## Agricultural and Environmental Systems Career Field

## Zoo and Aquarium

**Subject Code: 010940**

**Outcome & Competency Descriptions**

**Course Description:**

Students will apply responsible animal science principles and routine husbandry practices to captive animal populations. Learners will apply knowledge of animal behavior, welfare, and husbandry principles to enhance exhibit design, animal enrichment and training plans, and educational engagement programs. Emphasis will be given to data collection and research techniques. Students will apply principles of responsible population control, disease risk and management, and problem-solving/action planning techniques.

**Strand 1. Business Operations/21st Century Skills**

Learners apply principles of economics, business management, marketing and employability in an entrepreneur, manager and employee role to the leadership, planning, developing and analyzing of business enterprises related to the career field.

**Outcome: 1.1. Employability Skills**

Develop career awareness and employability skills (e.g., face-to-face, online) needed for gaining and maintaining employment in diverse business settings.

**Competencies**

1.1.1. Identify the knowledge, skills and abilities necessary to succeed in careers.

1.1.2. Identify the scope of career opportunities and the requirements for education, training, certification, licensure and experience.

**Outcome: 1.2. Leadership and Communications**

Process, maintain, evaluate and disseminate information in a business. Develop leadership and team building to promote collaboration.

**Competencies**

1.2.1. Extract relevant, valid information from materials and cite sources of information.

1.2.2. Deliver formal and informal presentations.

1.2.3. Identify and use verbal, nonverbal and active listening skills to communicate

effectively.

1.2.4. Use negotiation and conflict-resolution skills to reach solutions.

1.2.5. Communicate information (e.g., directions, ideas, vision, workplace expectations)

for an intended audience and purpose.

1.2.6. Use proper grammar and expression in all aspects of communication.

1.2.7. Use problem-solving and consensus-building techniques to draw conclusions and

determine next steps.

1.2.8. Identify the strengths, weaknesses and characteristics of leadership styles that

influence internal and external workplace relationships.

1.2.9. Identify advantages and disadvantages involving digital and/or electronic communications (e.g., common content for large audience, control of tone, speed, cost, lack of non-verbal cues, potential for forwarding information, longevity).

1.2.10. Use interpersonal skills to provide group leadership, promote collaboration and

work in team.

1.2.11. Write professional correspondence, documents, job applications and resumés.

1.2.12. Use technical writing skills to complete forms and create reports.

1.2.13. Identify stakeholders and solicit their opinions.

1.2.14 Use motivational strategies to accomplish goals.

**Outcome: 1.3. Business Ethics and Law**

Analyze how professional, ethical and legal behavior contributes to continuous improvement in organizational performance and regulatory compliance.

**Competencies**

1.3.1. Analyze how regulatory compliance (e.g., United States Department of Agriculture [USDA], Food and Drug Administration [FDA], United States Department of Interior [USDI], Ohio Livestock Care Standards, water quality standards, local water regulations, building codes) affects business operations and organizational performance.

1.3.2. Follow protocols and practices necessary to maintain a clean, safe and healthy work environment.

1.3.3. Use ethical character traits consistent with workplace standards (e.g., honesty, personal integrity, compassion, justice).

1.3.4. Identify how federal and state consumer protection laws affect products and services.

1.3.5. Access and implement safety compliance measures (e.g., quality assurance information, safety data sheets [SDSs], product safety data sheets [PSDSs], United States Environmental Protection Agency [EPA], United States Occupational Safety and Health Administration [OSHA]) that contribute to the continuous improvement of the organization.

**Outcome: 1.4. Knowledge Management and Information Technology**

Demonstrate current and emerging strategies and technologies used to collect, analyze, record and share information in business operations.

**Competencies**

1.4.1. Use office equipment to communicate (e.g., phone, radio equipment, fax machine, scanner, public address systems).

1.4.2. Select and use software applications to locate, record, analyze and present information (e.g., word processing, e-mail, spreadsheet, databases, presentation, Internet search engines).

1.4.3. Verify compliance with security rules, regulations and codes (e.g., property, privacy, access, accuracy issues, client and patient record confidentiality) pertaining to technology specific to the industry pathway.

