Small Animal Science

Subject Code: 010925

Course & Unit Description

Course Description:

Learners apply principles of nutrition, health and reproduction to the management of animals intended for companionship or research. Through interpretation, problem-solving and diagnostic methods, the learners develop and implement management programs that reflect responsible animal behavior, welfare and husbandry practices. Learners implement principals and practices of nutritional management, responsible breeding and disease management. Safe handling, grooming and training skills are developed and applied. Learners identify business management procedures and understand the importance of business regulations.

Unit: Introduction to Animal Science

Learners will describe the selection, care, health, and management of companion animals.

Benchmark: 1.3 Care and Management

Level 1: Describe the fundamental care and management practices for animals and select, handle, mark, manage environmental conditions, and provide general care for a limited number of animals or animal species

Level 2: Describe comprehensive care practices for animals and apply advanced management procedures to select, handle, mark, and manage environmental conditions

Indicators

1.3.01 Identify, classify, evaluate and select animal species and/or breeds

Academic Standards

Math: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)

Science: Explain the structure and function of ecosystems and relate how ecosystems change over time. (Life Sciences F, 9-10)

Benchmark: 1.6 Animal Behaviors

Level 1: Observe an animal's natural tendencies and predict changes in behavior when the environment is changed

Level 2: Apply management practices to animals that result in desired behavioral change

Indicators

1.6.05 Identify social relationships involved in behavioral adjustment and/or adaptation (animal to animal interaction, human to animal interaction)

Academic Standards

Science: Describe how human activities can impact the status of natural systems. (Life Sciences G, 9 -10)

Benchmark: 3.7 Communication Skills

Level 1: Integrate a variety of communication techniques to gather and convey information to an individual or small group

Level 2: Conduct a business meeting using decision-making techniques

Indicators
3.7.01 Apply techniques to participate in/facilitate a group discussion
3.7.04 Articulate ideas and impact audience through verbal and nonverbal communication
3.7.07 Extract relevant, valid information from materials and cite sources of information

Academic Standards
English: Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)
Math: Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)
Social Studies: Evaluate the reliability and credibility of sources. (Social Studies Skills and Methods A, 9 -10)

Benchmark: 3.9 Emotional Intelligence
Level 1: Exhibit desirable personal and professional appearance, attitudes, behaviors, and work habits
Level 2: Exhibit techniques to control emotional reactions to people and situations

Indicators
3.9.03 Manage personal emotions, behavior and appearance to maintain professionalism
3.9.08 Foster positive working relationships

Academic Standards
English: Use a variety of strategies to enhance listening comprehension. (Communication A, 8-10; Communication A, 11-12)
Social Studies: Analyze how issues may be viewed differently by various cultural groups. (People in Societies A, 11-12)

Unit: External Anatomy
The learner will investigate the form and function of the various parts of animals.

Benchmark: 1.2 Body Systems
Level 1: Differentiate the functions of body systems
Level 2: Describe the interrelationship of the animal body systems

Indicators
1.2.01 Identify external anatomical parts and functions
1.2.14 Compare and contrast variations of systems among species and their adaptive values

Academic Standards
English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)

Unit: Anatomy and Physiology of Companion Animals
In this unit, the learner will be able to differentiate the functions of body systems for companion animals.

Benchmark: 1.2 Body Systems
Level 1: Differentiate the functions of body systems
Level 2: Describe the interrelationship of the animal body systems

Indicators
1.2.02 Identify the anatomy and describe the physiology of the digestive systems
1.2.03 Identify the anatomy and describe the physiology of the nervous systems
1.2.04 Identify the anatomy and describe the physiology of the skeletal systems

1.2.05 Identify the anatomy and describe the physiology of the musculature systems
1.2.06 Identify the anatomy and describe the physiology of the circulatory systems
1.2.07 Identify the anatomy and describe the physiology of the integumentary systems (skin) and associated structures
1.2.08 Identify the anatomy and describe the physiology of the respiratory systems
1.2.09 Identify the anatomy and describe the physiology of the urinary systems
1.2.10 Identify the anatomy and describe the physiology of the male and female reproductive systems
1.2.11 Identify the anatomy and describe the physiology of the endocrine systems
1.2.12 Identify the anatomy and describe the physiology of the lymphatic systems
1.2.13 Identify the anatomy and describe the physiology of the mammary systems
1.2.14 Compare and contrast variations of systems among species and their adaptive values

Academic Standards

English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)

Unit: Companion Animal Feeding and Nutrition

The learner will develop an understanding of nutrient requirements and development of appropriate feeding management programs for the various phases of the life cycle as well as consideration for special-needs situations including nutritional management of various diseases.

