

Agricultural Mechanics Curriculum Guide

**CENTRAL VALLEY CONSORTIUM
AGRICULTURAL EDUCATION
TECH PREP**

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STANISLAUS COUNTY OFFICE OF EDUCATION

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SECTION ONE

INTRODUCTION

Introduction

Agricultural Mechanics Tech Prep is a four year sequence that encompasses the last two years of High School (Grade 11 & 12), and the first two years of Community College (Grade 13 & 14). Expectations are that students will have been enrolled in agricultural education courses at the beginning of their high school tenure. Curriculum grids have been developed to encompass these first two years of high school as well as the Tech Prep sequence of grades 11 through 14. These grids have several expectations of the Tech Prep identified student:

1. Completion of the Agriculture Mechanics Core I and II or the Ag I and II Core, at the Freshman and Sophomore High School level.
2. Completion of Applied Academic courses throughout the 4 years of high school.
3. Fulfillment of the Tech Prep Admissions requirements, including passing the Agriculture Mechanics Core I & II or the Ag I and II Core, with a "C" or better; a student portfolio containing a Letter of Introduction, Resume, Letter of Recommendation, Job Application, Work Samples, Record Book, and a Supervised Practical Experience Evaluation; and a score of "Proficient" or "Advanced" on the Ag. Mechanics Core or the Ag Core Written Scenario Evaluation.

Provisions will be made to accommodate special population groups and a procedure will be developed to remediate deficiency areas.

There are also grids to accommodate the various options to high school students so that Tech Prep involvement is obvious and attainable. These options include:

College Prep / Tech Prep

Traditional Agriculture Program and Tech Prep

Sports and Tech Prep

Agricultural Mechanics and Tech Prep

All the grids provide options that allow a student to become involved in Work-Place Learning, fulfill University of California or California State University entrance requirements, as well as develop Tech Prep foundations to carry to the Community College Tech Prep Program.

Agricultural Mechanics Tech Prep has been divided into three "Specialization Areas" at the high school level, Metal Fabrication, Power and Equipment, and Agriculture Structures and Construction. Students who are able to complete the Ag. Mechanics Core I & II in their Freshman and Sophomore years, are then able to focus the development of skills by taking one of the three "Specialization" Courses their Junior and Senior years.

These "Specialization" Courses, when taught correctly and with sufficient levels of instruction and skill development, may approximate an introductory course at the Community College level. In these cases, where a course articulation agreement is part of the Tech Prep Program, students may receive college credit for the course taken at the high school level. Schools must agree upon the methods of assessing competency in order for this to take place. When Tech Prep articulation functions as intended, it provides for eliminating duplication in the 4 year sequence for the specific career pathway. In addition, other college credit may be awarded for leadership activities, Supervised Practical Experience and Work-Place learning activities, and other areas where duplication is unnecessary.

Work-Place Learning is an integral part of all Tech Prep Programs in Agriculture. As such, the specific Tech Prep Grid allows for time in the school day for these activities in the High School Senior year. The remaining grids offer options that allow a student to be involved in Tech Prep and meet other personal and educational objectives. For these students, there may not be sufficient time within the traditional school day to be involved in Work-Place Learning. In both of these cases, work-place learning can occur after the traditional school day is finished, on weekends, during vacations, and summer breaks. This can be facilitated through independent study or work experience classes which also allow students to earn graduation credits.

Work-place learning begins in the High School Freshman year with Supervised Practical Experience opportunities. These are often entrepreneurial enterprises and usually continue throughout High School. Supervised Practical Experience may include paid on-the-job placement. Usually this commences during the Junior year and often continues through the college years. Community College level work experience ,that is directly related to the career path, is required. The number of hours varies by program and institution. Work-place learning enhances the educational process and provides needed job survival skills. This procedure is outlined in the Work-Place Learning Guide, "Learning to Work-Working to Learn".

Finally, Tech Prep is a partnership between High Schools ,Community Colleges, Teachers, Counselors, Administrators, Industry Representatives , Students, and Parents. In order for success to be part of this formula, all parties need to cooperate and work toward a common goal. The task is to MAKE TECH PREP WORK. Curriculum is the most important aspect of this process. It must be current, industry validated, taught by instructors with high levels of expertise and industry experience, enhanced with work-place learning experiences, and articulated between high schools and community colleges. Curriculum and the entire educational process must benefit our students with lifelong career options. This is education's role.

SECTION TWO

CURRICULUM

Developing Tech Prep Curricula

The following is an explanation of the procedure that was followed in identifying, developing, implementing, and field testing the Agricultural Mechanics Curriculum.

The following definitions will be helpful:

State Standards--Agriculture Performance Standards developed by the state and validated by industry in each of the 7 career paths or clusters. These are the student expectations after having completed specific courses in agriculture.

Integrated Performance Activities--Agriculture Integrated Activities that are used to enhance classroom instruction and are a hands-on, problem solving approach to education. They were developed to provide methodology to fulfill the State Standards and can be tied closely to them.

Ag I Core--The Basic Core, the state agriculture curriculum intended for the High School Freshman (Grade 9) year. This is a broad overview of all agriculture industries. It is a compilation of curriculum unit outlines complete with objectives, methods, enhancements, and assessments.

Ag II Core--A continuation of the Ag I Basic Core with increasing levels and student expectations. It is designed to be taught at the High School Sophomore (Grade 10) year. It is also a compilation of curriculum unit outlines complete with objectives, methods, enhancements, and assessments.

Advanced Clusters--The 7 career specific advanced curriculum areas with attendant units of instruction. The curriculum is narrowed to a single career area, of greater depth and expectations, but follows the same format as the Ag I and Ag II Basic Cores. It is intended to be taught in the High School Junior (Grade 11) and Senior (Grade 12) years.

Ag Mechanics Core I -- This course is intended for the high school Freshman (grade 9) year. It consists of the SDE Ag. Mechanics Advanced Cluster curriculum with leadership, S.P.E. development, and Ca Agriculture components added in to prepare students for a broad overview of the Ag. Mechanics industry.

Ag Mechanics Core II -- A continuation of the Ag Mechanics Core I with increasing levels and student expectations. It is designed to be taught at the Sophomore (grade 10) level.

Ag Mechanics Specialization Areas -- The areas of instruction to be taught in the Junior (grade 11) and Senior (grade 12) years. They are: Metal Fabrication; Power and Equipment; and Agricultural Structures and Construction. It is unclear exactly how much industry validation occurred in the development of the Ag Mechanics Specialized Areas. Industry advisory was included in the process through the agriculture instructors who developed the curriculum units.

To date there has been no disagreement as to the validity of these units or standards/activities by the Industry Advisory Committees associated with this Tech Prep Consortium.

Local enhancement--Additional activities and/or curriculum that is specific to a particular program and/or is not provided in the advanced cluster.

Supervised Practical Experience (SPE), Supervised Agricultural Experience (SAE), and Supervised Occupational Experience Programs (SOEP), are all synonymous terms that explain the project aspect of FFA and work-place learning. These activities are integral to the instructional program and are extensions of the classroom. Students may be involved in Entrepreneurial Enterprise Ownership Projects and/or Work Experience Projects. In both cases the activities should be directly related to the student's career pathway and are closely monitored and supervised by the agriculture instructor.

Steps Followed in Developing the Agricultural Mechanics Tech Prep Curriculum

Step 1

Identify that a curriculum exists and validate that it is appropriate for Ag Tech Prep Programs. This resulted in the adoption of the California State Agriculture Curriculum, Agricultural Mechanics Advanced Cluster.

Step 2

Identify if there existed a set of adopted standards that could be used in curriculum direction and assessment. This resulted in the adoption of the State Agriculture Performance Standards in Agricultural Mechanics.

Step 3

Identify if any other materials had been developed to enhance the educational and validation process. This resulted in the adoption of the State Agriculture Integrated Activities in Agricultural Mechanics.

Step 4

Articulate (match) the State Standards and the Integrated Activities into logical pairs or groups.

Step 5

Articulate the State Standards, Integrated Activities, and Advanced Cluster Curriculum Units. This validates what curriculum units fulfill which standards and provides integrated activities for inclusion with the teaching unit. This many-faceted approach builds higher student competency levels and critical-thinking and problem-solving skills.

Step 6

Identify additional integrated activities that can be used with the curriculum to attain completion of State Standards.

Step 7

Determine if the curriculum breaks itself down into logical groups of units and subsequent courses of instruction. The Ag Mechanics Curriculum can logically be divided into two segments: Ag Mechanics Core (I & II), and the "Specialization Areas" (Metal Fabrication, Power & Equipment, and Ag Structures and Construction). It is recommended that Ag Mechanics students take the Ag Mechanics Core I & II their Freshman and Sophomore years, and one of the Specialization Areas their Junior and Senior years.

Step 8

Determine if the time allocated for teaching each unit is reasonable given the inclusion of integrated performance activities and local enhancements. After reviewing the curriculum, it became apparent that the time allocated to cover each unit was insufficient. It was determined that the Ag Mechanics Core (I & II) consist of the units which focus on Metal Fabrication and Ag Structures and Construction, while the units dealing with Power and Equipment be covered in a separate, "Small Engines" course. Since curriculum has not been developed for the Specialization Areas (Only Performance Standards are available at this time), it could not be field tested. However, since many high schools offer the Specialization Areas in their Ag Mechanics Programs, it is vital to make them part of the Tech Prep Program.

Step 9

Determine if any additional curriculum units were needed to complete the State Standards expectations. No additional units were recommended.

Step 10

Take each course and sequence units of instruction into a logical sequence of increasing complexity and expectations.

Step 11

Identify additional integrated activities for either new units or to enhance already developed curriculum units of instruction. Identify any local enhancements that will enrich the curriculum for specific programs.

Step 12

Field-Test curriculum units, integrated performance activities, and assessment tools. Develop Written Scenarios, Work Samples, additional units of instruction, additional integrated activities, and generally determine whether or not the curriculum functions as intended in the time frame allowed.

Step 13

Make adjustments to the curriculum to reflect the field-test evaluations.

Step 14

Determine whether or not the course curriculum and materials are of sufficient scope, level, expectations, to approximate an available community college course.

Step 15

Articulate the Advanced Cluster courses with specific college courses. Identify which college courses can be approximately duplicated through instruction at the secondary level. Develop skill lists and objective expectations for the college course for student assessment and certification. Augment the existing high school units with additional curriculum, integrated activities, local enhancements and skill expectations to fulfill the college course objectives and requirements.

Step 16

Provide a system for developing high school and community college course articulation agreements.

Step 17

Document this process so that others may use this model for development of Ag Mechanics Tech Prep Programs. Provide adaptability so that other individuals and institutions may choose portions of this process and developed materials to augment their existing programs. At the same time, provide a complete model that schools can use to develop a new Ag Mechanics program with little additional resources needed.

Curriculum Design Process Chart

Insert Development Chart Here

This chart not available in this format. To receive a copy of this chart, write to
Ag Tech Prep
Stanislaus County Office of Education
County Center Three Ct.
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or call (209) 525-5020

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Career Performance Standards

1. *Personal Skills*

Students will understand how personal skill development affects their employability. They will exhibit positive attitudes, self confidence, honesty, perseverance, and self-discipline. They will manage time and balance priorities, as well as demonstrate a capacity for lifelong learning.

2. *Interpersonal Skills*

Students will understand key concepts in group dynamics, conflict resolution, and negotiation. They will work cooperatively, share responsibilities, accept supervision, and assume leadership roles. They will demonstrate cooperative working relationships across gender and cultural groups.

3. *Thinking and Problem Solving Skills*

Students will exhibit critical and creative thinking skills, logical reasoning, and problem solving. They will apply numerical estimation, measurement, and calculation, as appropriate. They will recognize problem situations; identify, locate and organize needed information or data; and propose, evaluate, and select from alternative solutions.

4. *Communication Skills*

Students will understand principles of effective communication. They will communicate both orally and in writing. They will listen attentively to instructions and request clarification or additional information as needed.

5. *Occupational Safety*

Students will understand occupational safety issues including the avoidance of physical hazards in the work environment. They will operate equipment safely as not to endanger themselves or others. They will demonstrate proper handling of hazardous materials.

6. *Employment Literacy*

Students will understand career paths and strategies for obtaining employment within their chosen fields. They will assume responsibility for professional growth. They will understand and promote the role of their field within a productive society, including the purposes of professional organizations.

7. *Technology Literacy*

Students will understand and adapt to changing technology by identifying, learning, and applying new skills to improve job performance. They will effectively employ technologies relevant to their fields.

Career Path Cluster

Performance Standards for

Agriculture Mechanics Core

I & II

The core curriculum in Agriculture is divided into two content areas: Agricultural and Environmental Science and Agricultural Mechanics. Both versions of the basic core contain the same standards in Agriculture and Society, Agricultural Business Management, and Employability and Leadership Development. The purpose of the Agricultural Mechanics Core is to provide a fundamental background in agriculture for beginning agricultural mechanics students in California, and to act as the foundation for in-depth study in the Agricultural Mechanics Specialization Areas.

A. Agriculture and Society

A.1 Agriculture and Society

Students will develop an awareness of the interrelationship of California agriculture and society on the local, state, national and international levels, and will discuss the economic impact of leading commodities.

A.2 Agriculture and the Environment

Student will understand the interrelationship of modern agriculture and the environment, focusing on water and other natural resources in California. They will explain how natural resource availability affects agriculture.

A.3 Agricultural Business and Technology

Students will understand the importance of agricultural firms and technology to the production, processing, and marketing of agricultural products. Students will outline the businesses and technologies needed to bring foodstuffs to consumers.

B. Agricultural Business Management

B.1 Record Keeping

Students will understand the importance of keeping accurate records of business transactions in agriculture. Students will maintain and complete the California Agriculture Record Book which pertains to their Supervised Occupational Experience (SOE) program and explain the consequences of inaccurate records.

B.2 Computer Literacy

Students will understand the importance of computer literacy as it pertains to record keeping and discuss the advantages and disadvantages of computers as a record keeping tool.

B.3 Purchasing and Marketing

Students will understand the functions of purchasing and marketing in the agricultural business. Students will demonstrate strategies for obtaining credit, supplies and materials and for securing buyers for their products.

C. Employability and Leadership Development

C.1 Interpersonal Leadership Development

Students will recognize the traits of effective leaders, and participate in leadership training activities associated with the FFA including public speaking, leading group discussions, working within a committee, conducting business meetings, and problem solving.

C.2 Projects

Students will understand the relationship between a supervised practical experience project (SPE) and their preparation for a career in agriculture. They will actively engage in and manage a SPE that will enable them to develop occupational skills.

C.3 Agriculture Core Employability

Students will develop an understanding of how to conduct a job search, interview for a job, and write a resume. They will develop an appreciation for factors involved in job candidate assessment including first impression, listening, and communication skills. They will describe how to use local placement services for a personal job search.

C.4 Careers in Agriculture

Students will be aware of existing and future employment opportunities in the field of agriculture. Students will understand how to acquire the knowledge and skills needed. They will explore a wide variety of occupations related to agriculture and analyze the qualifications required for employment.

D. Agricultural Mechanics

D.1 Measurement and Drafting

Students will be able to read and use a ruler or tape and complete calculations for problems involving length, area, volume and weight. They will use the basic skills needed to produce and interpret working drawings.

D.2 Small Engines and Power Equipment

Students will identify the components and understand the basic operation of small engines. They will perform basic maintenance and service procedures.

D.3 Woodworking & Metalworking

Students will understand the principles of woodworking and metal working, and identify tools used in woodworking and metal working. They will safely demonstrate applied skills through project drafting, design, and construction.

D.4 Concrete/Masonry

Students will understand the principles of concrete and masonry work and will apply these in constructing a concrete-masonry project.

D.5 Plumbing

Students will understand and safely demonstrate basic plumbing principles by installing steel, copper, plastic or PVC pipe and fittings.

D.6 Electricity

Students will understand elementary wiring and electronics as applied in agricultural industry, and will safely demonstrate their understanding through a series of work-related activities.

E. Agricultural Mechanics

E.1 Oxy-fuel Welding & Cutting

Students will understand the principles of oxy-fuel welding and cutting and explain the roles heat and pressure play in the process. They will safely select, adjust, and operate oxy-fuel equipment to construct a project with and without filler rods.

E.2 Electric Welding Processes

Students will understand the electric welding process. They will select and safely employ the appropriate welding apparatus and materials to construct a project requiring multiple types of welds meeting industry standards.

E.3 Chains, Cables, Slings, and Rope

Students will understand and demonstrate how to safely secure and hoist loads with chains, cables, slings and rope. They will select the appropriate materials for securing or hoisting a particular load including binders and mechanical levers and pulleys.

E.4 Surveying

Students will understand the use of surveying equipment. They will demonstrate surveying principles through survey instrument adjustment and land measurement activities.

E.5 Equipment Operation and Preventive Maintenance

Students will understand the concepts of safe equipment operation and maintenance. They will safely adjust, service, maintain, and operate various types of agricultural equipment. They will use the appropriate operator's manuals to develop service schedules, and keep maintenance records.

E.6 Types of Engines

Students will identify and compare the different types of engines and their major parts, systems, and principles of operation. They will disassemble and reassemble an engine.

E.7 Applied Hydraulics

Students will understand and recognize the basic principles of hydraulics used in agricultural machinery and processes including energy, force, pressure, friction, work, power, Pascal's Law. Students will safely troubleshoot hydraulic systems.

E.8 Agricultural Industry Employee/Employer Relationships

Students will understand agricultural industry employee-employer relationships and evaluation. They will understand how wages are tied to job performance.

E.9 Safety

Students will understand and demonstrate the safe use of hand/power tools and equipment.

E.10 D.C. Electrical Systems

Students will understand the basic principles of electricity, D.C. circuits and electronics used in agricultural machines. They will interpret basic electrical schematics and operate electrical testing devices.

E.11 Agricultural Structures

Students will understand the design, construction and maintenance of agricultural structures. They will design and construct a project(s) requiring basic carpentry, concrete/masonry, plumbing and electrical wiring skill.

E.12 Record Keeping

Students will demonstrate an understanding of the principles of keeping records utilizing a variety of methods and systems. They will identify the differences between production and financial records.

E.13 Interpersonal Leadership Development

Students will recognize the traits of effective leaders, and participate in leadership training activities associated with the FFA including public speaking, leading group discussions, working within a committee, conducting business meetings, and problem solving.

E.14 Supervised Practical Experience Project

Students will engage in a supervised practical experience employing skills and knowledge learned in the classroom. Students will maintain a record book.

Career Path Integrated Performance Activities

E. Agricultural Mechanics

E.1 Safety in the Shop

The teacher simulates specific safety hazards in the shop area. Students are assigned the job of the safety marshal to generate a list of safety concerns. Students each report their findings to the class including recommendations for improved safety practices.

