ETS PRAXIS

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The *Praxis*® Study Companion

Agriculture

5701

www.ets.org/praxis

Welcome to *The Praxis® Study Companion*

Prepare to Show What You Know

You have been working to acquire the knowledge and skills you need for your teaching career. Now you are ready to demonstrate your abilities by taking a *Praxis®* test.

Using the *Praxis® Study Companion* is a smart way to prepare for the test so you can do your best on test day. This guide can help keep you on track and make the most efficient use of your study time.

The Study Companion contains practical information and helpful tools, including:

- An overview of the *Praxis* tests
- Specific information on the *Praxis* test you are taking
- A template study plan
- Study topics
- Practice questions and explanations of correct answers
- Test-taking tips and strategies
- Frequently asked questions
- Links to more detailed information

So where should you start? Begin by reviewing this guide in its entirety and note those sections that you need to revisit. Then you can create your own personalized study plan and schedule based on your individual needs and how much time you have before test day.

Keep in mind that study habits are individual. There are many different ways to successfully prepare for your test. Some people study better on their own, while others prefer a group dynamic. You may have more energy early in the day, but another test taker may concentrate better in the evening. So use this guide to develop the approach that works best for you.

Your teaching career begins with preparation. Good luck!

Know What to Expect

Which tests should I take?

Each state or agency that uses the *Praxis* tests sets its own requirements for which test or tests you must take for the teaching area you wish to pursue.

Before you register for a test, confirm your state or agency's testing requirements at www.ets.org/praxis/states.

How are the *Praxis* tests given?

Praxis tests are given on computer. Other formats are available for test takers approved for accommodations (see page 49).

What should I expect when taking the test on computer?

When taking the test on computer, you can expect to be asked to provide proper identification at the test center. Once admitted, you will be given the opportunity to learn how the computer interface works (how to answer questions, how to skip questions, how to go back to questions you skipped, etc.) before the testing time begins. Watch the What to Expect on Test Day video to see what the experience is like.

Where and when are the *Praxis* tests offered?

You can select the test center that is most convenient for you. The *Praxis* tests are administered through an international network of test centers, which includes Prometric® Testing Centers, some universities, and other locations throughout the world.

Testing schedules may differ, so see the *Praxis* web site for more detailed test registration information at www.ets.org/praxis/register.

Table of Contents

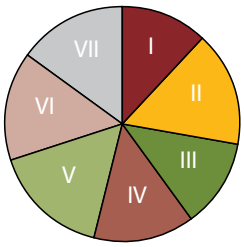
The Praxis® Study Companion guides you through the steps to success

1. Learn About Your Test

Learn about the specific test you will be taking

Agriculture (5701)

Test at a Glance	
Test Name	Agriculture
Test Code	5701
Time	2 hours
Number of Questions	120
Format	Selected-response questions
Test Delivery	Computer delivered



Content Categories		Approximate Number of Questions	Approximate Percentage of Examination
I.	Agribusiness Systems	14	12%
II.	Animal Systems	20	16%
III.	Food Science and Biotechnology Systems	14	12%
IV.	Environmental and Natural Resource Systems	16	14%
V.	Plant Systems	20	16%
VI.	Power, Structural, and Technical Systems	18	15%
VII.	Leadership and Career Development	18	15%

About This Test

The Agriculture test is designed to measure the professional knowledge and competencies of prospective teachers of agriculture in junior and senior high schools. The 120 selected-response questions assess both basic knowledge and the ability to apply principles to real-life situations. Test content is appropriate for examinees who have completed a bachelor's degree program in agricultural education.

The content of the test is based largely on the Agriculture, Food and Natural Resources (AFNR) Career Cluster Content Standards published by the National Council For Agricultural Education (2009).

The seven content areas cover agribusiness systems; animal systems; food science and biotechnology systems; environmental and natural resource systems; plant systems; power, structural, and technical systems; and leadership and career development.

This test may contain some questions that do not count toward your score.

Test Specifications

Test specifications in this chapter describe the knowledge and skills measured by the test. Study topics to help you prepare to answer test questions can be found on page 33.

I. Agribusiness Systems

A. Know the principles of capitalism and entrepreneurship in the agribusiness industry

1. Describe how supply and demand interact to determine the price of agricultural commodities
2. Describe the law of diminishing returns
3. Distinguish between fixed and variable costs
4. Distinguish between marginal cost and marginal return
5. Distinguish between inputs and outputs, and make decisions based on costs and availability
6. Distinguish among current and noncurrent assets and liabilities
7. Identify the opportunity costs within an agribusiness
8. Compare and contrast the main characteristics of individual proprietorships, partnerships, cooperatives, and corporations
9. Distinguish among the sectors of agribusiness (e.g., producer, service, processing, and marketing)
10. Identify methods of reducing risk in an agribusiness

B. Know the management skills needed to organize an agribusiness

1. Identify and describe key components of a contract and a lease
2. Describe diversification and specialization in agribusiness
3. Understand basic management skills (e.g., scheduling, hiring, purchasing)
4. Describe the components of an agribusiness plan
5. Understand steps in the management decision-making process

C. Know the record keeping needed to accomplish agribusiness objectives

1. Describe the purposes of enterprise records
2. Develop and complete an enterprise budget
3. Develop a balance sheet and analyzes its uses
4. Complete and interpret a cash-flow statement
5. Identify the components of a completed inventory
6. Describe depreciation
7. Develop an income/expense statement and describe its purposes

D. Is familiar with generally accepted accounting practices for making agribusiness decisions

1. Describe the differences between single- and double-entry methods of accounting
2. Complete a break-even analysis for an enterprise
3. Analyze the important financial ratios and calculations (e.g., net worth, debt to equity, solvency)

E. Is familiar with the fundamentals of savings, investments, and credit in agribusiness

1. Identify the importance of a savings and investment plan
2. Identify the sources of credit
3. Describe ways to build and maintain credit
4. Describe a business proposal

F. Is familiar with the marketing principles needed to accomplish agribusiness objectives

1. Describe the components and purpose of a promotional campaign
2. Describe key factors involved in marketing (e.g., product knowledge, service knowledge, customer knowledge)
3. Describe how market prices and cycles affect agricultural commodities
4. Describe commodity futures and options trading
5. Distinguish between hedging and speculation

II. Animal Systems

A. Is familiar with the historical development and trends of the animal systems industry

1. Explain past, current, and emerging trends related to the animal agricultural industry
2. Describe the domestication of animals

B. Know the classification, anatomical, and physiological characteristics of animals

1. Identify the major species of livestock
2. Understand the taxonomical classification system of animals
3. Identify the structure and function of the major body systems of animals (e.g., digestive, reproductive, respiratory)
4. Define terms used to distinguish animals by sex, age, and physical traits in livestock

C. Is familiar with proper health care of animals

1. Describe the use of vaccination and immunization in the animal science industry
2. Select proper routes of administration of medications and vaccines on various animal species
3. Describe methods of controlling parasites of livestock
4. Describe noninfectious and infectious diseases and disorders

D. Know basic principles of animal nutrition

1. Describe the importance of proper nutrition for animal production
2. Differentiate between ruminant and nonruminant digestion
3. Identify the major groups of nutrients (e.g., proteins, carbohydrates, minerals)
4. Describe the general principles involved in balancing a ration
5. Calculate a balanced ration given animal requirements and feed composition using the Pearson's square method
6. Describe symptoms of common nutrient deficiencies

E. Know the basic principles of animal production and management

1. Select market and breeding livestock based on visual assessment
2. Select animals to cull based on performance data
3. Describe grading systems of livestock (e.g., feeder, quality, and yield)
4. Interpret expected progeny differences (EPDs) to make production decisions
5. Describe processes involved in cell division, including how genes affect the transmission of characteristics
6. Complete Punnett square crosses for one-factor and two-factor crosses
7. Define phenotype and genotype of animals
8. Describe management procedures needed for effective livestock production (e.g., castration, docking, dehorning)
9. Define crossbreeding, grading up, inbreeding, linebreeding, and purebred breeding

F. Know safety practices related to animal production

1. Describe basic procedures for handling animal materials (e.g., vaccinations, supplements)
2. Describe safe animal-handling procedures
3. Identify the components of a safety and biosecurity plan for a specific class of animals

G. Is familiar with normal and abnormal animal behavior

1. Differentiate between normal and abnormal behavior in common livestock animals
2. Identify causes of abnormal behavior in common livestock animals

H. Is familiar with the proper design and use of animal facilities and the equipment for safe and efficient production

1. Identify common styles of facilities for common livestock production (dairy cattle, swine, beef cattle, etc.)
2. Identify safe and effective facility designs based on animal species and environment
3. Describe equipment needed for safe and effective handling of common livestock animals (e.g., squeeze chute, twitch, grooming stand, etc.)

I. Know the principles and practices of basic animal reproduction

1. Define terminology related to reproductive management and breeding systems, including castration, estrous, gestation, lactation, parturition
2. Explain the role of the estrous cycle, ovulation, heat detection, and fertilization in animal reproduction management
3. Identify practices and principles related to animal reproduction (e.g., artificial insemination, embryo transfer, selective breeding)

J. Is familiar with the effects of environmental conditions on animal production

1. Understand that various environmental conditions affect animal agriculture (e.g., air, water, temperature)
2. Describe the effect of detrimental environmental conditions on livestock (e.g., health, production, reproduction)

K. Is familiar with the impacts of animal production on the environment

1. Describe environmental conditions affected by animal production
2. Describe the importance of a waste-management and animal-disposal plan for livestock operations

L. Is familiar with the issues related to animal rights, animal welfare, and producer responsibilities

1. Differentiate between animal welfare and animal rights
2. Describe the United States Department of Agriculture (USDA) inspection process for livestock processing and handling facilities

III. Food Science and Biotechnology Systems

A. Know major issues and trends affecting the food products and processing industry

1. Identify major trends and developments in the food products and processing industry (e.g., buy local, free range, irradiated beef)
2. Describe dietary trends affecting the food industry (e.g., low fat, sugar free, gluten free)

B. Is familiar with industry organizations, groups, and regulatory agencies that affect the food products and processing industry

1. Identify major industry organizations, groups, and agencies that affect food products and processing
2. Describe how the USDA and the United States Food and Drug Administration (FDA) regulate the food products and processing industry (e.g., country-of-origin labeling, nutrition labeling, and inspections)

C. Is familiar with the safety principles and recommended equipment and facility management practices related to the food products and processing industry

1. Define the hazard analysis and critical control points (HACCP) and other major food safety practices
2. Describe the importance of controlled features in the processing of food (e.g., temperature, moisture, sanitation)

D. Is familiar with selecting, harvesting, processing, and classifying food products for storage, distribution, and consumption

1. Describe the purpose of grading to select food products for a specific use
2. Describe the methods by which value can be added to agricultural commodities
3. Identify basic processing techniques (e.g., preservation, homogenization, meat fabrication)

E. Is familiar with major innovations, historical developments, and applications of biotechnology in agriculture

1. Identify the major biotechnological innovations (e.g., increased yields, herbicide tolerance, and insect resistance)
2. Describe the advantages provided to the local producer by the application of advances in biotechnology

F. Is familiar with the ethical, legal, social, cultural, safety, and environmental issues related to biotechnology

1. Identify the major legal and ethical issues surrounding the adoption of biotechnology
2. Identify the social and cultural issues related to agricultural biotechnology (e.g., resistance to the use of genetically modified organisms [GMO], hormones)
3. Identify the economic impact of biotechnology
4. Describe the environmental issues related to agricultural biotechnology (e.g., herbicide resistance in weeds, beneficial-insect decline)

G. Know basic, safe laboratory procedures

1. Identify the principles of aseptic technique
2. Identify hazards in a biotechnology lab
3. Identify the safety equipment needed to properly conduct a laboratory experiment
4. Describe safe handling of laboratory materials, chemicals, and equipment

H. Is familiar with the various uses of genetic engineering in the agricultural industry

1. Identify the uses of genetic engineering, cloning, stem-cell research in agriculture
2. Identify the purpose of genetically modifying organisms in agriculture

IV. Environmental and Natural Resource Systems

A. Is familiar with natural cycles related to environmental and natural resource management

1. Identify and explain the carbon cycle, water cycle, and nitrogen cycle as related to the environment

B. Is familiar with chemical properties related to environmental and natural resources

1. Differentiate between organic and inorganic compounds
2. Describe preemergence and postemergence herbicides
3. Describe selective and nonselective herbicides
4. Describe the effects of chemicals on organisms at different levels of the food chain (e.g., biomagnification)
5. Differentiate between point and nonpoint source pollution

C. Know the various ecosystems of the environment

1. Identify and describe the various types of ecosystems (e.g., biomes, aquatic versus terrestrial)
2. Identify biotic and abiotic factors that define an ecosystem

D. Is familiar with the ecological concepts and principles related to natural resource systems

1. Describe the benefits of rotational grazing
2. Identify common forestry harvest techniques (e.g., clear-cut, thinning)
3. Explain the process of succession in a forest
4. Describe the purpose of reforestation (e.g., soil erosion, water quality, sustainability)
5. Explain the difference between preservation and conservation
6. Describe the concepts of population growth and carrying capacity

E. Is familiar with the current issues and regulations in environmental and natural resource management

1. Identify the federal agencies responsible for environmental regulation and natural resource management (e.g., United States Environmental Protection Agency [EPA], Natural Resources Conservation Service [NRCS], and Bureau of Land Management [BLM])
2. Describe the impact of federal regulations on agriculture production (e.g., Endangered Species Act [ESA], water rights)

F. Know the use of personal protective equipment (PPE) and safety procedures related to environmental and natural resource management

1. Identify PPE and safety procedures related to environmental and natural resources (e.g., forestry, fisheries, wildlife)

G. Is familiar with the role of environmental and natural resource management in the local, state, and national economies

1. Describe the importance of hunting, trapping, fishing, and outdoor recreation to the economy
2. Know significant legislative milestones related to natural resources (e.g., Clean Air Act, Clean Water Act)
3. Explain the contributions of environmental and natural resource management to the national economy

