Zoo and Aquarium Management

Subject Code: 010940

Course & Unit Description

Course Description:

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

Unit: Zoo Organizations, Ethics and Animal Rights vs. Animal Welfare

This unit will acquaint the student with responsible animal management principals and routine husbandry practices in relations to animal behavior methodology, business organizational structures, and legal compliance.

Benchmark: 1.3 Care and Management

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

Indicators

1.3.03 Describe and implement scientific concepts of animal welfare

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)

Academic Standards

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

1.6.05 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

1.6.07 Identify behavioral abnormalities and their cause(s) and employ corrective action

1.6.08 Identify and employ techniques to train and discipline animals for predictive behavior

1.6.09 Handle and move animals (e.g., training, restraint, confinement) with regard for safety of animals and handlers

Academic Standards

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

Benchmark: 3.10 Business Regulation, Law and Related Issues

Level 2: Determine the impact of government regulations and societal issues on an environmental project or the performance of a business enterprise

Indicators

3.10.02 Explain the purpose and impact of government regulations
3.10.06 Identify governmental agencies and non-governmental organizations that impact agricultural/environmental issues
3.10.07 Research history, politics and policies related to issues
3.10.08 Assess the impact of issues affecting the industry and recommend solutions

Academic Standards

English Standards: Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 8-10; Reading Process B, 11-12)

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

Social Studies Standards: Evaluate the consequences of geographic and environmental changes resulting from governmental policies and human modifications to the physical environment. (Geography B, 11-12)

Benchmark: 3.3 Management

Level 2: Analyze performance of an enterprise and reallocate resources to achieve goals

Indicators

3.3.04 Identify organizational structures of businesses

Academic Standards

English Standards: Analyze the features and structures of documents and critique them for their effectiveness. (Reading: Informational Text A, 11-12)

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

Social Studies Standards: Identify factors which inhibit or spur economic growth and cause expansions or recessions. (Economics B, 11-12)

Unit: Animal Record Keeping, regulations and Identification

Students will utilize principals of technology to manage information systems, research issues affecting the industry, and practice problem-solving/action planning techniques. Students will collect data, compare information and collection management systems, recognize different methods of tracking genetics in a zoo setting, and understand disease traceability.

Benchmark: 1.3 Care and Management

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
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)

Academic Standards

Math Standards:	Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Science Standards:	Explain the structure and function of ecosystems and relate how ecosystems change over time. (Life Sciences F, 9-10)

Benchmark: 3.10 Business Regulation, Law and Related Issues

Level 2: Determine the impact of government regulations and societal issues on an environmental project or the performance of a business enterprise

Indicators

3.10.02 Explain the purpose and impact of government regulations
3.10.03 Identify local, state and federal regulations relative to compliance
3.10.06 Identify governmental agencies and non-governmental organizations that impact agricultural/environmental issues
3.10.07 Research history, politics and policies related to issues
3.10.08 Assess the impact of issues affecting the industry and recommend solutions

Academic Standards

English Standards:	Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 8-10; Reading Process B, 11-12)
Math Standards:	Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis F, 8-10)
Social Studies Standards:	Evaluate the consequences of geographic and environmental changes resulting from governmental policies and human modifications to the physical environment. (Geography B, 11-12)

Benchmark: 3.6 Information Management

Level 2: Integrate software applications and use multiple software options to create a product, document or presentation

Indicators

3.6.01 Utilize technology to maintain and monitor business records
3.6.08 Adhere to common security guidelines for technology

Academic Standards

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

Unit: Genetic Management, Species Survival Plans and Animal Acquisition/Disposition

Students will learn to manage captive animal populations by evaluate production management strategies that emphasize responsible stewardship practices through reproductive decision-making.

Benchmark: 1.3 Care and Management

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

Indicators

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)
1.3.05 Estimate carrying capacity of the environment and its impact on animal health
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)

Academic Standards

Math Standards: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Science Standards: Explain the structure and function of ecosystems and relate how ecosystems change over time. (Life Sciences F, 9-10)

Benchmark: 1.5 Population Management

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, invitro 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 Standards: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Science Standards: Describe how human activities can impact the status of natural systems. (Life Sciences G, 9 -10)

Benchmark: 3.5 Purchasing and Inventory

Level 2: Manage inventory based on budgeting and sales forecasting.

Indicators

3.5.01 Explain the nature and scope of purchasing
3.5.02 Manage the bid process in purchasing
3.5.03 Evaluate and select vendors
3.5.05 Record inventory usage

Academic Standards

English Standards: Use multiple resources to enhance comprehension of vocabulary. (Vocabulary F, 8-10; Vocabulary E, 11-12)
Math Standards: Write and solve real-world, multi-step problems involving money, elapsed time and temperature, and verify reasonableness of solutions. (Measurement F, 8-10)

Unit: Managing Animal Populations in Zoos

Students will investigate mechanisms of animal behavior including topics in social organization, interspecies relations and animal learning. Students will use qualitative and quantitative techniques through behavioral studies to understand animal function by examining how animals cope with environmental change and apply knowledge gained to issues in animal conservation.

