Arkansas CTE

Agricultural Mechanics: Grades 10, 11, 12

Adopted 2007

Introduction to Agricultural Mechanics

1.1 Define terminology

1. Prepare a list of terms with definitions 1.1.1

1.2 Examine the importance of agricultural mechanics

1. Use reference materials to locate information on agricultural mechanics 1.2.1
2. Investigate and assess emerging agricultural technology and give an oral report in class 1.2.2

1.3 Identify careers in agricultural mechanics

1. Research a career in agricultural mechanics to determine educational requirements, working conditions, and salary 1.3.1

1.4 Identify appropriate FFA activities and supervised experiences in agricultural mechanics

1. List FFA activities available in agricultural mechanics 1.4.1
2. Plan and/or expand supervised experiences in agricultural mechanics 1.4.2
3. Keep records on FFA and supervised experience participation 1.4.3

Safety with Agricultural Electricity

2.1 Define terminology

1. Prepare a list of terms with definitions 2.1.1

2.2 Discuss the meaning and importance of safety in agricultural mechanics work

1. Name examples of accidents and their causes that have occurred in the local community 2.2.1
2. Identify the most frequent causes of accidents in an agricultural mechanics lab 2.2.2

2.3 Identify practices that promote safety and minimize hazards in agricultural mechanics

1. List precautions that may be taken to prevent accidents in the lab 2.3.1
2. Develop a safety plan for your school's agricultural mechanics lab 2.3.2
3. Identify safety colors associated with the agricultural mechanics lab 2.3.3

2.4 Describe conditions for fire combustion and control

1. Identify the meaning and use of a fire triangle 2.4.1
2. Explain how fire extinguishers are classified 2.4.2
3. extinguisher 2.4.3

2.5 Describe appropriate responses to accidents

1. Identify procedures with emergencies 2.5.1
2. Demonstrate basic first aid treatment for minor injuries 2.5.2

2.6 Describe the importance of personal safety

1. Identify personal protective equipment (PPE) and demonstrate the appropriate use of each in agricultural mechanics 2.6.1
2. Interpret posted safety and work regulations 2.6.2

Arc Welding in Agriculture

3.1 Define terminology

1. Prepare a list of terms with definitions 3.1.1

3.2 Describe the shielded arc welding process

1. Identify the components of the shielded metal arc welding process 3.2.1
2. Assess the quality of weld samples 3.2.2
3. Relate the welding process to different kinds and shapes of metals 3.2.3

3.3 Distinguish kinds and parts of metal arc welding equipment and supplies

1. List differences in AC and DC welders 3.3.1
2. List the major parts of shielded arc welders 3.3.2
3. Identify and compare electrodes by use and metal to be welded 3.3.3

3.4 Describe fire prevention and personal protection in welding

1. Identify fire protection equipment 3.4.1
2. Identify and properly use personal protection equipment in arc welding 3.4.2
3. List the practices to follow to prevent accidents 3.4.3
4. List the actions to take in case of an accidental injury 3.4.4
5. Identify proper methods of handling hot metal 3.4.5

3.5 Describe the process of striking an arc and running a bead

1. Demonstrate the ability to strike an arc following all safety procedures and appropriate techniques 3.5.1
2. Demonstrate the ability to run a simple bead on mild steel 3.5.2
3. Demonstrate the four basic welding positions 3.5.3
4. Demonstrate welding joints 3.5.4

Oxyacetylene Welding and Cutting in Agriculture

4.1 Define terminology

1. Prepare a list of terms with definitions 4.1.1

4.2 Describe the oxyacetylene welding and cutting processes in agriculture

1. Identify uses of oxyacetylene welding and cutting in agriculture 4.2.1
2. Relate welding and cutting processes to different kinds of metal 4.2.2

4.3 Distinguish parts and functions of oxyacetylene welding and cutting equipment and supplies

1. Label the major parts of oxyacetylene welding and cutting equipment 4.3.1
2. Distinguish between welding and cutting components of oxyacetylene equipment 4.3.2
3. Identify, compare, and select filler rods by type and by metal to be welded 4.3.3

4.4 Describe safe practices in oxyacetylene welding and cutting

1. Identify potential fire hazards with oxyacetylene welding and cutting 4.4.1
2. Identify and properly use personal protective equipment when using oxyacetylene equipment 4.4.2
3. List practices to follow to prevent accidental injury 4.4.3
4. List actions to take in case of an accident 4.4.4
5. Identify proper techniques of handling hot metal 4.4.5
6. Identify practices to follow in safely storing and using compressed gas 4.4.6