Benchmark: 1.1 Nutrition

Level 1: Analyze the nutritional content of a ration and administer it to animals
Level 2: Prepare/formulate and administer a ration and evaluate its effects on animals

Indicators

1.1.01 Identify types, composition, quality and compatibility of feeds, feed additives, and feed byproducts
1.1.02 Determine the role of nutrients and the nutritional requirements (matter and energy) for different life processes of the animal (e.g., maintenance/homeostasis, growth, reproduction, lactation)
1.1.03 Analyze nutritional content and quality of feeds (e.g., fiber, sodium, proteins, carbohydrates, lipids)
1.1.04 Identify and treat major nutrient deficiency and toxicity symptoms
1.1.05 Describe possible toxins, pathogens and contaminants found in feedstuffs (biological and non-biological) and their impact on animals
1.1.07 Formulate, prepare, and investigate rations and diets for production, specialty markets, and special diets (e.g., natural, organic, liver diet, heart diet, kidney diet)
1.1.08 Select and implement feeding and watering practices and systems for varying populations and purposes (e.g., reduce waste)

Academic Standards

English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)
Math: Write and solve real-world, multi-step problems involving money, elapsed time and temperature, and verify reasonableness of solutions. (Measurement F, 8-10)
Science: Describe the finite nature of Earth's resources and those human activities that can conserve or deplete Earth's resources. (Earth and Space Sciences D, 9-10)

Benchmark: 1.2 Body Systems

Level 1: Differentiate the functions of body systems
Level 2: Describe the interrelationship of the animal body systems

Indicators

1.2.02 Identify the anatomy and describe the physiology of the digestive systems

1.2.07 Identify the anatomy and describe the physiology of the integumentary systems (skin) and associated structures

Academic Standards

English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)

Unit: 1.3 Care and Management

Level 1: Describe the fundamental care and management practices for animals and select, handle, mark, manage environmental conditions, and provide general care for a limited number of animals or animal species

Level 2: Describe comprehensive care practices for animals and apply advanced management procedures to select, handle, mark, and manage environmental conditions

Indicators

1.3.07 Evaluate and perform animal care procedures during and following parturition (e.g., navel cord, afterbirth, colostrums, orphaned animals)

Academic Standards

Math: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)

Science: Explain the structure and function of ecosystems and relate how ecosystems change over time. (Life Sciences F, 9-10)

Unit: Companion Animal Reproduction

In this unit, the learner will use applications of reproduction and genetics to improve efficiency of animal breeding programs.

Benchmark: 1.5 Population Management

Level 1: Differentiate reproductive processes across species and determine the extent to which breeding programs can be implemented for an intended purpose or outcome

Level 2: Develop, implement and evaluate a reproduction and/or population management plan

Indicators

1.5.01 Determine the factors that influence estrus, gestation and parturition and employ appropriate management practices

1.5.02 Evaluate and employ breeding methods (e.g., artificial insemination, embryo transfer, natural selection, selective breeding, in vitro fertilization)

1.5.03 Practice ethical/responsible animal population management (e.g., spay, neuter, euthanasia, birth control, relocation, reintroduction, hunting)

1.5.04 Manipulate an animal's reproductive processes (e.g., sex-sorted semen, birth control, heat synchronization, nutritional flushing)

1.5.05 Select and implement reproductive management practices (e.g., male to female ratios, fertility, soundness for breeding, age and weight for breeding and timing, other requirements for breed and species integrity) and monitor embryos/fetuses

Academic Standards

Math: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)

Science: Describe how human activities can impact the status of natural systems. (Life Sciences G, 9 -10)

Benchmark: 2.3 Genetics

Level 1: Use mono- and dihybrid crosses to predict genotype and phenotype

Level 2: Model the molecular basis of genetic transfer

Indicators

2.3.01 Predict and explain offspring genotypes and phenotypes using Mendel's Laws and Punnett Square

Academic Standards

English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)

Math: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis F, 8-10)

Science: Explain the genetic mechanisms and molecular basis of inheritance. (Life Sciences C, 9-10)

Unit: Animal Behavior, Welfare and Husbandry

Based on the natural behavior of an animal, a student will be able to develop animal management systems that consider the welfare of the animal.