Benchmark: 1.5 Population Management

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, invitro fertilization)
1.5.03 Practice ethical/responsible animal population management (e.g., spay, neuter, euthanasia, birth control, relocation, reintroduction, hunting)
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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 Standards: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Science Standards: Describe how human activities can impact the status of natural systems. (Life Sciences G, 9 -10)

Benchmark: 1.6 Animal Behaviors

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

Indicators

1.6.01 Describe the adaptations and special senses (e.g., sight, hearing, smell, touch) of animals and how they contribute to animal behavior
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)
1.6.03 Manipulate an animal's behavioral and natural tendencies through appropriate management practices
1.6.04 Determine how animals learn (simple and complex) and how interventions can be employed to reach a desired behavior
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
1.6.07 Identify behavioral abnormalities and their cause(s) and employ corrective action
1.6.08 Identify and employ techniques to train and discipline animals for predictive behavior
1.6.09 Handle and move animals (e.g., training, restraint, confinement) with regard for safety of animals and handlers

Academic Standards

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

Unit: Animal Handling, Transport and Training

Students will evaluate animal enrichment and training plans utilizing principals of animal behavior, welfare and husbandry principals and practices to manage captive animal populations.

Benchmark: 1.6 Animal Behaviors

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

Indicators

1.6.01 Describe the adaptations and special senses (e.g., sight, hearing, smell, touch) of animals and how they contribute to animal behavior
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)
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1.6.07 Identify behavioral abnormalities and their cause(s) and employ corrective action
1.6.08 Identify and employ techniques to train and discipline animals for predictive behavior
1.6.09 Handle and move animals (e.g., training, restraint, confinement) with regard for safety of animals and handlers

Academic Standards

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

Unit: Animal Nutrition

Students will evaluate diet formulations for captive animal populations by combining information gathered from natural history, historical records and animal models.

Benchmark: 1.1 Nutrition

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 nonbiological) and their impact on animals
1.1.06 Determine feed efficiency in relation to cost and availability of feeds

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)
1.1.09 Evaluate/monitor performance of feeding systems and programs
1.1.10 Determine the ecological relationships between feed/agronomic production systems and feed quality

Academic Standards

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

Math Standards: Write and solve real-world, multi-step problems involving money, elapsed time and temperature, and verify reasonableness of solutions. (Measurement F, 8-10)

Science Standards: 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)

Unit: Aquatic Exhibits

Students will design an exhibit that designates a target audience and develops positive visitor relations while maintaining the highest level of species behavior, welfare, and husbandry principals.

Benchmark: 1.3 Care and Management

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
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
1.3.05 Estimate carrying capacity of the environment and its impact on animal health
1.3.06 Explain predator/prey relationships (e.g., predator control, species propagation, invasive species control) and implement measures to control predators when necessary
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 Standards: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)

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

Benchmark: 1.5 Population Management

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

Indicators

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

Academic Standards

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

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

Benchmark: 3.1 Marketing
Level 2: Develop and market a product or service to maximize profits and optimize cost

Indicators
3.1.01 Select target market and consumers
3.1.07 Promote products and services

Academic Standards

English Standards:	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 Standards:	Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)
Social Studies Standards:	Analyze how scarcity of productive resources affects supply, demand, inflation and economic choices. (Economics A, 11-12)

Benchmark: 3.2 Sales and Customer Service
Level 2: Use sales techniques to close the sale of a product/service and handle complex customer issues

Indicators
3.2.04 Prospect for new customers
3.2.08 Build and develop customer relationships

Academic Standards

English Standards:	Use a variety of strategies to enhance listening comprehension. (Communication A, 8-10; Communication A, 11-12)
Math Standards:	Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)

Unit: Disease Management and Risk

Students will identify common diseases in captive animals and evaluate a disease prevention plan and problem-solve disease outbreaks and cross-species contamination.

Benchmark: 1.3 Care and Management
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
1.3.05 Estimate carrying capacity of the environment and its impact on animal health
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 Standards:	Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Science Standards:	Explain the structure and function of ecosystems and relate how ecosystems change over time. (Life Sciences F, 9-10)

Benchmark: 1.4 Animal Health
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
1.4.07 Identify gastrointestinal ailments, neuromuscular disorders, respiratory diseases, blood disorders, and bone/joint problems
1.4.10 Administer care to animals in case of accident or illness
1.4.11 Classify pharmaceutical drugs and describe general characteristics of each type
1.4.12 Describe the routes of administration for medications (e.g., intranasal, oral, IV, subQ, 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

Academic Standards
English Standards: Apply knowledge of roots, affixes and phrases to aid understanding of content area vocabulary. (Vocabulary D, 11-12)
Math Standards: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Science Standards: Explain the characteristics of life as indicated by cellular processes and describe the process of cell division and development. (Life Sciences B, 9-10)

Unit: Controlling Native Wildlife Populations in Zoos
Students will examine and discuss implications for conservation policy and practice. Students will develop plans identifying scenarios where population control is necessary and justified from a conservation and animal welfare perspective.

