define the term "self concept".
3 2 1 0 3. Demonstrate characteristics of a positive self concept.

3 2 1 0 4. Identify defense mechanisms that are used to protect self concept.
5. Demonstrate interpersonal skills:
3 2 1 0 a. Tact and diplomacy
3 2 1 0 b. Respect for others
3 2 1 0 c. Respect for diversity
3 2 1 0 d. Recognition of others' strengths
3 2 1 0 e. Positive assertiveness
3 2 1 0 f. Positive attitude

VII. DECISION MAKING/PROBLEM SOLVING
1. Describe the factors that impact on decision making:
3 2 1 0 a. Needs and wants
3 2 1 0 b. Values
3 2 1 0 c. Goals
3 2 1 0 d. Standards
2. Distinguish between types of decisions:
3 2 1 0 a. Economic
3 2 1 0 b. Technical
3 2 1 0 c. Social
3 2 1 0 3. Apply the steps in the decision making process.
4. Utilize problem solving skills:
3 2 1 0 a. Identify the problem for resolution
3 2 1 0 b. Define critical issues
3 2 1 0 c. Analyze causes of a problem
3 2 1 0 d. Utilize research and assessment skills
3 2 1 0 e. Examine results of a problem
3 2 1 0 f. Offer solutions to a problem
3 2 1 0 g. Select a solution to a problem
3 2 1 0 h. Implement an action plan

VIII. TEAMWORK
1. Participate in team tasks:
3 2 1 0 a. Establish team goals
3 2 1 0 b. Establish team standards
3 2 1 0 c. Receive and give information
3 2 1 0 d. Process information
3 2 1 0 e. Plan for action
3 2 1 0 f. Complete team task on time
2. Build group consensus:
3 2 1 0 a. Clarify statements
3 2 1 0 b. Reconcile disputes and disagreements
3 2 1 0 c. Propose alternative plans for action
3 2 1 0 d. Respond positively to ideas and suggestions
3 2 1 0 e. Express agreement or neutrality
3 2 1 0 f. Demonstrate conflict resolution skills
3 2 1 0 g. Express disagreement diplomatically

IX. RESOURCE MANAGEMENT
3 2 1 0 1. Identify and explain the use of common supplies for a given occupational area.
3 2 1 0 2. Locate information and select the materials, tools, equipment, or other resources to perform the activities needed to
accomplish a specific task.
3 2 1 0 3. Determine cost, time, and resources needed to complete a task within an industry or occupation.
3 2 1 0 4. Explain the relationship between setting goals and managing money.
3 2 1 0 5. Identify fixed and flexible expenses.

X. TIME MANAGEMENT
3 2 1 0 1. Identify influences on use of time.
3 2 1 0 2. Set priorities or the order in which several tasks will be accomplished.
3 2 1 0 3. Identify and eliminate "time traps".
3 2 1 0 4. Identify and control personal "time wasters".
3 2 1 0 5. Develop strategies to overcome procrastination and meet deadlines.
3 2 1 0 6. Estimate the time required to perform activities needed to accomplish a specific task.
3 2 1 0 7. Create a time plan for solving a problem.
3 2 1 0 8. Develop a daily time plan for work
3 2 1 0 9. Utilize time management strategies
3 2 1 0 10. Demonstrate stress management skills.

XI. WORK ETHICS
1. Understand workplace policies related to:
3 2 1 0 a. Safety
3 2 1 0 b. Personal hygiene
3 2 1 0 c. Personal discipline (personal leave and absence)
3 2 1 0 d. Substance abuse
3 2 1 0 e. Employee theft
3 2 1 0 f. Sexual harassment
3 2 1 0 g. Causes for termination/legal actions
2. Apply employee rules, regulations, and policies in a given occupational area, including:
3 2 1 0 a. Punctuality and dependability
3 2 1 0 b. Responsibility for position
3 2 1 0 c. Accuracy
3 2 1 0 d. Cost effectiveness
3. Understand and value effective work ethic attitudes and behaviors such as:
3 2 1 0 a. Acceptance of the job requirements.
3 2 1 0 b. A willingness to take initiative with new challenges.
3 2 1 0 c. Take responsibility for decisions and actions.
3 2 1 0 4. Demonstrate personal characteristics that lead to job satisfaction.
3 2 1 0 5. Maintain openness to lifelong learning.
3 2 1 0 6. Create a portfolio or other means that display academic and technical skills.