Benchmark: 1.3 Care and Management

Level 1: Describe the fundamental care and management practices for animals and select, handle, mark, manage environmental conditions, and provide general care for a limited number of animals or animal species

Level 2: Describe comprehensive care practices for animals and apply advanced management procedures to select, handle, mark, and manage environmental conditions

Indicators

1.3.02 Recognize and determine the biotic and abiotic factors that impact the animals' environment (e.g., air, ventilation)

1.3.03 Describe and implement scientific concepts of animal welfare

1.3.04 Apply and record animal identification procedures and requirements (e.g., tagging, tattooing, ear notching, banding, branding, painting, electronic microchip implanting)

1.3.08 Identify, evaluate and perform general animal care/welfare procedures based on animal's use, species and life stage (e.g., weaning, dehorning, castrating, trimming hooves, milking, weighing, grooming, dental cleaning, dental floating, nail trimming)

1.3.09 Perform sanitation and disinfection procedures for care and management of animal

Academic Standards

Math: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)

Science: Explain the structure and function of ecosystems and relate how ecosystems change over time. (Life Sciences F, 9-10)

Benchmark: 1.6 Animal Behaviors

Level 1: Observe an animal's natural tendencies and predict changes in behavior when the environment is changed

Level 2: Apply management practices to animals that result in desired behavioral change

Indicators

1.6.03 Manipulate an animal's behavioral and natural tendencies through appropriate management practices

1.6.06 Describe the animal's vocal, visual and chemical means of communication and interpret the intent

Academic Standards

Science: Describe how human activities can impact the status of natural systems. (Life Sciences G, 9 -10)

Unit: Companion Animal Health

The learner will identify the most common infectious and noninfectious diseases affecting companion animals and provide information related to their prevention and treatment.

Benchmark: 1.4 Animal Health

Level 1: Identify prevalent diseases/disorders across animal groups and implement treatment and maintenance options to remedy an animal's health and welfare

Level 2: Evaluate animal condition and implement treatment and maintenance options for species-specific diseases/disorders

Indicators

1.4.01 Evaluate general condition of animal using diagnostic methods (e.g., visual exam, physical exam, vital signs)

1.4.02 Describe diseases/disorders and their symptoms that are caused by microorganisms, parasites, genetic defects and environmental factors

1.4.03 Identify signs of pain, distress, disease and allergic reactions

1.4.04 Collect specimens to perform urinalysis, hematology, cytology, skin scraping and fecal sample examinations

1.4.06 Apply principles of image physics and perform ultrasonography techniques

1.4.07 Identify gastrointestinal ailments, neuromuscular disorders, respiratory diseases, blood disorders, and bone/joint problems

1.4.08 Monitor and evaluate the quality of an animal's habitat (natural or artificial) and implement corrective methods as needed

1.4.09 Identify types of immunity and immune responses and maintain animal health through immunization

1.4.10 Administer care to animals in case of accident or illness

1.4.12 Describe the routes of administration for medications (e.g., intranasal, oral, IV, sub-Q, IM) and the process of drug absorption, distribution, metabolism, withdrawal and excretion

1.4.13 Calculate pharmaceutical dosages/mixtures administer drug treatments and monitor potential problems associated with incorrect administration and common adverse effects

1.4.15 Prepare a sterile surgical environment, prepare patients for surgery and conduct post-surgery procedures

1.4.16 Describe the indications, advantages, disadvantages, effects on the body and associated adverse side effects of commonly used preanesthetic and anesthetic agents

1.4.18 Explain zoonoses and communicable diseases common to humans and animals

Academic Standards

English: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)

Math: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)

Science: Explain the characteristics of life as indicated by cellular processes and describe the process of cell division and development. (Life Sciences B, 9-10)

Benchmark: 1.6 Animal Behaviors

Level 1: Observe an animal's natural tendencies and predict changes in behavior when the environment is changed

Level 2: Apply management practices to animals that result in desired behavioral change

Indicators

1.6.02 Describe and identify innate animal behavioral traits (e.g., protection, ingestion, homing, sleeping, grooming, elimination, sexual, care-giving, combative, evasive, breed differences)
1.6.05 Identify social relationships involved in behavioral adjustment and/or adaptation (animal to animal interaction, human to animal interaction)
1.6.06 Describe the animal's vocal, visual and chemical means of communication and interpret the intent
1.6.09 Handle and move animals (e.g., training, restraint, confinement) with regard for safety of animals and handlers

Academic Standards

Science: Describe how human activities can impact the status of natural systems. (Life Sciences G, 9 -10)

Unit: Research

Students will engage in laboratory or field experiments related to companion animal populations and research.

