

# Agriscience Foundations

## Objective Domains

This exam certifies that a candidate has the essential knowledge and skills necessary to work professionally in an entry level position in the agriculture industry. A successful candidate can demonstrate essential skills and knowledge in the application of basic plant, animal, and soil science; food safety; agricultural safety and regulatory practices; record keeping/documentation; and an efficient and effective use of resources. **150 hours or more of instruction and/or hands-on experience should be completed prior to taking this exam.**

### 1. Health of Agricultural Systems

#### 1.1. Differentiate between healthy and unhealthy agricultural systems and habitats.

- Plants
- Domestic and wild animals
- Environment
  - i. Contamination (not including identification of a specific contaminate), erosion, point and non-point pollution.
- Explain the impacts of conservation practices on soil and water resources.

#### 1.2. Summarize basic Integrated Pest Management (IPM) practices.

- Differentiate between biological, mechanical, cultural, and chemical controls.
- Understand that there may be multiple factors contributing to problems.
- Understand the importance of maintaining beneficial insects.

#### 1.3. Describe properties of healthy soil.

- Identify macronutrients.
- Understand major soil structure and texture types.
- pH
- Organic matter

#### 1.4. Explain how water moves between the land, ocean, and atmosphere (e.g. the water cycle).

### 2. Using and Maintaining Industry Documents

#### 2.1. Maintain complete and accurate records.

- Livestock and crop production records
- Chemical application records
- Animal medication records
- Food processing records
- Time and Temperature logs
- Financial reports



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**2.2 Interpret information on labels.**

- Pesticides
  - i. Chemical name, active ingredient, signal word, type of pesticide, organic/conventional classification
- Feed
  - i. Guaranteed Analysis, intended purpose, ingredient statement, feeding instructions.
- Medicine
  - i. Medication, dose, administration, withdrawal, intended animal, warnings, side effects.
- Nutrition Fact Panel
  - i. Serving size, servings per container, nutrient values
- Seed Tag
  - i. Variety, in-row spacing, row spacing, days to maturity, seed treatment, production date, germination rate, Genetically Modified (GM) classification.
- Fertilizer
  - i. Grade Statement and Guaranteed Analysis, Nutrient Source, organic/conventional classification.
- Principal Display Panel
  - i. Brand name, common name, net weight, label claims (e.g., Organic, low-fat, good source of calcium)

**2.3 Use weights and measures to complete simple calculations using information on labels and tags.**

- Imperial and metric
- Conversions, dose calculations, pesticide rate of application, mixing solutions, land area, etc.

**2.4 Interpret information on Safety Data Sheets (SDS).**

- Section 1: Identification
- Section 2: Hazard(s) Identification
- Section 4: First-Aid Measures
- Section 5: Fire-Fighting Measures
- Section 7: Handling and Storage
- Section 8: Exposure Controls/Personal Protection

**3. Workplace Safety and Procedures****3.1 Given a Standard Operating Procedure (SOP), select and use appropriate tools and equipment for job-related tasks.**

- Select and use appropriate tools for different tasks (e.g., hand tools, power equipment, machinery, lab equipment)
- Proper cleaning and storage of tools (e.g. Need to clean tools when transitioning between systems).
- Reference and locate basic information in equipment Original Equipment Manufacturer (OEM) manuals for proper use, maintenance, and simple repair.

**3.2 Implement sanitation and cleanliness to adhere to biosecurity standards.**

- Identification/use of PPE



- Prevent contamination.
  - i. Personal hygiene
- Control pathogens and vectors.
- Lab safety practices (e.g., hair tied back, gloves, closed-toe shoes, jewelry, etc.)
- Distinguish between safe and unsafe environmental conditions (e.g., air quality, work environment, etc.).

**3.3 Summarize the contents of the Worker Protection Standard (WPS) and how it applies to the agricultural employee.**

## 4. Animal Science

**4.1 Identify different uses of animals.**

- Animal protein production
- Companionship
- Labor
- Specialty livestock (e.g., bees, aquaculture, etc.)

**4.2 Identify species-specific terminology based on gender and age.**

**4.3 Given a scenario, explain the role of flight zones in the safe handling of animals.**

**4.4 Identify principles of quality care in animal agriculture.**

- Food
- Water
- Shelter
- Health Care

## 5. Plant Science

**5.1 Explain principles of plant biology.**

- Explain the requirements necessary for photosynthesis to occur and identify the products and byproducts of photosynthesis.
- Explain the role of each part of a plant (e.g., root, stem, leaves, flower, fruit, seed).
- Differentiate between monocotyledon and dicotyledon plants.

**5.2 Summarize plant nutrients and their delivery.**

- Understand the roles of macronutrients in plant growth.
- Know different application methods of fertilizers.

**5.3 Explain what seeds need to germinate and grow.**

- Light
- Moisture
- Temperature
- Oxygen
- Humidity



## 6. Food Safety

### 6.1 Describe how temperature affects microbial growth.

- USDA danger zone where pathogens grow: 40F to 140F.
- Refrigerator, freezer, room temperature, warm

### 6.2 Determine which allergens are present in a food product.

- Understand that there are specific lists of food allergens.
- Tree nuts, peanuts, fish, crustacean shellfish, wheat, soy, milk, eggs, sesame

### 6.3 Distinguish between sources of food contamination.

- Biological
- Chemical
- Physical



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