H. Is familiar with the impact of conventional and alternative energy sources on the environment

1. Identify environmental impacts of energy production
2. Identify and explain the use of conventional and alternative energy sources (e.g., fossil fuels, solar, biomass)

I. Is familiar with wetlands and their role in the environment

1. Explain the role of wetlands in the environment and the need for wetland conservation (e.g., flood control, wildlife habitat)

J. Is familiar with the use, production, and processing of natural resources

1. Identify products derived from natural resources (e.g., wood products, fuels, fish, and wildlife)
2. Differentiate between renewable and nonrenewable resources

K. Is familiar with procedures used to develop an environmental and natural resource management plan

1. Describe population sampling techniques (e.g., quadrat sampling, electrofishing in aquatic systems, radio tracking)
2. Describe the relationship between a species and the habitat needed to support that species
3. Describe a food web
4. Explain the importance of an indicator species

L. Know the general impact of land use on environmental and natural resources

1. Describe methods used to limit erosion and runoff (e.g., buffers, windbreaks)
2. Describe best management practices and explains how they benefit the environment (e.g., stocking rate, protection of critical wildlife habitat)
3. Describe the effects of urban sprawl on the environment

V. Plant Systems

A. Know the historical development of plant science and its relationship with society

1. Know the development of human use of plants (e.g., food, fiber, shelter)
2. Identify the major milestones and advances of plant science (e.g., plant genetics, soil amendments)
3. Understand the importance of plants in the global food supply

B. Know general safety issues related to plant systems

1. Identify and describe safety hazards related to plant production systems (e.g., chemicals, equipment, and tools)
2. Define hazardous plant classifications (e.g., noxious, invasive)
3. Identify and understand the use of personal protective equipment (PPE)
4. Interpret material safety data sheet (MSDS) information
5. Know guidelines for safe pesticide use

C. Know the basic principles of identification, classification, anatomy, and physiology as related to plant production and management

1. Understand the taxonomical classification system of plants and the importance of binomial nomenclature
2. Differentiate between monocots and dicots
3. Describe reproductive and vegetative plant parts and their functions (e.g., roots absorption, stem support)
4. Describe major plant processes (e.g., photosynthesis, transpiration, respiration)

5. Identify and classify plants according to use and growth habits (e.g., agronomic, horticultural, annual, perennial)
6. Differentiate between herbaceous and woody plants

D. Is familiar with the influence of environmental factors on plant growth

1. Describe how temperature, light, moisture, and air affect plant growth
2. Interpret USDA Plant Hardiness Zone Maps

E. Is familiar with propagation, cultivation, and harvesting of plants

1. Describe sexual reproduction in plants (e.g., fertilization, germination, pollination)
2. Describe asexual propagation methods (e.g., cutting, layering, grafting)
3. Identify major types of cultivation for horticultural crops, including hydroponics
4. Identify major types of cultivation for agronomic crops
5. Identify harvesting techniques (e.g., hand, mechanical)

F. Know the basic characteristics of both soils and growing media and their uses

1. Identify the macronutrients and micronutrients needed for plant growth
2. Describe the role of nitrogen (N), phosphorus (P), and potassium (K) in plant growth
3. Explain the role soil pH plays in plant production
4. Understand the materials used in soilless media, such as vermiculite, perlite, sphagnum moss, and horticultural-grade sand
5. Explain soil structure and texture as related to plant growth
6. Describe the types of water in soil (e.g., gravitational, capillary, available)
7. Describe the horizons within a soil profile
8. Understand the basics of soil conservation practices

G. Is familiar with the use of integrated pest management (IPM) in plant production

1. Describe IPM and its purposes
2. Differentiate between cultural, biological, mechanical (physical), and chemical controls
3. Describe the types and uses of pesticides (e.g., herbicides, fungicides, insecticides)

H. Is familiar with production and management practices associated with horticultural crops

1. Identify proper management and production techniques related to greenhouses, orchards, gardens, and nurseries
2. Describe greenhouse structures and systems
3. Describe the divisions of horticulture: pomology, floriculture, landscape, olericulture
4. Describe the importance of growth regulators

I. Is familiar with production and management practices associated with agronomic crops

1. Identify equipment used in cultivating and harvesting agronomic crops
2. Identify and describe the production and management practices of agronomic crops
3. Explain the importance of weed and pest control in agronomic crop production
4. Describe the divisions of agronomic crops (e.g., cereal grains, forage, oil, fiber)
5. Describe the purposes of crop rotation

J. Is familiar with the principles and elements of landscape and floral design

1. Identify and describe the principles and elements of landscape and floral design

VI. Power, Structural, and Technical Systems

A. Is familiar with the physical science principles and engineering applications associated with power, structural, and technical systems

1. Describe the basic principles of hydraulics (e.g., single-acting, double-acting cylinders)
2. Describe the basic principles of pneumatics
3. Differentiate among basic metals as they pertain to a welding shop (e.g., mild steel, cast iron, brass, and copper)
4. Describe horsepower for engines, equipment, and electrical motors
5. Differentiate among conduction, convection, and radiation
6. Describe principles of oil viscosity and lubrication

B. Is familiar with electricity and electrical wiring

1. Identify proper safety procedures with electricity and electrical wiring
2. Define common electrical terms (e.g., amp, volt, ohm, watt, kilowatt, kilowatt hour, conductor, resistance, and transformer)

3. Determine amperage, voltage, horsepower, wattage, and rpm from the nameplate on an electric motor
4. Identify the importance of grounding and ground fault circuit interrupters (GFCI)
5. Calculate electrical power usage and cost using Ohm's law
6. Interpret electrical diagrams of common 110-120 volt AC electrical circuits (e.g., single-pole switches, three-way switches, outlets, GFCI, fixtures)
7. Distinguish the differences between AC and DC circuits
8. Identify conductors and insulators

C. Is familiar with various power and energy sources

1. Describe proper safety procedures when dealing with power and energy sources
2. Compare and contrast the benefits and costs of various energy sources (e.g., wind, solar, hydro, coal, nuclear)
3. Differentiate among energy sources (e.g., internal combustion, mechanical, electrical)

D. Is familiar with the principles of power, energy transfer, and conversion

1. Describe the basic operating principles of an electric motor
2. Describe the basic principles of gears and pulleys
3. Describe gear reduction and multipliers
4. Describe the transfer of power/energy from a motor to an implement

E. Know the proper use, storage, and disposal of potentially hazardous materials common to the agricultural mechanics laboratory

1. Describe the importance of proper laboratory safety
2. Interpret safety data sheet (SDS), formerly known as material safety data sheet (MSDS), instructions and precautions
3. Identify Occupational Safety and Health Administration (OSHA) regulations regarding laboratory safety colors and uses
4. Explain the proper storage of compressed-gas bottles according to OSHA regulations
5. Describe the proper storage and disposal of hazardous materials (e.g., fuels, pesticides, paints)

F. Know the safe operation and maintenance of hand tools, power tools, and other equipment

1. Identify potential safety hazards in the agricultural mechanics laboratory
2. Identify and follow OSHA regulations
3. Identify hand tools and determine their uses
4. Identify power tools and determine their uses
5. Identify the proper use of electrical wiring tools and supplies
6. Describe the basic use and maintenance of common pneumatic shop equipment (e.g., air compressor, impact wrench)
7. Describe hand-tool and power-tool maintenance

G. Is familiar with the principles of small-engine operation, maintenance, and repair

1. Identify basic maintenance procedures and adjustments of internal combustion engines
2. Identify the basic parts of a small gas engine
3. Describe the four-stroke cycle and two-stroke cycle
4. Describe the principles of spark-ignition engine (gas) operation
5. Describe the basic principles of compression engine (diesel) operation
6. Identify the different fuels used in internal combustion engines
7. Describe engine displacement

H. Is familiar with the planning and building of structures

1. Describe safety practices associated with building construction
2. Read and interpret project plans for agricultural-structure projects
3. Discuss the importance of slope, elevation, and grades in site preparation
4. Identify types and designs of buildings
5. Identify and select construction materials.
6. Calculate a bill of materials
7. Define basic framing terminology (e.g., studs, headers, cripple studs)
8. Describe the purpose of walls, types of walls, supports, and siding used in agricultural buildings
9. Identify factors affecting the heating, cooling, and ventilation of agricultural structures

I. Is familiar with metal fabrication and welding

1. Describe and identify metal shop safety procedures and equipment
2. Describe different types of welding (e.g., shielded metal-arc welding (SMAW), gas metal-arc welding (GMAW), flux-cored arc welding (FCAW), and tungsten-inert gas (TIG) welding, oxy-fuel welding, and brazing)
3. Identify common welds or welding joints (e.g., lap, butt, fillet)
4. Describe basic arc welding procedures and terminology (e.g., positions, classifying rods, polarity)
5. Describe proper metal cutting practices (e.g., oxy-fuel, plasma, cutoff saws, and shears)
6. Describe basic oxy-fuel welding procedures and terminology (e.g., positions, equipment setup and selection)
7. Describe the fundamentals of cold metal work

J. Is familiar with the installation, maintenance, and repair of water systems

1. Describe safety practices for plumbing
2. Describe the process of plastic pipe fitting
3. Describe the process of sweating copper pipe
4. Identify methods of protecting water pipes against freezing
5. Identify different plumbing materials and common joints

K. Is familiar with the application of technology to the agriculture industry

1. Define the term GIS (Geographic Information System) and explain its relationship to GPS (Global Positioning System)
2. Explain how GPS and GIS are used in precision agriculture
3. List the common applications of GPS technology in agriculture
4. Identify potential applications for computer-controlled technology (e.g., greenhouse controls, computer numerical control machines, automated equipment)

L. Is familiar with the use of technical and mathematical approaches to map land, facilities, and infrastructure

1. Determine land area in acres and location from diagrams or legal description
2. Describe basic surveying procedures and equipment
3. Calculate slope, elevation, and grades

VII. Leadership and Career Development

A. Know the principles of leadership

1. Describe the importance of personal leadership development (e.g., personality, leadership style, Maslow's hierarchy)
2. Describe various forms of leadership (e.g., democratic, authoritarian, situational)

B. Know the foundational areas of career development

1. Describe how to develop a career plan (e.g., strengths, values, interests)
2. Develop a career plan to meet career goals (e.g., education, employment, lifestyle goals)
3. Describe the various components related to job preparation (e.g., resume development, interviewing, and overall business etiquette)

C. Understand the purpose, structure, and function of the National FFA Organization

1. Identify the FFA mission statement, creed, motto, ceremonies, and salute
2. Identify different types of FFA membership
3. Describe major historical moments and figures of FFA (e.g., founded in 1928, NFA, E. M. Tiffany, girls allowed in 1969, Henry C. Groseclose)
4. Identify the constitutional officer positions and their duties
5. Know the FFA degrees
6. Understand the importance of the Program of Activities and FFA Committee structures

D. Know individual and team leadership skills

1. Understand basic parliamentary procedural motions described in the FFA manual
2. Describe proper presentation and disposal of a main motion
3. Describe the purpose of parliamentary procedure in an FFA meeting
4. Describe team-building skills (e.g., motivation, communication, influence)
5. Differentiate between the positive and negative attributes of a leader
6. Identify the importance of ethics in leadership

E. Know communication skills

1. Describe effective communication skills (e.g., written, verbal, and nonverbal)
2. Identify techniques to improve listening, reading, writing, speaking, and nonverbal communication skills

F. Know information research skills to make informed decisions

1. Describe how to determine validity and reliability of a source (e.g., author, date, bibliography, type of source)
2. Understand the scientific method

G. Understand supervised agricultural experiences (SAE)

1. Describe the purpose of an SAE
2. Describe the major types of SAEs
3. Describe how to develop an SAE program
4. Identify student advancement and awards related to the SAE program (e.g., degrees, proficiency awards)
5. Apply basic financial record-keeping skills for the establishment and maintenance of an SAE

H. Know career opportunities across the various pathways of agriculture

1. Describe the various career pathways within the Agriculture, Food, and Natural Resources Career Cluster
2. Identify the specific skills and education needed for career pathways
3. Describe agricultural careers available to students in an agricultural education program

I. Is familiar with local program planning and management

1. Identify and describe the three components of a comprehensive agricultural education program
2. Define the scope and sequence for a secondary agricultural education program
3. Identify the purpose and importance of an advisory committee
4. Identify and describe career development events (CDEs) and their purpose
5. Identify FFA award programs (e.g., degree programs and applications, proficiencies, leadership awards, scholarships)

2. Familiarize Yourself with Test Questions

Become comfortable with the types of questions you'll find on the Praxis *tests*

The *Praxis* assessments include a variety of question types: constructed response (for which you write a response of your own); selected response, for which you select one or more answers from a list of choices or make another kind of selection (e.g., by clicking on a sentence in a text or by clicking on part of a graphic); and numeric entry, for which you enter a numeric value in an answer field. You may be familiar with these question formats from taking other standardized tests. If not, familiarize yourself with them so you don't spend time during the test figuring out how to answer them.

Understanding Computer-Delivered Questions

Questions on computer-delivered tests are interactive in the sense that you answer by selecting an option or entering text on the screen. If you see a format you are not familiar with, read the directions carefully. The directions always give clear instructions on how you are expected to respond.

For most questions, you respond by clicking an oval to select a single answer from a list of answer choices.

However, interactive question types may also ask you to respond by:

- **Clicking more than one oval** to select answers from a list of choices.
- **Typing in an entry box.** When the answer is a number, you may be asked to enter a numerical answer. Some questions may have more than one place to enter a response.
- **Clicking check boxes.** You may be asked to click check boxes instead of an oval when more than one choice within a set of answers can be selected.
- **Clicking parts of a graphic.** In some questions, you will select your answers by clicking on a location (or locations) on a graphic such as a map or chart, as opposed to choosing your answer from a list.
- **Clicking on sentences.** In questions with reading passages, you may be asked to choose your answers by clicking on a sentence (or sentences) within the reading passage.
- **Dragging and dropping answer choices into targets on the screen.** You may be asked to select answers from a list of choices and drag your answers to the appropriate location in a table, paragraph of text or graphic.
- **Selecting answer choices from a drop-down menu.** You may be asked to choose answers by selecting choices from a drop-down menu (e.g., to complete a sentence).