Related Standards:

Career Performance	3,4,5
Career Path Cluster	E.9
ELA	B.2

E.2 Welding-Electrical Project: Light Stand

Using content learned in oxy-acetylene welding, arc welding, electricity, metal working and plumbing, students use a Computer Assisted Design (CAD) program or working drawing to design, draft, and safely construct a light stand project. Students discuss and justify in an oral or written statement how they arrived at their design and their choice of materials.

Related Standards:

Career Performance	3,4,5,7
Career Path Cluster	E.1,2,9,10
MAT	B.1,2,3,4
PHS	E.1,2; F.1,2

E.3 Small Gasoline Engine Activity

In teams of three, students compete in a small gasoline engine contest consisting of four phases: 1) basic engine theory, 2) practical problem solving, 3) tool and parts identification, and 4) troubleshooting. The team members rotate separately through the first three phases, and then function as a team in the fourth phase. The team members divide their responsibilities into three areas of troubleshooting: compression, ignition, and carburization in order to eliminate the mechanical "bugs" in the engine and have it run at a governed speed within fifteen minutes. (*The CATA Curricular Activities Code for FFA Contests gives the complete specifications.*)

Related Standards:

Career Performance	2,3
Career Path Cluster	E.5,6,13
ELA	B.2; D.1; E.1
PHS	C.3; F.1,2

E.4 Farm Power Activity

In teams of three, students compete in a farm power contest consisting of three phases: 1) tractor, hydraulic, and machinery identification, questions, problems, or exercises; 2) tractor driving safety, and 3) troubleshooting of tractors or machinery. (*The CATA Curricular Code for FFA Contest gives the complete specifications.*)

Related Standards:

Career Performance	1,2,3,5
Career Path Cluster	E.5,6,7
ELA	B.2; D.1; E.1
MAT	G.1,2,3

E.5 Rope Work Experiment

Given the necessary rope, pulleys, and equipment, students (working in small groups) pull and lift various loads and record the different lengths of rope required to move the loads with single, double, triple pulley and trucker knot arrangements. Students write a lab report explaining why different rope lengths are required to move progressively heavier loads when the power source is constant.

Related Standards:

Career Performance	2,3,4
Career Path Cluster	E..3,13
ELA	B.1,2
MAT	A.1,2,3
PHS	C.1,2

E.6 Electric Welding/Oxy-Fuel Activity

Using skills learned in arc welding and oxy-fuel equipment use, students build a small project following a set of plans. All materials and equipment are provided. Students select the proper materials and equipment for the given job. Upon completion of the project, students explain their choice of welding rod for the position used. The project should consist of several types of welds and positions as well as other oxy-fuel fundamentals such as cutting and piercing.

Related Standards:

Career Performance	1,3,5,6
Career Path Cluster	E.1,2,5
ELA	B.2; C.1,2; E.1
MAT	B.1,2,3,4
PHS	E.1,2; F.1,2

E.7 Surveying Skills Activity

Using a level, a tripod, and a surveying rod, students work in pairs to shoot elevations of three points on a given site and determine the degree of angle between the three points. Teams calculate the area of a given plot and determine the acreage of the plot. Teams also determine the percent slope of a concrete slab and record surveying measurements using industry standards. The students submit these calculations in a written report in which they explain how they obtained their findings.

Related Standards:

Career Performance	2,3,4,7
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Career Path Cluster	E.4,13
ELA	B.2; C.2; E.1
MAT	A.1,2,3; B.1,2,3,4; C.1,2,5

E.8 Agricultural Mechanics Skills Activity

Teams of three students compete in an agricultural mechanics competition consisting of: mandatory skills tests in tool and materials identification, arc and gas welding, and electrical skills; an additional skills test chosen from the following list; wood-working, rope-working, tool-sharpening, soil and water management, and plumbing, as well as a written test on the eight major areas included in agricultural mechanics. (*See CATA Curricular Code for FFA Contests for complete specifications for the contest.*)

Related Standards:

Career Performance	1,2,3,4
Career Path Cluster	E.1,2,3,5,6,10
ELA	B.2; C.1,2; D.1,2
MAT	A.1,2,4; B.1,2,3,4; C.1,2,5
PHS	E.1,2; F.1,2

E.9 Concrete/Arc Welding Project: Boot Scraper

Given a working drawing, and necessary materials and tools, students construct a project (e.g. a metal boot scraper with a concrete base and two attached scrub brushes) utilizing arc welding and concrete techniques. Students submit their project with the working drawing for the instructor to compare for accuracy.

Related Standards:

Career Performance	1,3,4
Career Path Cluster	E.2,5
ELA	B.2; C.2; D.2
MAT	A.1,2,3,4; B.1,2,3,4
PHS	E.1,2

E.10 Small Engine Powered Equipment

Using a small engine powered item of equipment students make an outline of service items to be examined. They service engine and equipment, and make any recommendation for repairs and increased performance.

Related Standards:

Career Performance	1,3,6
Career Path Cluster	E.5,6,13
ELA	B.2; C.2; D.2

E.11 Equipment Transport and Adjustment

Students properly and safely attach a hydraulically controlled disc to a tractor. They explain the principles of hydraulics as applied to this application. Students safely transport the disc on the highway, prepare the disc for field operation, and correctly adjust the disc for 6" depth of cut.

Related Standards:

Career performance	1,3,4,5
Career Path Cluster	E.5,7,9
ELA	B.2; C.2; D.2

E.12 Hazard Hunt

Given a tractor with numerous safety defects, students identify hazards, listing them and recommend corrective action for each in writing.

Related Standards:

Career Performance	1,2,3,4
Career path Cluster	E.5,6,7,13
ELA	B.2; C.2; D.2

E.13 Agriculture Mechanics Inventory

Students determine what information is needed and produce a spreadsheet for keeping track of inventory in the agricultural mechanics facility, including item value. Individual students are assigned specific parts of the entire facility to inventory.

Related Standards:

Career Performance	1,2,3,6,7
Career Path Cluster	E.5,12
ELA	B.2; C.2; D.2
MAT	A.1,2,3,4

E.14 Load Tie-Down

Given a load to secure, students (working in pairs) will demonstrate their ability to tie down and secure the load in a safe manner for transport. Students determine maximum load capacity and secure the load with appropriate material(s) (rope, chains, binders, etc.). Students will explain and respond to questions relating to their method of choice.

Related Standards:

Career Performance	2,3,4,5
Career Path Cluster	E.3,9
ELA	B.2; C.2; D.2; E.1

E.15 Employee Recovery Rate

Given a scenario of an agricultural firm, students calculate individual pay according to employee recovery rates and write an employee pay contract.

Related Standards:

Career Performance 1,3,4,6
Career Path Cluster E.8,13

E.16 D.C. Circuit Troubleshooting

Students use circuit testing devices, e.g. continuity tester and V.O.M., to troubleshoot a simple D.C. electrical circuit on agricultural machines or equipment.

Related Standards:

Career Performance 3,7
Career Path Cluster E.10
ELA B.2; C.2; D.2

E.17 Maintenance Records

Given an engine driven piece of equipment students utilize the operator's manual to perform all required maintenance and record a service maintenance schedule. Students submit a written report of how the service was performed, materials used, and next service due.

Related Standards:

Career Performance 1,3,4,7
Career Path Cluster E.5,6,12
ELA B.2; C.2; D.2

E.18 supervised Practical Experience Discussion

In career pathway groups, students reevaluate their career goals and discuss their Supervised Practical Experience in relation to their career goals.

Related Standards:

Career Performance 1,2,3,4,6,7
Career path Cluster E.13,14
ELA B.2; C.2; D.2

Sequenced Units

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Agricultural Mechanics
Suggested Sequence of Advanced Cluster
Curriculum Units (Grades 11 & 12)
Traditional Ag. Program

****NOTE** - This sequence of units is recommended for students who have completed the Ag. Core I & II during their Freshman and Sophomore years.

Agricultural Mechanics (Grade 11)

CLF2100 Tool Use & Maintenance & Shop Safety (35 hrs)

- (CLF2101) Shop Cleaning and Tool Storage
- (CLF2102) Shop Safety Practices
- (CLF2103) Tool ID, Safety, and Use
- (CLF2104) Tool Selection for the Ag. Mechanics Shop
- (CLF2105) Sharpening Hand Tools and Grinder Safety
- (CLF2106) Grinder and Wheel Selection
- (CLF2107) Tool Sharpening Procedures
- (CLF2108) Tool Handle Fitting
- (CLF2109) Cutting Tool Construction and Repair
- (CLF2149) Unit Exam

****NOTE:** It is suggested that lessons 2101 thru 2104 be taught as ongoing and interspersed throughout the course. Lessons 2105 thru 2109 can best be taught using demonstrations and/or student projects.

CLF2200 Fasteners (5 hrs)

- (CLF2201) Types and Uses of Fasteners
- (CLF2202) Selecting Fasteners
- (CLF2249) Unit Exam

****NOTE** It is suggested that these lessons be taught as ongoing and interspersed throughout the course.

CLF2600 Rope Work (5 hrs)

- (CLF2601) Selection and Use of Rope
- (CLF2601) Rope ID and Care
- (CLF2601) Knots, Hitches, and Their Uses
- (CLF2601) Splicing Rope
- (CLF2601) Unit Exam

- CLF2150 Measurement (10 hrs)**
 (CLF2151) Measurement Systems
 (CLF2152) Reading Measuring Tools
 (CLF2154) Linear Measurements
 (CLF2155) Square measurements
 (CLF2199) Unit Exam
- CLF2400 Woodworking (15 hrs)**
 (CLF2401) Selecting Wood and Lumber
 (CLF2402) Measuring and Marking Wood
 (CLF2403) Woodworking Hand Tools
 (CLF2404) Woodworking Power Tools
 (CLF2405) Fastening Wood Joints
 (CLF2449) Unit Exam
- CLF2350 Metal Working (16 hrs)**
 (CLF2351) Metalworking Safety
 (CLF2352) ID and Use of Basic Metalworking Tools
 (CLF2353) Types and Properties of Common Metalworking Materials
 (CLF2354) Layout and Transferring on Metal
 (CLF2355) Sheet Metal
 (CLF2356) Cold Metal
 (CLF2357) Hot Metal
 (CLF2399) Unit Exam
- CLF2850 Types of Engines (25 hrs)**
 (CLF2851) Engine Types and Operating Cycles
 (CLF2852) Engine Operating Principles
 (CLF2853) Engine Terminology
 (CLF2854) Engine Systems
 (CLF2855) Engine Disassembly and Reassembly
 (CLF2899) Unit Exam
- CLF2750 Use of Manuals (2 hrs)**
 (CLF2751) Operator's Manual
 (CLF2752) Service Schedules
- CLF2150 Measurement (10 hrs)**
 (CLF2153) Calipers & Micrometers
 (CLF2156) Cubic Measurements
 (CLF2157) Weights & Measures
 (CLF2199) Unit Exam

- CLF2800 Equipment Operation & Maintenance (12 hrs)**
 (CLF2801) Equipment Operation Safety
 (CLF2802) Oil and Oil Filter Maintenance
 (CLF2803) Fuel Filter Maintenance
 (CLF2804) Battery Maintenance
 (CLF2805) Hydraulic System Maintenance
 (CLF2806) Hazardous Agricultural Chemicals
 (CLF2849) Unit Exam

- CLF2900 Work & Power (20 hrs)**
 (CLF2901) Definitions and Terminology
 (CLF2902) Work and Power formulas
 (CLF2903) Uses of Work and Power
 (CLF2904) Problems Using Work and Power
 (CLF2905) Safety
 (CLF2949) Unit Exam

Local Enrichment / Projects (25 hrs)

****NOTE:** It is suggested that local enrichment, or project time be used to reinforce the lessons learned in each unit. This implies that each unit should have a planned project for the students to complete.

Agricultural Mechanics (Grade 12)

- CLF2500 Concrete / Masonry (15 hrs)**
 (CLF2501) Ingredients and Characteristics of Concrete
 (CLF2502) Concrete Proportions
 (CLF2503) Estimating Concrete Materials
 (CLF2504) Form Preparation and Reinforcement
 (CLF2505) Placing, Finishing, and Curing
 (CLF2506) Laying Masonry Units
 (CLF2549) Unit Exam

- CLF2550 Plumbing (10 hrs)**
 (CLF2551) Plumbing Materials
 (CLF2552) Plumbing Fittings
 (CLF2553) Plumbing Tools
 (CLF2554) Installation of a Plumbing Project
 (CLF2599) Unit Exam

- CLF2650 Electricity (15 hrs)**
 (CLF2651) Principles of Electricity
 (CLF2652) Electrical Safety
 (CLF2653) Conductors and Overcurrent protection
 (CLF2654) Wire Splices
 (CLF2655) Electrical Cord Repair
 (CLF2656) Simple Circuit Installation
 (CLF2657) Testing Electric Circuits
 (CLF2699) Unit Exam
- CLF2700 Surveying (10 Hrs)**
 (CLF2701) Surveying in Agriculture
 (CLF2702) Surveying Equipment
 (CLF2703) Land Area Measurements
 (CLF2704) Differential Leveling
- CLF2450 Project Design (5 hrs)**
 (CLF2451) Preparing a Working Drawing
 (CLF2452) Project Planning and Construction
- CLF2300 Arc Welding (35 hrs)**
 (CLF2301) Welding Equipment and Safety
 (CLF2302) Striking and Maintaining An arc
 (CLF2303) American Welding Society (AWS) Classification System for Electrodes
 (CLF2304) Four Basic Weld Joints
 (CLF2305) Controlling Distortion in Arc Welding
 (CLF2306) Weld Testing
 (CLF2307) Career Opportunities in Welding
 (CLF2349) Unit Exam
- CLF2250 Oxyacetylene Welding (35 hrs)**
 (CLF2251) Oxyacetylene Equipment and Safety
 (CLF2252) Oxyacetylene Equipment Setup
 (CLF2253) Oxyacetylene Fusion Welding
 (CLF2254) Four Basic Oxyacetylene Welds
 (CLF2255) Oxyacetylene Brazing
 (CLF2256) Oxyacetylene Cutting
 (CLF2257) Oxyacetylene Heating of Metal
 (CLF2258) Oxyacetylene Cutting / Welding Project
 (CLF2299) Unit Exam

Local Enrichment / Projects (55 hrs)

****NOTE:** It is suggested that local enrichment, or project time be used to reinforce the lessons learned in each unit. This implies that each unit should have a planned project for the students to complete.

Developed by the Agricultural Mechanics Curriculum Committee, November, 1994

Agricultural Mechanics
Suggested Sequence of Advanced Cluster
Curriculum Units (Grades 11 & 12)
With Small Engines Course Separate

****NOTE** - This sequence of units is recommended for students who have completed the Ag. Core I & II during their Freshman and Sophomore years.

Agricultural Mechanics (Grade 11)

CLF2100 Tool Use & Maintenance & Shop Safety (40 hrs)

- (CLF2101) Shop Cleaning and Tool Storage
- (CLF2102) Shop Safety Practices
- (CLF2103) Tool ID, Safety, and Use
- (CLF2104) Tool Selection for the Ag. Mechanics Shop
- (CLF2105) Sharpening Hand Tools and Grinder Safety
- (CLF2106) Grinder and Wheel Selection
- (CLF2107) Tool Sharpening Procedures
- (CLF2108) Tool Handle Fitting
- (CLF2109) Cutting Tool Construction and Repair
- (CLF2149) Unit Exam

****NOTE:** It is suggested that lessons 2101 thru 2104 be taught as ongoing and interspersed throughout the course.

CLF2200 Fasteners (10 hrs)

- (CLF2201) Types and Uses of Fasteners
- (CLF2202) Selecting Fasteners
- (CLF2249) Unit Exam

****NOTE** It is suggested that these lessons be taught as ongoing and interspersed throughout the course.

CLF2600 Rope Work (5 hrs)

- (CLF2601) Selection and Use of Rope
- (CLF2601) Rope ID and Care
- (CLF2601) Knots, Hitches, and Their Uses
- (CLF2601) Splicing Rope
- (CLF2601) Unit Exam

CLF2150 Measurement (5 hrs)

- (CLF2151) Measurement Systems
- (CLF2152) Reading Measuring Tools

CLF2400 Wood Working (25 hrs)

- (CLF2401) Selecting Wood and Lumber

- (CLF2402) Measuring and Marking Wood
- (CLF2403) Woodworking Hand Tools
- (CLF2404) Woodworking Power Tools
- (CLF2405) Fastening Wood Joints
- (CLF2449) Unit Exam

CLF2350 Metal Working (25 hrs)

- (CLF2351) Metalworking Safety
- (CLF2352) ID and Use of Basic Metalworking Tools
- (CLF2353) Types and Properties of Common Metalworking Materials
- (CLF2354) Layout and Transferring on Metal
- (CLF2355) Sheet Metal
- (CLF2356) Cold Metal
- (CLF2357) Hot Metal
- (CLF2399) Unit Exam

CLF2550 Plumbing (15 hrs)

- (CLF2551) Plumbing Materials
- (CLF2552) Plumbing Fittings
- (CLF2553) Plumbing Tools
- (CLF2554) Installation of a Plumbing Project
- (CLF2599) Unit Exam

CLF2650 Electricity (15 hrs)

- (CLF2651) Principals of Electricity
- (CLF2652) Electrical Safety
- (CLF2653) Conductors and Overcurrent protection
- (CLF2654) Wire Splices
- (CLF2655) Electrical Cord Repair
- (CLF2656) Simple Circuit Installation
- (CLF2657) Testing Electric Circuits
- (CLF2699) Unit Exam

Local Enrichment / Projects (40)

****NOTE:** It is suggested that local enrichment, or project time be used to reinforce the lessons learned in each unit. This implies that each unit should have a planned project for the students to complete.

Agricultural Mechanics (Grade 12)

CLF2150 Measurement (10 hrs)

- (CLF2157) Weights & Measures
- (CLF2154) Linear Measurements
- (CLF2155) Square measurements
- (CLF2199) Unit Exam

- CLF2300 Arc Welding (45 hrs)**
(CLF2301) Welding Equipment and Safety
(CLF2302) Striking and Maintaining An arc
(CLF2303) American Welding Society (AWS) Classification System for Electrodes
(CLF2304) Four Basic Weld Joints
(CLF2305) Controlling Distortion in Arc Welding
(CLF2306) Weld Testing
(CLF2307) Career Opportunities in Welding
(CLF2349) Unit Exam

- CLF2250 Oxyacetylene Welding (45 hrs)**
(CLF2251) Oxyacetylene Equipment and Safety
(CLF2252) Oxyacetylene Equipment Setup
(CLF2253) Oxyacetylene Fusion Welding
(CLF2254) Four Basic Oxyacetylene Welds
(CLF2255) Oxyacetylene Brazing
(CLF2256) Oxyacetylene Cutting
(CLF2257) Oxyacetylene Heating of Metal
(CLF2258) Oxyacetylene Cutting / Welding Project
(CLF2299) Unit Exam

- CLF2450 Project Design (15 hrs)**
(CLF2451) Preparing a Working Drawing
(CLF2452) Project Planning and Construction

Local Enrichment / Projects (65)

****NOTE:** It is suggested that local enrichment, or project time be used to reinforce the lessons learned in each unit. This implies that each unit should have a planned project for the students to complete.