XII. CAREER PLANNING
3 2 1 0 1. Access and use information to develop educational and career options.
3 2 1 0 2. Prepare a personal budget.
3 2 1 0 3. Develop a financial expectation.
3 2 1 0 4. Participate in career exploration activities.
3 2 1 0 5. Apply self-assessment skills to the career decision-making process.
3 2 1 0 6. Recognize potential impact of career choice on family and personal life.

STUDENT LEADERSHIP ACTIVITIES

I. COLLEGIALITY
3 2 1 0 1. Identify roles and responsibilities of a leader in relation to one's own aptitudes as a leader or follower

II. TRUST AND CONFIDENCE
3 2 1 0 1. Control emotions under demands, time, pressure, and opposition

III. HONEST, OPEN COMMUNICATION
3 2 1 0 1. Value diversity, practice tolerance and acceptance, and work cooperatively toward common goals

IV. TANGIBLE SUPPORT
3 2 1 0 1. Apply one or more problem-solving processes to a given situation(s)

V. HIGH EXPECTATIONS

3 2 1 0 1. Establish and examine personal short- and long-term goals, including resources needed to reach these goals

VI. EXPERIMENTATION
3 2 1 0 1. Analyze the benefits and risks in assuming a leadership style

VII. INVOLVEMENT IN DECISION MAKING
3 2 1 0 1. Accept responsibility for personal decisions and actions

VIII. PROTECTION OF WHAT'S IMPORTANT
3 2 1 0 1. Cooperate and compromise through teamwork and group participation

IX. APPRECIATION AND RECOGNITION
3 2 1 0 1. Demonstrate cooperative behaviors to contribute to one another's success

ACADEMIC COMPETENCIES

LANGUAGE ARTS
I. ORAL COMMUNICATIONS
3 2 1 0 1. Use appropriate telephone techniques to gather and record information
3 2 1 0 2. Participate in group discussions for problem resolution
3 2 1 0 3. Organize and lead discussions

II. INFORMATIONAL READING
3 2 1 0 1. Expand scope of reading materials to include related publications
3 2 1 0 3. Use vocabulary appropriate for entry-level jobs
3 2 1 0 4. Interpret business correspondence, professional articles, and supporting graphic materials
3 2 1 0 5. Interpret information from manuals, computer printouts, and electronic sources

III. WRITTEN COMMUNICATIONS
3 2 1 0 1. Use acceptable standards for grammar, mechanics, and word usage
3 2 1 0 2. Write appropriate messages for specific audiences
3 2 1 0 3. Use a wide variety of references and resources (both electronic and printed) for the purpose of writing documents

MATHEMATICAL SKILLS AND CONCEPTS
IV. OPERATIONS
3 2 1 0 1. Solve problems that involve whole numbers, decimals, and fractions including use of appropriate conversions when
necessary (e.g., fractions to decimals or decimals to fractions)
3 2 1 0 2. Solve problems that involve percents, ratios, and proportions including use of appropriate conversions when necessary
(e.g., decimals to percents, percents to decimals, or ratios to percents)

V. ALGEBRA
3 2 1 0 2. Apply the order of operations principle when using mathematical processes
3 2 1 0 3. Identify multiple applications for using algebraic equations to solve problems

VI. MEASUREMENTS
3 2 1 0 1. Estimate and convert American units of measurements (length, volume, and weight) to metric measurements and vice versa

VII. STATISTICS AND PROBABILITY
3 2 1 0 1. Construct, read, and interpret tables, charts, and graphs
3 2 1 0 2. Make inferences about data from tables, charts, and graphs

SCIENCE AND TECHNOLOGY
VIII.
3 2 1 0 1. Describe positive and negative impacts of technology on the environment
3 2 1 0 2. Apply scientific method to solve problems