Remember that with every question you will get clear instructions.

Perhaps the best way to understand computer-delivered questions is to view the Computer-delivered Testing Demonstration on the Praxis web site to learn how a computer-delivered test works and see examples of some types of questions you may encounter.

Understanding Selected-Response Questions

Many selected-response questions begin with the phrase "which of the following." Take a look at this example:

Which of the following is a flavor made from beans?

(A) Strawberry

(B) Cherry

(C) Vanilla

(D) Mint

How would you answer this question?

All of the answer choices are flavors. Your job is to decide which of the flavors is the one made from beans.

Try following these steps to select the correct answer.

1) **Limit your answer to the choices given.** You may know that chocolate and coffee are also flavors made from beans, but they are not listed. Rather than thinking of other possible answers, focus only on the choices given ("which of the following").

2) **Eliminate incorrect answers.** You may know that strawberry and cherry flavors are made from fruit and that mint flavor is made from a plant. That leaves vanilla as the only possible answer.

3) **Verify your answer.** You can substitute "vanilla" for the phrase "which of the following" and turn the question into this statement: "Vanilla is a flavor made from beans." This will help you be sure that your answer is correct. If you're still uncertain, try substituting the other choices to see if they make sense. You may want to use this technique as you answer selected-response questions on the practice tests.

Try a more challenging example

The vanilla bean question is pretty straightforward, but you'll find that more challenging questions have a similar structure. For example:

Entries in outlines are generally arranged according to which of the following relationships of ideas?

(A) Literal and inferential

(B) Concrete and abstract

(C) Linear and recursive

(D) Main and subordinate

You'll notice that this example also contains the phrase "which of the following." This phrase helps you determine that your answer will be a "relationship of ideas" from the choices provided. You are supposed to find the choice that describes how entries, or ideas, in outlines are related.

Sometimes it helps to put the question in your own words. Here, you could paraphrase the question in this way: "How are outlines usually organized?" Since the ideas in outlines usually appear as main ideas and subordinate ideas, the answer is (D).

QUICK TIP: Don't be intimidated by words you may not understand. It might be easy to be thrown by words like "recursive" or "inferential." Read carefully to understand the question and look for an answer that fits. An outline is something you are probably familiar with and expect to teach to your students. So slow down, and use what you know.

Watch out for selected-response questions containing "NOT," "LEAST," and "EXCEPT"

This type of question asks you to select the choice that does not fit. You must be very careful because it is easy to forget that you are selecting the negative. This question type is used in situations in which there are several good solutions or ways to approach something, but also a clearly wrong way.

How to approach questions about graphs, tables, or reading passages

When answering questions about graphs, tables, or reading passages, provide only the information that the questions ask for. In the case of a map or graph, you might want to read the questions first, and then look at the map or graph. In the case of a long reading passage, you might want to go ahead and read the passage first, noting places you think are important, and then answer the questions. Again, the important thing is to be sure you answer the questions as they refer to the material presented. So read the questions carefully.

How to approach unfamiliar formats

New question formats are developed from time to time to find new ways of assessing knowledge. Tests may include audio and video components, such as a movie clip or animation, instead of a map or reading passage. Other tests may allow you to zoom in on details in a graphic or picture.

Tests may also include interactive questions. These questions take advantage of technology to assess knowledge and skills in ways that standard selected-response questions cannot. If you see a format you are not familiar with, **read the directions carefully**. The directions always give clear instructions on how you are expected to respond.

QUICK TIP: Don't make the questions more difficult than they are. Don't read for hidden meanings or tricks. There are no trick questions on *Praxis* tests. They are intended to be serious, straightforward tests of your knowledge.

Understanding Constructed-Response Questions

Constructed-response questions require you to demonstrate your knowledge in a subject area by creating your own response to particular topics. Essays and short-answer questions are types of constructed-response questions.

For example, an essay question might present you with a topic and ask you to discuss the extent to which you agree or disagree with the opinion stated. You must support your position with specific reasons and examples from your own experience, observations, or reading.

Take a look at a few sample essay topics:

- "Celebrities have a tremendous influence on the young, and for that reason, they have a responsibility to act as role models."
- "We are constantly bombarded by advertisements—on television and radio, in newspapers and magazines, on highway signs, and the sides of buses. They have become too pervasive. It's time to put limits on advertising."
- "Advances in computer technology have made the classroom unnecessary, since students and teachers are able to communicate with one another from computer terminals at home or at work."

Keep these things in mind when you respond to a constructed-response question

1) **Answer the question accurately.** Analyze what each part of the question is asking you to do. If the question asks you to describe or discuss, you should provide more than just a list.

2) **Answer the question completely.** If a question asks you to do three distinct things in your response, you should cover all three things for the best score. Otherwise, no matter how well you write, you will not be awarded full credit.

3) **Answer the question that is asked.** Do not change the question or challenge the basis of the question. You will receive no credit or a low score if you answer another question or if you state, for example, that there is no possible answer.

4) **Give a thorough and detailed response.** You must demonstrate that you have a thorough understanding of the subject matter. However, your response should be straightforward and not filled with unnecessary information.

5) **Reread your response.** Check that you have written what you thought you wrote. Be sure not to leave sentences unfinished or omit clarifying information.

QUICK TIP: You may find that it helps to take notes on scratch paper so that you don't miss any details. Then you'll be sure to have all the information you need to answer the question.

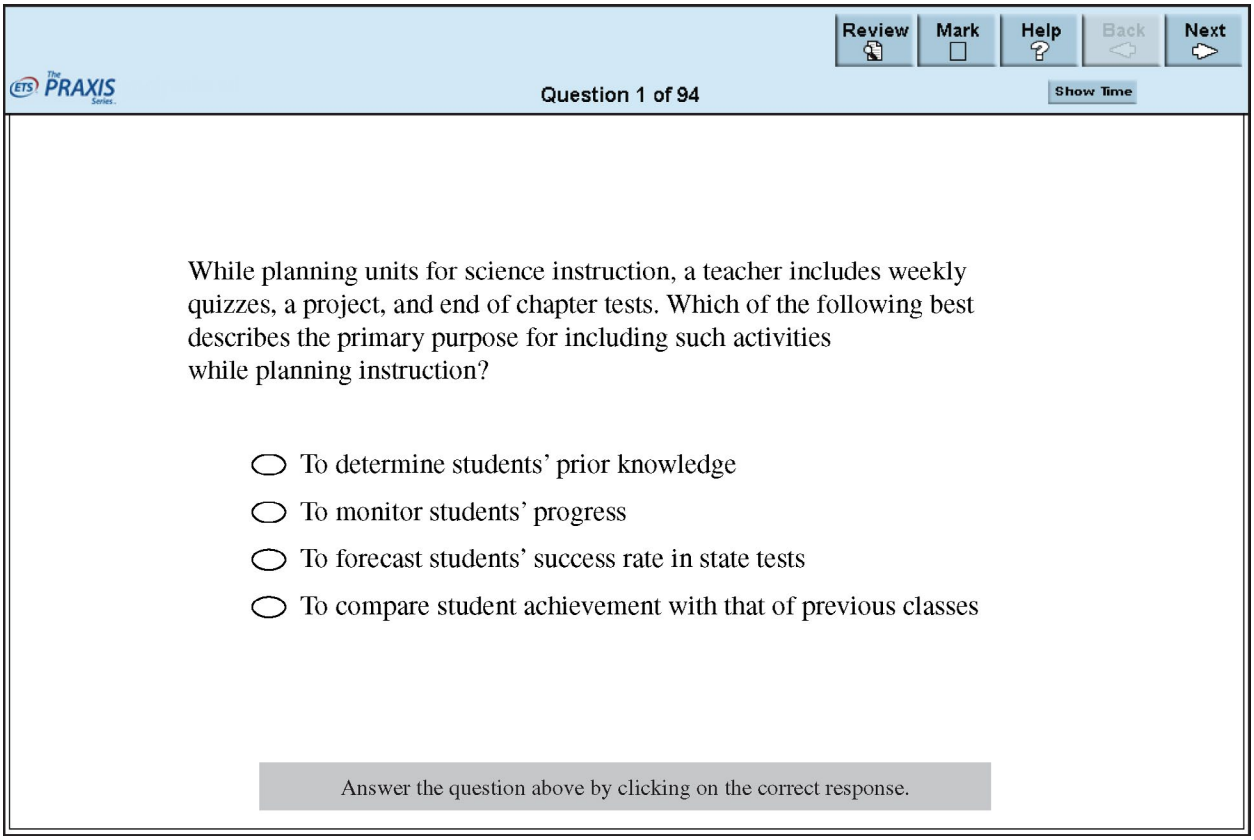
For tests that have constructed-response questions, more detailed information can be found on page 5.

3. Practice with Sample Test Questions

Answer practice questions and find explanations for correct answers

Computer Delivery

This test is available on computer. A sample of a computer-delivered test screen is shown below. For the purposes of this guide, sample questions are provided as they would appear in a paper-delivered test.



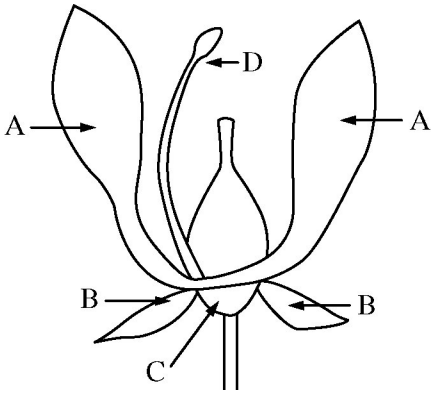
Sample Test Questions

The sample questions that follow illustrate the kinds of questions on the test. They are not, however, representative of the entire scope of the test in either content or difficulty. Answers with explanations follow the questions.

Directions: Each of the questions or statements below is followed by four suggested answers or completions. For each question, select the best answer or answers from the choices given.

Questions 1-2 refer to the diagram of a flower shown.

For each of the following questions, select the one choice below that is most closely related to it. Each choice may be used once, more than once, or not at all in this group of questions.



(A) A
(B) B
(C) C
(D) D

1. Which letter identifies a structure that is present in a staminate flower but that is not present in a pistillate flower?

2. Which letter identifies the receptacle?

3. Which of the following is the most likely cause for the decline and abandonment of farmland after many years of overirrigation?

   (A) Overirrigation prevented regular fertilization.
   (B) Overirrigation reduced the effectiveness of pesticides.
   (C) Soil salts accumulated under poor drainage conditions.
   (D) Crop rotation was not possible.

4. A farmer buys a new tractor for $40,000 and expects to use it for 20 years, after which the tractor will have a salvage value of $10,000. What is the straight-line depreciation that can be taken for the first year of ownership?

   (A) $1,500
   (B) $1,667
   (C) $2,000
   (D) $2,250

5. The demand for which of the following products is likely to be the most elastic?

   (A) Water
   (B) Bread
   (C) Salt
   (D) Pork

6. Which TWO of the following indicate the most probable effects of import tariffs and quotas on domestic prices and domestic production?

   (A) Prices increase
   (B) Prices decrease
   (C) Production increases
   (D) Production decreases

7. An enterprise analysis shows an average return of $151 for each $100 of feed fed to hogs last year and a return of $130 for each $100 of feed fed to hogs this year. Assuming that feed costs are stable and there are no major death losses, which of the following is the most likely explanation for the difference in returns?

   (A) Lower feed efficiency
   (B) Poor record keeping
   (C) Lower market prices
   (D) Lower purchase prices

8. Which of the following degrees can be awarded by the local chapter of the FFA?

   I. Greenhand FFA Degree
   II. Chapter FFA Degree
   III. State FFA Degree
   IV. American FFA Degree

   (A) I only
   (B) II only
   (C) I and II only
   (D) I, II, III, and IV

9. Which of the following concepts in ***Robert's Rules of Order*** requires that motions be dealt with in order of importance?

   (A) Order of business
   (B) Orders of the day
   (C) Order of precedence
   (D) Point of order

10. The primary purpose of a Supervised Agricultural Experience (SAE) program is to

    (A) provide a basis for students to apply for and win proficiency awards
    (B) provide students with an income to be used to learn money management skills
    (C) give students a chance to earn enough money to qualify for local, state, and national FFA degrees
    (D) allow students to apply skills learned in the classroom and learn new skills in a specialized area

11. Which of the following is a type of bacterium that produces a toxin in food under anaerobic conditions?

    (A) *Clostridium botulinum*
    (B) *Clostridium tetani*
    (C) *Mycobacterium bovis*
    (D) *Staphylococcus aureus*

12. Which of the following is a likely outcome of the development and use of genetically modified plants?

    (A) Reduced cost of plant seeds
    (B) New plant varieties being patented
    (C) Increased genetic diversity within a planted field
    (D) Less oversight and fewer regulations than for unmodified crops

13. Which of the following most likely indicates the presence of water in the hydraulic system in a piece of farm machinery?

    (A) A grayish, milky fluid
    (B) Excessive fluid use
    (C) Excessive thinning of the fluid
    (D) A noisy relief valve

14. Which of the following actions is most important before removing the blade from a gas-powered lawn mower?

    (A) Adjusting the wheels to their highest level
    (B) Removing the spark plug
    (C) Emptying the gas tank
    (D) Removing the air filter

15. Which of the following is the best power hand tool and the best position for cutting a 14-inch wide by 8-foot long strip from a 4-foot-wide by 8-foot-long sheet of plywood?