Small Engines (Grade 11 or 12)

- CLF2750 Use of Manuals (5 hrs)**
(CLF2751) Operator's Manual
(CLF2752) Service Schedules
- CLF2150 Measurement (10 hrs)**
(CLF2153) Calipers & Micrometers
(CLF2156) Cubic Measurements
(CLF2157) Weights & Measures
(CLF2199) Unit Exam
- CLF2850 Types of Engines (25 hrs)**
(CLF2851) Engine Types and Operating Cycles
(CLF2852) Engine Operating Principles
(CLF2853) Engine Terminology
(CLF2854) Engine Systems
(CLF2855) Engine Disassembly and Reassembly
(CLF2899) Unit Exam
- CLF2800 Equipment Operation & Maintenance (15 hrs)**
(CLF2801) Equipment Operation Safety
(CLF2802) Oil and Oil Filter Maintenance
(CLF2803) Fuel Filter Maintenance
(CLF2804) Battery Maintenance
(CLF2805) Hydraulic System Maintenance
(CLF2806) Hazardous Agricultural Chemicals
(CLF2849) Unit Exam
- CLF2900 Work & Power (20 hrs)**
(CLF2901) Definitions and Terminology
(CLF2902) Work and Power formulas
(CLF2903) Uses of Work and Power
(CLF2904) Problems Using Work and Power
(CLF2905) Safety
(CLF2949) Unit Exam

Developed by the Agricultural Mechanics Curriculum Committee Field Test Sites, April, 1995.

Agricultural Mechanics Core I Suggested Sequence of Curriculum Units (Grade 9)

****Note --** This sequence of units is recommended for students who wish to specialize in Agricultural Mechanics. The Agricultural Mechanics Core I & II courses incorporate the curriculum found in the Agricultural Mechanics Advanced Cluster and adds to it what is known as the "Common Core", or those units of instruction that are common to both the Ag. Core I & II and the Agricultural Mechanics Core I & II. Those units are:

Agriculture and Society
Agriculture Business Management
Employability and Leadership Development

Agricultural Mechanics Core I (Grade 9)

Common Core Area: It is suggested that the following units be taught, where appropriate, throughout the course.

- (CLF110) Economy of California Agriculture (4 hrs)**
 - (CLF111) State and Local Production
 - (CLF112) California and the National Agricultural Economy
 - (CLF113) California Agriculture and the Global Economy

- (CLF120) Agriculture and Society (2 hrs)**
 - (CLF121) Agricultural Trends
 - (CLF122) Agencies for Agriculture

- (CLF130) Agriculture and California Resources (4 hrs)**
 - (CLF131) Agricultural Resources
 - (CLF132) Agriculture and the Environment

- (CLF410) Record Keeping (9 hrs)**
 - (CLF411) Introduction to Record Keeping
 - (CLF412) Record Book; Topic Cover, Front Page, and Planning Calendar
 - (CLF413) Record Book: Calendar
 - (CLF414) Record Book: Business Agreement / Budget
 - (CLF415) Record Book: Journal
 - (CLF419) Record Book: Personal Receipts and Expenses / Activities

- (CLF610) Supervised Occupational Experience Program (4 hrs)**
 - (CLF611) Introduction to SOEP
 - (CLF612) Getting Started
 - (CLF613) Long Range SOEP Plans

- (CLF710) Job Search Resources (2 hrs)**
 - (CLF712) Researching a Career

- (CLF810) Career Options (3hrs)**
 - (CLF811) Importance of Work
 - (CLF812) Agriculture Careers
 - (CLF813) Trends in Career Opportunities

- (CLF820) Occupational Goals (2 hrs)**
 - (CLF821) Choosing a Career

- (CLF510) FFA Leadership Development (10 hrs)**
 - (CLF511) History of the FFA
 - (CLF512) Chapter Formation and Aims and Purposes of FFA
 - (CLF513) The Local Chapter and Sectional, Regional and State Organization
 - (CLF514) The National Organization
 - (CLF515) The FFA Emblem and Creed
 - (CLF516) Chapter Officer Duties
 - (CLF517) FFA Jacket, Dress Code, Code of Ethics, Motto and Salute
 - (CLF518) Unit Test

- (CLF520) Parliamentary Procedure (5 hrs)**
 - (CLF521) Origins of Parli Pro
 - (CLF522) Handling of Motions and Table of precedence
 - (CLF527) Application of Parliamentary Procedure

Agricultural Mechanics Units

- CLF2100 Tool Use & Maintenance & Shop Safety (35 hrs)**
 - (CLF2101) Shop Cleaning and Tool Storage
 - (CLF2102) Shop Safety Practices
 - (CLF2103) Tool ID, Safety, and Use
 - (CLF2104) Tool Selection for the Ag. Mechanics Shop
 - (CLF2105) Sharpening Hand Tools and Grinder Safety
 - (CLF2106) Grinder and Wheel Selection
 - (CLF2107) Tool Sharpening Procedures
 - (CLF2108) Tool Handle Fitting
 - (CLF2109) Cutting Tool Construction and Repair
 - (CLF2149) Unit Exam

****NOTE:** It is suggested that lessons 2101 thru 2104 be taught as ongoing and interspersed throughout the course. Lessons 2105 thru 2109 can best be taught using demonstrations and/or student projects.

- CLF2200 Fasteners (5 hrs)**
 - (CLF2201) Types and Uses of Fasteners
 - (CLF2202) Selecting Fasteners

(CLF2249) Unit Exam
**NOTE It is suggested that these lessons be taught as ongoing and interspersed throughout the course.

CLF2150 Measurement (4 hrs)
(CLF2151) Measurement Systems
(CLF2152) Reading Measuring Tools

CLF2400 Wood Working (15 hrs)
(CLF2401) Selecting Wood and Lumber
(CLF2402) Measuring and Marking Wood
(CLF2403) Woodworking Hand Tools
(CLF2404) Woodworking Power Tools
(CLF2405) Fastening Wood Joints
(CLF2449) Unit Exam

CLF2350 Metal Working (16 hrs)
(CLF2351) Metalworking Safety
(CLF2352) ID and Use of Basic Metalworking Tools
(CLF2353) Types and Properties of Common Metalworking Materials
(CLF2354) Layout and Transferring on Metal
(CLF2355) Sheet Metal
(CLF2356) Cold Metal
(CLF2357) Hot Metal
(CLF2399) Unit Exam

CLF2550 Plumbing (10 hrs)
(CLF2551) Plumbing Materials
(CLF2552) Plumbing Fittings
(CLF2553) Plumbing Tools
(CLF2554) Installation of a Plumbing Project
(CLF2599) Unit Exam

CLF2650 Electricity (15 hrs)
(CLF2651) Principles of Electricity
(CLF2652) Electrical Safety
(CLF2653) Conductors and Overcurrent protection
(CLF2654) Wire Splices
(CLF2655) Electrical Cord Repair
(CLF2656) Simple Circuit Installation
(CLF2657) Testing Electric Circuits
(CLF2699) Unit Exam

Local Enrichment / Projects (35 hrs)

Agricultural Mechanics Core I

Common Core	45	hrs
Ag. Mech. Units	100	hrs
<u>Local Enrichment</u>	<u>35</u>	<u>hrs</u>
Total	180	hrs

****NOTE:** It is suggested that local enrichment, or project time be used to reinforce the lessons learned in each unit. This implies that each unit should have a planned project for the students to complete.

Developed by the Agricultural Mechanics Curriculum Committee Field Test Sites, April, 1995.

Agricultural Mechanics Core II
Suggested Sequence of Curriculum Units
(Grade 10)

Agricultural Mechanics Core II (Grade 10)

Common Core Area: It is suggested that the following units be taught, where appropriate, throughout the course.

- (CLF130) Agriculture and California Resources (1 hr)**
(CLF133) Energy and Agriculture
- (CLF410) Record Keeping (6 hrs)**
(CLF416) Record Book: Loan Payment Summary
(CLF417) Record Book: Inventories
(CLF418) Record Book: Financial Statement / Net Income Summary
- (CLF610) Supervised Occupational Experience Program (1 hr)**
(CLF613) Long Range SOEP Plans
- (CLF710) Job Search Resources (7 hrs)**
(CLF711) Where are the Jobs?
(CLF713) The Job You Want: How to Get it
- (CLF720) Applying for Jobs (4 hrs)**
(CLF721) Job Search Techniques: The Telephone and the Walk-In
(CLF722) The Letter of Application
(CLF723) The Resume (Personal Data Sheet)
(CLF724) Job Applications
- (CLF730) Interview Skills (4 hrs)**
(CLF731) Interviewing Skills
- (CLF530) Communications (10 hrs)**
(CLF531) The Importance of Speaking and Listening
(CLF521) Effective Committee Skills
(CLF521) Public Speaking Presentations
(CLF521) Special Communication Skills

- (CLF540) Critical Thinking (3 hrs)**
(CLF541) The Critical Thinker
(CLF542) Problem Solving
(CLF543) Critical Processes

Agricultural Mechanics Units

- CLF2150 Measurement (10 hrs)**
(CLF2154) Linear Measurements
(CLF2155) Square measurements
(CLF2157) Weights & Measures
(CLF2199) Unit Exam
- CLF2300 Arc Welding (35 hrs)**
(CLF2301) Welding Equipment and Safety
(CLF2302) Striking and Maintaining An arc
(CLF2303) American Welding Society (AWS) Classification System for Electrodes
(CLF2304) Four Basic Weld Joints
(CLF2305) Controlling Distortion in Arc Welding
(CLF2306) Weld Testing
(CLF2307) Career Opportunities in Welding
(CLF2349) Unit Exam
- CLF2250 Oxyacetylene Welding (35 hrs)**
(CLF2251) Oxyacetylene Equipment and Safety
(CLF2252) Oxyacetylene Equipment Setup
(CLF2253) Oxyacetylene Fusion Welding
(CLF2254) Four Basic Oxyacetylene Welds
(CLF2255) Oxyacetylene Brazing
(CLF2256) Oxyacetylene Cutting
(CLF2257) Oxyacetylene Heating of Metal
(CLF2258) Oxyacetylene Cutting / Welding Project
(CLF2299) Unit Exam
- CLF2450 Project Design (5 hrs)**
(CLF2451) Preparing a Working Drawing
(CLF2452) Project Planning and Construction

Local Enrichment / Projects (59 hrs)

****NOTE:** It is suggested that local enrichment, or project time be used to reinforce the lessons learned in each unit. This implies that each unit should have a planned project for the students to complete.

Agricultural Mechanics Core II

Common Core	36	hrs
Ag. Mech. Units	85	hrs
<u>Local Enrichment</u>	<u>59</u>	<u>hrs</u>
Total	180	hrs

Developed by the Agricultural Mechanics Curriculum Committee Field Test Sites, April, 1995.

Advanced Specialization in Agricultural Mechanics Metal Fabrication

The **Agricultural Mechanics Core I & II** provides a thorough background for each advanced specialization area. This advanced area in **Metal Fabrication** should not be taught without the students having first completed the Ag Mechanics Core I & II.

Components of this advanced specialization duplicate outcome statements found in the **Agricultural Mechanics Advanced Cluster**; They are included here to further reinforce instruction on those outcomes.

A. Leadership

Students shall appreciate the wide variety of leadership training activities available through the FFA organization and understand the importance of developing communication and critical thinking skills as well as self appraisal.

1. Understand the benefits of FFA membership
2. Understand the principles of parliamentary procedure.
3. Demonstrate public speaking abilities by selecting, researching, developing, and delivering an 8-10 minute presentation.
4. Demonstrate Communication skills using telephone, letters, memos, and verbal conversation.
5. Understand the basic concepts of scientific inquiry and critical thinking.

B. Employability & Careers

Students shall appreciate the importance of Supervised Occupational Experience Programs in the total program of agricultural education, and develop those skills necessary to search, locate, and apply for employment, as well as building a portfolio.

1. Engage in an appropriate S.O.E., taking into consideration individual career goals, and maintain records in the California Vocational Agriculture Record Book.

2. Understand the importance of positive work ethics and values in the work place.
3. Develop a Portfolio which will include a resume, application, letter of application, letter(s) of recommendation, and work samples.
4. Develop interviewing and job keeping skills.

C. Safety and First Aid

Students will demonstrate safe work habits and develop first aid skills.

1. Understand that safety is on going and is practiced daily.
2. Pass appropriate safety tests on equipment students will be using.
3. Demonstrate the appropriate steps to take when handling emergencies.
4. Be familiar with potential hazards and OSHA regulations.

D. Oxyacetylene/Oxy-Fuel Welding

Students will be able to perform Oxyacetylene (fuel) welding tasks using appropriate metal preparation techniques, joints, and filler rods.

1. Use the Oxyacetylene (fuel) equipment to weld mild steel in flat, horizontal, and vertical positions.
2. Use the Oxyacetylene (fuel) equipment to weld pipe in each of the standard joints.
3. Braze weld the butt, fillet, and lap joints.
4. Braze weld pipe in the fillet position.
5. Make appropriate repairs to cast iron using cast iron and brass filler rods.
6. Properly apply other specialty rods including but not limited to hard surfacing.
7. Become familiar with different types of Oxy-Fuel welding systems.

E. Shielded Metal Arc Welding

Students will be able to perform arc welding tasks using appropriate joints, electrodes, metal preparation techniques, and weld current.

1. Arc weld mild steel in flat, horizontal, vertical and overhead positions.
2. Arc weld pipe in each of the standard positions.
3. Make repairs to cast iron using nickel rod.
4. Properly use other specialty rods including those with applications for but not limited to hard surfacing.
5. Properly set the amperage and type of current for the specific application and rod being used.

F. Metal Cutting

Students will demonstrate proficiently with various metal cutting techniques.

1. Use the Oxyacetylene (fuel) torch to make cuts in plate and sheet metal using combination, drag, and gouging tips.
2. Make joint preparations for steel using the Air Arc.
3. Cut non-ferrous metals using the Air Arc.
4. Cut non-ferrous and nonferrous metals using a plasma arc system.
5. Cut material to length using the hydraulic shear.
6. Make square and angle cuts on different shapes of metal using the band saw, abrasive cut off saw, and /or cold cut saw.

-OPTIONAL-

7. Make a pattern for the pantograph - Oxyacetylene duplicator.
8. Use an Oxyacetylene pattern cutting machine to cut patterns in mild steel plate.

G. Power Tools

Students will be proficient in the use and application of power tools.

1. Bore and countersink holes in various materials using the portable electric drill, pneumatic drill, and drill press.
2. Grind, buff, and sand metal projects using portable and stationary grinders and sanders.

3. Cut sheet metal using shears, nibblers, saber saw, and circular saw.
4. Demonstrate the use of a manual or hydraulic bending unit (portable or stationary) on angle iron, pipe, flat and round stock.
5. Use a hydraulic iron worker to shear and punch flat stock and angle iron, and to notch pipe.

H. Project Layout

Students will become proficient in laying out holes, cuts and angles on metal for specific applications

1. Layout holes and select the correct tools for boring various metals and shapes.
2. Layout square cuts, angles, and compound angle cuts on various metals and shapes

I. MIG Welding

Students will demonstrate proficiency using the MIG welding process (GMAW).

1. Using the MIG welder and solid wire, demonstrate welding mild steel in various positions employing the basic joints.
2. Use the MIG welder and inner or outer shield wire to weld mild steel 1/4" or thicker in the flat position.
3. Demonstrate welding aluminum and/or stainless steel in the flat position using a MIG welder or spool gun.
4. Demonstrate proficiency at MIG machine maintenance and troubleshooting.

J. TIG Welding

Students will demonstrate proficiency using the TIG welding process (GTAW).

1. Using the TIG welding process, demonstrate various joints in the flat and horizontal position on aluminum and/or stainless steel.
2. Have knowledge of other unique or exotic metals that can be welded using the TIG process.

K. Phase of Metals

Students will understand the phases of matter and the role temperature and pressure play in the change of phase of metals.

1. Observe phase change of metal when they are subject to heat and be able to apply the knowledge in practical applications.
2. Define melting point, thermal conductivity, and grain structure.
3. Describe the effect of cooling rate on the grain structure of steel.
4. Describe how materials behave under applied pressure and explain how to compensate for pressure problems in various situations where metals are used.

L. Mass Production

Students will understand the reasons for and apply mass production techniques in constructing specific projects.

1. Make jigs and fixtures for the construction of a project which involves replication of a number of identical components.
2. Use and apply a simple assembly line technique to construct a group project

M. Project Design and Construction

Students will apply skills learned in welding, metal working, finish work, and project design to plan for and build a complex project.

1. Using actual cost estimates and drawings, complete a plan for a project including: working drawing, bill of materials, and sequence of operations.
2. Employing appropriate tools and skills, manufacture the parts and construct and finish a complex project.

N. Project Finishing

Students will demonstrate the skills necessary to finish a project in a professional way.

1. Finish a product to the degree appropriate for the intended use of the item made.
2. Complete the surface preparation of a metal project using proper tools and materials, sealers, paints, etc.
3. Carry a project to completion including all details involved in the production of the finished product.

O. Atomic Structure

Students will understand the principals of atomic structure and apply that knowledge to welding practices.

1. Make simple sketches of the atomic structures of various metals.
2. Explain why the addition of carbon to steel effects its structure and the properties of the metal.
3. Apply the understanding of the effects of carbon content on steel (relating to hardness and strength) to welding and project applications.

P. Alloys

Students will understand the importance of the synthesis of new alloys which have properties necessary for specific applications and purposes.

1. Explain what alloy steel is and how it is manufactured.
2. List the common additive elements involved in alloy steel Production.
3. Identify which qualities are affected by each additive in an alloy.

Q. Basic Machine and Foundry Principals (Optional)

Students will demonstrate knowledge and use of machine tools and basic foundry principles.

1. Turn stock to size using the metal lathe.
2. Turn a taper using a metal lathe.
3. Turn external threads using a metal lathe.
4. Perform a drill and tap using the metal lathe for boring and indexing.
5. Select appropriate speed for materials being turned.
6. Select and sharpen appropriate cutting tools for use on machinery.
7. Use a milling machine to square and flatten a surface.
8. Use the mill to make a step, shoulder, and groove in a metal sample.
9. Use the milling machine to machine a key way on a shaft.

Developed by the Agricultural Mechanics Curriculum Committee Field Test Sites, April, 1995.