4.5 Describe the process of using oxyacetylene welding and cutting equipment

1. Demonstrate the ability to setup, turn oxygen and acetylene on, and properly adjust valves 4.5.1
2. Demonstrate the ability to light and adjust torches to gain carbonizing, neutral, and oxidizing flames 4.5.2
3. Demonstrate the ability to fuse mild steel with and without a filler rod 4.5.3
4. Demonstrate the ability to cut mild steel using a cutting torch 4.5.4

Metal Technology

5.1 Define terminology

1. Prepare a list of terms with definitions 5.1.1

5.2 Describe cold metal and sheet metal processes in agriculture

1. Identify uses of cold metal and sheet metal work 5.2.1
2. Relate cold metal and sheet metal work to different kinds of metal 5.2.2

5.3 Discuss skills and processes used in cold metal and sheet metal work

1. Identify and safely use tools in cold metal and sheet metal work 5.3.1
2. Demonstrate measuring and marking metal materials 5.3.2
3. Demonstrate cutting metal materials 5.3.3
4. Demonstrate skills in bending and shaping metal 5.3.4
5. Demonstrate how to tap a hole in flat mild steel 5.3.5
6. Demonstrate skills to maintain tools and/or construct a simple project 5.3.6

5.4 Describe fire prevention and personal protection with cold metal and sheet metal work

1. Identify fire protection equipment 5.4.1
2. Identify and properly use personal protective equipment 5.4.2
3. List the practices to follow to prevent accidents 5.4.3
4. List the actions to take in case of an accident 5.4.4

Small Engines

6.1 Define terminology

1. Prepare a list of terms with definitions 6.1.1

6.2 Describe the role and importance of small engines

1. List uses of small gas engines in agriculture and horticulture 6.2.1
2. Indicate impact of using small engines on the environment 6.2.2

6.3 Describe the kinds and sizes of small engines

1. Distinguish between two-stroke and four-stroke cycle engines 6.3.1
2. Identify the major parts of an engine and describe the functions of the parts 6.3.2

6.4 Describe preventative maintenance (service) of small engines

1. Match tools used in working on small gas engines with their functions 6.4.1
2. Practice safety in using and servicing small engines, including the use of personal protective equipment and disposal of wastes from engines 6.4.2
3. Service the air filtration system on a small engine 6.4.3
4. Service the lubrication system on a small engine 6.4.4
5. Service the ignition and fuel systems on a small engine 6.4.5

Agricultural Graphics

7.1 Define terminology

1. Prepare a list of terms with definitions 7.1.1

7.2 Discuss the meaning and application of agricultural graphics

1. Explain how sketches and drawings provide a representation of a project or item 7.2.1
2. Identify the importance of sketching and drawing in agricultural mechanics 7.2.2
3. Indicate how sketches and drawings may be used in construction 7.2.3

7.3 Describe how a drawing is made

1. Identify tools used in sketching and drawing and how the tools are used 7.3.1
2. Identify the elements of a plan 7.3.2
3. Demonstrate the correct use of an architect's scale 7.3.3
4. Create a sheet layout and title block 7.3.4
5. Construct orthographic, isometric, and oblique drawings 7.3.5

Hand and Power Tool Use and Maintenance

8.1 Define terminology

1. Prepare a list of terms with definitions 8.1.1

8.2 Discuss hand and power tools in agricultural mechanics

1. Identify common hand and power tools 8.2.1
2. Practice safety when using hand and power tools, including the use of personal protective equipment 8.2.2
3. Demonstrate the proper use of common hand and power tools 8.2.3

8.3 Describe the meaning and practice of tool fitting and their functions

1. Identify tool conditions where fitting skills are needed 8.3.1
2. Sharpen a cold chisel, twist drill, lawn mower blade, or other cutting tool 8.3.2

Plumbing

9.1 Define terminology

1. Prepare a list of terms with definitions 9.1.1

9.2 Explain the meaning and importance of plumbing skills

1. Identify common plumbing applications used in agriculture, including water supply and wastewater management 9.2.1
2. List common practices in maintaining water systems 9.2.2

