Chariho Regional School District - Science Curriculum
September, 2016

VETERINARY SCIENCE CURRICULUM

Unit 1: Safety and Sanitation

OVERVIEW

Summary

Students will gain an understanding of the types of hazards common in veterinary hospitals and the organization that regulates safety standards in the workplace. They will be able to read an MSDS and locate important safety information within it. Students will learn how to protect themselves from potential hazards in the workplace. They will be able to describe the correct methods of protection given scenarios describing hazardous situations. They will also research zoonotic diseases. Students will investigate the differences between sanitation, disinfection, and sterilization, and be able to relate which cleaning method should be used in any given situation.

Content to Be Learned

- Safety precautions for a given scenario.
- OSHA and its purpose.
- Methods of sanitation and when to use them.
- Examples of the four types of safety hazards.

Practices

- Obtaining, evaluating, and communicating critical information from Safety Data Sheets to prevent accidents in the animal hospital.
- Constructing explanations as to the importance of proper handling of animals in a veterinary hospital setting to prevent hazards or the spread of pathogens.

Crosscutting Concepts

- Cause and effect.

Essential Questions

- How can the prevention of accidents and the spread of pathogens in the veterinary hospital benefit those in the community?

Agriculture, Food and Natural Resources (AFNR) Career Cluster Content Standards

- AS.03.01. Performance Indicator: Prescribe and implement a prevention and treatment program for animal diseases, parasites and other disorders.
    - AS.03.01.05.a. Identify and describe zoonotic diseases.

    - AS.03.01.05.b. Explain the health risk of zoonotic diseases to humans and their historical significance and future implications.
- AS.06.01. Performance Indicator: Demonstrate safe animal handling and management techniques.
    - AS.06.01.01.a. Discuss the dangers involved in working with animals.
    - AS.06.01.01.b. Outline safety procedures for working with animals by species.

Unit 2: Veterinary Terminology

OVERVIEW

Summary

Students will learn many common Greek and Latin prefixes, suffixes, and roots that compose the language of veterinary medicine and learn how to dissect veterinary terms to discover their meanings.

Content to Be Learned

- General and widely used veterinary terms.
- Greek and Latin prefixes.
- Abbreviations commonly used in veterinary medicine.

Practices

- Obtaining, evaluating, and communicating information to describe scientific terminology.

Crosscutting Concepts

- Structure and function.

Essential Questions

- How is understanding scientific words beneficial when determining the meaning of and using veterinary vocabulary?

Standards

No Standards Applicable.

Unit 3: Anatomy and Physiology

OVERVIEW

Summary

Students will investigate the body systems and gain a working knowledge of how each system functions, its purpose, and how it is affected by disease. Students will apply their knowledge by reading and analyzing professional journal articles. Students will develop a vocabulary of directional anatomical terms and will be able to identify anatomical structures of animals. Students will apply their knowledge by dissection and assembling anatomical models.

Content to Be Learned

- Common anatomical terminology.
- Common intramuscular injection sites.
- Common sites for measuring pulse and collecting blood samples.
- Structure and function of the skeletal system.
- Structure and function of the circulatory system.
- Structure and function of the respiratory system.
- Structure and function of the nervous system.
- Homeostasis.

Practices

- Using models to correctly communicate anatomical direction.
- Using models to describe and illustrate the differences between types of muscle.
- Using models to make comparisons between companion animals and large mammal anatomy.

Crosscutting Concepts

- System and system models.
- Structure and function.

Essential Questions

- How do the systems of the body help to maintain homeostasis and what implications does that have on life?
- How does the relationship between the skeletal and muscular system contribute to the viability of an animal?
- How does the relationship between the respiratory and nervous system contribute to the viability of an animal?

AFNR Career Cluster Content Standards

- AS.02. Performance Element: Classify, evaluate, select and manage animals based on anatomical and physiological characteristics.
    - AS.02.02.01.a. Identify basic characteristics of animal cells, tissues, organs and body systems.
    - AS.02.02.01.b. Compare and contrast animal cells, tissues, organs and body systems.
    - AS.02.02.01.c. Explain how the components and systems of animal anatomy and physiology relate to the production and use of animals.
    - AS.02.02.05.a. Describe the properties, locations, functions and types of animal organs.
    - AS.02.02.06.a. Describe the functions of the animal body systems and system components.

- AS.02.02.06.c. Explain the impact of animal body systems on performance, health, growth and reproduction.

- AS.02.03. Performance Indicator: Select animals for specific purposes and maximum performance based on anatomy and physiology.
  - AS.02.03.01.b. Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.

