CSET®

California Subject Examinations for Teachers®

TEST GUIDE

AGRICULTURE SUBTEST II

Subtest Description

This document contains the Agriculture subject matter requirements arranged according to the domains covered by Subtest II of CSET: Agriculture. In parentheses after each named domain is the domain code from the Agriculture subject matter requirements.

Agriculture
Subtest II: Animal Science; Environmental Science and Natural Resource Management

Part I: Content Domains for Subject Matter Understanding and Skill in Agriculture

ANIMAL SCIENCE (SMR Domain 3)

Candidates demonstrate a broad understanding of principles of animal science. Candidates apply this knowledge to plan and implement programs. Candidates are to be able to demonstrate an understanding of a range of topics in animal science, including anatomy and physiology of livestock, animal production practices, animal nutrition, animal genetics and reproduction, and animal facilities management.

0001 Anatomy and Physiology of Livestock (SMR 3.1)

a. Demonstrate knowledge of and compare the structure, function, and interrelationships of cells, organs, and organ systems in livestock (e.g., beef and dairy cattle, swine, sheep, horses, rabbits, poultry).
b. Demonstrate an understanding of physiological processes (e.g., digestion, respiration) of organs and organ systems in livestock.
c. Analyze the relationship between animal anatomy and physiology and the care of livestock (e.g., the relationship of the digestive system to nutrition and feeding practices, the relationship of the reproductive system to practices during parturition).
d. Demonstrate knowledge of principles and procedures for evaluating livestock and carcasses.

0002 Management and Veterinary Practices in Animal Production (SMR 3.2)

a. Demonstrate knowledge of products derived from livestock and characteristics and uses of various species and breeds of livestock.
b. Demonstrate an understanding of safe, humane, and ethical management and veterinary practices and procedures in animal production (e.g., handling, castrating, dehorning, medicating) and of the public perception of animal welfare in animal production systems.
c. Demonstrate an understanding of characteristics of healthy and unhealthy animals, as well as types, causes, symptoms, preventive actions, and treatments of common infectious and noninfectious diseases in livestock.

d.   Demonstrate knowledge of types, symptoms, effects, and life cycles of common internal and external pests and parasites and methods for preventing and treating pest and parasite infestations.

e.   Demonstrate knowledge of harvesting and inspecting meat and other animal products.

0003   Nutritional Requirements of Livestock (SMR 3.3)

a.   Demonstrate an understanding of the processes and stages of growth and development of livestock.

b.   Demonstrate knowledge of sources and functions of animal nutrients and symptoms of nutrient deficiencies.

c.   Demonstrate an understanding of the composition, classification, and nutritional value of various types of feed.

d.   Analyze factors (e.g., species, age, pregnancy, lactation, optimal weight gain) influencing nutritional requirements and feeding options.

e.   Demonstrate an understanding of types, functions, and effects of various feed additives (e.g., minerals, vitamins, antibiotics).

0004   Animal Genetics and Reproduction (SMR 3.4)

a.   Demonstrate an understanding of basic principles of inheritance and genetics (e.g., Mendelian genetics; the genetic basis of animal selection; function of genes, chromosomes, and DNA; biotechnology and cloning).

b.   Demonstrate an understanding of the processes of meiosis and fertilization.

c.   Demonstrate knowledge of animal breeding systems, methods, and procedures (e.g., crossbreeding, artificial insemination, embryo transfer).

d.   Demonstrate knowledge of the care of animals during gestation and parturition.

e.   Demonstrate knowledge of factors that influence breeding decisions (e.g., phenotype, performance records).

0005   Environmental and Facilities Management in Animal Production Systems (SMR 3.5)

a.   Demonstrate an understanding of environmental needs (e.g., range requirements, temperature control, appropriate housing) of livestock.

b.   Demonstrate knowledge of different types, characteristics, and purposes of animal facilities, tools, technology, and equipment used in various animal production systems.

c.   Demonstrate an understanding of procedures for managing waste (e.g., manure, carcasses) and maintaining sanitation in various animal production systems.

(Draft Curriculum Standards for Agriculture [2004]: Standards 1.4–1.9, 2. California Agricultural Education Career Preparation Standards: Grades 11–12 [1995]: Animal Science Career Path Standards 1–6. Agriculture Teacher Preparation in California: Standards of Quality and Effectiveness [1999]: Standard 2.)

ENVIRONMENTAL SCIENCE AND NATURAL RESOURCE MANAGEMENT
(SMR Domain 4)

Candidates demonstrate a broad understanding of principles of environmental science and natural resource management. Candidates apply this knowledge to plan and implement programs. Candidates are able to demonstrate an understanding of a range of topics in environmental science and natural resource management, including basic ecological principles and natural resources; relationships between agriculture, the environment, and society; ecosystem and resource management; and forestry.