Benchmark: 1.3 Care and Management
Level 2: Describe comprehensive care practices for animals, and apply advanced management procedures to select, handle, mark and manage environmental conditions.

Indicators
1.3.03 Describe and implement scientific concepts of animal welfare
1.3.05 Estimate carrying capacity of the environment and its impact on animal health
1.3.06 Explain predator/prey relationships (e.g., predator control, species propagation, invasive species control) and implement measures to control predators when necessary

Academic Standards
Math Standards: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Science Standards: Explain the structure and function of ecosystems and relate how ecosystems change over time. (Life Sciences F, 9-10)

Benchmark: 1.4 Animal Health

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

Indicators

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

Academic Standards

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

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

Science Standards: 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 Behavior

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

Indicators

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

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

Academic Standards

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

Unit: Animal Exhibits and Mixed Species Exhibits

Students will apply principals of zoo design to develop exhibits that support animal and human interaction, conservation, animal care/welfare, education and research practice.

Benchmark: 1.4 Animal Health

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)

Academic Standards

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

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

Science Standards: 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 Behavior
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)
1.6.09 Handle and move animals (e.g., training, restraint, confinement) with regard for safety of animals and handlers

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

Benchmark: 3.2 Sales and Customer Service
Level 2: Use sales techniques to close the sale of a product/service and handle complex customer issues

Indicators
3.2.08 Build and develop customer relationships

Academic Standards
English Standards: Use a variety of strategies to enhance listening comprehension. (Communication A, 8-10; Communication A, 11-12)
Math Standards: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)

Benchmark: 3.3 Management
Level 2: Analyze performance of an enterprise and reallocate resources to achieve goals

Indicators
3.3.05 Plan operational capacity
3.3.06 Develop a continuous-improvement management program

Academic Standards
English Standards: Analyze the features and structures of documents and critique them for their effectiveness. (Reading: Informational Text A, 11-12)
Math Standards: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Social Studies Standards: Identify factors which inhibit or spur economic growth and cause expansions or recessions. (Economics B, 11-12)

Unit: Education and Research in Zoos and Field Conservation
Students will develop plans for educational and visitor engagement programs. Students will engage in laboratory or field experiments related to captive animal populations and conservation.

Benchmark: 1.3 Care and Management
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

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

Academic Standards

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

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

Banchmark: 1.4 Animal Health

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
1.4.08 Monitor and evaluate the quality of an animal's habitat (natural or artificial) and implement corrective methods as needed
1.4.10 Administer care to animals in case of accident or illness
1.4.18 Explain zoonoses and communicable diseases common to humans and animals

Academic Standards

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

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

Science Standards: 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: 3.11 Research and Analysis

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
3.11.06 Compute measures of central tendency and dispersion to interpret results and draw conclusions
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 Standards: 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 Standards: Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations. (Algebra D, 8-10)

Science Standards: 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: Zoo Associations

Students will be acquainted with the basics of business management procedures and understand the scope and importance of business regulations, law, and related issues in relations to captive animal populations and conservation.

Benchmark: 3.10 Business Regulation, Law and Related Issues

Level 2: Determine the impact of government regulations and societal issues on an environmental project or the performance of a business enterprise

Indicators

3.10.02 Explain the purpose and impact of government regulations
3.10.03 Identify local, state and federal regulations relative to compliance
3.10.06 Identify governmental agencies and non-governmental organizations that impact agricultural/environmental issues
3.10.08 Assess the impact of issues affecting the industry and recommend solutions

Academic Standards

English Standards: Demonstrate comprehension of print and electronic text by responding to questions (e.g., literal, inferential, evaluative and synthesizing). (Reading Process B, 8-10; Reading Process B, 11-12)
Math Standards: Construct convincing arguments based on analysis of data and interpretation of graphs. (Data Analysis F, 8-10)
Social Studies Standards: Evaluate the consequences of geographic and environmental changes resulting from governmental policies and human modifications to the physical environment. (Geography B, 11-12)

Benchmark: 3.3 Management

Level 2: Analyze performance of an enterprise and reallocate resources to achieve goals

Indicators

3.3.03 Develop business goals/objectives and mission statement
3.3.04 Identify organizational structures of businesses

Academic Standards

English Standards: Analyze the features and structures of documents and critique them for their effectiveness. (Reading: Informational Text A, 11-12)
Math Standards: Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions. (Number G, 8-10)
Social Studies Standards: Identify factors which inhibit or spur economic growth and cause expansions or recessions. (Economics B, 11-12)