9.3 Describe common plumbing practices

1. Identify tools used in plumbing and state their functions 9.3.1
2. Identify common materials used in plumbing, including pipe/tubing and fittings 9.3.2
3. Demonstrate the process of measuring, cutting and joining plastic pipe 9.3.3
4. Demonstrate measuring, cutting, and sweating copper tubing 9.3.4
5. Practice safety when performing plumbing jobs, including the use of personal protective equipment 9.3.5

Woodworking

10.1 Define terminology

1. Prepare a list of terms with definitions 10.1.1

10.2 Discuss the use and importance of woodworking in agriculture

1. Identify common structures made of wood 10.2.1
2. List advantages and disadvantages of wood in agriculture 10.2.2

10.3 Describe the kinds and uses of wood materials and fasteners

1. Identify common kinds and dimensions of wood materials, including lumber and plywood 10.3.1
2. Identify common kinds and sizes of fasteners used in woodworking 10.3.2

10.4 Discuss and apply practices in working with wood in construction

1. Identify common tools used in working with wood 10.4.1
2. Demonstrate how tools are properly used in woodworking 10.4.2
3. Follow safe practices in woodworking, including the use of personal protective equipment 10.4.3
4. Demonstrate the use of a claw hammer with fasteners 10.4.4
5. Demonstrate measuring and marking wood materials 10.4.5
6. Demonstrate the use of crosscut and rip saws in cutting wood materials 10.4.6

Electricity in Agriculture

11.1 Define terminology

1. Prepare a list of terms with definitions 11.1.1

11.2 Describe the meaning and nature of electricity

1. Identify the principles of electricity, including amperes, volts, watts, and circuits 11.2.1
2. Explain the role of magnetism in electricity 11.2.2
3. Distinguish the roles of conductors and insulators, including the kinds of materials used for each 11.2.3
4. List and explain important practices in the safe use of electricity, including the use of a ground-fault circuit interrupter (GFCI) 11.2.4

11.3 Discuss the importance of electricity in agriculture

1. Identify farm and non-farm uses of electricity 11.3.1
2. Identify practices to assure uninterrupted electrical service 11.3.2

11.4 Describe important electrical wiring practices in agriculture

1. Discuss the importance and meaning of the National Electrical Code® 11.4.1
2. Identify common materials used in electrical wiring 11.4.2
3. Identify common tools used in electrical wiring work and demonstrate their proper use 11.4.3
4. Demonstrate measuring and cutting electrical wire 11.4.4
5. Demonstrate splicing wire 11.4.5
6. Demonstrate installing a switch, outlet, or light 11.4.6

Concrete and Masonry

12.1 Define terminology

1. Prepare a list of terms with definitions 12.1.1

12.2 Discuss the meaning and importance of concrete and masonry

1. Identify the meaning of concrete and masonry 12.2.1
2. List uses of concrete and masonry in agriculture and horticulture 12.2.2
3. Calculate measurements of concrete and masonry units 12.2.3

12.3 Describe the mixing, placement, and curing of concrete

1. Identify tools used in concrete work 12.3.1
2. List ingredients and proportions used in making concrete 12.3.2
3. Prepare forms for placing concrete 12.3.3
4. Identify the importance of reinforcement, including wire, rods, and fiberglass 12.3.4
5. Indicate the importance and procedures used to finish concrete 12.3.5
6. Indicate appropriate curing practices for concrete 12.3.6
7. Identify appropriate safety practices in concrete work 12.3.7

12.4 Describe the use and placement of masonry units

1. Identify the tools used in concrete masonry work 12.4.1
2. List kinds and sizes of masonry units 12.4.2
3. List ingredients used in mortar 12.4.3
4. Identify procedures in laying masonry units 12.4.4

Surveying

13.1 Define terminology

1. Prepare a list of terms with definitions 13.1.1

13.2 Discuss the meaning and importance of surveying in agriculture

1. List and explain important kinds of surveying, including land and structural 13.2.1
2. Identify uses of surveying in agriculture and horticulture 13.2.2
3. Describe the nature of survey work 13.2.3

13.3 Discuss practices used in surveying

1. Identify equipment used in survey work, including remote sensing and global positioning systems 13.3.1
2. Explain the meaning and use of field notes 13.3.2
3. Explain the measurements used with land, including linear, direction, elevation, and area measurements 13.3.3
4. Set up and use equipment for differential leveling 13.3.4