Advanced Specialization in Agricultural Mechanics Power and Machinery Course Objectives

The Agricultural Mechanics Core I & II provides a thorough background for each advanced specialization area. This advanced area in Power and Machinery should not be taught without the students having first completed the Ag. Mechanics Core I & II.

Components of this advanced specialization duplicate outcome statements found in the Agricultural Mechanics Core I & II; They are included here to further reinforce instruction on those outcomes.

A. Leadership

Students shall appreciate the wide variety of leadership training activities available through the FFA organization and understand the importance of developing communication and critical thinking skills as well as self appraisal.

1. Understand the benefits of FFA membership
2. Understand the principles of parliamentary procedure.
3. Demonstrate public speaking abilities by selecting, researching, developing, and delivering an 8-10 minute presentation.
4. Demonstrate communication skills using telephones, letters, memos, and verbal conversation.
5. Understand the basic concepts of scientific inquiry and critical thinking.

B. Employability & Careers

Students shall appreciate the importance of Supervised Occupational Experience Programs in the total program of agricultural education, and develop those skills necessary to search, locate, and apply for employment, as well as building a portfolio.

1. Engage in an appropriate S.O.E., taking into consideration individual career goals, and maintain records in the California Vocational Agriculture Record Book.
2. Understand the importance of positive work ethics and values in the work place.
3. Develop a Portfolio which will include a resume, application, letter of application, letter(s) of recommendation, and work samples.
4. Develop interviewing and job keeping skills.

C. Safety and First Aid

Students will demonstrate safe work habits and develop first aid skills.

1. Understand that safety is on going and is practiced daily.
2. Pass appropriate safety tests on equipment students will be using.
3. Demonstrate the appropriate steps to take when handling emergencies.
4. Be familiar with potential hazards and OSHA regulations.
5. Develop a proper attitude toward work and avoid unsafe practices.

D. Measurement

Students understand and are able to read and use a ruler or tape, also calculate problems involving length, area, and volume and weight and know the difference between the English and metric measurements. (PS-5)

1. Correctly measure objects with a ruler, tape or framing square.
2. Correctly measure objects using calipers and micrometers.
3. Calculate and solve basic measurement problems including cubic measurement and standard liquid measurement.
4. Differentiate between English and Metric measurement units.
5. Students will use various methods to determine the mass and volume of regularly and irregularly shaped objects.

E. Project Design

Students will master the basic skills necessary to make a simple drawing and then design, and construct a particular project by correctly interpreting the working drawing.

1. Identify the different types of lines used in a drawing or layout.
2. Interpret a working drawing

F. Electricity

Students will develop and demonstrate a basic understanding of electricity, its theory, and practical application.

1. Differentiate between series and parallel circuits.
2. Design and build a simple electrical circuit.
3. Make four different splices.
4. Exhibit safety habits.

G. Manuals

Students will understand the importance of an operator's manual for a given piece of equipment and be able to utilize it for ordering or maintenance.

- or
1. Identify the equipment that is to be serviced or repaired and locate the proper service operator's manual.
 2. Using the index, determine the main sections and their page numbers.
 3. Using the proper manual, determine the location of various parts or systems and locate adjustment points for adjusting the equipment.
 4. Identify proper names of these parts and systems.
 5. Order repair or replacement parts by proper name.
 6. Determine when service is due.

H. Farm Machinery

Students will familiarize themselves with the different types of farm machinery and their uses.

1. Identify the different categories of farm machinery.
2. Describe the basic types of work performed by each of the categories of machines.
3. Identify job categories available that require a knowledge of farm machinery.
4. Identify five skills required for each job category.

I. Equipment Maintenance and Operation

Students will develop and demonstrate a basic understanding of adjustment, service, maintenance, calibration and safe operation of agricultural equipment.

1. Demonstrate safe operation procedures for three pieces of agricultural equipment and pass all corresponding written safety tests.
2. Be able to change the lubricating oil and oil filters, air and fuel filters, and maintain battery water levels.
3. Pass all corresponding safety tests and use safe work habits while servicing, maintaining, calibrating, and adjusting agricultural equipment.
4. List common hazards related to working with agricultural chemicals and identify potentially dangerous situations.
5. Determine what safety standards to follow when using equipment for

- spreading or spraying hazardous agricultural chemicals.
6. Demonstrate basic procedures for calibration of sprayers and planters.
 7. Prepare a piece of equipment for storage.
 8. Recognize the personal and financial implications related to the safe use and replacement/repair of components used in hydraulic applications.

J. Tractor Tune-up

Students will develop and demonstrate the skills necessary to tune up an internal combustion engine

1. Identify six conditions that could lead to engine failure.
2. Perform an engine tune-up using the procedures listed in the Ag Mechanical California Curriculum Guideline unit on "Engine Tune-up."

K. Clutch, Brake and Track Maintenance

Students will develop a basic understanding of clutch, brake and track maintenance.

1. Differentiate between properly and improperly adjusted clutches and brakes on a piece of equipment.
2. Be able to refer to the operator's manual and make a simple brake and clutch adjustments.
3. Demonstrate adjustment of track tension in accordance with the operator's manual.
4. Be able to determine the extent of wear on tracks and their component parts.
5. Specify the repair necessary for a given set of tracks.

L. Calibration

Students will develop and demonstrate the skills necessary to calibrate various types of farm implement.

1. Field check the calibration of a fertilizer spreader or grain drill.
2. Calibrate a grain drill in the shop.
3. Calibrate a spray rig.
4. Field check the calibration of an aqua ammonia or NH₃ fertilizer rig.

M. Hydraulics

Students will develop and demonstrate a basic understanding of practical applications for hydraulics.

1. Describe the functions of different hydraulic parts.
2. Test for, diagnose and repair simple problems in a hydraulic system including stopping leaks, flushing, cleaning and refilling systems.
3. Use a shop manual to find repair information.
4. Attach a remote cylinder.
5. Assemble a simple hydraulic system.

N. Engine Systems

Students will develop and demonstrate a basic understanding of the types and systems of engines.

1. Distinguish the different types and systems of small gas engines.
2. Be able to identify major parts of an engine.
3. Understand the basic terminology involved in a study of engines.
4. Identify the operating principles of the two and four-stroke engine.

O. Carburetion Systems

Students will develop and demonstrate a basic understanding of the carburetion systems of engines.

1. Be familiar with terminology used regarding carburetion systems.
2. List the purpose of each component of a fuel system.
3. Identify three types of fuel filters.
4. Identify three types of air cleaners.
5. Identify all parts of the float and vacuum-type carburetors.

P. Ignition System

Students will develop and demonstrate a basic understanding of the ignition systems of engines.

1. Be able to identify different types of ignition systems.
2. Be able to identify and explain the functions of a magneto ignition system.
3. Remove and replace the breaker points.

4. Check the gap on a spark plug.
5. Test a spark plug.
6. Students will determine various changes and conversions of different forms of energy by tracing gasoline back to its source and discussing its use.

Q. Engine Overhaul

Students will develop and demonstrate a basic understanding of the overhaul and repair of engines.

1. Locate the proper manuals and specifications for specific engines.
2. Select the proper hand tools for repair/overhaul.
3. Disassemble, repair and replace the major components in an engine. (This should include but not be limited to items such as piston rings, valves, needle valves, gaskets and ignition parts.
4. Reassemble an engine.

R. Power Transmission

Students explain and demonstrate principles related to the transmission of power.

1. Define linear motion and rotation motion.
2. Explain the relationship of power and friction to the transmission of power.
3. Demonstrate the knowledge of transmission of power using chains.
4. Develop an awareness of the importance of safety in relation to application of transmission of power.

S. Strength of Materials

Students understand forces and their effect upon various types of Materials (PS-9)

1. Students define stress and state how it is measured.
2. Students define strain and tell how it is measured.
3. Students differentiate between tensile strength and compressive strength and relate how each is used in evaluating metal.
4. Students define elasticity of metals and describe its importance in manufacturing.
5. Students define bending strength, shear strength, fatigue strength and impact strength and give examples of each.

T. Mechanics

Students understand mechanics, including the interrelationship of force, mass, distance, and time. (PS-11)

1. Students demonstrate how pulleys work in relation to mass, energy and distance.
2. Students differentiate between velocity and speed.
3. Students describe the standards uses for measuring distance and time.

U. Heat Transfer

Students understand heat, heat transfer and the difference between heat and temperature and the implications for calculating heat conversion into work. (PS-15)

1. Students describe how heat is transferred by means of currents.
2. Students will observe how heat changes matter and determine whether heating will temporarily or permanently change an object.

V. Electronics (Optional)

Students understand and appreciate the role of electricity in the technological world. (PS-16 & 17)

1. Students define electric current and state the difference between conductors and insulators.
2. Students define voltage and amperage and describe their applications in agricultural mechanics
3. Students differentiate between alternating and direct current.
4. Explain the voltage drop and its effect on welding (application) current.
5. Differentiate between open-circuit voltage and arc voltage.

6. Students become aware of the prevalence of electromagnetics by investigating the extent to which they are used in arc welders. MIG welders and other electrical shop equipment.
7. Students define electromagnetics and describe their application in the conversion of electrical energy into mechanical energy in electric motors.
8. Students explain the principles of the electric motor.

Advanced Specialization in Agricultural Mechanics Agriculture Structures & Construction Course Objectives

The Agricultural Mechanics Core I & II provides a thorough background for each advanced specialization area. This advanced area in Agriculture Structures and Construction should not be taught without the students having first completed the Ag. Mechanics Core I & II.

Components of this advanced specialization duplicate outcome statements found in the Agricultural Mechanics Core I & II ; They are included here to further reinforce instruction on those outcomes.

A. Leadership

Students shall appreciate the wide variety of leadership training activities available through the FFA organization and understand the importance of developing communication and critical thinking skills as well as self appraisal.

1. Understand the benefits of FFA membership
2. Understand the principles of parliamentary procedure.
3. Demonstrate public speaking abilities by selecting, researching, developing, and delivering an 8-10 minute presentation.
4. Demonstrate communication skills using telephones, letters, memos, and verbal conversation.
5. Understand the basic concepts of scientific inquiry and critical thinking.

B. Employability & Careers

Students shall appreciate the importance of Supervised Occupational Experience Programs in the total program of agricultural education, and develop those skills necessary to search, locate, and apply for employment, as well as building a portfolio.

1. Engage in an appropriate S.O.E., taking into consideration individual career goals, and maintain records in the California Vocational Agriculture Record Book.
2. Understand the importance of positive work ethics and values in the work place.
3. Develop a Portfolio which will include a resume, application, letter of application, letter(s) of recommendation, and work samples.
4. Develop interviewing and job keeping skills.

C. Safety and First Aid

Students will demonstrate safe work habits and develop first aid skills.

1. Understand that safety is on going and is practiced daily.
2. Pass appropriate safety tests on equipment students will be using.
3. Demonstrate the appropriate steps to take when handling emergencies.
4. Be familiar with potential hazards and OSHA regulations.
5. Develop a proper attitude toward work and avoid unsafe practices.

D. Measurement

Students will understand and are able to read and use a ruler or tape and complete calculations for problems involving length, area, and volume and weight using American standard and metric measurements.

1. Correctly measure objects with a ruler, tape or framing square.
2. Calculate and solve basic measurement problems including, but not limited to the calculation of board feet, cubic measurement, and standard liquid measurement.
3. Differentiate between American standard and metric measurements units and use in solving problems requiring linear and volumetric calculations.
4. Use various methods to determine the mass and volume of regular and irregular shaped objects using American standard and metric systems.

E.. Project Design

Students understand the basic skills required to make simple drawings and be able to interpret a working drawing.

1. Identify the three (3) types of drawings (orthographic, isometric, oblique).
2. Read blueprints including schedules, details, and symbols.
3. Understand the steps necessary to develop plans and apply for building permits and types of other permits related to the construction trade.
4. Interpret a surveyor's fieldbook correctly when reading a map.

F. Wood Structures

Students will acquire the knowledge and skills necessary to design and construct wood structures.

1. Identify the woods, wood substitutes, and materials commonly used in the building of wood structures.
2. Read blueprints including schedules, details and symbols.
3. Make an estimate for a bill of materials using sketches and drawings for a wood structure included on a landscape plan.
4. Identify and use common carpentry tools for the construction and installation of wood structures.
5. Participate in the building of a wood structure.

G. Concrete Structures

Students will become aware of the types of concrete structures used in construction and develop an understanding of how they are installed.

1. Recognize and identify the types of concrete structures used in construction.
2. Develop and estimate the cost for a bill of materials for concrete structures using drawings, plans or blueprints.
3. Identify materials used in the construction of concrete structures.
4. Demonstrate mastery of basic masonry techniques used in the construction of concrete structures.
5. Identify and use basic masonry tools used in the construction of concrete structures.
6. Build a concrete item or structure including the building and eventual removal of the forms for the structure.
7. Determine the structural integrity of a project, by performing a slump test.

H. Building Components

Students will familiarize themselves with and be able to identify building components and design features.

1. Identify foundation components.
2. Differentiate between new and old systems of floor joists.
3. Identify framing components and roof styles
4. Differentiate between types of trusses.

5. Identify by grade the common types of lumber used in construction.

I. Framing and Forms

Students will understand the procedures necessary to form or frame a particular structure or foundation.

1. Properly layout a building site with batter boards, lines, and stakes.
2. Be able to properly form, pour, reinforce, and finish a concrete foundation or slab.
3. Install floor joists and sills to specifications.
4. Layout, assemble, erect, and plumb a wall section.
5. Cut out and install common rafters and joists to specifications.
6. Be able to layout, setup, and install a truss.

J. Fences

Students will develop the knowledge and skills necessary to design, layout and construct simple fences used for home and farm applications.

1. Developing a fencing plan, taking in account all pertinent land considerations (e.g., topography property boundaries, etc.).
2. Properly layout a fence line.
3. Have a knowledge of fencing materials and their appropriate uses (i.e., wire, electric, wood, posts, gates, fasteners, pipe, and cables).
4. Repair a wood and/or wire fence.
5. Install a section of fence including a gate.
6. Perform a splice on a wire fence.
7. Properly anchor a fence line.
8. List factors to consider when installing an electric fence.
9. Align posts using a level or a transit.

K. Surveying

Students will develop and demonstrate a basic understanding of surveying as it is used in agricultural applications.

1. Perform various measurements for horizontal and vertical applications.
2. Set up and keep a field notebook.
3. Visually identify the builder's, engineer's, and turret levels.
4. Identify and use a direct reading and positive reading rod with an engineer's scale and an architect's scale.
5. Understand and identify applications for profile leveling.
6. Determine distance with the assistance of a transit.
7. Calculate cuts and fills for a given piece of property.
8. Layout a building site for a simple agricultural structure (e.g., polebarn).
9. Understand and be able to read a topographic map.
10. Explain how land is subdivided in California and the United States.

L. Irrigation Systems

Students will develop the knowledge and skills necessary to design, layout and construct simple fences used for home and farm applications.

1. Differentiate between deep well turbine, low lift, and booster pumps.
2. Properly start and stop a deep well turbine pump.
3. Use and maintain the mechanical device necessary for irrigating crops.
4. Calculate the amount of irrigation water necessary for a field planted with a specified local crop.
5. Given the appropriate information, determine motor and pump efficiency levels.
6. Determine the flow, pressure, and application rates of irrigation water given specific information about the equipment used and crop to be irrigated.
7. Understand the principles of injector and vacuum systems used in irrigation.
8. Determine how to channel flow and alter pressure for various situations using relief valves, check valves, and pressure compensators.
9. Safely handle irrigation equipment and be able to determine when a technician is needed for repairs.

M. Physical Properties of Materials.

Students will explain how physical forces effect various types of materials.

1. Define stress and state how it can be measured.
2. Define strain and explain how it can be measured.
3. Differentiate between tensile and compressive strength and describe how each is used in evaluating metal, wood, and wood substitutes.
4. Describe the concept of elasticity of metals, wood and other materials and explain how this knowledge can be used in construction.
5. Differentiate between bending strength, shear strength, fatigue strength, and impact strength; give examples of each; and demonstrate the effects of one for the class.

N. Energy

Students will understand that energy is the ability to do work, that energy comes in many forms and can be converted from one form to another. (PS-10)

1. Identify the different forms of energy such as heat, light, mechanical, and electromagnetic and cite examples of each found in their school or home environment.
2. Observe and describe how heat changes matter and determine whether heating will temporarily or permanently change the physical properties of an object.
3. Determine how energy can be channeled to work with the use of energy efficient building materials, environmental controls, and design.

O. Heat Transfer

Students understand heat, heat transfer, and the difference between heat and temperature and the implications for conversion of into work. (PS-15)

1. Describe how heat is transferred by means of current and heat links.
2. Identify heat storage and conversion devices and explain generally how there devices work.
3. Understand how to calculate an R value.
4. Gain knowledge of the respective insulating factors of various building materials.

P. Electricity

Students understand and appreciate the role of electricity in the

technological world. (PS-10)

1. Define electric current and state the difference between conductors and insulators.
2. Define voltage and amperage and describe the application of each in agricultural mechanics.
3. Differentiate between alternating and direct current and identify appropriate applications for each.
4. Describe voltage drop and its effect on welding current, and motor/pump operation.
5. Differentiate between open-circuit voltage and closed circuit voltage.
6. Explain how capacitor start motors function and the principles of single and three phase operation.
7. Develop an appreciation for and general knowledge of new advances in electrical technology including solar energy storage systems and their practical uses.

Q. Electronics (optional)

Students understand the relationship of magnetic forces and electrical currents and investigate the common uses of magnetism (PS-17)

1. Become aware of the prevalence of electromagnetics by investigating the extent to which they are used in arc welders, MIG welders, and other electrical shop equipment.
2. Define the term electromagnetic and describe applications in the conversion of electrical energy into mechanical energy in electric motor.
3. Explain the principles of operation for the electric motor.
4. Measure the current of motors and determine the efficiency of a specific motors.
5. Understand the principles and value of electrostatic application in agriculture.

