



Correlation of Agricultural Mechanics and Technology Systems, by Hancock, Edgar, Pate, Dyer, and Hoover (Goodheart-Willcox Publisher ©2017) to

Precision Exams Agricultural Systems and Technology II (113) Standards

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The correlation chart below lists the Standards, Objectives, and Indicators for the Agricultural Systems and Technology II (113) exam in the left column. Corresponding content from *Agricultural Mechanics and Technology Systems* that can be used by a student to help achieve the standard, objective, or indicator is listed in the right column.

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	Objective		Page Numbers
STANDARD 1			11% of Exam Blueprint
Develop personal, leadership, and career skills through FFA participation.			
Objective 1 Assess the role of FFA participation in developing personal and leadership skills.			
1.	Identify important personal skills and the strategies to use in developing skills.	Job	Skills 23–24, Making
		a G	ood Impression 33–34,
		Mai	intaining Employment
		37–	38
2.	Identify important leadership skills and the role of FFA participation in developing	Nat	ional FFA
	the skills.	Org	anization 45–48
Objective 2	Assess the role of FFA participation in developing career skills.		
1.	List and describe proficiency awards appropriate in agricultural systems and	Nat	ional FFA
	technology.	Org	anization 45–48, SAE
		Rec	ordkeeping 58–59

	Objective	Page Numbers
2.	List and describe career development events appropriate in agricultural systems and	Supervised Agricultural
	technology.	Experiences (SAEs) 48–54
3.	Relate the importance of supervised agricultural experience to FFA achievement.	Supervised Agricultural
		Experiences (SAEs) 48–54
4.	Utilize FFA and supervised agricultural experience participation to gain advanced	FFA Levels 46,
	degrees of FFA membership.	Supervised Agricultural
		Experiences (SAEs) 48–54
STANDARI		5% of Exam Blueprint
Explain the	maintenance and expansion of supervised agricultural experience (SAE) pi	ograms in agricultural
education.		
Objective 1	Maintain and use SAE records.	
1.	Explain how SAE records are maintained from year to year.	SAE Recordkeeping 58– 59
2.	Explain how to summarize and analyze SAE records.	SAE Recordkeeping 58– 59
Objective 2	Devise long-range plans for expanding SAE programs.	
1.	Evaluate the overall quality of a current SAE and determine how to make it more	Planning 58, Financial
	productive or profitable.	Records 60, Budget and
		Inventory 60
2.	Explain factors that should be considered in expanding on SAE program.	Types of SAEs 49–53,
		Planning 58, Budget and
		Inventory 60
3 .	Explain how placement SAE and ownership SAE programs may be expanded.	Types of SAEs 49–53
STANDARI) 3	14% Of Exam Blueprini
Describe the	role of agricultural education in advanced agricultural systems and technological systems and te	ology.
Objective 1	Investigate the importance of agricultural power, structural, and technical system career opportunities	ms and the available
1.	Explain the meaning and importance of agricultural power units, machinery, and	Revolutionizing
	equipment.	Agriculture 5–9,
		Sustainable Energy 66–69,
		Robotics 81, Electric
		Motors and Controls 600-
		620, Engine
		Classifications 900–906,
		Power Systems 947–950
2.	Identify and describe career opportunities in agricultural power units, machinery,	Careers in Agricultural
	and equipment.	Mechanics 22–23,
		Apprenticeships 25, Trade
		Unions and Professional
		Organizations 36
Objective 2	keview the importance of safety in agricultural power, structural, and technical	systems.

	Objective	Page Numbers
1.	Identify safety hazards and the actions needed to minimize risk with agricultural power units, machinery, and equipment.	Hazards in Agricultural Mechanics and Technology 88–89, Personal Protective Equipment 93–100, General Safety 100–105, Outdoor Equipment and Machinery 110–112, Safely Using Electric Motors 620, Safety 913– 914
2.	Select and properly use appropriate personal protective equipment (PPE).	Personal Protective Equipment 93–100
3.	Maintain neat, well-organized, well-ventilated, and safe work areas.	Hazards in Agricultural Mechanics and Technology 88–89, Breathing Protection 97– 98, Shop and Lab Practices That Improve Safety 103
4.	Identify appropriate safety responses in accidents or emergencies, including the use of first aid and contact of emergency services.	Safety Regulations 90–93, General Safety 100–105, First Aid 113
5.	Properly dispose of waste materials to assure minimum environmental impact.	Safety Regulations 90–93, Chemical Safety 106–108
Annly nhysi	cal science laws and principles with agricultural power units machinery a	nd equipment
Objective 1	Identify and explain the functions of power units, machinery, and equipment use	ed in agriculture.
1.	Distinguish sources of power, including internal combustion engines, and electric motors.	Electric Motors and Magnetism 601–602, Types of Electric Motors 604–608, Internal Combustion Engines 898– 899, Engine Classifications 900–906
2.	Explain the functions of equipment used in agriculture, including tillage equipment, planting equipment, application equipment, cutting equipment, and harvesting equipment.	Revolutionizing Agriculture 5–10, Food Distribution and Safety 71, Precision Agriculture 73– 79, Robots 81
Objective 2	Identify and distinguish the components and systems of internal combustion eng	ines.
1.	Classify engines by fuel used, kind of ignition, and cycle of operation.	Alternate Fuels 66–67, Engine Classifications 900–906