0006   Basic Ecological Principles and Natural Resources (SMR 4.1)

a. Demonstrate an understanding of energy, water, and nutrient cycles and the concepts of niche, community, and ecosystem.
b. Demonstrate knowledge of the interrelationship between environmental factors (e.g., climate, weather, habitat) and plant and animal communities.
c. Demonstrate knowledge of types and characteristics of renewable energy and natural resources (e.g., wind power, forests, wildlife) and nonrenewable energy and natural resources (e.g., fossil fuels, minerals).
d. Demonstrate an understanding of human and agricultural dependence on natural resources and principles and methods for the sustainable use of resources.

0007   Relationships Between Agriculture, the Environment, and Society (SMR 4.2)

a. Demonstrate knowledge of impacts of agricultural production systems on the environment (e.g., runoff of fertilizers, water table depletion, salinization) and principles and methods for minimizing and mitigating environmental degradation.
b. Demonstrate knowledge of the advantages and disadvantages of different production systems (e.g., monoculture, sustainable agriculture, organic agriculture).
c. Demonstrate knowledge of the effects of environmental degradation on agricultural production (e.g., decreased productivity, loss of farmland, depletion of aquifers).
d. Demonstrate basic knowledge of social, ethical, and legal issues (e.g., stewardship, use restrictions, landowner property rights) and the role of government agencies and private organizations (e.g., Environmental Protection Agency, land trusts, Sierra Club) relating to the use and management of ecosystems and natural resources.

0008   Ecosystem and Resource Management (SMR 4.3)

a. Demonstrate knowledge of principles and methods of soil and water conservation and management (e.g., erosion control, water reclamation).
b. Demonstrate knowledge of types (e.g., rangelands, forests, wetlands), characteristics (e.g., stability), and uses (e.g., grazing, mining, logging, recreation) of important California ecosystems, as well as principles and methods for their successful management.

   c. Demonstrate knowledge of principles and methods for wildlife management (e.g., identification of major wildlife species, habitat conservation and renewal).

   d. Demonstrate knowledge of principles and methods for the management of outdoor recreation areas.

0009   Forestry (SMR 4.4)

   a. Demonstrate knowledge of major types of forests in the United States, their characteristics (e.g., dominant tree species), uses (e.g., recreation, timber, watershed), and products (e.g., softwoods, hardwoods).

   b. Demonstrate knowledge of principles and methods of forest management (e.g., timber management, multiple-use management, urban forest management).

   c. Demonstrate knowledge of the effects of social, economic, and political factors on forests.

   d. Demonstrate an understanding of the causes, control, and importance of fire in the forest and wildland ecosystems (e.g., fire chemistry and behavior, fire control methods, the fire triangle, prescribed burning).

   e. Demonstrate knowledge of tools and equipment used in forest and wildland management (e.g., compass, Global Positioning Systems [GPS], maps, surveying equipment, timber measurement tools).

(Draft Curriculum Standards for Agriculture [2004]: Standards 1.2, 7. California Agricultural Education Career Preparation Standards: Grades 11–12 [1995]: Forestry and Natural Resources Career Path Standards 1–7. Agriculture Teacher Preparation in California: Standards of Quality and Effectiveness [1999]: Standard 6.)

Part II: Subject Matter Skills and Abilities Applicable to the Content Domains in Agriculture

Candidates apply knowledge of scientific principles and methods, experimental design, measurement, and data analysis to investigate and understand agriculture-related problems and issues. Candidates understand and apply safety rules and practices in the classroom, laboratory, field, and Supervised Agricultural Experience (SAE) settings.

Candidates understand the integral relationships among classroom activities, FFA programs, and SAEs in the context of the local community. Candidates apply organizational, leadership, and communication skills to work effectively with groups and individuals (e.g., advisory committees, industry representatives, community organizations, student organizations, school leaders, elected officials). They understand the goals and purposes of SAE programs and the characteristics of different types of SAEs. They understand strategies for coordinating student SAEs and for supervising, advising, and supporting students during their experiences. Candidates understand the characteristics, functions, and organizational structures of student leadership development organizations (e.g., FFA) and their roles and responsibilities as advisors to these organizations. Candidates are able to effectively represent the agricultural program in individual and group settings in the school, community, and industry. Candidates are able to understand and respond to issues related to diversity, equity, and ethics in the agriculture program.

Candidates understand historical events, current research, and recent developments in agriculture. They are familiar with social, economic, legal, and ethical issues in the field. They apply strategies (e.g., accessing Internet resources, joining professional organizations) for staying abreast of current issues and developments in agriculture. They are able to identify industry trends and job opportunities, employers' expectations, and the personal characteristics (e.g., appropriate work habits, social and communication skills) necessary for a successful career in agriculture. They apply their knowledge to assist students in academic and career planning and development and in applying for, obtaining, and maintaining employment in agriculture and related fields.

Candidates understand the interrelationships and connections among the various subdisciplines of agriculture and between agriculture and other disciplines commonly taught in public schools. Candidates can identify and integrate themes and concepts among these disciplines and subdisciplines.