Agricultural Mechanics

Industry Skills Listing

A. Ag Mechanics

1. Hand Tools

Selecting and placing (including Storing) the following:

- Saw Horses
- Portable electric saws
- Track and hoists
- Wire brushes
- Brooms
- Extension Cords
- Auxiliary Lights
- Crowbars
- Chains (including chain hoist)
- Bolts, nails, screws, cotter pins, etc.
- Lubricants
- Paint and brushes
- Wood files
- Wood scrapers
- Steel wool
- Jointer plane
- Electric sander

Identifying, selecting, and using the following chiseling and boring equipment:

- Wood chisels
- Carpenter's brace and bits
- Hand drill
- Breast drill
- Press drills

Identifying, selecting, and using the following fasteners:

- Box
- Common
- Finishing nails
- Common types and kinds of woodscrews

Identifying, selecting, and using the following miscellaneous tools:

- Claw and ball-peen hammers
- Pliers
- Riveting hammer
- Steel and wood vises
- Nail set
- Center punch
- Screwdrivers
- Hatchets
- Common wrenches
- Selecting and using step and straight extension ladders

Tool fitting

- Selecting and using motor-driven general purpose grinders
- Selecting and using types of kinds of grinder wheels
- Fitting handles to tools (axes, hatchets, hammers, shovels, forks, etc.)
- Selecting and using wire brush wheels

Grinding, filing, and/or honing the following tools:

- Wood chisels
- Axes and hatchets
- Cultivator shovels
- Hand shovels
- Drill points
- Plane irons
- Cold chisels
- Drill bits (twist and auger)
- Center punches
- Cleaning files
- Dressing cold chisels, hammers, punches

2. Power Tools

Select, operate safely, and use correctly the following power tools:

- Portable electric saw
- Radial arm saw
- Floor type drill press
- Portable electric drill
- Pedestal grinder
- Air compressor
- Machine hack saw
- Band saw
- Portable sanders, grinders

3. Hot and Cold Metal Work

Identifying kinds of metals. Identifying, selecting,

and using the following:

- Combination square
- Ruler
- Chalk
- Scratch awl
- Center punch
- Cold chisels
- Hacksaws and blades
- Mill files
- File cards
- Twist drills
- Protractors
- Cape chisels
- Combination pliers
- Round punches
- Square punches
- Tongs
- Carpenter's brace
- Breast drill
- Press drill
- Portable electric drill
- Taps and dies
- Bending jig
- Metal vises
- Hot and cold rivets
- Lubricants for drilling, threading tapping
- Ball-peen hammers
- Anvil
- Bolt cutters
- Outside calipers
- Inside calipers
- Center gauge
- Steel rule
- Micrometer

4. **Sheetmetal**

- Selecting and using flat files
- Selecting and using tin snips, emery cloth and sandpaper
- Identifying kinds of sheet metal
- Rivet sets
- Layout techniques for small projects

5. **Rope Work**

- Identifying the kinds and grades of rope
- Selection and care of rope for farm jobs
- Whipping end of rope

Making and using a crownknot and end splice

Identifying, making, and using common knots:

Overhand

Square

Single bowline

Identifying, making, and using common splices:

Eye or side

Loop

6. **Sketching and Drawing**

Prepare a bill of materials

Calculating materials requirements

Interpreting a blue-print

Selecting and using drawing pencils, lettering equipment, scales, inks, etc.

7. **Carpentry and Woodworking**

Identifying, selecting, and using the following measuring and marking equipment:

Carpenter's steel square

Steel rule

Scratch awl

Chalk line

Try square

Steel tape

Sliding tee-bevel

Identifying, selecting, and using the following sawing equipment:

Hacksaw and blades

Portable electric saw

Band saw

Hand ripsaw

Hand crosscut saw

Identifying, selecting, and using the following planing and smoothing equipment:

Jack plane

Smooth plane

Sandpaper

Selecting and laying out a building site

Laying out a foundation

Determining sources of building plans

Laying out and cutting common rafters

Identifying and selecting roof types

Identifying and selecting steel buildings and building materials

Identifying and selecting insulating materials

- Identifying and selecting siding materials
- Identifying and selecting roofing materials
- Identifying and selecting building or structural types
- Identifying parts of common farm buildings
- Identifying and selecting ventilating systems
- Identifying and selecting types of masonry units
- Selecting types of masonry wall construction
- Selecting waterproofing agents and vapor barriers
 - for new basement walls and concrete floors
- Repairing and remodeling farm buildings and foundations
- Scaling lumber
- Using the board foot table on the framing square
- Using the brace table on the framing square
- Selecting temporary foundations for movable farm structures

Use:

- Brace, hand
- Bits, auger
- Counter sinks
- Expansion bits
- Screwdriver bits
- Wood chisel
- Bar clamps
- I clamps
- C clamps
- Wood files and rasps
- Hammers - nail, ripping
- Hatchets
- Screw drivers
- Wrecking bar
- Draw knife
- Nail sets

9. **Electric Arc Welding**
 - Selecting the make, type, and size of arc welder
 - Identifying kinds of metals
 - Selecting the make, type and size of electrodes
 - Selecting and using welding table, metal vise, ground clamp and electrode holder, face shield, welding gloves, chipping hammer, wire brush
 - Connecting welding to electric power source
 - Striking and holding an arc
 - Laying a bead
 - Chipping and removing slag
 - Cleaning metals to be welded
 - Identifying, selecting, and making butt, fillet, lap, edge, and corner welds
 - Cutting, hard surfacing, padding, stressing metals
 - Welding various kinds of metals
 - Controlling expansion and contraction
 - Using safety precautions
10. **Oxyacetylene Welding**
 - Selecting make and type of welder
 - Selecting the oxygen, acetylene, acetylene regulator, hoses and connections, welding blowpipe, goggles, flint lighter, welding filler rods, wrenches, flux, and cutting blow torch, welding table
 - Obtaining oxygen and acetylene tanks
 - Setting up welding equipment
 - Lighting the flame
 - Testing hoses and connections for gas leaks
 - Shutting down the equipment
 - Adjusting flame for operations
 - Identifying metals
 - Laying a bead
 - Making a joint without using a filler rod
 - Using safety precautions with oxyacetylene equipment
 - Cutting
 - Fusion welding
 - Brazing
11. **Concrete Work**
 - Selecting form materials, gravel screen, wheelbarrow, shovels, measuring boxes, and water measuring boxes, and water measurers, trowels, and tampers
 - Determining quantities of materials needed for job
 - Selecting and making proper mixture
 - Mixing concrete by hand

Testing workability of a mixture
Mixing with a machine
Placing concrete in forms
Leveling and finishing, troweling, tamping
Curing, removing forms, edging

12. **Farm Fencing**

Planning a fencing arrangement
Selecting kinds and types of wire and posts
Selecting and using staples, wire tighteners, fencing tools, tampers, post hole hand augers, powered augers
Setting corner posts and other posts
Selecting and using bracing materials
Stretching wire, laying wire
Selecting and installing types of gates
Selecting and using electric fences

13. **Pipework and Plumbing**

Selecting and applying sealing compounds
Selecting plumbing fixtures
Identifying and selecting types of pipes and tubing
Identifying and selecting common types of pipe fittings
Selecting and using pipe cutters
Selecting and using pipe threaders
Selecting and using hinged pipe vises
Selecting and using combination pipe and machinist vises
Selecting and using pipe burr reamers
Selecting and using pipe wrenches
Selecting and using equipment to measure pipe marking equipment
Cutting pipe with a wheel pipe cutter and/or hacksaw
Cutting pipe with a cold chisel
Selecting and using pipe threading dies

B. Farm Power and Machinery

1. **Internal Combustion Engines and Tractors**

Observing safe operational practices
Attaching and using safety devices
Selecting and adjusting carburetors
Removing, cleaning, adjusting, and replacing spark plugs
Checking and replacing or tightening wheel bearings
Packing wheel bearings
Greasing machines
Removing, cleaning, and replacing air cleaner

Cleaning oil and air breather pipes
Adjusting fan belt tension
Blowing-out radiators and air screens
Selecting, inspecting, filling, and installing batteries
Cleaning battery connections
Adjusting brakes
Adjusting tappets
Installing gaskets
Cleaning fuel lines and sediment bowls
Checking engine speeds and adjusting governors
Steam-cleaning engines
Calculating pulley speeds
Filing and/or replacing braker points
Checking engine timing
Adjusting drawbar height
Removing and installing starters
Selecting and attaching hydraulic power units
Selecting and using proper fuels
Draining and refilling oil systems
Draining and refilling transmissions and differentials
Filling fuel tanks
Checking and recognizing fuel in fuel systems
Selecting, inspecting, repairing, and replacing rubber
tires and tubes
Selecting and using proper lubricants

C. Farm Surveying

1. Measurement and calculation of distance, elevation, volumes, angles, areas: plotting profile lines, contour lines, grade lines, and slopes
Selecting and using the following:
 - Surveyor's tape (chain)
 - Surveyor's marking pins
 - Surveying instruments
 - Leveling rod
 - Plumb bob
 - Hand level
 - Graph paper
 - Calculating cuts, fills, avgs. elevations
 - Stake a field for surveying elevations
 - Determine elevations of a field
 - Apply a given slope to a field
 - Determine volumes of cut and fill for land leveling
 - Measure and calculate areas in acres
 - Layout boundaries and fence lines

Layout patterns for crop of tree plantings
Layout square corner and common angles
Stake out a building foundation, floor levels.
Check floors for levelness, walls for plumbness
Determine pressure available from water at different heights
Determine slope of a field or hillside

D. Rural Electrification

1. **Motors**

Check wiring for safety
Trace down troubles
Understand how motors operate

2. **Switches**

Replace switches
Install special application switches - remote control
or automatic
Check for troubles and correct them

3. **Protection devices**

Maintain and replace common devices
Overload devices

4. **Circuits**

Series
Parallel
Combination
Remote Control

5. **Wiring installation**

House wiring
Auxiliary buildings

6. **Automatic controls**

Understand the possibilities of electrical controls in
controlling power and machines

SECTION THREE

COMMUNITY COLLEGE

Articulated Courses

The following is a diagram showing which college courses are potential CC/HS articulated courses. Note: The programs on the left must be completed in their entirety in order for the CC courses on the right to be articulated. Also, Articulation Agreements must be established between each high school and the community college with which it is working.

PROGRAM - HS	ARTICULATED COURSES - CC	
<u>General Ag Mechanics</u>		
Ag I Core	AG - M 200	Basic Mechanics - Ag
Ag II Core	(Proposed)	Leadership
Ag Mechanics (11)		
Ag Mechanics (12)		
<u>Specialization - Metal Fabrication</u>		
Ag Mechanics Core I	AG - M 200	Basic Mechanics - Ag
Ag Mechanics Core II	AG - M 210	Agricultural Welding
Metal Fabrication (11)	AG - M 349B	Work Experience Ag
Metal Fabrication (12)	(Proposed)	Leadership
<u>Specialization - Power & Equipment</u>		
Ag Mechanics Core I	AG - M 200	Basic Mechanics - Ag
Ag Mechanics Core II	AG - M 389	Small Engine Repair
Power & Equipment (11)	AG - M 349B	Work Experience Ag
Power & Equipment (12)	(Proposed)	Leadership
<u>Specialization - Ag Structures & Const.</u>		
Ag Mechanics Core I	AG - M 200	Basic Mechanics - Ag
Ag Mechanics Core II	AG - M 349B	Work Experience Ag
Ag Structures & Const. (11)	(Proposed)	Leadership
Ag Structures & Const. (12)		

Community College Ag Mechanics

Course Outlines

Topical Content Outline (Potential CC/HS Articulated Courses)

AG - M 200 - Basic Mechanics - Ag
--

Catalog Description:

Basics in woodworking, cold metal, forging, plumbing, and welding as related to farm maintenance and repair. Designed for agricultural students who need development in basic mechanical skills.

Objectives - The student will

- A. Differentiate between the four different metal joining processes demonstrated in class.
- B. Select the proper method of joining metals and materials.
- C. Identify the tools, materials, and machines found in the farm shop.
- D. Demonstrate the correct use, care, and maintenance of the tools, materials, and machines commonly found in the farm shop.
- E. Compute common shop problems regarding measuring and ordering supplies and equipment for given applications.
- F. Adhere to common shop safety practices.
- G. Identify safety hazards and eliminate them before accidents occur.
- H. Identify and care for various kinds of rope.
- I. Demonstrate knowledge of rope knots by tying several useful knots.
- J. Prepare a simple three dimension drawing showing top, end, and side views.
- K. Apply the techniques of sharpening and refitting the more common farm tools.
- L. Demonstrate the method to forge and temper a cold chisel using a forge for the source of heat.
- M. Explain the methods of painting, types of paints, their preferred uses, and cleanup procedures.
- N. Select the most adequate (cost and quality) supplies (lumber, steel, materials) for a given situation -- fence, building, etc.
- O. Demonstrate the necessary skills involved in operating farm shop tools.
- P. Identify types of threads and properly use taps, dies, and tap drills.
- Q. Measure and thread pipe, and correctly identify the more commonly used fittings.
- R. Build a wall using concrete block and brick after mixing mortar to suggested recommendations.
- S. Illustrate knowledge of concrete by forming, pouring, screeding and finishing a slab to a proper size and slope.
- T. Assemble an electrical wiring board or display as per instructions.
- U. Explain the path electricity takes in a circuit.

Content

- A. Ropework
 - 1. Types and uses
 - 2. Care
 - 3. Splices
 - 4. Knots
- B. Farm Woodwork
 - 1. Measuring, marking
 - 2. Hand tools, their care, proper use and operation
 - 3. Power tools -- how to operate, adjust, and repair
 - 4. Safety rules and considerations
- C. Cold Metal
 - 1. Use and sharpening of hand held tools such as chisels, punches, scribes, taps, and dies.
 - 2. Operation and care of power metal working tools.
 - 3. Bending, drilling, marking, threading, and sawing metal
- D. Hot Metal
 - 1. Use and care of gas torch for cutting, welding, and heating
 - 2. Operation of electric welder both D.C. and A.C.
 - 3. Forging and heat-treating metal using a forge
- E. Sheetmetal
 - 1. Layout
 - 2. Cutting and bending
 - 3. Soldering
 - 4. Operation and care of sheetmetal tools
- F. Plumbing
 - 1. Operation and care of plumbing tools
 - 2. Types of fittings
 - 3. Layout and measuring
- G. Construction Materials
 - 1. Properties of metals, woods, etc.
 - 2. Figuring bills of materials
 - 3. Fasteners of all types
- H. Blueprints
 - 1. Sketching
 - 2. Reading blueprints
- I. Concrete
 - 1. Physical properties
 - 2. Estimating quantities
 - 3. Figuring costs
- J. Paints
 - 1. Types
 - 2. Estimating quantities

3. Mixing
 4. Application
- K. Electrical
1. Splices
 2. Lighting circuit
 3. Receptacle circuit

AG - M 210 - Agricultural Welding

Catalog Description

Techniques of operating electric welding machines; oxyacetylene torches and tungsten inert gas equipment for fusion welding, heating, brazing, curring, hard surfacing and soldering of all common types of metal in all positions.

Objectives -- The student shall

- A. Employ safe working habits at all times.
- B. Operate all types of electric and gas welding equipment.
- C. Perform welds on materials in any weld position (flat; overhead, vertical or horizontal)
- D. Demonstrate welding, brazing, and hard-facing on different metal surfaces
- E. Evaluate equipment and materials as to their best use, value, and cost.
- F. Select the correct and/or the most cost-effective equipment for a given job.
- G. Evaluate the different welding procedures and electrodes.
- H. Select welds that best fit the situation presented.
- I. Compare different welding machines and accessories.
- J. Select the most convenient and economic method of cutting metal for presented situations.

Content

- A. Shop safety practices
- B. Types of oxy-acetylene equipment
- C. Types of electric welders
- D. Types of T.I.G. and M.I.G. welders
- E. Operation, adjustment, and maintenance of various types of welding equipment.
- F. Types of welding rod for gas and electric welding.
- G. Welding in flat, horizontal, vertical, and overhead position.
- H. Different types of joints in welding
- I. Various kinds of metals and their properties.
- J. Hard-facing with both electric and gas welding equipment.
- K. Techniques for controlling distortion
- L. Practical application of welding, cutting, and heating metals, using both electric and gas welding equipment.

AG 349B - Work Experience Agricultural - Supervised Practice

Catalog Description:

Designed for agriculture majors who wish to combine classroom experience with an expansion of skills or knowledge acquired at a site of employment on a paid or volunteer basis. Work must directly relate to the student's area of study. Maximum of 4 units may be earned per semester. May be repeated to a maximum of 16 units Work Experience credit. (Cooperative General Work Experience is excluded in this maximum). Also offered during June, July, and August.

Objectives -- The student will:

- A. Identify job requirements for entry-level employment.
- B. Combine traditional college study with on-the-job experience.
- C. Identify major components of labor market in order to determine employment trends.
- D. Review sources of occupational planning information and evaluate present career choices.
- E. Set attainable educational and career goals.
- F. Develop effective techniques of human interaction.

Content

- A. Introduction
- B. Job Skills Development
- C. Oral Communication
- D. Written Communication
- E. Career Goals
- F. Community Relations

AG - M 389 - Small Engine Repair

Catalog Description:

A short course in servicing, operation, and maintenance of small gas engines, garden and landscape equipment. The student will need shop clothes and a small gas engine to overhaul.

Objectives -- The student will:

- A. Correctly measure, mark and read precision measuring tools.
- B. Identify and apply the basic principles of operation of the internal combustion engine.
- C. Identify parts and comprehend engine systems.
- D. Overhaul small engines using correct procedures and tools.
- E. Correctly disassemble and assemble a small internal combustion engine.
- F. Analyze common engine failures and calculate typical engine problems.
- G. Demonstrate correct techniques for system adjustments.

Content

- A. Safety standards, attitudes, and safe tool use with small engine maintenance and repair.
- B. Principles of internal combustion engines
 - a. 2-stroke cycle
 - b. 4 stroke-cycle
- C. Identification of parts and systems of small engines.
- D. Overhaul techniques and part-renewal procedures
- E. Service, tune-up and trouble-shooting on small engines
- F. Calculation of problems common to small engines
- G. Manual usage for efficient/correct small engine repair

Skills Listing for Proposed Course Articulations

Basic Mechanics

1. Select the proper method of joining metals and materials.
2. I.D. the tools, materials, and machines found in the typical farm shop.
3. Demonstrate the care, use, and maintenance of the tools, materials, and machines found in the typical farm shop.
4. Compute common shop measuring problems.
5. Compute a bill of materials.
6. Develop a cutting list for a shop project.
7. Demonstrate shop safety.
8. I.D. shop hazards and eliminate them before accidents occur.
9. I.D. and care for various kinds of rope.
10. Demonstrate knowledge of rope knots by tying several useful knots.
11. Prepare a working drawing showing the top, end, and front views of a shop project.
12. Demonstrate the techniques of sharpening and refitting common farm tools.
13. Explain the methods of painting, types of paint, their uses and cleanup procedures.
14. Select the most adequate (cost & quality) supplies (lumber, metal, hardware, etc.) for a given situation -- fence, building, etc.
15. Demonstrate safe operation of shop tools.
16. I.D. types of threads and demonstrate the use of taps, dies, and tap drills.
17. Measure and thread pipe, and correctly I.D. the more commonly used fittings.
18. Demonstrate use of concrete and masonry tools.
19. Explain the procedure for forming, pouring, screeding, and finishing a concrete slab.
20. Assemble an electrical wiring board or display as per instructions.
21. Demonstrate electrical safety.
22. Explain the path electricity takes in a circuit.