    (A) A portable jigsaw, with the plywood's A side facing up
    (B) A portable jigsaw, with the plywood's C side facing up
    (C) A portable circular saw, with the plywood's A side facing up
    (D) A portable circular saw, with the plywood's C side facing up

16. Which of the following is a disorder in ruminants that is characterized by an excessive accumulation of gas in the rumen?

    (A) Agalactia
    (B) Bloat
    (C) Bovine pleuropneumonia
    (D) Grass tetany

17. An electric fence installed to keep both mature cattle and sheep in a field should have a wire placed at which of the following heights?

    I. 6 inches
    II. 18 inches
    III. 40 inches
    IV. 60 inches

    (A) I only
    (B) II only
    (C) II and III only
    (D) III and IV only

18. Which of the following methods of reforestation has the lowest direct cost but is also the slowest method and the least reliable?

    (A) Natural seeding
    (B) Direct seeding
    (C) Planting seedlings
    (D) Planting cuttings

19. Continued high agricultural production by farms in the United States depends most on which of the following natural resources?

    (A) Coal
    (B) Limestone
    (C) Gypsum
    (D) Petroleum

20. Which of the following is a true statement about the flow of energy in an ecosystem?

    (A) Smaller organisms need less energy per gram of body weight than do larger organisms.
    (B) Energy transfer between organisms normally involves conservation of heat energy.
    (C) Energy flow between trophic levels is inefficient.
    (D) Chemical energy is converted into radiant energy, which is then converted into chemical energy at the next trophic level.

21. If the permeability of subsoil is rapid, the subsoil texture is most likely classified as

    (A) coarse
    (B) medium
    (C) fine
    (D) silty

22. Moderate and frequent irrigation is normally most appropriate for a corn crop growing in a

    (A) dispersed alluvial fan soil
    (B) heavy-textured soil, such as silty clay
    (C) light-textured soil, such as loamy sand
    (D) region of low humidity

23. The loss of water in the form of vapor from plants is referred to as the

    (A) transpiration
    (B) respiration
    (C) oxidation
    (D) condensation

24. The maximum depth that plant roots can readily penetrate without encountering a restrictive soil layer is referred to as the

    (A) effective depth
    (B) depth to the subsoil
    (C) depth to a parent material
    (D) O horizon

25. Soil structure refers to which of the following?
    (A) Arrangement of soil particles
    (B) Proportion of sand, silt, and clay
    (C) Organic composition
    (D) Profile depth

26. Which of the following best describes an effect of the green revolution in the 1960s?
    (A) Increased varieties of each crop planted
    (B) Increased use of fertilizers
    (C) Decreased use of mechanization
    (D) Decreased use of pesticides

27. Which of the following is part of a farm combine?
    (A) Beater
    (B) Conditioner
    (C) Seed plate
    (D) Furrow opener

28. The principles of xeriscaping are best exemplified by a homeowner who
    (A) installs an in-ground sprinkler system that operates on a timer
    (B) lowers the cutting height on the lawn mower to reduce the surface area in contact with the cutting blade
    (C) increases the use of fertilizer on the turfgrass to promote growth
    (D) replaces nonnative ornamentals with native shrubs that do not require irrigation

Questions 29-30 relate to a market steer project.

Jan. 1 purchased:
1 feeder calf, 600 pounds @ $200.00 / cwt
2 tons ground corn @ $10.50 / cwt
1 ton hay @ $125.00 / ton
Aug. 1 sold:
1 finished steer, 1,100 pounds @ $185.00 / cwt

29. If one considers the purchase price of the steer, the sales price of the steer, and the cost of the feed, the net income is closest to which of the following?
    (A) $290.00
    (B) $415.00
    (C) $700.00
    (D) $835.00

30. If the steer is fed 1 ton of corn and 2 tons of hay and has the same weight gain, the net income will be closest to which of the following?
    (A) $165.00
    (B) $375.00
    (C) $585.00
    (D) $625.00

Answers to Sample Questions

1. The correct answer is (D). A staminate flower is one that contains stamens, the male reproductive parts of a flower. A staminate flower does not contain a pistil, the female reproductive part of a flower. In pistillate flowers, the stamens are not present. All other labeled flower parts in the diagram are present in both staminate and pistillate flowers.

2. The correct answer is (C). The swollen base of a flower-supporting stem is the receptacle.

3. The correct answer is (C). The overirrigated lands usually receive very low rainfall and have high temperatures and high rates of evaporation. There is insufficient water and drainage to flush out the salts that have accumulated over the years.

4. The correct answer is (A). The tractor's value will drop by $30,000 (from $40,000 to $10,000) over 20 years. The annual loss in value (depreciation) thus averages $1,500 per year

5. The correct answer is (D). Of the products listed, only pork has several substitutes that consumers can buy if the price of pork becomes too high.

6. The correct answers are (A) and (C). Tariffs and quotas place certain restrictions on imported products; such restrictions lead to an increase in domestic prices and production.

7. The correct answer is (C). Changes in market price have a greater influence on returns than do most other inputs.

8. The correct answer is (C). FFA degrees, in order from the lowest to the highest level, are Greenhand, Chapter, State, and American. The first two degrees are awarded by the local chapter. The third degree is given by the state association, and the American FFA Degree is given by the National FFA Organization.

9. The correct answer is (C). *Robert's Rules of Order* states that motions must be taken in order of priority, or precedence. Order of business is the usual agenda that an organization will follow in conducting its meetings. Orders of the day is a privileged motion used when the agenda is not being followed. Point of order is an incidental motion used to stop incorrect actions and to insist on the enforcement of parliamentary rules.

10. The correct answer is (D). Learning by applying acquired skills while acquiring new skills in a specialized area is the primary purpose of SAE programs.

11. The correct answer is (A). *Clostridium botulinum* is a spore-forming, strictly anaerobic bacterium. Active *Clostridium botulinum* produces a potent neurotoxin known as botulinum toxin that causes food-borne botulism. *Clostridium tetani* is also anaerobic but is not food-borne. Bacteria in (C) and (D) are not anaerobic.

12. The correct answer is (B). Biotechnology companies will patent new varieties of plants. (A) is incorrect because new seeds will cost more as biotechnology companies attempt to recover their investment in developing new varieties. (C) is incorrect because genetic variety does not increase within a field; the plants in the field will be the same genetically. (D) is incorrect because the oversight and regulation will be the same or stricter than those for nongenetically modified plants.

13. The correct answer is (A). A grayish, milky fluid is indicative of water in the hydraulic system.

14. The correct answer is (B). Before working on or near the blade of a lawn mower, it is important to remove the spark plug to prevent the lawn mower from accidentally starting.

15. The correct answer is (D). The portable circular saw is the best power hand tool for performing a straight cut. Because the blade teeth move in an upward motion through the wood, the lower-quality C side of the plywood should be facing up in order to avoid splinter damage to the more valuable A side of the plywood.

16. The correct answer is (B). Bloat is the visible distension of the belly that is caused by excessive buildup of gases in the rumen.

17. The correct answer is (C). Electric fence wire should be placed at the height at which it can be easily touched by the animal's nose, because the nose is often damp and is therefore especially sensitive to electricity. However, the wire must not be so high or so low that the animal can pass beneath or jump over it without touching the wire. Recommended wire heights for cattle and horses are 30 to 40 inches and for hogs and sheep are 6 to 18 inches. Because the stock to be kept in the field are mature cattle and sheep, two wires should be used, at 40-inch and 18-inch heights.

18. The correct answer is (A). Natural seeding is the least expensive because it requires the least labor and has the lowest machine costs. Natural seeding is also the least reliable and slowest because there are more uncontrolled variables compared to the other methods (e.g., availability of seed).

19. The correct answer is (D). The United States agricultural system is based on energy derived from petroleum products: first, fuels for mechanization; second, petroleum-based pesticides and herbicides; and third, petroleum-based products for fertilizers.

20. The correct answer is (C). Biologists estimate that approximately 90 percent of the energy is lost between levels of an energy pyramid. Thus, it is true that energy is inefficiently transferred between trophic levels.

21. The correct answer is (A). Permeability refers to the ability of air and water to pass through the subsoil. Coarse-textured soils have larger particles (sand) and larger spaces between the particles that facilitate the passage of water and air. The smaller particles characteristic of soils with medium and fine textures provide more of a barrier to air and water movement.

22. The correct answer is (C). Water drains rapidly out of light-textured soils, leaving the root zone dry. Moderate, frequent applications of water will provide more consistent moisture in the root zone than will infrequent, heavy watering.

23. The correct answer is (A). Transpiration is the release of water vapor from the leaves of vascular plants through pores called stomata. This flow of water vapor out of the leaves causes water to rise from the roots through the xylem.

24. The correct answer is (A). The subsoil is easily penetrated by plant roots, and its depth is included in the effective depth measurement. Depending on the makeup of the parent material, effective depth may end at the beginning of the parent material. Very often, however, the parent material is nonrestrictive in the upper portion and is therefore included in the effective depth. The O horizon is the organic layer on the surface of the soil.

25. The correct answer is (A). Soil structure is defined as the arrangement of soil particles.

26. The correct answer is (B). The green revolution was characterized by increased crop production as a result of the use of specific varieties of crops, fertilizers, and pesticides. Therefore, mechanization increased in order to deliver the fertilizers and pesticides, and a few specific varieties of crop plants replaced the larger number of varieties that had been previously planted.

27. The correct answer is (A). The beater on a combine is a device for threshing (separating) the grain from the straw and chaff. (B), (C), and (D) are not parts of a combine; they are associated with other types of farm equipment.

28. The correct answer is (D). Only (D) illustrates xeriscaping, which refers to a set of landscaping practices that conserve moisture and reduce the water needs of a landscape.

29. The correct answer is (A). Net income for this problem is determined using the following formula and mathematical procedure:

Net income = (sales price – purchase price) – (cost of corn + cost of hay);

purchase price = (600 pounds ÷ 100) × $200 per cwt = $1,200;

sales price = (1,100 pounds ÷ 100) × $185 per cwt = $2,035;

cost of corn = (2 tons × 2,000 pounds per ton) ÷ 100 × ($10.50 per cwt) = $420;

cost of hay = 1 ton × $125 per ton = $125;

net income = ($2,035–$1,200) – ($420 +$125);

net income = $290.

30. The correct answer is (B). Net income for this problem is determined using the following formula and mathematical procedure:

Net income = (sales price – purchase price) – (cost of corn + cost of hay);

purchase price = (600 pounds ÷ 100) × $200 per cwt = $1,200;

sales price = (1,100 pounds ÷ 100) × $185 per cwt = $2,035;

cost of corn = (1 ton × 2,000 pounds per ton) ÷ 100 × ($10.50 per cwt) = $210;

cost of hay = 2 tons × $125 per ton = $250;

net income = ($2,035–$1,200) – ($210 + $250);

net income = $375.

4. Determine Your Strategy for Success

Set clear goals and deadlines so your test preparation is focused and efficient

Effective *Praxis* test preparation doesn't just happen. You'll want to set clear goals and deadlines for yourself along the way. Otherwise, you may not feel ready and confident on test day.

1) Learn what the test covers.

You may have heard that there are several different versions of the same test. It's true. You may take one version of the test and your friend may take a different version a few months later. Each test has different questions covering the same subject area, but both versions of the test measure the same skills and content knowledge.

You'll find specific information on the test you're taking on page 5, which outlines the content categories that the test measures and what percentage of the test covers each topic. Visit www.ets.org/praxis/testprep for information on other *Praxis* tests.

2) Assess how well you know the content.

Research shows that test takers tend to overestimate their preparedness—this is why some test takers assume they did well and then find out they did not pass.

The *Praxis* tests are demanding enough to require serious review of likely content, and the longer you've been away from the content, the more preparation you will most likely need. If it has been longer than a few months since you've studied your content area, make a concerted effort to prepare.

3) Collect study materials.

Gathering and organizing your materials for review are critical steps in preparing for the *Praxis* tests. Consider the following reference sources as you plan your study:

- Did you take a course in which the content area was covered? If yes, do you still have your books or your notes?
- Does your local library have a high school-level textbook in this area? Does your college library have a good introductory college-level textbook in this area?

Practice materials are available for purchase for many *Praxis* tests at www.ets.org/praxis/testprep. Test preparation materials include sample questions and answers with explanations.

4) Plan and organize your time.

You can begin to plan and organize your time while you are still collecting materials. Allow yourself plenty of review time to avoid cramming new material at the end. Here are a few tips:

- Choose a test date far enough in the future to leave you plenty of preparation time. Test dates can be found at www.ets.org/praxis/register/dates_centers.
- Work backward from that date to figure out how much time you will need for review.
- Set a realistic schedule—and stick to it.

5) Practice explaining the key concepts.

Praxis tests with constructed-response questions assess your ability to explain material effectively. As a teacher, you'll need to be able to explain concepts and processes to students in a clear, understandable way. What are the major concepts you will be required to teach? Can you explain them in your own words accurately, completely, and clearly? Practice explaining these concepts to test your ability to effectively explain what you know.

6) Understand how questions will be scored.

Scoring information can be found on page 52.

7) Develop a study plan.

A study plan provides a road map to prepare for the *Praxis* tests. It can help you understand what skills and knowledge are covered on the test and where to focus your attention. Use the study plan template on page 31 to organize your efforts.

And most important—get started!

Would a Study Group Work for You?

Using this guide as part of a study group

People who have a lot of studying to do sometimes find it helpful to form a study group with others who are working toward the same goal. Study groups give members opportunities to ask questions and get detailed answers. In a group, some members usually have a better understanding of certain topics, while others in the group may be better at other topics. As members take turns explaining concepts to one another, everyone builds self-confidence.

If the group encounters a question that none of the members can answer well, the group can go to a teacher or other expert and get answers efficiently. Because study groups schedule regular meetings, members study in a more disciplined fashion. They also gain emotional support. The group should be large enough so that multiple people can contribute different kinds of knowledge, but small enough so that it stays focused. Often, three to six members is a good size.