1.4.5. Use information technology tools to maintain, secure and monitor business records.

1.4.8. Use electronic media to communicate and follow network etiquette guidelines.

**Outcome: 1.5. Global Environment**

Evaluate how beliefs, values, attitudes and behaviors influence organizational strategies and goals.

**Competencies**

1.5.2. Describe how cultural intelligence skills influence the overall success and survival of an organization.

1.5.3. Use cultural intelligence to interact with individuals from diverse cultural settings.

1.5.4. Recognize barriers in cross-cultural relationships and implement behavioral adjustments.

**Outcome: 1.6. Business Literacy**

Develop foundational skills and knowledge in entrepreneurship, financial literacy and business operations.

**Competencies**

1.6.1. Identify business opportunities.

1.6.2. Assess the reality of becoming an entrepreneur, including advantages and disadvantages (e.g., risk versus reward, reasons for success and failure).

1.6.3. Explain the importance of planning your business.

1.6.6. Identify the target market served by the organization, the niche that the organization

fills and an outlook of the industry.

**Outcome 1.8 Operations Management**

Plan, organize and monitor an organization or department to maximize contribution to organizational goals and objectives.

**Competencies**

1.8.5. Use inventory and control systems to purchase materials, supplies and equipment (e.g., Last In, First Out [LIFO]; First In, First Out [FIFO]; Just in Time [JIT]; LEAN).

1.8.8. Identify routine activities for maintaining business facilities and equipment.

**Outcome 1.12 Site and Personal Safety Procedures**

Follow site and personal safety procedures in specific situations with specialized tools and equipment, evaluate the situation and take corrective action.

**Competencies**

1.12.1. Use Occupational Safety and Health Administration (OSHA) defined procedures for identifying employer and employee responsibilities, working in confined spaces, managing worker safety programs, using ground fault circuit interrupters (GFCIs), maintaining clearance and boundaries and labeling.

1.12.2. Interpret safety signs and symbols.

1.12.3. Interpret personal safety rights according to the employee Right to Know plan.

1.12.4. Describe how working under the influence of drugs and alcohol increases the risk of accident, lowers productivity, raises insurance costs and reduces profits.

1.12.5. Identify the location of emergency flush showers, eyewash fountains, Safety Data Sheets (SDSs), fire alarms and exits.

1.12.6. Identify procedures for the handling, storage and disposal of hazardous materials.

1.12.7. Select, use, store, maintain and dispose of personal protective equipment (PPE), appropriate to job tasks, conditions and materials.

1.12.8. Identify safety hazards and take corrective measures.

1.12.9. Identify, inspect and use safety equipment appropriate for the task.

1.12.10. Follow established procedures for the administration of first aid and contact emergency medical personnel when necessary.

1.12.15. Select and operate fire extinguishers based on the class of fire.

**Strand 2. Animal Science**

Learners apply principles of animal anatomy, physiology, genetics, behavior, nutrition and production to the research and development, selection and reproduction, health and management of animals in domestic and natural environments.

**Outcome: 2.1. Nutrition**

Analyze, formulate, prepare and administer a ration for a population of specific animal species based on economics, nutrition and availability of feedstuffs and evaluate the feed's effects on animals, and animal products.

**Competencies**

2.1.2. Describe the role of nutrients and nutritional requirements of different animal life processes and species.

2.1.4. Identify and address major nutrient deficiency and toxicity symptoms.

2.1.6. Formulate and prepare rations and diets for different stages of an animal’s life.

2.1.7. Calculate performance indicators (feed efficiency, average daily gain, minimum energy required) in relation to the cost, quality and availability of feeds.

2.1.8. Select and determine the feeding and watering practices and systems, based on the animal population, purpose and requirement.

**Outcome: 2.3. Care and Management**

Apply animal care, management and record procedures to ensure husbandry and welfare, including managing environmental conditions to ensure health and performance.

**Competencies**

2.3.1. Identify species-specific terminology (gender, age, reproductive status).

2.3.2. Identify, classify, evaluate and select animal species or breeds for a desired outcome.

2.3.3. Determine the biotic and abiotic factors (e.g., air, ventilation) that impact the animals’ environment.

2.3.4. Apply concepts of pest control and nuisance animal control, sanitation, and disinfection procedures for animals' care and management.