Agricultural Welding

1. Demonstrate welding safety.
2. Demonstrate safe operation of all types of electric and gas welding equipment.
3. Perform welds on materials in various welding positions (flat, horizontal, vertical, overhead, etc.).
4. Demonstrate welding, brazing, and hard-surfacing on various metal surfaces.
5. Evaluate equipment and materials as to their best use, value, and cost.
6. Select the correct and/or the most cost-effective equipment and materials for a given job.
7. Compare different welding procedures and accessories.
8. Select the most economical and convenient method of cutting metal for a given situation.
9. Evaluate different welding procedures.
10. Select the correct welding procedure for a given job.

Small Engine Repair

1. I.D. and apply the basic principals of operation of the internal combustion engine.

2. I.D. engine parts and comprehend systems.
3. Overhaul small engines using the correct tools and procedures.
4. Disassemble and assemble a small engine.
5. Analyze common engine failures and calculate costs to solve typical engine problems.
6. Demonstrate correct system adjustment techniques.
7. Demonstrate small engine safety.
8. Demonstrate the use of manuals and operation instructions.

Work Experience - Ag

1. I.D. job requirements for entry, technical, and professional level employment.
2. Combine classroom instruction with on-the-job experience.
3. I.D. major components of labor market in order to determine employment trends.
4. Review sources of occupational planning information and evaluate present career choices.
5. Set attainable educational and career goals.
6. Develop effective techniques of human interaction.
7. Demonstrate communication techniques with employers, co-workers, and public.
8. Develop portfolio containing resume, letter of recommendation, sample application, and work samples.

The Pathway Specific Program Agreement

The Program Agreement

Of utmost importance in any Tech Prep articulation process is the agreement negotiated and established between the high school and community college. It establishes the responsibilities and provides the details of the working articulation procedure. It identifies the courses and outlines the competencies to be articulated. It establishes procedures for on-going review and evaluation and is signed in good faith by the executives of each institution. The guiding principle of the articulation agreement is to assure the program "in the best interest of the student" recognizes past learning experiences and minimizes repetition of instruction.

To establish a Tech prep curricular agreement, it is essential that the secondary school is using the State approved Model Curriculum Frameworks for the given pathway. The frameworks have been field tested, have the validation of the industry and assure the community college that the student has received instruction in the pathway specific competencies. The community college curriculum can then be developed or modified if necessary to prevent unnecessary repetition of instruction.

Granting of post secondary credits may vary from one community college to another and is a negotiable issue at the local level. Most community colleges require the student to complete at least one additional class in the same pathway before granting credits for the articulated high school program. Generally, students having completed the secondary portion of the four-year pathway sequence are granted "advanced standing" or "continuing student" status prior to registration for their first semester at the community college. Additional information and specifics in developing articulation agreements can be found in the "Articulation System Guide" developed by the Central Valley Consortium for Agriculture Education Tech Prep.

The following pages show an example of a Program Agreement and certificate of Completion.

safety hazards and eliminate them before accidents occur.

- Identify and care for various kinds of rope.
- Demonstrate knowledge of rope knots by tying several useful knots.
- Prepare a simple three-dimension drawing showing top, end, and side views.
- Apply the techniques of sharpening and refitting the more common farm tools.
 - Demonstrate the method to forge and temper a cold chisel using a forge for the source of heat.
 - Explain the methods of painting, types of paints, their preferred uses, and clean-up procedures.
 - Select the most adequate (cost and quality) supplies (lumber, steel, materials) for a given situation-- fence building, etc.
 - Demonstrate the necessary skills involved in operating farm shop tool.
 - Identify types of threads and properly use taps, dies,

- and tap drills.
- Measure and thread pipe and correctly identify the more commonly used fittings.
- Build a wall using concrete block and brick after mixing mortar to suggested recommendations.
- Illustrate knowledge of concrete by forming, pouring, screeding and finishing a slab to a proper size and slope.
- Assemble an electrical wiring board or display as per instructions.
- Explain the path electricity takes in a circuit.

3. In addition, the student will:

- Have a basic understanding of agricultural concepts and skills.
- Appropriately complete a job application.
- Use language in accordance with standards of acceptable usage.
- Identify the main idea of an article or publication.
- Have a basic understanding of the research process.
- Demonstrate proficiency in basic mathematical computations.
- Effectively deliver an oral presentation.
- Communicate effectively with individuals and groups.
- Demonstrate basic computer proficiency.
- Have a basic understanding of record keeping.
- Have the ability to work effectively in a group.
- Have a basic understanding of the metric system.

4. Has received the recommendation of the secondary school agriculture teacher.

5. Presents a portfolio which includes a minimum of:

- A letter of introduction
- Personal resume
- A completed scenario with a "proficient" or better rating
- Two work samples
- Two letters of recommendation
- A job or college application
- A writing sample
- SOE

Students meeting the above requirements will be granted post

the above to be true and accurate.

High School Instructor

Signature

Typed Name

School and District

High School Administrator

Signature

Typed Name & Title

School and District

Student

Signature

Typed Name

School and District

***Note:**

Student's high school transcript must be attached.

SECTION FOUR

ASSESSMENT



Introduction To Student Assessment In Tech Prep

What is Assessment? By definition*, assessment involves appraisal & evaluation. Assessment in education not only evaluates what a student understands or skills that he/she can demonstrate but additionally indicates the quality of instruction that was provided. So as we enter the age of "accountability" in education, assessment becomes extremely important to determine the level of a student's understanding and ability to complete a task, as well as the quality of instruction received. Too often in education, students are assessed using paper/pencil written examinations that involve multiple choice, true/false or short essay questions. Most of these assessment strategies utilize a student's short-term memory or ability to memorize facts. Therefore, a more realistic approach to assessment has been selected for Tech Prep. Alternative assessment, performance assessment or authentic assessment are all terms that indicate this new approach to assessment.

Authentic Assessment (Performance assessment) is typically defined by a set of performance standards (instructional objectives). Students must show progress towards these standards. Authentic assessment may include many different types of testing approaches that are more typical of real - life settings and allow students to demonstrate their knowledge and skills through creating a product, demonstrating a skill or documenting a process.

Two different types of assessment have been selected for use in Tech Prep for Ag Education. They are Cumulative assessment; (projects which develop over an extended time frame and have more than one component). The other form of assessment is administered (on - demand) assessments which are short term examinations that determine a student's knowledge in a more specified area. Today's diverse student population can likely be better served by a flexible system of assessment that allows students to demonstrate a variety of knowledge and skills.

The cumulative form of assessment selected for use in Tech Prep is the Portfolio and the administered form of assessment used in Tech Prep is the Written Scenario.

*Websters

Written Scenarios

Construction Of A Calf Pen

SCENARIO

A local dairyman has asked for your assistance in the construction of ten wooden calf pens. The dairyman's woodworking skills are very limited and he does not have the time to construct them himself. He has stated that you can construct one pen and if he is pleased with it, you can build the other nine. His only request is that the pen measure 48 inches wide, 48 inches tall, and 84 inches long.

INSTRUCTIONS

Prepare a list of building materials and fasteners that you would use to accomplish this task. In addition, you need to provide a simple sketch (working plan) of what the finished product will look like. This explanation should be descriptive enough to convince the dairyman that you are qualified to construct this project request.

To receive a proficient rating on this task, you must show all of the following:

1. Knowledge of
 - Types and grades of lumber applicable to this project
 - Types and uses of woodworking tools (power, and hand)
 - Techniques of measuring, marking, cutting, assembling, and fastening wood
 - Formulating a bill of materials
 - Sketching
2. Ability to propose a solution to this scenario
3. Ability to communicate effectively in writing

Shop Safety (Pedestal Grinder)

SCENARIO

A local metal fabrication shop has recently had several employee injuries in a relatively short period of time (3 weeks) while operating the pedestal grinder. They are consequently very concerned for the safety of their employees and have asked you to conduct a safety seminar in the safe operation of a pedestal grinder.

When you arrive you learn that most of the employees have never received any instruction pertinent to the safe operation of the grinder. In addition, they do not know the names and functions of the parts of the grinder.

INSTRUCTIONS

Prepare a list of recommendations and a description of the information you would provide for their employees. This explanation should be descriptive enough to convince the company that you are qualified to conduct this safety seminar.

To receive a proficient rating on this task, you must show all of the following:

1. Knowledge of
 - Pedestal grinder parts identification
 - Function of each part of the grinder
 - Proper adjustments on grinder
 - Safe operating speeds for specific wheels
 - Safe operation procedures
2. Ability to propose a solution to this scenario
3. Ability to communicate effectively in writing

Electrical Circuit

SCENARIO

A neighbor has asked you to wire an electrical circuit so that he can have a light installed in his garage. He has stated that he wants to be able to turn the light on from the kitchen as well as in the garage.

INSTRUCTIONS

Prepare an explanation of the correct wiring procedure for this particular circuit. In addition, you need to provide a wiring diagram of the circuit. This explanation needs to include the necessary materials to complete the job.

To receive a proficient rating on this task, you must show all of the following:

1. Knowledge of
 - Types and Sizes of Wire
 - Types and Uses of Electrical Tools
 - Electrical Circuits
 - Wiring Diagram
 - Types of Switches
 - Electrical Safety
2. Ability to propose a solution to this scenario
3. Ability to communicate effectively in writing

Electrical Safety

2. Ability to propose a solution to this scenario
3. Ability to communicate effectively in writing

Fasteners

SCENARIO

You are working for a metal fabrication shop on a part time basis and you have been assigned to clean up and organize the "Bolt Room". This room has boxes and bags of fasteners all over the place and there never was any organized method of storing them. Your boss wants you to make a list of the major fastener groups and then list the common types of fasteners within each group. Also, make recommendations as to what storage system should be used for each major fastener group.

INSTRUCTIONS

List as many different types of fasteners you can think of under the following groups:

- Nails
- Screws
- Bolts
- Nuts
- Washers
- Machine Screws
- Rivets

Next, give a brief description of the purpose, tools used, and storage system for each type of fastener.

To receive a proficient rating on this task, you must show all of the following:

1. Knowledge of
 - Different types of fasteners
 - Fastener storage systems
 - Fastener uses
2. Ability to propose a solution to this scenario.
3. Ability to communicate effectively in writing.

Project Design

SCENARIO

Your dad wants you to design a box scraper that will attach to his tractor's three-point hitch. The scraper is to be 6' wide, 2' tall and 2' deep. You are given the following list of materials and their costs:

- | | |
|--------------------------------|--------------------|
| • 1/4" plate steel | \$3.50 per sq. ft. |
| • 2" x 4" x .250 wall sq. tube | \$3.94 per ft. |
| • 3" x 3" x 1/4" angle | \$1.40 per ft. |
| • 1/2" x 4" plow blade | \$2.50 per ft. |
| • 1/2" x 4" flat | \$1.97 per ft. |
| • 2" x 2" x .120 sq. tube | \$1.36 per ft. |
| • Primer | \$7.00 per qt. |
| • Paint | \$8.00 per qt. |
| • Shearing & Forming | \$60.00 (labor) |

Your dad would like you to present him with a three-view drawing of the scraper, a bill of materials showing the amounts and costs, as well as a total cost of the scraper, and a materials cutting list. Your dad would also like to know how long it will take you to construct the project and how much you would charge him to build it (include this on the bill of materials).

INSTRUCTIONS:

Prepare the following:

- Three view drawing
- Bill of materials
- Cutting list

To receive a proficient rating on this task, you must show all of the following:

1. Knowledge of
 - Symbols, scales, and tools used in three-view drawings.
 - Elements of a plan
 - Formulating a bill of materials.
 - Techniques of measuring
 - Material descriptions
2. Ability to propose a solution to this scenario.
3. Ability to communicate effectively in writing.

Oxyacetylene Cutting

SCENARIO

Your neighbor recently bought an oxy-acetylene set up and would like you to demonstrate to him how to set it up and use it safely. He would also like to know about safety gear, pressure settings, and equipment maintenance.

INSTRUCTIONS

- Describe the steps for safe set-up and shut-down of the oxy-acetylene cutting system.
- List and explain the use of each item of safety gear.
- Describe how to set the pressure regulators and the procedure for cutting 1/4" plate steel.
- Explain how to care for and maintain each part of the oxy-acetylene cutting set-up.

To receive a proficient rating on this task, you must show all of the following:

1. Knowledge of
 - Oxyacetylene cutting systems
 - Oxyacetylene Safety
 - Oxyacetylene cutting procedures
 - Equipment care and maintenance
2. Ability to propose a solution to this scenario.
3. Ability to communicate effectively in writing.

Small Engines

SCENARIO

You have just been hired to work in a small engine equipment repair shop. A customer brings in a lawn mower that he says he bought at a garage sale. He has no idea when the mower was serviced last or whether it even runs (he says he pulled the starter rope a few times but nothing happened). The customer wants you to determine if the mower is worth repairing so that it is in good working condition.

INSTRUCTIONS

Prepare a step-by-step list of items you will check in each of the three major engine systems and explain why each check is made. Explain what will be done to service the mower. Also, be able to explain to the customer how to safely operate and maintain the mower.

To receive a proficient rating on this task, you must show all of the following:

1. Knowledge of:
 - Engine systems
 - Order of checks
 - Safe operation procedures
 - Service checks and maintenance schedules
2. Ability to propose a solution to this scenario.
3. Ability to communicate effectively in writing.

Tool Use & Safety

SCENARIO

You are given a working drawing of a project which requires the use of various hand and power tools. It is your job to list the tools you would use in this project as well as give a brief description of how to safely use each tool.

INSTRUCTIONS

You will be given a working drawing of a shop project from your instructor. First, prepare a list of tools you would use to construct the project (indicate which task each tool will be used for). Second, briefly describe the safe operation of each tool.

To receive a proficient rating on this task, you must show all of the following:

1. Knowledge of
 - Tools and their uses.
 - Tool safety
2. Ability to propose a solution to this scenario.
3. Ability to communicate effectively in writing.

Work Samples

Name:
Date:
Period:

Agricultural Mechanics
Hot Duplex to a Switch to Control a Light

Objective: To instruct teach basic writing skills when wiring in a light that is controlled by a toggle switch.

Materials: _____ toggle switch
_____ porcelain receptacle
_____ duplex receptacle
_____ NM clamps
_____ wire nut
_____ ground clips
_____ 14-2-G NM cable (Romex)

Instructions: Wire the circuit so that the source enters the circuit at the duplex receptacle box. The light is to be controlled by the switch. It will be wired according to the NEC and may be continuity tested when completed.

Steps: **Diagram your circuit first!!!**

1. install NM clamps
2. cut, rip and install cable between the light box and the switch
3. cut, rip and install the cable between the light box and duplex
4. install the source wire using remnant wire
5. strip the wire ends back approx. 5/8"
6. connect the neutral (white wire) as per the diagram
7. connect the hot wire as per the diagram
8. safety ground the system
9. have instructor visually inspect your board
10. connect power cord for test if required to do so

insert circuit diagram here

Name:

Date:

Period:

Agricultural Mechanics
Hot Duplex to a Switch to Control a Light
(120 Points)

Duplex

6" free conductor	5_____
clamps tight/cables tight	8_____
wires/pinched plastic	6_____
black to brass	6_____
white to silver	6_____
wires clockwise	6_____
properly grounded	3_____

Light Box

6" free conductor	5_____
clamps tight/cables tight	8_____
wires/pinched plastic	4_____
neutral to silver	5_____
wires clockwise	6_____
black to brass	3_____
black wire to white wire	5_____
wire nuts tight	3_____
properly grounded	3_____

Switch

6" free conductor	5_____
clamps tight/cables tight	4_____
wires/pinched plastic	6_____
wires clockwise	6_____
properly grounded	3_____

Diagrammed correctly 14_____

Total Points Earned 120_____

Name:
Date:
Period:

Ag. Welding and Construction
Torch Cutting Examination
(85 points)

Instruction:

This examination is designed to test your ability to use the cutting torch as you have been practicing in class. Follow the instructions on the back of this sheet.

Note: Keep all material from your material that is supplied!!

Materials Needed:

1 - 4" x 8" x 1/4" mild steel plate

Straight Line Cut

1. Measure and mark a line 1" in from the end of your material as shown on the layout page.
2. Cut along this line using the techniques you have been shown in class.
3. Scoring will include the accuracy, straightness, and neatness of your cut.

Cut a Hole

1. Using a piece of 1 1/4" or 1 1/2" pipe, lay out 2 circles to be cut, one of which is to be a hole cut into the plate.
2. Start your cut by piercing a hole into the plate within this circle.
3. Once the hole is pierced, follow around the line you drew with the torch to obtain as close to a circle as you can get.
4. Scoring will include the accuracy, roundness, and neatness of your cut.

Cut a Circle to Fit Hole

1. Use the other circle that was marked on your material. **This is to fit inside the hole that is to be cut.**
2. Start your cut by piercing a hole into the plate outside this circle.
3. Once the hole is pierced, follow around the line you drew with the torch to obtain as close to a circle as you can get.
4. Scoring will include the accuracy, roundness and neatness of your cut.

3-Leaf Clover

1. Draw a 3 leaf clover on the remainder of your material.
2. Cut it out with the torch as demonstrated in class.
3. Scoring will include the accuracy, roundness, and neatness of your cut.

Insert material diagram here

Scoresheet

Ability to Follow Instructions

All materials accounted for	10	8	6	4	2	0	___
Instructions followed	10	8	6	4	2	0	___

Straight Line Cut

1" in from the edge	5	4	3	2	1	0	___
straightness of cut	5	4	3	2	1	0	___
smoothness of cut	5	4	3	2	1	0	___

Cut a Hole

symmetry of cut	5	4	3	2	1	0	___
smoothness of cut	5	4	3	2	1	0	___
location of hole cut	5	4	3	2	1	0	___

Cut Circle to Fit Hole

symmetry of cut	5	4	3	2	1	0	___
smoothness of cut	5	4	3	2	1	0	___
location of circle cut	5	4	3	2	1	0	___
fits in hole cut	5	4	3	2	1	0	___

Freehand Cut a Cloverleaf

symmetry of cut	5	4	3	2	1	0	___
location of cut	5	4	3	2	1	0	___
smoothness of cut	5	4	3	2	1	0	___

TOTAL SCORE: -----> ___

Included in the original form of this document was another work sample
that is not available in this format.
We apologize for any inconvenience.

SECTION FIVE

RESULTS

Field Testing Process

The process used to field test the Agricultural Mechanics curriculum is similar to the other curriculum areas. Because of the short testing period (Nov. 1, 1994 - Feb. 28, 1995) and the large amount of curriculum to be tested, I was able to select four test sites and utilize my own site (Hilmar High School) as well to fill in any gaps.