Here are some ways to use this guide as part of a study group:

- **Plan the group's study program.** Parts of the study plan template, beginning on page 31 can help to structure your group's study program. By filling out the first five columns and sharing the worksheets, everyone will learn more about your group's mix of abilities and about the resources, such as textbooks, that members can share with the group. In the sixth column ("Dates I will study the content"), you can create an overall schedule for your group's study program.
- **Plan individual group sessions.** At the end of each session, the group should decide what specific topics will be covered at the next meeting and who will present each topic. Use the topic headings and subheadings in the Test at a Glance table on page 5 to select topics, and then select practice questions, beginning on page 19.
- **Prepare your presentation for the group.** When it's your turn to present, prepare something that is more than a lecture. Write two or three original questions to pose to the group. Practicing writing actual questions can help you better understand the topics covered on the test as well as the types of questions you will encounter on the test. It will also give other members of the group extra practice at answering questions.

- **Take a practice test together.** The idea of a practice test is to simulate an actual administration of the test, so scheduling a test session with the group will add to the realism and may also help boost everyone's confidence. Remember, complete the practice test using only the time that will be allotted for that test on your administration day.
- **Learn from the results of the practice test.** Review the results of the practice test, including the number of questions answered correctly in each content category. For tests that contain constructed-response questions, look at the Sample Test Questions section, which also contain sample responses to those questions and shows how they were scored. Then try to follow the same guidelines that the test scorers use.
- **Be as critical as you can.** You're not doing your study partner(s) any favors by letting them get away with an answer that does not cover all parts of the question adequately.
- **Be specific.** Write comments that are as detailed as the comments about the sample responses. Indicate where and how your study partner(s) are doing an inadequate job of answering the question. Writing notes in the margins of the answer sheet may also help.
- **Be supportive.** Include comments that point out what your study partner(s) got right.

Then plan one or more study sessions based on aspects of the questions on which group members performed poorly. For example, each group member might be responsible for rewriting one paragraph of a response in which someone else did an inadequate job.

Whether you decide to study alone or with a group, remember that the best way to prepare is to have an organized plan. The plan should set goals based on specific topics and skills that you need to learn, and it should commit you to a realistic set of deadlines for meeting those goals. Then you need to discipline yourself to stick with your plan and accomplish your goals on schedule.

5. Develop Your Study Plan

Develop a personalized study plan and schedule

Planning your study time is important because it will help ensure that you review all content areas covered on the test. Use the sample study plan below as a guide. It shows a plan for the *Core Academic Skills for Educators: Reading* test. Following that is a study plan template that you can fill out to create your own plan. Use the "Learn about Your Test" and "Test Specifications" information beginning on page 5 to help complete it.

Use this worksheet to:
1. **Define Content Areas:** List the most important content areas for your test as defined in chapter 1.
2. **Determine Strengths and Weaknesses:** Identify your strengths and weaknesses in each content area.
3. **Identify Resources:** Identify the books, courses, and other resources you plan to use for each content area.
4. **Study:** Create and commit to a schedule that provides for regular study periods.

Praxis Test Name (Test Code): Core Academic Skills for Educators: Reading (5712)
Test Date: 9/15/15

Content covered	Description of content	How well do I know the content? (scale 1–5)	What resources do I have/need for the content?	Where can I find the resources I need?	Dates I will study the content	Date completed
Key Ideas and Details						
Close reading	Draw inferences and implications from the directly stated content of a reading selection	3	Middle school English textbook	College library, middle school teacher	7/15/15	7/15/15
Determining Ideas	Identify summaries or paraphrases of the main idea or primary purpose of a reading selection	3	Middle school English textbook	College library, middle school teacher	7/17/15	7/17/15
Determining Ideas	Identify summaries or paraphrases of the supporting ideas and specific details in a reading selection	3	Middle and high school English textbook	College library, middle and high school teachers	7/20/15	7/21/15
Craft, Structure, and Language Skills						
Interpreting tone	Determine the author's attitude toward material discussed in a reading selection	4	Middle and high school English textbook	College library, middle and high school teachers	7/25/15	7/26/15
Analysis of structure	Identify key transition words and phrases in a reading selection and how they are used	3	Middle and high school English textbook, dictionary	College library, middle and high school teachers	7/25/15	7/27/15
Analysis of structure	Identify how a reading selection is organized in terms of cause/effect, compare/contrast, problem/solution, etc.	5	High school textbook, college course notes	College library, course notes, high school teacher, college professor	8/1/15	8/1/15
Author's purpose	Determine the role that an idea, reference, or piece of information plays in an author's discussion or argument	5	High school textbook, college course notes	College library, course notes, high school teacher, college professor	8/1/15	8/1/15

(continued on next page)

Content covered	Description of content	How well do I know the content? (scale 1–5)	What resources do I have/need for the content?	Where can I find the resources I need?	Dates I will study the content	Date completed
Language in different contexts	Determine whether information presented in a reading selection is presented as fact or opinion	4	High school textbook, college course notes	College library, course notes, high school teacher, college professor	8/1/15	8/1/15
Contextual meaning	Identify the meanings of words as they are used in the context of a reading selection	2	High school textbook, college course notes	College library, course notes, high school teacher, college professor	8/1/15	8/1/15
Figurative Language	Understand figurative language and nuances in word meanings	2	High school textbook, college course notes	College library, course notes, high school teacher, college professor	8/8/15	8/8/15
Vocabulary range	Understand a range of words and phrases sufficient for reading at the college and career readiness level	2	High school textbook, college course notes	College library, course notes, high school teacher, college professor	8/15/15	8/17/15
Integration of Knowledge and Ideas						
Diverse media and formats	Analyze content presented in diverse media and formats, including visually and quantitatively, as well as in words	2	High school textbook, college course notes	College library, course notes, high school teacher, college professor	8/22/15	8/24/15
Evaluation of arguments	Identify the relationship among ideas presented in a reading selection	4	High school textbook, college course notes	College library, course notes, high school teacher, college professor	8/24/15	8/24/15
Evaluation of arguments	Determine whether evidence strengthens, weakens, or is relevant to the arguments in a reading selection	3	High school textbook, college course notes	College library, course notes, high school teacher, college professor	8/27/15	8/27/15
Evaluation of arguments	Determine the logical assumptions upon which an argument or conclusion is based	5	High school textbook, college course notes	College library, course notes, high school teacher, college professor	8/28/15	8/30/15
Evaluation of arguments	Draw conclusions from material presented in a reading selection	5	High school textbook, college course notes	College library, course notes, high school teacher, college professor	8/30/15	8/31/15
Comparison of texts	Recognize or predict ideas or situations that are extensions of or similar to what has been presented in a reading selection	4	High school textbook, college course notes	College library, course notes, high school teacher, college professor	9/3/15	9/4/15
Comparison of texts	Apply ideas presented in a reading selection to other situations	2	High school textbook, college course notes	College library, course notes, high school teacher, college professor	9/5/15	9/6/15

My Study Plan

Use this worksheet to:

1. **Define Content Areas:** List the most important content areas for your test as defined in chapter 1.
2. **Determine Strengths and Weaknesses:** Identify your strengths and weaknesses in each content area.
3. **Identify Resources:** Identify the books, courses, and other resources you plan to use for each content area.
4. **Study:** Create and commit to a schedule that provides for regular study periods.

Praxis Test Name (Test Code): _____

Test Date: _____

Content covered	Description of content	How well do I know the content? (scale 1–5)	What resources do I have/need for this content?	Where can I find the resources I need?	Dates I will study this content	Date completed

(continued on next page)

Content covered	Description of content	How well do I know the content? (scale 1–5)	What resources do I have/need for the content?	Where can I find the resources I need?	Dates I will study the content	Date completed

6. Review Study Topics

Review study topics with questions for discussion

Using the Study Topics That Follow

The Agriculture test is designed to measure the knowledge and skills necessary for a beginning teacher.

This chapter is intended to help you organize your preparation for the test and to give you a clear indication of the depth and breadth of the knowledge required for success on the test.

Virtually all accredited programs address the topics covered by the test; however, you are not expected to be an expert on all aspects of the topics that follow.

You are likely to find that the topics below are covered by most introductory textbooks. Consult materials and resources, including lecture and laboratory notes, from all your coursework. You should be able to match up specific topics and subtopics with what you have covered in your courses.

Try not to be overwhelmed by the volume and scope of content knowledge in this guide. Although a specific term may not seem familiar as you see it here, you might find you can understand it when applied to a real-life situation. Many of the items on the actual test will provide you with a context to apply to these topics or terms.

Discussion Areas

Interspersed throughout the study topics are discussion areas, presented as open-ended questions or statements. These discussion areas are intended to help test your knowledge of fundamental concepts and your ability to apply those concepts to situations in the classroom or the real world. Most of the areas require you to combine several pieces of knowledge to formulate an integrated understanding and response. If you spend time on these areas, you will gain increased understanding and facility with the subject matter covered on the test. You may want to discuss these areas and your answers with a teacher or mentor.

Note that this study companion *does **not** provide answers for the discussion area questions*, but thinking about the answers to them will help improve your understanding of fundamental concepts and will probably help you answer a broad range of questions on the test.

Study Topics

An overview of the areas covered on the test, along with their subareas, follows.

I. Agribusiness Systems

A. Know the principles of capitalism and entrepreneurship in the agribusiness industry

1. Describe how supply and demand interact to determine the price of agricultural commodities
2. Describe the law of diminishing returns
3. Distinguish between fixed and variable costs
4. Distinguish between marginal cost and marginal return
5. Distinguish between inputs and outputs, and make decisions based on costs and availability
6. Distinguish among current and noncurrent assets and liabilities
7. Identify the opportunity costs within an agribusiness
8. Compare and contrast the main characteristics of individual proprietorships, partnerships, cooperatives, and corporations
9. Distinguish among the sectors of agribusiness (e.g., producer, service, processing, and marketing)
10. Identify methods of reducing risk in an agribusiness

B. Know the management skills needed to organize an agribusiness

1. Identify and describe key components of a contract and a lease
2. Describe diversification and specialization in agribusiness
3. Understand basic management skills (e.g., scheduling, hiring, purchasing)
4. Describe the components of an agribusiness plan
5. Understand steps in the management decision-making process

C. Know the record keeping needed to accomplish agribusiness objectives

1. Describe the purposes of enterprise records
2. Develop and complete an enterprise budget
3. Develop a balance sheet and analyzes its uses
4. Complete and interpret a cash-flow statement
5. Identify the components of a completed inventory
6. Describe depreciation
7. Develop an income/expense statement and describe its purposes

D. Is familiar with generally accepted accounting practices for making agribusiness decisions

1. Describe the differences between single- and double-entry methods of accounting
2. Complete a break-even analysis for an enterprise
3. Analyze the important financial ratios and calculations (e.g., net worth, debt to equity, solvency)

E. Is familiar with the fundamentals of savings, investments, and credit in agribusiness

1. Identify the importance of a savings and investment plan
2. Identify the sources of credit
3. Describe ways to build and maintain credit
4. Describe a business proposal

F. Is familiar with the marketing principles needed to accomplish agribusiness objectives

1. Describe the components and purpose of a promotional campaign
2. Describe key factors involved in marketing (e.g., product knowledge, service knowledge, customer knowledge)
3. Describe how market prices and cycles affect agricultural commodities
4. Describe commodity futures and options trading
5. Distinguish between hedging and speculation

Discussion areas: Agribusiness Systems

- How does the law of diminishing returns affect decision making in agricultural production?
- How are proprietorships, partnerships, cooperatives, and corporations alike, and how are they different?

- How do the major risk-reducing strategies affect decisions concerning production and marketing of agricultural commodities?
- How do diversification and specialization affect management skills needed in agribusiness organization?
- How is an enterprise budget developed, and how is it used to accomplish agribusiness objectives?
- How should a cash-flow statement be used to inform buying and selling agribusiness assets?
- What are the important financial ratios used in agribusiness, and how are they used to make agribusiness decisions?
- What are the advantages and disadvantages of the major sources of credit available in agribusiness?
- What are the major methods used to build and maintain credit, and how do credit ratings affect agribusiness?
- How should the key factors involved in marketing affect a promotional market campaign to accomplish agribusiness objectives?
- How do hedging and speculation affect an agribusiness?

II. Animal Systems

A. Is familiar with the historical development and trends of the animal systems industry

1. Explain past, current, and emerging trends related to the animal agricultural industry
2. Describe the domestication of animals

B. Know the classification, anatomical, and physiological characteristics of animals

1. Identify the major species of livestock
2. Understand the taxonomical classification system of animals
3. Identify the structure and function of the major body systems of animals (e.g., digestive, reproductive, respiratory)
4. Define terms used to distinguish animals by sex, age, and physical traits in livestock

C. Is familiar with proper health care of animals

1. Describe the use of vaccination and immunization in the animal science industry
2. Select proper routes of administration of medications and vaccines on various animal species
3. Describe methods of controlling parasites of livestock
4. Describe noninfectious and infectious diseases and disorders

D. Know basic principles of animal nutrition

1. Describe the importance of proper nutrition for animal production
2. Differentiate between ruminant and nonruminant digestion
3. Identify the major groups of nutrients (e.g., proteins, carbohydrates, minerals)
4. Describe the general principles involved in balancing a ration
5. Calculate a balanced ration given animal requirements and feed composition using the Pearson's square method
6. Describe symptoms of common nutrient deficiencies

E. Know the basic principles of animal production and management

1. Select market and breeding livestock based on visual assessment
2. Select animals to cull based on performance data
3. Describe grading systems of livestock (e.g., feeder, quality, and yield)
4. Interpret expected progeny differences (EPDs) to make production decisions
5. Describe processes involved in cell division, including how genes affect the transmission of characteristics
6. Complete Punnett square crosses for one-factor and two-factor crosses
7. Define phenotype and genotype of animals
8. Describe management procedures needed for effective livestock production (e.g., castration, docking, dehorning)
9. Define crossbreeding, grading up, inbreeding, linebreeding, and purebred breeding

F. Know safety practices related to animal production

1. Describe basic procedures for handling animal materials (e.g., vaccinations, supplements)
2. Describe safe animal-handling procedures
3. Identify the components of a safety and biosecurity plan for a specific class of animals

G. Is familiar with normal and abnormal animal behavior

1. Differentiate between normal and abnormal behavior in common livestock animals
2. Identify causes of abnormal behavior in common livestock animals

H. Is familiar with the proper design and use of animal facilities and the equipment for safe and efficient production

1. Identify common styles of facilities for common livestock production (dairy cattle, swine, beef cattle, etc.)
2. Identify safe and effective facility designs based on animal species and environment
3. Describe equipment needed for safe and effective handling of common livestock animals (e.g., squeeze chute, twitch, grooming stand, etc.)