	Objective	Page Numbers
2.	Explain the functions of engine systems, including air, fuel exhaust, ignition, lubrication, and cooling.	Internal Combustion Engines 898–914, Engine Maintenance 924–928, System Inspection and Maintenance 957–966
3.	Identify the major components or structure of an engine, including engine block, cylinders, pistons, connecting rods, and crankshaft.	Engine Components 906– 910
4.	Describe the strokes of a four-stroke-cycle engine, including the role of combustion and heat.	Engine Classifications 900–906
STANDARI)5	22% of Exam Blueprint
Provide pre	ventive maintenance in the care and operation of internal combustion engin	nes.
Objective 1	Assess the importance of proper preventive maintenance of internal combustion	engines.
1.	Relate proper preventive maintenance to engine life and efficiency of operation.	Engine Maintenance 924– 928, Machinery Management 966–972
2.	Explain preventive maintenance in terms of environmental responsibilities, including reduced emissions, more efficiency, and disposal of wastes.	Engine Maintenance 924– 928, Systems Inspection and Maintenance 957–966, Machinery Management 966–972
3.	Utilize operators' manuals to determine preventive maintenance schedules and practices for specific engines.	Engine Maintenance 924– 928, Machinery Management 966–972
4.	Identify, select, properly use, and maintain tools needed in preventive maintenance of internal combustion engines.	Engine Maintenance 924– 928, Service Information 929, Manuals, Schedules, and Service Records 956, Machinery Management 966–972
Objective 2	Perform preventive maintenance on engine systems.	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
1.	Perform air intake system maintenance on engines, including those with dry element filters, oil foam filters, and oil bath cleaners.	Fuel and Air System 926– 927, Air Intake and Exhaust System 957–958
2.	Perform fuel system maintenance on an engine, including filter replacement.	Fuel and Air System 926– 927, Fuel System 963–964
3.	Perform lubrication system maintenance on an engine, including selecting and changing oil and replacing the filter.	Lubrication System 925– 926, Lubrication System 958–961
4.	Perform ignition system maintenance on an engine, including battery cleaning and hydrometer testing.	Checking the Spark 931– 932, Starting/Ignition Systems 965–966
5.	Perform exhaust system maintenance on an engine, including checking for leaks and replacing worn or damaged components.	Air Intake and Exhaust System 957–958
6.	Perform cooling system maintenance on liquid- and air-cooled engines.	Cooling System 928, Cooling System 961–963
7.	Perform electrical system maintenance on engines.	Electrical System 964–966
STANDARI	06	3% of Exam Blueprint

	Objective	Page Numbers
Provide preventive maintenance and repair in the care and operation of power units and implements.		
Objective 1	Perform preventive maintenance on power units and implements.	<u> </u>
1.	Clean all components, removing trash, mud, dust, and other dirt by using pressure	Engine Maintenance 924–
	washing, hand wiping, or other appropriate methods.	928
2.	Assess the drive train for maintenance or repair.	Power Trains 940–946
3.	Properly inflate tires.	-
4.	Lubricate the steering system, as appropriate.	Final Drives 945–946,
		Lubrication System 958–
		961
5.	Adjust belts and chains for proper operation.	Belts and Chains 947–949
6.	Inspect, analyze, and provide appropriate service for the clutch brakes.	_
7.	Perform appropriate service on a hydraulic system, including checking fluid levels	Hydraulic Components
	and replenishing fluids as needed, checking for leaks, and replacing or tightening	981–989
	faulty fluid conveyance components.	
8.	Adjust covers, shields, and other safety devices.	Outdoor Equipment and
		Machinery 110–112,
		Safety 913–914, Power
		Take-Off (PTO) 949–950
9.	Evaluate and service vehicle traction and ballasting as needed.	Tractor Weight and
		Ballasting 969–970
Objective 2	Perform basic repair on power units and implements.	Engine Treachlache die s
1.	Explain the meaning and importance of troubleshooting malfunctions.	Engine Troubleshooting
		930–934, Iroubleshooting
2	Salast and use appropriate computer and onboard diagnostic equipment	Engine Troubleshooting
۷.	Select and use appropriate computer and onboard diagnostic equipment.	
3	Use technical manuals in diagnosing problems, taking corrective actions, and	Service Information 929
5.	testing power units and implements following repair	Manuals Schedules and
	testing power units and implements following repair.	Service Records 956
4.	Use metal fabrication skills in making repairs to power units and implements.	Assembling Metal 730–
		736, Oxyfuel Welding and
		Cutting 744–745, Welding
		Positions 787–789,
		Welding Using GMAW
		837–843, Welding with
		GTAW 866–870
STANDAR	D 7	3% of Exam Blueprint
Safely operate basic power units and equipment.		
Objective 1	Identify power unit controls and instruments and their functions.	
1.	Locate controls on a power unit, including starter button or key, throttle, clutch,	Checking the Spark 931–
	brakes, lights, and others (depending on the unit), and explain and demonstrate their	932, Starting/Ignition
	function.	Systems 965–966
2.	Locate instruments on a power unit, including oil pressure gauge, and others	Checking the Compression
	(depending on the unit), and discuss their functions.	932–934
3.	Perform a pre-operation inspection according to the manufacturer's	Systems Inspection and
	recommendations in the owner's manual.	Maintenance 957–966
Objective 2	Identify equipment controls for various agricultural power units and describe th	eir functions.