1. The field test sites and instructors are as follows:

1.1	Chowchilla H.S.	Darol Fishman
	Merced H.S.	Richard Regalo & Jim Andersen
	Turlock H.S.	Joe DiGrazia
	Galt H.S.	Carl Wright & Mark Fuerhbach
	Hilmar H.S.	Dick Piersma

2. Four main goals were given to each test site. They are:

- 2.1 Validate and sequence the curriculum tested
- 2.2 Validate and develop additional integrated activities
- 2.3 Validate curriculum assessment and provide examples (including scenarios)
- 2.4 Make recommendations for additions and/or deletions to the curriculum.

I visited with each test site at least two times and conversed with the instructors numerous times via telephone and fax, during the test period. At the end of the test period, all data was collected and summarized into this report.

Results

1. Curriculum

- 1.1 Each field test site was instructed to validate and / or propose changes to the recommended sequence of curriculum, and unit time allotment, developed by the Agricultural Mechanics Curriculum Committee (see Appendix-1a).
- 1.2 One of the significant results of the field testing is the fact that most of the units covered do not allow enough time to complete them adequately. In other words, in order to teach the curriculum to a level where the student will develop marketable skills, more time is needed. This is mainly due to limited facilities, materials, equipment, staff, and budget constraints.
- 1.3 Another significant result is that though all of the units contain relevant, current, and rigorous material, not all are applicable in this two-year course of study and perhaps should be moved to a third year or another course (ie. Small Engines).
- 1.4 The third significant result relates to Ag Mechanics Programs. All of the test sites have 3 or 4 year Ag Mechanics Programs. Thus, teaching the Advanced Clusters at the 11th & 12th grade levels would actually be a two-year step backward for these programs. To get around this problem, all of the test sites teach the "Advanced Clusters" in grades 9 & 10, and then teach a specialty area in grades 11 & 12.

All of the field test sites validated the curriculum content and if the above problems with time and sequencing can be worked out, then the curriculum is sound.

2. Integrated Activities

- 2.1 As a whole, the established integrated activities as found in the CDE document, "Agricultural Education Program Components and Strategies for Implementation" (January, 1995), are adequate, and in Section 4, "Work Samples", you will find many examples of projects and / or assignments which are good examples of integrated activities.

3. Curriculum Assessment

- 3.1 Each of the field test sites provided samples of tests, quizzes, worksheets, and scenarios which can be found in Section 4.

Recommendations

1. Unit Sequence and Time Allotment

- 1.1 The recommendation for the sequence and time allotment of the Ag mechanics Curriculum (Advanced Clusters) for use in grades 11-12 is found in Section 2, "Sequenced Units".
- 1.2 Essentially, the field test sites recommend that some of the units be moved out of the Advanced Cluster curriculum and incorporated into a separate course entitled, 'Small Engines' (Section 2, "Sequenced Units").
- 1.3 Also, it is recommended that the unit on Rope Work (CLF 2600) be moved to the Animal Science Cluster, and the Surveying (CLF 2700) and Concrete / Masonry (CLF 2500) units be moved to the Advanced Specialization area of "Agricultural Structures".
- 1.4 This will allow an increase in the time allotted for the completion of each unit remaining in the Agricultural Mechanics Advanced Cluster. Also, an increase in time allotted for local enrichment will allow for more project construction which is essential to skill development.

2. Program Options

Since there are a wide variety of Agricultural Mechanics programs across the State, the Field Test Sites recommend that program options be available for Agriculture Departments to employ.

- 2.1 Appendixes 1d and 1e illustrate the proposed program options.
- 2.2 According to the Agricultural Model Curriculum Framework, an Ag student takes the Basic Core during years 1 & 2 and covers topics such as Animal Science, Plant Science, Ag. Business management, and California Agriculture. Years 3 & 4 would then consist of taking one of the Advanced Core Clusters in the areas of Animal Science, Plant & Soil Science, Ag Mechanics, Natural Resources & Forestry, Ag Mechanics, or Ag. Business Management.
- 2.3 This sequence works fine for the student interested in Plant or Animal Science, ABM, OH, Forestry, etc. However, if this sequence were followed for the Ag Mechanics student, he / she would not receive instruction in Ag Mechanics until their 3rd and 4th year in the program. To get around this problem it is

recommended that those students interested in Ag Mechanics have the option to take Ag Mechanics all four years (See Section 2, "Sequenced Units").

- 2.4 The Ag Mechanics student has two options. The first option allows students to take the two year Basic Core and then take the Ag Mechanics Advanced Cluster in years 3 & 4 (Ag. Mechanics Advanced Cluster - Traditional Ag. Program). The second option is for the student who is serious about specializing in Ag Mechanics. Instead of the traditional Basic Core, students would take the Ag Mechanics Advanced Cluster along with a series of units called "Common Core Curriculum" during years 1 & 2 (Ag. Mechanics Core I & II). This would allow the student to "specialize" in an area of Ag Mechanics during the 3rd & 4th years.
- 2.5 Realizing that certain units from the "Basic Core Curriculum" are essential for all Ag students to learn (ie. Record Keeping, CA Agriculture, Leadership, SOE's etc.), the proposed options have included them as well.
(The "Common Core Curriculum" includes instruction on topics that are considered essential for all Ag students.)

**Agricultural Mechanics
Course Outline (Grades 11 & 12)
Traditional Ag. Program**

****NOTE** - This course outline is recommended for students who have completed the Ag. Core I & II during their Freshman and Sophomore years.

Agricultural Mechanics (Grade 11)

<u>CODE</u>	<u>UNIT TITLE</u>	<u>HOURS</u>	<u>YEAR TAUGHT</u>
CLF2100	Tool Use & Maintenance & Shop Safety	35	3
CLF2200	Fasteners	5	3
CLF2600	Rope Work	5	3
CLF2150	Measurement	10	3
CLF2400	Woodworking	15	3
CLF2350	Metal Working	16	3
CLF2850	Types of Engines	25	3
CLF2750	Use of Manuals	2	3
CLF2150	Measurement	10	3
CLF2800	Equipment Operation & Maintenance	12	3
CLF2900	Work & Power	20	3
	Local Enrichment / Projects**	25	3
	TOTAL	180	3

Agricultural Mechanics (Grade 12)

<u>CODE</u>	<u>UNIT TITLE</u>	<u>HOURS</u>	<u>YEAR TAUGHT</u>
CLF2500	Concrete / Masonry	15	4
CLF2550	Plumbing	10	4
CLF2650	Electricity	15	4
CLF2700	Surveying	10	4
CLF2450	Project Design	5	4
CLF2300	Arc Welding	35	4
CLF2250	Oxyacetylene Welding	35	4
	Local Enrichment / Projects **	55	4
	TOTAL	180	4

****NOTE:** It is suggested that local enrichment, or project time be used to reinforce the lessons learned in each unit. This implies that each unit should have a planned project for the students to complete.

Developed by the Agricultural Mechanics Curriculum Committee, November, 1994

**Agricultural Mechanics
Course Outline (Grades 11 & 12)
With Small Engines Course Separate**

****NOTE** - This sequence of units is recommended for students who have completed the Ag. Core I & II during their Freshman and Sophomore years.

Agricultural Mechanics (Grade 11)

CODE	UNIT TITLE	HOURS	YEAR TAUGHT
CLF2100	Tool Use & Maintenance & Shop Safety	40	3
CLF2200	Fasteners	10	3
CLF2600	Rope Work	5	3
CLF2150	Measurement	5	3
CLF2400	Wood Working	25	3
CLF2350	Metal Working	25	3
CLF2550	Plumbing	15	3
CLF2650	Electricity	15	3
	Local Enrichment / Projects**	40	3
	TOTAL	180	3

Agricultural Mechanics (Grade 12)

CODE	UNIT TITLE	HOURS	YEAR TAUGHT
CLF2150	Measurement	10	4
CLF2300	Arc Welding	45	4
CLF2250	Oxyacetylene Welding	45	4
CLF2450	Project Design	15	4
	Local Enrichment / Projects**	65	4
	TOTAL	180	4

****NOTE:** It is suggested that local enrichment, or project time be used to reinforce the lessons learned in each unit. This implies that each unit should have a planned project for the students to complete.

Small Engines (Grade 11 or 12)

<u>CODE</u>	<u>UNIT TITLE</u>	<u>HOURS</u>	<u>YEAR TAUGHT</u>
CLF2750	Use of Manuals	5	3 or 4
CLF2150	Measurement	10	3 or 4
CLF2850	Types of Engines	25	3 or 4
CLF2800	Equipment Operation & Maintenance	15	3 or 4
CLF2900	Work & Power	20	3 or 4
	TOTAL	90	3 or 4

Developed by the Agricultural Mechanics Curriculum Committee Field Test Sites, April, 1995.

Agricultural Mechanics Core I Course Outline (Grade 9)

****Note --** This course outline is recommended for students who wish to specialize in Agricultural Mechanics. The Agricultural Mechanics Core I & II courses incorporate the curriculum found in the Agricultural Mechanics Advanced Cluster and adds to it what is known as the "Common Core", or those units of instruction that are common to both the Ag. Core I & II and the Agricultural Mechanics Core I & II. Those units are:

- Agriculture and Society
- Agriculture Business Management
- Employability and Leadership Development

It is suggested that the following units be taught throughout the course.

<u>CODE</u>	<u>UNIT TITLE</u>	<u>HOURS</u>	<u>YEAR TAUGHT</u>
(CLF110)	Economy of California Agriculture	4	1
(CLF120)	Agriculture and Society	2	1
(CLF130)	Agriculture and California Resources	4	1
(CLF410)	Record Keeping	9	1
(CLF610)	Supervised Occupational Experience	4	1
(CLF710)	Job Search Resources	2	1
(CLF810)	Career Options	3	1
(CLF820)	Occupational Goals	2	1
(CLF510)	FFA Leadership Development	10	1
(CLF520)	Parliamentary Procedure	5	1
TOTAL		45	1

Agricultural Mechanics Units

<u>CODE</u>	<u>UNIT TITLE</u>	<u>HOURS</u>	<u>YEAR TAUGHT</u>
CLF2100	Tool Use & Maintenance & Shop Safety	35	1
CLF2200	Fasteners	5	1
CLF2150	Measurement	4	1
CLF2400	Wood Working	15	1
CLF2350	Metal Working	16	1
CLF2550	Plumbing	10	1
CLF2650	Electricity	15	1
Local Enrichment / Projects **		35	1
TOTAL		135	1

****NOTE:** It is suggested that local enrichment, or project time be used to reinforce the lessons learned in each unit. This implies that each unit should have a planned project for the students to complete.

Developed by the Agricultural Mechanics Curriculum Committee Field Test Sites, April, 1995

Agricultural Mechanics Core II Course Outline (Grade 10)

****Note --** This course outline is recommended for students who wish to specialize in Agricultural Mechanics. The Agricultural Mechanics Core I & II courses incorporate the curriculum found in the Agricultural Mechanics Advanced Cluster and adds to it what is known as the "Common Core", or those units of instruction that are common to both the Ag. Core I & II and the Agricultural Mechanics Core I & II. Those units are:

- Agriculture and Society
- Agriculture Business Management
- Employability and Leadership Development

It is suggested that the following units be taught throughout the course:

<u>CODE</u>	<u>UNIT TITLE</u>	<u>HOURS</u>	<u>YEAR TAUGHT</u>
(CLF130)	Agriculture and California Resources	1	2
(CLF410)	Record Keeping	6	2
(CLF610)	Supervised Occupational Experience	1	2
(CLF710)	Job Search Resources	7	2
(CLF720)	Applying for Jobs	4	2
(CLF730)	Interview Skills	4	2
(CLF530)	Communications	10	2
(CLF540)	Critical Thinking	3	2
TOTAL		36	2

Agricultural Mechanics Units

<u>CODE</u>	<u>UNIT TITLE</u>	<u>HOURS</u>	<u>YEAR TAUGHT</u>
CLF2150	Measurement (10 hrs)	10	2
CLF2300	Arc Welding (35 hrs)	35	2
CLF2250	Oxyacetylene Welding (35 hrs)	35	2
CLF2450	Project Design (5 hrs)	5	2
Local Enrichment / Projects**		59	2
TOTAL		144	2

****NOTE:** It is suggested that local enrichment, or project time be used to reinforce the lessons learned in each unit. This implies that each unit should have a planned project for the students to complete.

Developed by the Agricultural Mechanics Curriculum Committee Field Test Sites, April, 1995.

SECTION SIX

APPENDICES

Appendix A
Targeted Occupations

Agriculture Career Cluster Areas

Targeted Occupations

Curriculum Area: Agricultural Mechanics

- I. Entry Level: High School graduate in general can do
 1. General Laborer
 2. Driver - (With required licenses)
 3. Counter/Inventory Control Assistant
 4. Equipment Operator
 5. Basic Machine Operator
 6. Service Technician Trainee
 7. Small Gas Engine Equipment Mechanic
 8. Welder Helper

- II. Advanced Level: Tech Prep Completers preferred
 1. Millwright
 2. Computer Numerical Control (CNC) Operator
 3. Shop Foreperson
 4. Service Manager
 5. Field Representative
 6. Electrical Technician
 7. Equipment set-up Foreperson
 8. Welder (Certified)
 9. Contractor
 10. Mechanic

- III. Professional Level: Baccalaureate Degree Required
 1. Engineer
 2. Inspector
 3. Teacher, Agricultural Mechanics
 4. Agricultural Mechanics Business Owner/Operator
 5. Manager
 6. Regional Supervisor
 7. Plant Superintendent
 8. CEO
 9. Researcher/Developer
 10. Service Trainer/Consultant

AGRICULTURAL MECHANICS

Job Title	Entry Level	Technical Level	Professional Level
Agricultural Engineer			X
Agricultural Engineering Technician		X	
Agricultural Equipment Field Service Technician		X	
Agricultural Equipment Service Technician		X	
Agricultural Instructor			X
Agricultural Machine and Equipment Fabricator		X	
Agricultural Machinery and Equipment Parts Sales	X		
AGRICULTURAL MECHANICS BUS. OWNER			X
Agricultural Mechanics Business Manager			X
Agricultural Mechanics Business Supervisor		X	
Agricultural Mechanics Business Tenant/Operator			X
Agricultural Mechanics Business Worker	X		
Agricultural Mechanics Shop Supervisor		X	
Agricultural Mechanics Technical Writer		X	
Assembly Technician		X	
Automated Equipment Engine Technician		X	
Backhoe Operator	X		
BASIC MACHINE OPERATOR	X		
Carpenter, Apprentice	X		
CEO			X
COMPUTER NUMERICAL CONTROL OPER.		X	
Construction Technician		X	
CONSULTANT			X
CONTRACTOR		X	
Cooling and Freezing Equipment Operator/Tender	X		
COUNTER/INVENTORY CONTROL ASSISTANT	X		
Dairy Equipment Repairer		X	
Demonstrator/Promoter of Agricultural Machinery		X	
Diesel Mechanic		X	
Diesel Mechanic Apprentice	X		
Diesel Plant Operator		X	
DRIVER (WITH REQUIRED LICENSES)	X		
Electrical Equipment Mechanic		X	
ELECTRICAL TECHNICIAN		X	
Electronic Controls Maintenance Technician		X	
Endless-Track-Vehicle Mechanic		X	
ENGINEER			X
Equipment Fabricator		X	
EQUIPMENT OPERATOR	X		
Equipment Service Technician		X	
EQUIPMENT SET-UP FOREPERSON		X	
Evaporative Cooler Equipment Installer/Service		X	
Excavating, Loading Machine Operator		X	
Farm Equipment Mechanic Apprentice	X		
Farm Equipment Mechanic I, II		X	

Farm Equipment Operator	X		
Farm Equipment Salesperson		X	
Farm Safety Specialist			X
FIELD REP		X	
Fuel Injection Servicer		X	
Gas Engine Mechanic		X	
Gas Engine Operator	X		
GENERAL LABORER	X		
General Welder/Cutter		X	
Grader, Dozer, Scraper Operator		X	
Heating and Air-Conditioning Equipment Installer		X	
Heating, Air-Conditioning, Refrigeration Mechanic		X	
Heavy Equipment Operator		X	
Hydraulic Systems Technician		X	
Hydraulic/Pneumatic Engineer			X
INSPECTOR			X
Irrigation Engineer			X
Irrigation Equipment Manufacturer's Sales Rep			X
Irrigation Equipment Salesperson		X	
Irrigation System Designer			X
Land Surveyor			X
Liquid Fertilizer Servicer		X	
Log Truck Driver		X	
Logging Equipment Mechanic		X	
Machine Operator Tender	X		
Machinery Erector/Assembler		X	
Machinery Maintenance Mechanic		X	
Machinery Maintenance Worker	X		
Machinery Manufacturer			X
Machinery Manufacturer's Sales Rep			X
Machinery Operator	X		
Maintenance Carpenter		X	
Maintenance Electrician		X	
Maintenance Mechanic		X	
MANAGER			X
Manufacturer's Service Rep		X	
Material Moving Equipment Operator		X	
MECHANIC		X	
Mechanic's Helper	X		
Mechanical Engineer			X
Mechanics Assistant	X		
Metal Fabricator		X	
Milk Truck Driver	X		
Milling Machine Operator	X		
MILLWRIGHT		X	
Millwright Apprentice	X		
Mobile Heavy Equipment Mechanic		X	
Packing House Maintenance Technician		X	
Parts Business Office Manager		X	
Parts Business Receiving Clerk	X		

Parts Counter Salesperson		X	
Plant Operator		X	
PLANT SUPERINTENDENT			X
Power Plant Operator		X	
Power Saw Mechanic	X		
Quality Control Specialist			X
Refrigeration Mechanic		X	
Refrigeration Unit Repairer		X	
REGIONAL SUPERVISOR			X
Rental Equipment Maintenance Technician		X	
Research Mechanic		X	
RESEARCHER/DEVELOPER			X
Roasting, Baking Machine Operator/Tender	X		
SALESPERSON		X	
Service Engine Repairer		X	
SERVICE MANAGER		X	
SERVICE TECHNICIAN TRAINEE	X		
SERVICE TRAINER			X
Sheet Metal Worker	X		
SHOP FOREPERSON		X	
Shop Maintenance Worker	X		
Small Engine Specialist	X		
SMALL GAS ENGINE EQUIPMENT MECHANIC	X		
Sprinkler Irrigation Equipment Mechanic		X	
Stationary Engineer			X
Surveying Technician		X	
Surveyor Assistant	X		
Systems Analyst			X
Tank Truck Driver	X		
TEACHER, AGRICULTURAL MECHANICS			X
Tool and Equipment Rental Clerk	X		
Tractor Mechanic		X	
Tractor-Trailer Truck Driver		X	
Truck Driver	X		
Trucking Dispatcher	X		
Voc-Ed Teacher			X
Waste-Water Treatment Plant Operator		X	
Water Treatment Plant Attendant	X		
WELDER (CERTIFIED)		X	
WELDER HELPER	X		
Welder, Arc		X	
Welder, Gas		X	
Welder/Assembler		X	
Welders and Cutters		X	
Welding Technician		X	

Appendix B
Students Will be Able to...

to lead and follow

Professional-***

- All of the above
- Utilize statistical methods; Be able to analyze and interpret data from research and draw inferences from charts, tables, and graphs that illustrate data from real-world situations
- Design and develop experimental tasks
- Use experimental or theoretical probability as appropriate, to represent and solve problems involving uncertainty
- Have ability to retrieve, sequence, package and present information
evaluate personnel matters
- Possess and exhibit leadership skills
- Have basic oral communication skills in a second language

Entry level** jobs are those at the lowest level of responsibility and these workers generally work under the supervision of another. A high school diploma is usually required for employment, but that requirement is often waived if the applicant has sufficient experience. *Technical level** employees usually work in an occupation involving mid-level responsibility and decision making is nearly always a part of it. These occupations usually require an associate of arts/science degree or certificate/license providing evidence of two or more years of specialized training. *****Professional level** occupations normally require a baccalaureate or higher college degree. Some of these occupations may also require certification or licensure. These employees perform very complex tasks and serve in positions that require the responsibility for successful management of departments, enterprises, programs or projects.