I. Know the principles and practices of basic animal reproduction

1. Define terminology related to reproductive management and breeding systems, including castration, estrous, gestation, lactation, parturition
2. Explain the role of the estrous cycle, ovulation, heat detection, and fertilization in animal reproduction management
3. Identify practices and principles related to animal reproduction (e.g., artificial insemination, embryo transfer, selective breeding)

J. Is familiar with the effects of environmental conditions on animal production

1. Understand that various environmental conditions affect animal agriculture (e.g., air, water, temperature)
2. Describe the effect of detrimental environmental conditions on livestock (e.g., health, production, reproduction)

K. Is familiar with the impacts of animal production on the environment

1. Describe environmental conditions affected by animal production
2. Describe the importance of a waste-management and animal-disposal plan for livestock operations

L. Is familiar with the issues related to animal rights, animal welfare, and producer responsibilities

1. Differentiate between animal welfare and animal rights
2. Describe the United States Department of Agriculture (USDA) inspection process for livestock processing and handling facilities

Discussion areas: Animal Systems

- How do past trends in the agriculture industry compare to today's trends (e.g., diet, availability, genetics, and technology)?
- How has the domestication of animals affected the development of the agriculture industry?
- What are the characteristics of the most important animals in the United States agriculture industry?
- What are the functions of major body systems in animals, and how do the systems interact?

- What are common vaccines given today for diseases that at one time destroyed entire herds?
- What are the benefits of giving a subcutaneous injection versus an intramuscular injection?
- How are parasites transmitted and how are they controlled?
- How do differences between ruminant and nonruminant digestive systems affect management of the two groups?
- What types of decisions can be made using expected progeny differences (EPDs)?
- How can a Punnett square be used to determine the probability of offspring genotypes and phenotypes resulting from a given dihybrid cross?
- Why do many feedlots have high, closed-in fences for loading livestock?
- What are three biosecurity measures that a lamb feedlot should have in place?
- What are the symptoms of a horse with colic?
- How are observations of abnormal behavior used to make management decisions for common livestock?
- Identify equipment and procedures for handling livestock when performing common management practices (e.g., palpation, washing, shoeing, branding).
- How do the needs of common livestock affect the design of facilities?
- What are the stages of the estrous cycle in a sexually mature mare, and what are the characteristics of each stage?
- What are the advantages and disadvantages of artificial insemination and embryo transfer?
- What role do artificial insemination and embryo transfer have in selective breeding?
- How do extreme variations in environmental conditions affect the overall productivity of different types of livestock?
- Explain how variations in environmental conditions affect the different physiological systems in livestock.
- Which carcass-disposal and waste-disposal methods have the least impact on the environment?
- How do the concerns of animal welfare and animal rights organizations affect management decisions of animal production?
- What steps are involved in inspecting animals antemortem?

III. Food Science and Biotechnology Systems

A. Know major issues and trends affecting the food products and processing industry

1. Identify major trends and developments in the food products and processing industry (e.g., buy local, free range, irradiated beef)
2. Describe dietary trends affecting the food industry (e.g., low fat, sugar free, gluten free)

B. Is familiar with industry organizations, groups, and regulatory agencies that affect the food products and processing industry

1. Identify major industry organizations, groups, and agencies that affect food products and processing
2. Describe how the USDA and the United States Food and Drug Administration (FDA) regulate the food products and processing industry (e.g., country-of-origin labeling, nutrition labeling, and inspections)

C. Is familiar with the safety principles and recommended equipment and facility management practices related to the food products and processing industry

1. Define the hazard analysis and critical control points (HACCP) and other major food safety practices
2. Describe the importance of controlled features in the processing of food (e.g., temperature, moisture, sanitation)

D. Is familiar with selecting, harvesting, processing, and classifying food products for storage, distribution, and consumption

1. Describe the purpose of grading to select food products for a specific use
2. Describe the methods by which value can be added to agricultural commodities
3. Identify basic processing techniques (e.g., preservation, homogenization, meat fabrication)

E. Is familiar with major innovations, historical developments, and applications of biotechnology in agriculture

1. Identify the major biotechnological innovations (e.g., increased yields, herbicide tolerance, and insect resistance)
2. Describe the advantages provided to the local producer by the application of advances in biotechnology

F. Is familiar with the ethical, legal, social, cultural, safety, and environmental issues related to biotechnology

1. Identify the major legal and ethical issues surrounding the adoption of biotechnology
2. Identify the social and cultural issues related to agricultural biotechnology (e.g., resistance to the use of genetically modified organisms [GMO], hormones)
3. Identify the economic impact of biotechnology
4. Describe the environmental issues related to agricultural biotechnology (e.g., herbicide resistance in weeds, beneficial-insect decline)

G. Know basic, safe laboratory procedures

1. Identify the principles of aseptic technique
2. Identify hazards in a biotechnology lab
3. Identify the safety equipment needed to properly conduct a laboratory experiment
4. Describe safe handling of laboratory materials, chemicals, and equipment

H. Is familiar with the various uses of genetic engineering in the agricultural industry

1. Identify the uses of genetic engineering, cloning, stem-cell research in agriculture
2. Identify the purpose of genetically modifying organisms in agriculture

Discussion areas: Food Science and Biotechnology Systems

- What are the major dietary trends in the United States, and how do these trends influence the production and processing of foods?
- What is the importance of industry organizations and groups and regulatory agencies to the food processing industry and to consumers?
- Specifically, what are the roles of the USDA and FDA, and how do they influence food production and processing?
- How do major food safety standards and practices influence equipment and facility management practices related to the food products and processing industry?
- What is HACCP, and how does it affect food production and processing?
- How are features such as temperature, moisture, and sanitation controlled in food production and processing, and how does the control influence the equipment and facility management practices related to the food products and processing industry?
- How do grading procedures and policies affect selecting, harvesting, processing, and classifying food products for storage, distribution, and consumption?
- What are some examples of value-added food products?
- What are some of the major innovations that have affected developments and applications of biotechnology in agriculture?
- How has the application of biotechnology advances been utilized by local producers?
- What are the major legal and ethical issues associated with the use of biotechnology, and how do these issues affect the adoption of genetically modified organisms?
- What are the common applications of genetically modified organisms, cloning, and stem-cell research in agriculture?

IV. Environmental and Natural Resource Systems

A. Is familiar with natural cycles related to environmental and natural resource management

1. Identify and explain the carbon cycle, water cycle, and nitrogen cycle as related to the environment

B. Is familiar with chemical properties related to environmental and natural resources

1. Differentiate between organic and inorganic compounds
2. Describe preemergence and postemergence herbicides
3. Describe selective and nonselective herbicides
4. Describe the effects of chemicals on organisms at different levels of the food chain (e.g., biomagnification)
5. Differentiate between point and nonpoint source pollution

C. Know the various ecosystems of the environment

1. Identify and describe the various types of ecosystems (e.g., biomes, aquatic versus terrestrial)
2. Identify biotic and abiotic factors that define an ecosystem

D. Is familiar with the ecological concepts and principles related to natural resource systems

1. Describe the benefits of rotational grazing
2. Identify common forestry harvest techniques (e.g., clear-cut, thinning)
3. Explain the process of succession in a forest
4. Describe the purpose of reforestation (e.g., soil erosion, water quality, sustainability)
5. Explain the difference between preservation and conservation
6. Describe the concepts of population growth and carrying capacity

E. Is familiar with the current issues and regulations in environmental and natural resource management

1. Identify the federal agencies responsible for environmental regulation and natural resource management (e.g., United States Environmental Protection Agency [EPA], Natural Resources Conservation Service [NRCS], and Bureau of Land Management [BLM])
2. Describe the impact of federal regulations on agriculture production (e.g., Endangered Species Act [ESA], water rights)

F. Know the use of personal protective equipment (PPE) and safety procedures related to environmental and natural resource management

1. Identify PPE and safety procedures related to environmental and natural resources (e.g., forestry, fisheries, wildlife)

G. Is familiar with the role of environmental and natural resource management in the local, state, and national economies

1. Describe the importance of hunting, trapping, fishing, and outdoor recreation to the economy
2. Know significant legislative milestones related to natural resources (e.g., Clean Air Act, Clean Water Act)
3. Explain the contributions of environmental and natural resource management to the national economy

H. Is familiar with the impact of conventional and alternative energy sources on the environment

1. Identify environmental impacts of energy production
2. Identify and explain the use of conventional and alternative energy sources (e.g., fossil fuels, solar, biomass)

I. Is familiar with wetlands and their role in the environment

1. Explain the role of wetlands in the environment and the need for wetland conservation (e.g., flood control, wildlife habitat)

J. Is familiar with the use, production, and processing of natural resources

1. Identify products derived from natural resources (e.g., wood products, fuels, fish, and wildlife)
2. Differentiate between renewable and nonrenewable resources

K. Is familiar with procedures used to develop an environmental and natural resource management plan

1. Describe population sampling techniques (e.g., quadrat sampling, electrofishing in aquatic systems, radio tracking)
2. Describe the relationship between a species and the habitat needed to support that species
3. Describe a food web
4. Explain the importance of an indicator species

L. Know the general impact of land use on environmental and natural resources

1. Describe methods used to limit erosion and runoff (e.g., buffers, windbreaks)
2. Describe best management practices and explains how they benefit the environment (e.g., stocking rate, protection of critical wildlife habitat)
3. Describe the effects of urban sprawl on the environment

Discussion areas: Environmental and Natural Resource Systems

- Explain how the major nutrients cycle between the living and nonliving components of ecosystems.
- How do agricultural production methods affect nutrient cycles?
- What is biomagnification, and how is it related to food chains?
- Why would preemergence herbicides be used instead of postemergence herbicides?
- How do biotic and abiotic factors interact within an ecosystem?
- What are the advantages and disadvantages of rotational grazing?
- What are the processes involved in population growth and carrying capacity?
- How are population growth and carrying capacity related?
- How do significant legislative decisions affect environmental and natural resource management in the local, state, and national economies?
- What are the advantages and disadvantages of conventional and alternative energy sources?
- Why is it important to conserve wetlands?
- How are renewable and nonrenewable resources alike, and how are they different?
- What are the major techniques used to sample populations?
- How are quadrant sampling, electrofishing, and radio tracking used to study populations?
- What are indicator species, and why is it important to monitor them?
- How does urban sprawl affect the environment (e.g., natural resources, pollution, and habitat destruction)?

V. Plant Systems

A. Know the historical development of plant science and its relationship with society

1. Know the development of human use of plants (e.g., food, fiber, shelter)
2. Identify the major milestones and advances of plant science (e.g., plant genetics, soil amendments)
3. Understand the importance of plants in the global food supply

B. Know general safety issues related to plant systems

1. Identify and describe safety hazards related to plant production systems (e.g., chemicals, equipment, and tools)
2. Define hazardous plant classifications (e.g., noxious, invasive)
3. Identify and understand the use of personal protective equipment (PPE)
4. Interpret material safety data sheet (MSDS) information
5. Know guidelines for safe pesticide use

C. Know the basic principles of identification, classification, anatomy, and physiology as related to plant production and management

1. Understand the taxonomical classification system of plants and the importance of binomial nomenclature
2. Differentiate between monocots and dicots
3. Describe reproductive and vegetative plant parts and their functions (e.g., roots absorption, stem support)
4. Describe major plant processes (e.g., photosynthesis, transpiration, respiration)
5. Identify and classify plants according to use and growth habits (e.g., agronomic, horticultural, annual, perennial)
6. Differentiate between herbaceous and woody plants

D. Is familiar with the influence of environmental factors on plant growth

1. Describe how temperature, light, moisture, and air affect plant growth
2. Interpret USDA Plant Hardiness Zone Maps

E. Is familiar with propagation, cultivation, and harvesting of plants

1. Describe sexual reproduction in plants (e.g., fertilization, germination, pollination)
2. Describe asexual propagation methods (e.g., cutting, layering, grafting)
3. Identify major types of cultivation for horticultural crops, including hydroponics
4. Identify major types of cultivation for agronomic crops
5. Identify harvesting techniques (e.g., hand, mechanical)

F. Know the basic characteristics of both soils and growing media and their uses

1. Identify the macronutrients and micronutrients needed for plant growth
2. Describe the role of nitrogen (N), phosphorus (P), and potassium (K) in plant growth
3. Explain the role soil pH plays in plant production
4. Understand the materials used in soilless media, such as vermiculite, perlite, sphagnum moss, and horticultural-grade sand
5. Explain soil structure and texture as related to plant growth
6. Describe the types of water in soil (e.g., gravitational, capillary, available)
7. Describe the horizons within a soil profile
8. Understand the basics of soil conservation practices

G. Is familiar with the use of integrated pest management (IPM) in plant production

1. Describe IPM and its purposes
2. Differentiate between cultural, biological, mechanical (physical), and chemical controls
3. Describe the types and uses of pesticides (e.g., herbicides, fungicides, insecticides)

H. Is familiar with production and management practices associated with horticultural crops

1. Identify proper management and production techniques related to greenhouses, orchards, gardens, and nurseries
2. Describe greenhouse structures and systems
3. Describe the divisions of horticulture: pomology, floriculture, landscape, olericulture
4. Describe the importance of growth regulators

I. Is familiar with production and management practices associated with agronomic crops

1. Identify equipment used in cultivating and harvesting agronomic crops
2. Identify and describe the production and management practices of agronomic crops
3. Explain the importance of weed and pest control in agronomic crop production
4. Describe the divisions of agronomic crops (e.g., cereal grains, forage, oil, fiber)
5. Describe the purposes of crop rotation

J. Is familiar with the principles and elements of landscape and floral design

1. Identify and describe the principles and elements of landscape and floral design

Discussion areas: Plant Systems

- Aside from food, what are other human uses for plants and plant products?
- What plants contribute most to global food supply?
- Describe the major advances in plant science over the past 60 years that have affected food production.
- What are noxious plants? What are the proper handling procedures for noxious plants?