2.3.5. Perform species-specific animal identification techniques for traceability and records.

2.3.6. Calculate a facility or habitat's carrying capacity and its impact on animal health.

2.3.7. Identify and recognize predator-prey relationships and implement control measures.

2.3.8. Evaluate and perform animal care procedures aligned with industry standards throughout the life of the animal.

2.3.9. Monitor and evaluate the quality of an animal's habitat and implement corrective methods as needed.

2.3.10. Recognize common restraints and tack devices for handling including their use and adjustments.

2.3.11. Groom animals through brushing, bathing and therapeutic treatments.

2.3.12. Assess the nails and hooves of animals and understand the practice of trimming and treating for specific species.

2.3.14. Identify and recognize normal and abnormal dental structures and conditions.

**Outcome: 2.4. Recognizing Diseases and Disorders**

Evaluate animal conditions for species-specific diseases and disorders to assess an animal’s health and welfare.

**Competencies**

2.4.2. Identify abnormalities in the skeleton, body form and functions and identify associated symptoms.

2.4.3. Describe the clinical signs that are associated with an abnormality caused by environmental factors (e.g. heat stress, standing condition, air quality).

2.4.4. Assess clinical signs of animals and identify diseases caused by microorganisms (e.g., parasites, viruses, bacteria, fungi, protozoa).

2.4.5. Describe zoonotic diseases and explain the health risk on humans and animals.

2.4.6. Implement disease prevention methods and procedures including the use of personal protective equipment.

**Outcome: 2.5 Animal Health**

Implement preventive measures, treatment and maintenance options for species-specific diseases and disorders to improve an animal’s health and welfare.

**Competencies**

2.5.3. Recognize the preventative measures or treatments needed to maintain animal health.

**Outcome: 2.6. Population Management**

Manage reproduction practices in animal populations across habitats to achieve the desired outcomes and specific goals.

**Competencies**

2.6.1. Identify factors that lead to reproductive maturity and select animals for reproductive readiness.

2.6.2. Compare and select superior individuals based on phenotype.

2.6.3. Compare and select superior individuals based on breeding values and heritability of the desired traits.

2.6.4. Identify normal and abnormal signs of parturition and recommend appropriate management practices.

2.6.5. Understand the rationale to manipulate an animal’s reproductive processes to support breeding (e.g., sex-sorted semen, heat synchronization, nutritional flushing, light cycling, natural and selected breeding).

2.6.6. Understand the rationale for selecting breeding methods (e.g., artificial insemination, embryo transfer, natural selection, selective breeding, invitro fertilization, cloning).

2.6.7. Describe requirements and environmental influences during different stages of gestation within different species.

2.6.8. Describe ethical and responsible animal population management practices (e.g., spaying, neutering, heat suppression, relocation, reintroduction, hunting, containment, culling, euthanasia).

**Strand 5. Elements of Production**

Learners apply principles of practice related to the management and maintenance of food, agriculture and natural resources systems.

**Outcome: 5.15 Animal Behavior**

Apply management practices to assure animal welfare considering species-specific behaviors, human safety, social influences, public perception and regulations associated with animal welfare.

**Competencies**

5.15.1. Understand social influences, public perception and regulations that are associated with animal welfare.

5.15.2. Describe the adaptations and special senses (e.g., sight, hearing, smell, touch) of animals and how they contribute to animal behavior.

5.15.3. Identify and describe the innate behavioral patterns of animals.

5.15.4. Describe social relationships involved in behavioral adjustment and adaptation (e.g., animal-to-animal and human-to-animal interaction).

5.15.5. Interpret an animal’s intent based on its vocalization, body posture and chemical means of communication.

5.15.6. Recognize behavior abnormalities and recommend corrective action.

5.15.7. Humanely handle, restrain and move animals.

5.15.11. Identify methods to minimize animal stress and safety (physiology, psychological and nutritional).

5.15.12. Examine an animal to evaluate its general condition.

**Outcome: 5.16 Biosecurity**

Connect the sources and causes of contamination and develop the protocols to implement biosecurity procedures.

**Competencies**

5.16.5. Implement biosecurity procedures to prevent cross-site contamination (e.g., proper

use and disposal of personal protective equipment [PPE] from site to site, vehicle cleaning between farm and processing site).

5.16.7. Select bio-containment practices (e.g., quarantine, eradicate, showering into facilities) to manage pests and diseases.