Appendix C
Pathway Grids
for all
Agricultural Pathways

AGRICULTURAL EDUCATION TECH PREP
Career Pathways Core Lists

Career Pathway

A List

B List

Agricultural Business

Ag Business 1

Ag Business 2

Agricultural Mechanics

Ag Mechanics 3

Ag Mechanics 4

*Power & Machinery
 or Metal Fabrication
 or Ag Structures*

*Power & Machinery
 or Metal Fabrication
 or Ag Structures*

Animal Science

Animal Science 1

Animal Science 2

Forestry &
 Natural Resources

Nat. Resources 1

Forestry

Nat. Resources 1

Nat. Resources 2

Ornamental Horticulture

Ornamental Hort.1
Nursery Industry

Ornamental Hort.2
*Landscape Industry
 or Florist Industry*

Plant Science

Plant Science 1

Plant Science 2

Technical Elective C List

Ag Mechanics 1 or 2

Ag Mechanics 3 or 4

Power & Machinery

Metal Fabrication

Ag Structures

Ag Business or Ag Computers

Typing/Keyboarding

Ornamental Horticulture

Wildlife Production

Other Technical Courses related to the Career Pathway but not Agriculture:

ie. Industrial Technology

Business or Computers

Foreign Language

Drafting or Mechanical Drawing

Environmental Studies

This list is to be used in advising students using the generic Tech Prep Grids.

WORKPLACE LEARNING AND TECH PREP

Workplace learning is an integral part of all Tech Prep Programs in Agriculture. As such, the specific Tech Prep Grid allows for time in the school day for these activities in the Senior year. The remaining grids offer options that allow a student to be involved in Tech Prep and meet other personal and educational objectives. For these students, there may not be sufficient time within the school day to be involved with Workplace Learning. In both of these cases, workplace learning could occur after the school day is finished, on weekends, during vacations, and summer breaks.

Workplace learning begins in the Freshman year with Supervised Practical Experience opportunities which is also a requirement of Ag Tech Prep. These are often entrepreneurial enterprises and usually continue throughout High School. Paid Work Experience SPE usually commences during the Junior year and continues through college. This procedure is outlined in the Workplace Learning Guide, "Learning to Work - Working to Learn."

Appendix D
Agricultural
Mechanics
Grids
(Secondary)

TECH PREP AGRICULTURE CURRICULUM AGRICULTURAL MECHANICS

TECH PREP

Secondary Curriculum

SUBJECT	Freshman	Sophomore	Junior	Senior
Technical Core	Ag Mechanics 1	Ag Mechanics 2	Ag Mechanics 3 Power & Machinery or Metal Fabrications or Ag Structures	Ag Mechanics 4 Power & Machinery or Metal Fabrications or Ag Structures
Technical Elective	Agriculture 1 Core	Agriculture 2 Core	*Tech Prep Elective C List	*Tech Prep Elective C List
Math	Applied Math 1 (Algebra 1)	Applied Math 2 (Geometry)	Applied Math 3 (Algebra 2 Trigonometry)	Work Place Learning
Science	Applied Biology	Applied Biology or Chemistry	Applied Physics 1	Applied Physics 2
Communica- tions	English 1	English 2 Applied Communications	English 3 Applied Communications	English 4 Applied Communications
Social Science	Social Studies	World History	U.S. History	Government Economics
P.E. Humanities	Physical Education	Physical Education	Fine Arts **	Work Place Learning

SECONDARY TECH PREP SEQUENCE FOR SELECTED CAREER PATHWAY.

*Tech Prep Electives Possible only with 7 period day.

**Fine Art credit may be awarded for certain Ag courses.

UC/CSUC acceptance of Applied Academics courses for Math, English, Biology, and Physics will determine student eligibility for admission.

Depending on how closely the High School follows the Appropriate Curriculum, college credit may be awarded to successful completers.

TECH PREP AGRICULTURE CURRICULUM AGRICULTURAL MECHANICS

Traditional Agriculture

Secondary Curriculum

SUBJECT	Freshman	Sophomore	Junior	Senior
Technical Core	Ag Mechanics 1	Ag Mechanics 2	Ag Mechanics 3 Power & Machinery or Metal Fabrications or Ag Structures	Ag Mechanics 4 Power & Machinery or Metal Fabrications or Ag Structures
Technical Elective	*Agriculture 1 Core	*Agriculture 2 Core or Ag Biology	*Tech Prep Elective C List	*Tech Prep Elective C List
Math Humanities	Algebra A Math 1 (Algebra 1)	Algebra B Math 2 (Geometry)	Fine Arts **	
Physical Science	Physical Science	*	*	*
Communica- tions	English 1	English 2	English 3	English 4
Social Science	Social Studies	World History	U.S. History	Government Economics
P.E.	Physical Education	Physical Education		

SECONDARY TECH PREP SEQUENCE FOR SELECTED CAREER PATHWAY. Minimum High School Graduation Requirements

* Additional Technical Elective Course possible with 7 period day (C List)

**Fine Art Credit may be granted for certain Ag Courses

Ag Biology Accepted, allows for local graduations requirements differences

TECH PREP AGRICULTURE CURRICULUM AGRICULTURAL MECHANICS

Ag Science Option

Secondary Curriculum

SUBJECT	Freshman	Sophomore	Junior	Senior
Technical Core	Ag Mechanics 1	Ag Mechanics 2	Ag Mechanics 3 Power & Machinery or Metal Fabrications or Ag Structures	Ag Mechanics 4 Power & Machinery or Metal Fabrications or Ag Structures
Ag Mechanics Option	*Agriculture 1 Core	*Agriculture 2 Core or Ag Biology	*	*
Math Humanities	Math 1 (Algebra 1)	Math 2 (Geometry)	Math 3 (Algebra 2 Trigonometry)	Fine Arts ** _____
Science	*	*	Chemistry	*
Communica- tions	English 1	English 2	English 3	English 4
Social Science	Social Studies	World History	U.S. History	Government Economics
P.E. Foreign Language	Physical Education	Physical Education	Foreign Language	Foreign Language

SECONDARY TECH PREP SEQUENCE FOR SELECTED CAREER PATHWAY.

* With 7 period schedule, additional technical core courses possible (C List)

**Fine Art Credit may be awarded for certain ag courses

SCIENCE CREDIT FOR AG BIOLOGY EXPECTED

FULFILLS REQUIREMENTS FOR UC/CSUC ADMISSION FROM H.S. with Ag Biology Credit.

TECH PREP AGRICULTURE CURRICULUM AGRICULTURAL MECHANICS

College Prep/Tech Prep

Secondary Curriculum

SUBJECT	Freshman	Sophomore	Junior	Senior
Technical Core	Ag Mechanics 1	Ag Mechanics 2	Ag Mechanics 3 Power & Machinery or Metal Fabrications or Ag Structures	Ag Mechanics 4 Power & Machinery or Metal Fabrications or Ag Structures
Technical Elective	*Agriculture 1 Core	*Agriculture 2 Core or Ag Biology *	*	Tech Prep Elective C List
Math Humanities	Math 1 (Algebra 1)	Math 2 (Geometry)	Math 3 (Algebra 2 Trigonometry)	Fine Arts ** <hr style="width: 10%; margin: 0 auto;"/>
Science	*	Biology	Chemistry	*
Communica- tions	English 1	English 2	English 3	English 4
Social Science	Social Studies	World History	U.S. History	Government Economics
P.E. Foreign Language	Physical Education	Physical Education	Foreign Language	Foreign Language

SECONDARY TECH PREP SEQUENCE FOR SELECTED CAREER PATHWAY.

* With 7 period schedule, additional technical core courses possible (C List)

**Fine Art Credit may be awarded for certain ag courses

FULFILLS REQUIREMENTS FOR UC/CSUC ADMISSION FROM H.S.

TECH PREP AGRICULTURE CURRICULUM AGRICULTURAL MECHANICS

College Tech Prep/Sports

Secondary Curriculum

SUBJECT	Freshman	Sophomore	Junior	Senior
Technical Core	Ag Mechanics 1	Ag Mechanics 2	Ag Mechanics 3 Power & Machinery or Metal Fabrications or Ag Structures	Ag Mechanics 4 Power & Machinery or Metal Fabrications or Ag Structures
Additional Technical Electives	*Agriculture 1 Core	*Agriculture 2 Core or Ag Biology *	*	*
Math/ Physical Science	Math 1 (Algebra 1)	Math 2 (Geometry)	Math 3 (Algebra 2 Trigonometry)	Chemistry
Foreign Language/ Humanities	*	Foreign Language	Foreign Language	Fine Arts ** <hr style="width: 10%; margin-left: auto; margin-right: 0;"/>
Communications	English 1	English 2	English 3	English 4
Social Science	Social Studies	World History	U.S. History	Government Economics
P.E.	Physical Education	Physical Education	Physical Education	Physical Education

SECONDARY TECH PREP SEQUENCE FOR SELECTED CAREER PATHWAY.

* With 7 period schedule, additional technical core courses possible (C List)

**Fine Art Credit may be awarded for certain ag courses

FULFILLS REQUIREMENTS FOR UC/CSUC ADMISSION FROM H.S. with Ag Biology Credit

Sports Option

Appendix E
Agricultural Mechanics Grids
(Community College)

TECH PREP AGRICULTURE CURRICULUM

AGRICULTURAL SALES AND SERVICE TECHNICIAN CERTIFICATE

AMT *Community College Curriculum*

SUBJECT	<i>Freshman 1st Semester</i>	<i>Freshman 2nd Semester</i>	<i>Sophomore 1st Semester</i>	<i>Sophomore 2nd Semester</i>
Technical Core	AG 315 * Intro to Agriculture Guidance	Ag-M 210 * Agricultural Mechanics	AG 240 * Farm Power	AGM 380 * Ag Fluid Power or INDED 362 * Hydraulics/ Pneumatics
Technical Core	AG-M 200 Basic Mechanics - Ag	Ag-M 215 * Farm Tractors	*Career Path Core see listing core options	*Career Path Core see listing core options
Technical Core			Other Non-Ag Support Course * See listing Core options	Other Non-Ag Support Course * See listing Core options
Technical Core	OH 210 * Introduction to Ornamental Horticulture	OH 276 * Park & Landscape Management		
General Education	GE Activities _____	GE Natural Science _____	GE Social Science _____	GE Humanities _____
General Education	English Comp _____	GE Activities _____	Health Education _____	Communications Analytical Thinking _____
Work-Place Learning	Work Experience Minimum 6	Work Experience	Work Experience	Work Experience

*Specific Technician Certificate Requirements

Minimum competency must be demonstrated in Reading, Written Expression, Mathematics as referred to in the Specific Graduation Requirements.

Successful completion of additional courses for the Intersegmental General Education Transfer Core Curriculum will GE Certify the lower division B.S. requirement for U.C. and C.S.U.C.

Successful completion of additional courses for the C.S.U.C. Transfer Core Curriculum will GE Certify the lower division B.S. Requirement for C.S.U.C.

Minimum 62 units completion for the Associate in Science (A.S.) Degree (30 units must be Agriculture)

TECH PREP AGRICULTURE CURRICULUM

ASSOCIATE DEGREE/CSU TRANSFER PATTERN

AS/CSU *Community College Curriculum*

SUBJECT	<i>Freshman 1st Semester</i>	<i>Freshman 2nd Semester</i>	<i>Sophomore 1st Semester</i>	<i>Sophomore 2nd Semester</i>
Technical Core	AG 315 Intro to Agriculture	Career Path Core Option _____	Career Path Core Option _____	Career Path Core Option _____
Technical Core	Career Path Core Option _____	Career Path Core Option _____	Career Path Core Option _____	Career Path Core Option _____
Technical Core Elective	Career Path Core Option _____	Career Path Core Option _____	Elective _____	
General Education	English Comp _____	Communications Analytical Thinking _____	GE Humanities _____	Elective _____
General Education	Guidance _____	GE Activities _____	GE Activities _____	Elective _____
General Education	GE Health Education _____	GE Math _____	GE Natural Science _____	GE Social Science _____
Work-Place Learning	Work Experience Minimum 6	Work Experience	Work Experience	Work Experience

Minimum competency must be demonstrated in Reading, Written Expression, Mathematics as referred to in the Specific Graduation Requirements.

Successful completion of additional courses for the Intersegmental General Education Transfer Core Curriculum will GE Certify the lower division B.S. requirement for U.C. and C.S.U.C.

Successful completion of additional courses for the C.S.U.C. Transfer Core Curriculum will GE Certify the lower division B.S. Requirement for C.S.U.C.

Minimum 62 units completion for the Associate in Science (A.S.) Degree (30 units must be Agriculture)

Appendix F
*California Agriculture Model
Curriculum Instructional
Materials order forms*

Agriculture Learning Activities Packets

The University of California, Davis is pleased to offer a diverse group of Learning Activity Packets (LAPS) for individualized instruction. These packets include student and teacher manuals. Most packets are available in Spanish and/or English, and are sold separately. The LAPS are written at a low reading level (4th to 5th grade) and are particularly good for sheltered agriculture courses, junior high school, and students who are learning handicapped.

Items	Quantity in English	Quantity in Spanish	Unit Price	Total Amount
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EXPLORING ANIMALS

Sheep			\$20.00	
Wildlife			\$15.00	
Poultry			\$20.00	
Animal Science			\$20.00	
Small Animal			\$15.00	
Dairy Cattle			\$15.00	
Beef			\$20.00	
Swine			\$15.00	
Horses			\$15.00	

EXPLORING PLANTS

Vegetable Crops			\$20.00	
Field Crops			\$20.00	
Ornamental Horticulture			\$20.00	
Tree Crops			\$20.00	
Plant Science			\$20.00	
Forestry			\$20.00	

OTHER SUBJECTS

Agriculture and Society				
Careers in Agriculture				
FFA				
Supervised Occupational Experience				
			Subtotal from Page 2	
			Subtotal from Page 1	
			TOTAL OF ORDER	

Send completed order form, along with school purchase order or check. (Make checks payable to The Regents of the University of California.) Mail completed order to:

Agriculture Model Curriculum Project
 Agricultural Education Program
 Dept. of Agronomy and Range Science
 University of California
 Davis, CA. 95616

Curriculum Office (916) 752-8002
 Eric Zilbert (916) 752-1808
 FAX (916) 752-4361

ALLOW FOR 2 WEEKS DELIVERY

Model Curriculum Order Form

Name:	School:
School District:	Phone:
Address:	
City:	State: Zip:

Items	Disk Version Price	Disk Types Avail	Specify Disk Type *	Disk Qty Wanted	Printed Version Price	Printed Qty Wanted	Total Amt.
Agriculture Model Curriculum Guide					\$15.00		

LESSON PLANS

Basic Core (9th & 10th grades)	\$30.00	DOS or Mac			\$80.00		
First Year Basic Core Lab Manual					\$10.00		

ADVANCED CLUSTERS

ANIMAL SCIENCE	\$30.00	DOS or Mac			\$60.00		
Plant & soil Science	\$30.00	DOS or Mac			\$60.00		
Ag Mechanics	\$30.00	DOS or Mac			\$60.00		
Agricultural Mechanics	\$30.00	DOS or Mac			\$60.00		
Agricultural Business Management	\$30.00	DOS or Mac			\$60.00		
Integrated Agriculture Biology Syllabus & Resource Materials					\$60.00		
Forestry (1985ed.)					\$80.00		
Natural Resources & Rural Recreation					\$80.00		

OTHER MATERIALS

Animal Health Core Curriculum					\$80.00		
International Infusion Packet					\$15.00		
California Vocational Agriculture Record Book Manual					\$ 7.00		
California vocational Agriculture Record Book Problems					\$ 7.00		
					* \$		

* Subtotal (shipping included: sales tax not required)
Please carry subtotal to back page.

Appendix G
Tech Prep Curriculum
Order Form

Central Valley Consortium Agriculture Education Tech Prep Order Form

ITEM	UNIT COST	QUANTITY REQUESTED	TOTAL
A Project Overview	\$3.00		
Advisory Committee Manual	\$3.00		
Articulation Guide	\$3.00		
<i>Choose Agriculture and Win</i> A Recruitment Guide	\$3.00		
Counseling and Guidance Guide	\$3.00		
Curriculum Guides (Supplements to the State Frameworks)			
Agribusiness	\$3.00		
Agricultural Mechanics	\$3.00		
Animal Science	\$3.00		
Forestry & Natural Resources	\$3.00		
Ornamental Horticulture	\$3.00		
Plant & Soil Science	\$3.00		
<i>Getting a Job and Keeping It</i> A Placement Guide	\$5.00		
Integration of Academics Guide	\$5.00		
<i>Learning to Work -- Working to Learn</i> A Workplace Learning Guide	\$3.00		
Portfolio Guidelines for Grade 13-14	\$3.00		
Program Assessment and Certification Guide	\$3.00		
<i>Special Needs Not Different People</i> A Special Needs Populations Guide	\$3.00		
Student Tracking and Follow-up Guide	\$3.00		
Targeted Occupations in Agriculture Guide	\$3.00		
The Role of Student Assessment in Tech Prep	\$3.00		
TOTAL (Prices Include Tax & Shipping)			
<p style="text-align: center;"><u>Make Checks or Purchase Order Payable to:</u></p> <p style="text-align: center;">Stanislaus County Office of Education Agriculture Education Tech Prep 801 County Center III Court Modesto, CA 95355 For Information: (209) 525-5020</p>		<p style="text-align: center;">Ship to:</p> <p>School: _____</p> <p>Attention: _____</p> <p>Street: _____</p> <p>City: _____</p> <p>State: _____</p> <p>Zip: _____</p> <p>Phone: _____</p> <p>Your Purchase Order#: _____</p>	
MATERIALS MAY NOT BE DUPLICATED FOR COMMERCIAL PURPOSES			