Benchmark: 3.11 Research and Analysis

Level 1: Conduct a study or survey; select descriptive statistics; create graphical displays and draw conclusions
Level 2: Conduct a problem-based study applying scientific methodology and using descriptive statistics to communicate and support predictions and conclusions

Indicators

3.11.01 Identify research problems and structure a statistical experiment, simulation or study related to the problem
3.11.02 Create a hypothesis and set the probability of acceptance based on review of valid literature
3.11.03 Establish and implement procedures for systematic collection, organization, and use of data
3.11.04 Select and apply sampling methods that appropriately represent the population to be studied
3.11.05 Create, interpret and use tabular and graphical displays and descriptive statistics to describe data
3.11.07 Describe the relationships among variables using correlations and draw conclusions
3.11.08 Draw conclusions based on observations and/or data analysis and disseminate information to interested parties

Academic Standards

English: Formulate open-ended research questions suitable for inquiry and investigation and adjust questions as necessary while research is conducted. (Research A, 8-10; Research A, 11-12)
Math: Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)
Science: Participate in and apply the processes of scientific investigation to create models and to design, conduct, evaluate and communicate the results of these investigations. (Scientific Inquiry A, 9-10)

Unit: 3.6: Information Management

Level 1: Select and use a computer and computer application for a specific purpose
Level 2: Integrate software applications and use multiple software options to create a product, document or presentation

Indicators

3.6.02 Conduct research using the Internet
3.6.03 Create and utilize documents using word processors, spreadsheets, databases and electronic mail

3.6.04 Conduct oral/visual presentation using presentation software
3.6.08 Adhere to common security guidelines for technology

Academic Standards

English: Prepare writing for publication that follows an appropriate format and uses a variety of techniques to enhance the final product. (Writing Process F, 11-12)

Math: Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)

Benchmark: 3.7 Communication Skills

Level 1: Integrate a variety of communication techniques to gather and convey information to an individual or small group

Level 2: Conduct a business meeting using decision-making techniques

Indicators

3.7.03 Develop and deliver formal and informal presentations
3.7.04 Articulate ideas and impact audience through verbal and nonverbal communication
3.7.07 Extract relevant, valid information from materials and cite sources of information
3.7.08 Develop reports and documents that organize information accurately and use formatting techniques for user friendliness

Academic Standards

English: Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)

Math: Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)

Social Studies: Evaluate the reliability and credibility of sources. (Social Studies Skills and Methods A, 9 -10)

Unit: Careers in Animal Sciences

Learners will identify and develop the communication and business leadership skills and knowledge needed in the animal science career field.

Benchmark: 3.7 Communication Skills

Level 1: Integrate a variety of communication techniques to gather and convey information to an individual or small group

Level 2: Conduct a business meeting using decision-making techniques

Indicators

3.7.01 Apply techniques to participate in/facilitate a group discussion
3.7.03 Develop and deliver formal and informal presentations
3.7.04 Articulate ideas and impact audience through verbal and nonverbal communication
3.7.08 Develop reports and documents that organize information accurately and use formatting techniques for user friendliness

Academic Standards

English: Produce functional documents that report, organize and convey information and ideas accurately, foresee readers' problems or misunderstandings and that include formatting techniques that are user friendly. (Writing Applications C, 11-12)

Math: Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)

Social Studies: Evaluate the reliability and credibility of sources. (Social Studies Skills and Methods A, 9 -10)

Benchmark: 3.8 Business Leadership
Level 1: Determine appropriate leadership style for a specific situation and apply to the situation
Level 2: Use multiple leadership concepts to change situations and enhance effectiveness in the change process

Indicators
3.8.06 Think critically and use problem-solving skills to analyze complex and diverse concepts
3.8.07 Use reasoning, judgment and imagination to create new possibilities in situations
3.8.11 Develop relationships with peer groups, support services, and professional organizations

Academic Standards

English:	Use a variety of strategies to enhance listening comprehension. (Communication A, 8-10; Communication A, 11-12)
Math:	Locate and interpret mathematical information accurately, and communicate ideas, processes and solutions in a complete and easily understood manner. (Mathematical Processes H, 8-10)
Social Studies:	Critique data and information to determine the adequacy of support for conclusions. (Social Studies Skills and Methods B, 11-12)