- What personal protective equipment should be worn when applying pesticides, fungicides, or insecticides to plants?
- What are the major functions of plant parts, and how do these functions interact in normally functioning plants?
- What symptoms would be observed in a plant that does not receive proper light? Moisture? Temperature?
- What are the main factors that determine plant hardiness zones?
- What are the important differences between the major methods of asexual plant propagation?
- What factors should be considered in determining which harvesting technique to use in a specific situation?
- What are the major macronutrients and micronutrients required by plants, and what role do they play in plant growth?
- How will a plant that requires a neutral soil respond when planted in a very basic soil?
- What are the main considerations when developing and using integrated pest management (IPM)?
- What are some examples of when a physical control for a pest would be used over a chemical control?
- What are the benefits of using a biological control over a chemical control? What are the risks?
- What are common active ingredients in herbicides used to control weeds, and how do they function?
- Explain how greenhouse systems control environmental conditions.
- What are the major differences in production techniques for greenhouses, orchards, gardens, and nurseries?
- What are the specific functions of growth regulators? Give examples of how they are used with horticultural crops.
- What are the primary conditions that must be considered when designing a greenhouse?
- What are some pests that at one time destroyed crops but are now under control due to various methods of pest control?

VI. Power, Structural, and Technical Systems

A. Is familiar with the physical science principles and engineering applications associated with power, structural, and technical systems

1. Describe the basic principles of hydraulics (e.g., single-acting, double-acting cylinders)
2. Describe the basic principles of pneumatics
3. Differentiate among basic metals as they pertain to a welding shop (e.g., mild steel, cast iron, brass, and copper)
4. Describe horsepower for engines, equipment, and electrical motors
5. Differentiate among conduction, convection, and radiation
6. Describe principles of oil viscosity and lubrication

B. Is familiar with electricity and electrical wiring

1. Identify proper safety procedures with electricity and electrical wiring
2. Define common electrical terms (e.g., amp, volt, ohm, watt, kilowatt, kilowatt hour, conductor, resistance, and transformer)
3. Determine amperage, voltage, horsepower, wattage, and rpm from the nameplate on an electric motor
4. Identify the importance of grounding and ground fault circuit interrupters (GFCI)
5. Calculate electrical power usage and cost using Ohm's law
6. Interpret electrical diagrams of common 110-120 volt AC electrical circuits (e.g., single-pole switches, three-way switches, outlets, GFCI, fixtures)
7. Distinguish the differences between AC and DC circuits
8. Identify conductors and insulators

C. Is familiar with various power and energy sources

1. Describe proper safety procedures when dealing with power and energy sources
2. Compare and contrast the benefits and costs of various energy sources (e.g., wind, solar, hydro, coal, nuclear)
3. Differentiate among energy sources (e.g., internal combustion, mechanical, electrical)

D. Is familiar with the principles of power, energy transfer, and conversion

1. Describe the basic operating principles of an electric motor
2. Describe the basic principles of gears and pulleys
3. Describe gear reduction and multipliers
4. Describe the transfer of power/energy from a motor to an implement

E. Know the proper use, storage, and disposal of potentially hazardous materials common to the agricultural mechanics laboratory

1. Describe the importance of proper laboratory safety
2. Interpret safety data sheet (SDS), formerly known as material safety data sheet (MSDS), instructions and precautions
3. Identify Occupational Safety and Health Administration (OSHA) regulations regarding laboratory safety colors and uses
4. Explain the proper storage of compressed-gas bottles according to OSHA regulations
5. Describe the proper storage and disposal of hazardous materials (e.g., fuels, pesticides, paints)

F. Know the safe operation and maintenance of hand tools, power tools, and other equipment

1. Identify potential safety hazards in the agricultural mechanics laboratory
2. Identify and follow OSHA regulations
3. Identify hand tools and determine their uses
4. Identify power tools and determine their uses
5. Identify the proper use of electrical wiring tools and supplies
6. Describe the basic use and maintenance of common pneumatic shop equipment (e.g., air compressor, impact wrench)
7. Describe hand-tool and power-tool maintenance

G. Is familiar with the principles of small-engine operation, maintenance, and repair

1. Identify basic maintenance procedures and adjustments of internal combustion engines
2. Identify the basic parts of a small gas engine
3. Describe the four-stroke cycle and two-stroke cycle
4. Describe the principles of spark-ignition engine (gas) operation
5. Describe the basic principles of compression engine (diesel) operation
6. Identify the different fuels used in internal combustion engines
7. Describe engine displacement

H. Is familiar with the planning and building of structures

1. Describe safety practices associated with building construction
2. Read and interpret project plans for agricultural-structure projects
3. Discuss the importance of slope, elevation, and grades in site preparation
4. Identify types and designs of buildings
5. Identify and select construction materials.
6. Calculate a bill of materials
7. Define basic framing terminology (e.g., studs, headers, cripple studs)
8. Describe the purpose of walls, types of walls, supports, and siding used in agricultural buildings
9. Identify factors affecting the heating, cooling, and ventilation of agricultural structures

I. Is familiar with metal fabrication and welding

1. Describe and identify metal shop safety procedures and equipment
2. Describe different types of welding (e.g., shielded metal-arc welding (SMAW), gas metal-arc welding (GMAW), flux-cored arc welding (FCAW), and tungsten-inert gas (TIG) welding, oxy-fuel welding, and brazing)
3. Identify common welds or welding joints (e.g., lap, butt, fillet)
4. Describe basic arc welding procedures and terminology (e.g., positions, classifying rods, polarity)
5. Describe proper metal cutting practices (e.g., oxy-fuel, plasma, cutoff saws, and shears)

6. Describe basic oxy-fuel welding procedures and terminology (e.g., positions, equipment setup and selection)
7. Describe the fundamentals of cold metal work

J. Is familiar with the installation, maintenance, and repair of water systems

1. Describe safety practices for plumbing
2. Describe the process of plastic pipe fitting
3. Describe the process of sweating copper pipe
4. Identify methods of protecting water pipes against freezing
5. Identify different plumbing materials and common joints

K. Is familiar with the application of technology to the agriculture industry

1. Define the term GIS (Geographic Information System) and explain its relationship to GPS (Global Positioning System)
2. Explain how GPS and GIS are used in precision agriculture
3. List the common applications of GPS technology in agriculture
4. Identify potential applications for computer-controlled technology (e.g., greenhouse controls, computer numerical control machines, automated equipment)

L. Is familiar with the use of technical and mathematical approaches to map land, facilities, and infrastructure

1. Determine land area in acres and location from diagrams or legal description
2. Describe basic surveying procedures and equipment
3. Calculate slope, elevation, and grades

Discussion areas: Power, Structural, and Technical Systems

- How are hydraulic and pneumatic systems similar? How are they different?
- What is oil viscosity, and how is it related to motors?
- What are the safety procedures that should be employed when working with electrical systems?
- Explain how voltage, resistance, and current are related in an electrical circuit.
- What is the difference between a kilowatt and a kilowatt hour?
- Explain how regular circuit breakers and ground fault interrupters protect people in different ways.
- What are potential dangers involved with the use of different power and energy sources?
- Discuss why the currently used energy sources have some negative impacts or issues.
- How can an electric motor be used with gears and/or pulleys to control and power an implement?
- What are the most likely sources of injury in an agricultural mechanics laboratory? What safety precautions and regulations should be followed to reduce the likelihood of these injuries?
- For specific projects, how does management determine which hand or power tools should be used and how they should be safely used?
- What are common power tools used in the agricultural mechanics laboratory? What are the uses of these power tools? What safety precautions are associated with these power tools?
- What are common electrical wiring tools used in the agricultural mechanics laboratory? What are the uses of these electrical wiring tools? What safety precautions are associated with these electrical wiring tools?
- How do the main parts of an internal combustion engine work together?
- What are the primary differences between a gasoline-powered engine and a diesel-powered engine?
- Why is it important to understand engine displacement of internal combustion engines?
- How are agricultural-structure project plans read and interpreted?
- How are slope and elevation taken into account during site selection, and preparation?
- When would one use a lap, butt, or fillet joint?

- Compare the safety practices used when installing plastic versus copper pipe.
- How is plastic pipe fitting different from using copper pipe?
- What are the basic surveying procedures and equipment, and how are they used to map land, facilities, and infrastructure?

VII. Leadership and Career Development

A. Know the principles of leadership

1. Describe the importance of personal leadership development (e.g., personality, leadership style, Maslow's hierarchy)
2. Describe various forms of leadership (e.g., democratic, authoritarian, situational)

B. Know the foundational areas of career development

1. Describe how to develop a career plan (e.g., strengths, values, interests)
2. Develop a career plan to meet career goals (e.g., education, employment, lifestyle goals)
3. Describe the various components related to job preparation (e.g., resume development, interviewing, and overall business etiquette)

C. Understand the purpose, structure, and function of the National FFA Organization

1. Identify the FFA mission statement, creed, motto, ceremonies, and salute
2. Identify different types of FFA membership
3. Describe major historical moments and figures of FFA (e.g., founded in 1928, NFA, E. M. Tiffany, girls allowed in 1969, Henry C. Groseclose)
4. Identify the constitutional officer positions and their duties
5. Know the FFA degrees
6. Understand the importance of the Program of Activities and FFA Committee structures

D. Know individual and team leadership skills

1. Understand basic parliamentary procedural motions described in the FFA manual
2. Describe proper presentation and disposal of a main motion
3. Describe the purpose of parliamentary procedure in an FFA meeting
4. Describe team-building skills (e.g., motivation, communication, influence)
5. Differentiate between the positive and negative attributes of a leader
6. Identify the importance of ethics in leadership

E. Know communication skills

1. Describe effective communication skills (e.g., written, verbal, and nonverbal)
2. Identify techniques to improve listening, reading, writing, speaking, and nonverbal communication skills

F. Know information research skills to make informed decisions

1. Describe how to determine validity and reliability of a source (e.g., author, date, bibliography, type of source)
2. Understand the scientific method

G. Understand supervised agricultural experiences (SAE)

1. Describe the purpose of an SAE
2. Describe the major types of SAEs
3. Describe how to develop an SAE program
4. Identify student advancement and awards related to the SAE program (e.g., degrees, proficiency awards)
5. Apply basic financial record-keeping skills for the establishment and maintenance of an SAE

H. Know career opportunities across the various pathways of agriculture

1. Describe the various career pathways within the Agriculture, Food, and Natural Resources Career Cluster
2. Identify the specific skills and education needed for career pathways
3. Describe agricultural careers available to students in an agricultural education program

I. Is familiar with local program planning and management

1. Identify and describe the three components of a comprehensive agricultural education program
2. Define the scope and sequence for a secondary agricultural education program
3. Identify the purpose and importance of an advisory committee
4. Identify and describe career development events (CDEs) and their purpose
5. Identify FFA award programs (e.g., degree programs and applications, proficiencies, leadership awards, scholarships)

Discussion areas: Leadership and Career Development

- What are the differences between democratic and authoritarian leadership? What are some situations where each form of leadership would be the most appropriate?
- What are parliamentary procedure motions, and when are specific motions commonly used?
- What are the four classifications of motions?
- What are some ways to improve listening skills?

7. Review Smart Tips for Success

Follow test-taking tips developed by experts

Learn from the experts. Take advantage of the following answers to questions you may have and practical tips to help you navigate the *Praxis* test and make the best use of your time.

Should I guess?

Yes. Your score is based on the number of questions you answer correctly, with no penalty or subtraction for an incorrect answer. When you don't know the answer to a question, try to eliminate any obviously wrong answers and then guess at the correct one. Try to pace yourself so that you have enough time to carefully consider every question.

Can I answer the questions in any order?

You can answer the questions in order or skip questions and come back to them later. If you skip a question, you can also mark it so that you can remember to return and answer it later. Remember that questions left unanswered are treated the same as questions answered incorrectly, so it is to your advantage to answer every question.

Are there trick questions on the test?

No. There are no hidden meanings or trick questions. All of the questions on the test ask about subject matter knowledge in a straightforward manner.

Are there answer patterns on the test?

No. You might have heard this myth: the answers on tests follow patterns. Another myth is that there will never be more than two questions in a row with the correct answer in the same position among the choices. Neither myth is true. Select the answer you think is correct based on your knowledge of the subject.

Can I write on the scratch paper I am given?

Yes. You can work out problems on the scratch paper, make notes to yourself, or write anything at all. Your scratch paper will be destroyed after you are finished with it, so use it in any way that is helpful to you. But make sure to select or enter your answers on the computer.

Smart Tips for Taking the Test

1. **Skip the questions you find extremely difficult.** Rather than trying to answer these on your first pass through the test, you may want to leave them blank and mark them so that you can return to them later. Pay attention to the time as you answer the rest of the questions on the test, and try to finish with 10 or 15 minutes remaining so that you can go back over the questions you left blank. Even if you don't know the answer the second time you read the questions, see if you can narrow down the possible answers, and then guess. Your score is based on the number of right answers, so it is to your advantage to answer every question.

2. **Keep track of the time.** The on-screen clock will tell you how much time you have left. You will probably have plenty of time to answer all of the questions, but if you find yourself becoming bogged down, you might decide to move on and come back to any unanswered questions later.