	Objective	Page Numbers
1.	Compare and contrast various agricultural power units and equipment.	Agriculture 5–10, Advantages of Electric Motors 600–601, Theory of Engine Operation 899– 900, Measuring Engine Performance 920–923
2.	Mount or attach equipment to a power unit or tractor following manufacturer's recommendations.	Wiring an Agricultural Trailer 586–593
3.	Operate equipment following safe and approved practices.	General Safety 100–106, Outdoor Equipment and Machinery 110–112, Safety 913–914
STANDARI Dian and asi	J8 astruction with concrete	11% 0ј Ехат Биергіні
Objective 1	ISTRUCTION WITH CONCrete. Identify power unit controls and instruments and their functions	
1.	Define concrete and list advantages and disadvantages of its use.	Concrete Applications and Characteristics 350–367
2.	Identify important agricultural uses of concrete.	Concrete Applications and Characteristics 350, Concrete Forms 364–366
3.	Explain proportions and qualities of ingredients.	Forming Concrete 350– 353, Mixing Concrete 356–357
4.	Describe the qualities of properly placed and cured concrete.	Concrete Applications and Characteristics 350, Compression Strength and Tensile Strength 357–359
Objective 2	Place concrete.	6
1.	Identify tools and equipment used in placing concrete.	Concrete Applications and Characteristics 350–367, Masonry Tools and Equipment 374–378
2.	Explain the construction and use of forms.	Concrete Forms 364–366
3.	Calculate the amount of concrete needed for a job.	Materials 258, Material Estimates 355–357
4.	Explain the use of reinforcing steel.	Material Estimates 355– 357
5.	Demonstrate the placing of concrete including striking off, finishing the surface, and curing.	Compression Strength and Tensile Strength 357–359, Finishing 360–362, Flatwork Placement and Curing 366–367
STANDARI) 9	16% of Exam Blueprint
Plan and ins	tall basic electrical wiring systems.	
Objective 1	Explain the characteristics and measurement of electricity.	

	Objective	Page Numbers
1.	Define electricity and identify the kinds of current (DC and AC) used in agriculture.	Conductors and Insulators 520–521, Alternating Current 530–532, Direct Current 532
2.	Describe how electricity is measured, including ampere, watt, and volt.	Amps, Watts, Volts, and Ohms 522
3.	Discuss voltage drop and its impact on electrical devices.	Voltage Drop 535
4.	Describe the meaning and use of circuits.	Electric Circuits 521–527, Types of Circuits 548, DC Circuits 570
5.	Describe safety practices with electricity.	Electrical Safety 108–109, Safety around Electricity 535–538
Objective 2	Install basic electrical circuits.	
1.	Distinguish between the functions and materials of insulators and conductors.	Conductors and Insulators 520–521
2.	Identify and use materials and tools in circuit installation.	Planning AC Circuits 549– 555, Connecting Wires 559–564, Making Wire Connections 580–586
3.	Explain and demonstrate the installation of boxes, splices, and connections.	Service Entrance 544–547, Electrical Devices 555– 559, Connecting Wires 559–564, Making Wire Connections 580–586
4.	Energize simple circuit to test its workability.	Troubleshooting DC Circuits 593–594
5.	Use instruments to test and validate circuits.	Troubleshooting DC Circuits 593–594
STANDARI	D 10	5% of Exam Blueprint
Fabricate w	ith metal.	
Objective 1	Use shielded metal arc welding (SMAW) processes.	
1.	Make 3G (vertical position-groove weld) welds on carbon steel.	Welding Position 787–789
2.	Make 3F (vertical position-butt weld) welds on carbon steel.	Welding Position 787–789
Objective 2	Use plasma cutting and air carbon arc gouging processes.	
1.	Perform safety inspections of equipment and accessories.	Personal Protective Equipment 93–100, Compressed Gases 107, Plasma Cutting Safety 883–885
2.	Set up for manual plasma cutting operations on carbon steel.	Plasma Cutting 880–882, Using a Plasma Torch 885–887
3.	Set up for manual air carbon arc gouging on carbon steel.	-
Objective 3	Use gas metal arc welding (GMAW) processes.	

Objective		Page Numbers
1.	Use Short Circuit Transfer welding processes to make 3G (vertical position-groove weld) welds on carbon steel.	Welding Position 787– 789, Pulsed Arc 824, Methods of Metal Transfer 833–835
2.	Use Short Circuit Transfer welding process to make 3F (vertical position-butt weld) welds on carbon steel.	Welding Position 787– 789, Pulsed Arc 824, Methods of Metal Transfer 833–835