3. **Read all of the possible answers before selecting one.** For questions that require you to select more than one answer, or to make another kind of selection, consider the most likely answers given what the question is asking. Then reread the question to be sure the answer(s) you have given really answer the question. Remember, a question that contains a phrase such as "Which of the following does NOT …" is asking for the one answer that is NOT a correct statement or conclusion.

4. **Check your answers.** If you have extra time left over at the end of the test, look over each question and make sure that you have answered it as you intended. Many test takers make careless mistakes that they could have corrected if they had checked their answers.

5. **Don't worry about your score when you are taking the test.** No one is expected to answer all of the questions correctly. Your score on this test is not analogous to your score on the *GRE*® or other tests. It doesn't matter on the *Praxis* tests whether you score very high or barely pass. If you meet the minimum passing scores for your state and you meet the state's other requirements for obtaining a teaching license, you will receive a license. In other words, what matters is meeting the minimum passing score. You can find passing scores for all states that use the *Praxis* tests at www.ets.org/praxis/institutions/scores/passing or on the web site of the state for which you are seeking certification/licensure.

6. **Use your energy to take the test, not to get frustrated by it.** Getting frustrated only increases stress and decreases the likelihood that you will do your best. Highly qualified educators and test development professionals, all with backgrounds in teaching, worked diligently to make the test a fair and valid measure of your knowledge and skills. Your state painstakingly reviewed the test before adopting it as a licensure requirement. The best thing to do is concentrate on answering the questions.

8. Check on Testing Accommodations

See if you qualify for accommodations that may make it easier to take the Praxis *test*

What if English is not my primary language?

Praxis tests are given only in English. If your primary language is not English (PLNE), you may be eligible for extended testing time. For more details, visit www.ets.org/praxis/register/plne_accommodations/.

What if I have a disability or other health-related need?

The following accommodations are available for *Praxis* test takers who meet the Americans with Disabilities Act (ADA) Amendments Act disability requirements:

- Extended testing time
- Additional rest breaks
- Separate testing room
- Writer/recorder of answers
- Test reader
- Sign language interpreter for spoken directions only
- Perkins Brailler
- Braille slate and stylus
- Printed copy of spoken directions
- Oral interpreter
- Audio test
- Braille test
- Large print test book
- Large print answer sheet
- Listening section omitted

For more information on these accommodations, visit www.ets.org/praxis/register/disabilities.

Note: Test takers who have health-related needs requiring them to bring equipment, beverages, or snacks into the testing room or to take extra or extended breaks must request these accommodations by following the procedures described in the *Bulletin Supplement for Test Takers with Disabilities or Health-Related Needs* (PDF), which can be found at https://www.ets.org/s/praxis/pdf/bulletin_supplement_test_takers_with_disabilities_health_needs.pdf.

You can find additional information on available resources for test takers with disabilities or health-related needs at www.ets.org/disabilities.

9. Do Your Best on Test Day

Get ready for test day so you will be calm and confident

You followed your study plan. You prepared for the test. Now it's time to prepare for test day.

Plan to end your review a day or two before the actual test date so you avoid cramming. Take a dry run to the test center so you're sure of the route, traffic conditions, and parking. Most of all, you want to eliminate any unexpected factors that could distract you from your ultimate goal—passing the *Praxis* test!

On the day of the test, you should:

- be well rested
- wear comfortable clothes and dress in layers
- eat before you take the test
- bring an acceptable and valid photo identification with you
- bring an approved calculator only if one is specifically permitted for the test you are taking (see Calculator Use, at ____)
- be prepared to stand in line to check in or to wait while other test takers check in

You can't control the testing situation, but you can control yourself. Stay calm. The supervisors are well trained and make every effort to provide uniform testing conditions, but don't let it bother you if the test doesn't start exactly on time. You will have the allotted amount of time once it does start.

You can think of preparing for this test as training for an athletic event. Once you've trained, prepared, and rested, give it everything you've got.

What items am I restricted from bringing into the test center?

You cannot bring into the test center personal items such as:

- handbags, knapsacks, or briefcases
- water bottles or canned or bottled beverages
- study materials, books, or notes
- pens, pencils, scrap paper, or calculators, unless specifically permitted for the test you are taking (see Calculator Use, at http://www.ets.org/praxis/test_day/policies/calculators)
- any electronic, photographic, recording, or listening devices

Personal items are not allowed in the testing room and will not be available to you during the test or during breaks. You may also be asked to empty your pockets. At some centers, you will be assigned a space to store your belongings, such as handbags and study materials. Some centers do not have secure storage space available, so please plan accordingly.

Test centers assume no responsibility for your personal items.

If you have health-related needs requiring you to bring equipment, beverages or snacks into the testing room or to take extra or extended breaks, you need to request accommodations in advance. Procedures for requesting accommodations are described in the Bulletin Supplement for Test Takers with Disabilities or Health-related Needs (PDF).

Note: All cell phones, smart phones (e.g., Android® devices, iPhones®, etc.), and other electronic, photographic, recording, or listening devices are strictly prohibited from the test center. If you are seen with such a device, you will be dismissed from the test, your test scores will be canceled, and you will forfeit your test fees. If you are seen *using* such a device, the device will be confiscated and inspected. For more information on what you can bring to the test center, visit www.ets.org/praxis/test_day/bring.

Are You Ready?

Complete this checklist to determine whether you are ready to take your test.

- ❒ Do you know the testing requirements for the license or certification you are seeking in the state(s) where you plan to teach?
- ❒ Have you followed all of the test registration procedures?
- ❒ Do you know the topics that will be covered in each test you plan to take?
- ❒ Have you reviewed any textbooks, class notes, and course readings that relate to the topics covered?
- ❒ Do you know how long the test will take and the number of questions it contains?
- ❒ Have you considered how you will pace your work?
- ❒ Are you familiar with the types of questions for your test?
- ❒ Are you familiar with the recommended test-taking strategies?
- ❒ Have you practiced by working through the practice questions in this study companion or in a study guide or practice test?
- ❒ If constructed-response questions are part of your test, do you understand the scoring criteria for these questions?
- ❒ If you are repeating a *Praxis* test, have you analyzed your previous score report to determine areas where additional study and test preparation could be useful?

If you answered "yes" to the questions above, your preparation has paid off. Now take the *Praxis* test, do your best, pass it—and begin your teaching career!

10. Understand Your Scores

Understand how tests are scored and how to interpret your test scores

Of course, passing the *Praxis* test is important to you so you need to understand what your scores mean and what your state requirements are.

What are the score requirements for my state?

States, institutions, and associations that require the tests set their own passing scores. Visit www.ets.org/praxis/states for the most up-to-date information.

If I move to another state, will my new state accept my scores?

The *Praxis* tests are part of a national testing program, meaning that they are required in many states for licensure. The advantage of a national program is that if you move to another state that also requires *Praxis* tests, you can transfer your scores. Each state has specific test requirements and passing scores, which you can find at www.ets.org/praxis/states.

How do I know whether I passed the test?

Your score report will include information on passing scores for the states you identified as recipients of your test results. If you test in a state with automatic score reporting, you will also receive passing score information for that state.

A list of states and their passing scores for each test are available online at www.ets.org/praxis/states.

What your *Praxis* scores mean

You received your score report. Now what does it mean? It's important to interpret your score report correctly and to know what to do if you have questions about your scores.

Visit http://www.ets.org/s/praxis/pdf/sample_score_report.pdf to see a sample score report.
To access *Understanding Your Praxis Scores*, a document that provides additional information on how to read your score report, visit www.ets.org/praxis/scores/understand.

Put your scores in perspective

Your score report indicates:

- Your score and whether you passed
- The range of possible scores
- The raw points available in each content category
- The range of the middle 50 percent of scores on the test

If you have taken the same *Praxis* test or other *Praxis* tests in the last 10 years, your score report also lists the highest score you earned on each test taken.

Content category scores and score interpretation

Questions on the *Praxis* tests are categorized by content. To help you in future study or in preparing to retake the test, your score report shows how many raw points you earned in each content category. Compare your "raw points earned" with the maximum points you could have earned ("raw points available"). The greater the difference, the greater the opportunity to improve your score by further study.

Score scale changes

ETS updates *Praxis* tests on a regular basis to ensure they accurately measure the knowledge and skills that are required for licensure. When tests are updated, the meaning of the score scale may change, so requirements may vary between the new and previous versions. All scores for previous, discontinued tests are valid and reportable for 10 years, provided that your state or licensing agency still accepts them.

These resources may also help you interpret your scores:

- *Understanding Your Praxis Scores* (PDF), found at www.ets.org/praxis/scores/understand
- *Praxis* Passing Scores, found at https://www.ets.org/praxis/institutions/scores/passing
- State requirements, found at www.ets.org/praxis/states

Appendix: Other Questions You May Have

Here is some supplemental information that can give you a better understanding of the *Praxis* tests.

What do the *Praxis* tests measure?

The *Praxis* tests measure the specific knowledge and skills that beginning teachers need. The tests do not measure an individual's disposition toward teaching or potential for success, nor do they measure your actual teaching ability. The assessments are designed to be comprehensive and inclusive but are limited to what can be covered in a finite number of questions and question types. Teaching requires many complex skills that are typically measured in other ways, including classroom observation, video recordings, and portfolios.

Ranging from Agriculture to World Languages, there are more than 80 *Praxis* tests, which contain selected-response questions or constructed-response questions, or a combination of both.

Who takes the tests and why?

Some colleges and universities use the *Praxis* Core Academic Skills for Educators tests (Reading, Writing, and Mathematics) to evaluate individuals for entry into teacher education programs. The assessments are generally taken early in your college career. Many states also require Core Academic Skills test scores as part of their teacher licensing process.

Individuals entering the teaching profession take the *Praxis* content and pedagogy tests as part of the teacher licensing and certification process required by many states. In addition, some professional associations and organizations require the *Praxis* Subject Assessments for professional licensing.

Do all states require these tests?

The *Praxis* tests are currently required for teacher licensure in approximately 40 states and United States territories. These tests are also used by several professional licensing agencies and by several hundred colleges and universities. Teacher candidates can test in one state and submit their scores in any other state that requires *Praxis* testing for licensure. You can find details at www.ets.org/praxis/states.

What is licensure/certification?

Licensure in any area—medicine, law, architecture, accounting, cosmetology—is an assurance to the public that the person holding the license possesses sufficient knowledge and skills to perform important occupational activities safely and effectively. In the case of teacher licensing, a license tells the public that the individual has met predefined competency standards for beginning teaching practice.

Because a license makes such a serious claim about its holder, licensure tests are usually quite demanding. In some fields, licensure tests have more than one part and last for more than one day. Candidates for licensure in all fields plan intensive study as part of their professional preparation. Some join study groups, others study alone. But preparing to take a licensure test is, in all cases, a professional activity. Because a licensure exam surveys a broad body of knowledge, preparing for a licensure exam takes planning, discipline, and sustained effort.

Why does my state require the *Praxis* tests?

Your state chose the *Praxis* tests because they assess the breadth and depth of content—called the "domain"—that your state wants its teachers to possess before they begin to teach. The level of content knowledge, reflected in the passing score, is based on recommendations of panels of teachers and teacher educators in

each subject area. The state licensing agency and, in some states, the state legislature ratify the passing scores that have been recommended by panels of teachers.

How were the tests developed?

ETS consulted with practicing teachers and teacher educators around the country during every step of the *Praxis* test development process. First, ETS asked them what knowledge and skills a beginning teacher needs to be effective. Their responses were then ranked in order of importance and reviewed by hundreds of teachers.

After the results were analyzed and consensus was reached, guidelines, or specifications, for the selected-response and constructed-response tests were developed by teachers and teacher educators. Following these guidelines, teachers and professional test developers created test questions that met content requirements and *ETS Standards for Quality and Fairness*.*

When your state adopted the research-based *Praxis* tests, local panels of teachers and teacher educators evaluated each question for its relevance to beginning teachers in your state. During this "validity study," the panel also provided a passing-score recommendation based on how many of the test questions a beginning teacher in your state would be able to answer correctly. Your state's licensing agency determined the final passing-score requirement.

ETS follows well-established industry procedures and standards designed to ensure that the tests measure what they are intended to measure. When you pass the *Praxis* tests your state requires, you are proving that you have the knowledge and skills you need to begin your teaching career.

How are the tests updated to ensure the content remains current?

Praxis tests are reviewed regularly. During the first phase of review, ETS conducts an analysis of relevant state and association standards and of the current test content. State licensure titles and the results of relevant job analyses are also considered. Revised test questions are then produced following the standard test development methodology. National advisory committees may also be convened to review and revise existing test specifications and to evaluate test forms for alignment with the specifications.

How long will it take to receive my scores?

Scores for tests that do not include constructed-response questions are available on screen immediately after the test. Scores for tests that contain constructed-response questions or essays aren't available immediately after the test because of the scoring process involved. Official score reports are available to you and your designated score recipients approximately two to three weeks after the test date for tests delivered continuously, or two to three weeks after the testing window closes for other tests. See the test dates and deadlines calendar at www.ets.org/praxis/register/dates_centers for exact score reporting dates.

Can I access my scores on the web?

All test takers can access their test scores via My *Praxis* Account free of charge for one year from the posting date. This online access replaces the mailing of a paper score report.

The process is easy—simply log into My *Praxis* Account at www.ets.org/praxis and click on your score report. If you do not already have a *Praxis* account, you must create one to view your scores.

Note: You must create a *Praxis* account to access your scores, even if you registered by mail or phone.

**ETS Standards for Quality and Fairness* (2014, Princeton, N.J.) are consistent with the *Standards for Educational and Psychological Testing*, industry standards issued jointly by the American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education (2014, Washington, D.C.).

Your teaching career is worth preparing for, so start today!

Let the Praxis® Study Companion guide you.

To search for the *Praxis* test prep resources
that meet your specific needs, visit:

www.ets.org/praxis/testprep

To purchase official test prep made by the creators
of the *Praxis* tests, visit the ETS Store:

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