Next Generation Science Standards

Students who demonstrate understanding can:

HS-LS1-2. **Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.** [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.] [*Assessment Boundary: Assessment does not include interactions and functions at the molecular or chemical reaction level.*]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. • Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.	**LS1.A: Structure and Function** • Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level.	**Systems and System Models** • Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales.

Connections to other DCIs in this grade-band: N/A

Articulation of DCIs across grade-bands:
MS.LS1.A

Common Core State Standards Connections:
ELA/Literacy -
SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *(HS-LS1-2)*

* The performance expectations marked with an asterisk integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

Unit 4: Clinical Exams

OVERVIEW

Summary

Students will gain practical knowledge of the methods used to assess an animal's health. They will gain experience using the stethoscope and oto/ophthalmoscope to determine normal and abnormal signs of health. Students will participate in a group lab formulating and executing a procedure using the regional approach to assess an animal's health. Students will gain an understanding of the various regions of an animal's body and the signs of illness that may be present in those areas. They will understand that certain signs and symptoms may indicate a variety of diseases and/or other health problems. A role-playing activity will enable students to practice communication skills and learn to properly chart the medical history of an animal. Students will

understand that temperature, pulse, and respiration (TPR) is a useful baseline for predicting overall animal health. They will understand that TPR varies for every species of animal and may vary not only due to illness or disease, but also due to age, stress, and other environmental factors. Students will participate in a group lab following standard veterinary procedures to assess TPR.

Content to Be Learned

- Importance of communication to obtain animal history.
- Use of a stethoscope, otoscope, and ophthalmoscope.
- Characteristics of a healthy animal and the signs and methods used to assess an unhealthy animal.
- Abnormalities in general animal health and how they relate to problems and/or illnesses.
- Purpose and benefit of a routine for all physical exams.

Practices

- Obtaining, evaluating, and communicating patient health history and information.
- Asking questions to determine the health status of an animal.
- Analyzing and interpreting data to determine the health of an animal. (temperature/pulse/respiration, owner descriptions, etc).

Crosscutting Concepts

- Structure and function.
- Cause and effect.

Essential Questions

- How can following a routine, correctly recording animal health information, lead to overall better health in animals?
- How can technology be beneficial in determining animal health issues?

AFNR Career Cluster Content Standards

- AS.02.02. Performance Indicator: Apply principles of comparative anatomy and physiology to uses within various animal systems.
    - AS.02.02.05.a. Describe the properties, locations, functions and types of animal organs.
    - AS.02.02.05.b. Compare and contrast organ types and functions among animal species.
    - AS.02.02.05.c. Relate the importance of animal organs to the health, growth and reproduction of animals.
- AS.02.03. Performance Indicator: Select animals for specific purposes and maximum performance based on anatomy and physiology.
    - AS.02.03.01.a. Identify ways an animal's health can be affected by anatomical and physiological disorders.
    - AS.02.03.01.b. Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.
    - AS.02.03.01.c. Evaluate and select animals to maximize performance based on anatomical and physiological characteristics that affect health, growth and reproduction.
- AS.03.01. Performance Indicator: Prescribe and implement a prevention and treatment program for animal diseases, parasites and other disorders.

- AS.03.01.01.a. Explain methods of determining animal health and disorders.
- AS.03.01.01.b. Perform simple health-check evaluations on animals.

Unit 5: Hospital Procedures

OVERVIEW

Summary

Students will gain an understanding of the spay or neuter process and its benefits to pets and pet owners. They will research and debate the arguments for and against spaying or neutering, and form a conclusion about the topic. Students will gain an understanding of several common hospital procedures and be able to describe and demonstrate the procedures to others. They will complete vaccination schedules, read and fill syringes, and apply bandages. Students will understand the common methods of administering medications. They will complete activities to calculate medication amounts, dispense and label medications, and correctly fill and read a syringe.

Content to Be Learned

- Techniques to perform several common hospital procedures (bandaging, routes of administration, determining doses, teeth brushing).
- Arguments for and against spaying and neutering.
- Process of immunity.
- Disease transmission.

Practices

- Planning and carrying out investigations to practice correct hospital procedure techniques.
- Engaging in argument from evidence to explain the benefits of spaying or neutering procedures.
- Using mathematical and computational thinking to determine correct dosages of medication for animals.
- Using models to practice common hospital procedures.

Crosscutting Concepts

- Cause and effect.
- Structure and function.
- Systems and system models.

Essential Questions

- What affect does correctly carrying out hospital procedures have on the health of animals?

AFNR Career Cluster Content Standards

- AS.03.01. Performance Indicator: Prescribe and implement a prevention and treatment program for animal diseases, parasites and other disorders.
    - AS.03.01.04.a. Explain the clinical significance of common considerations in veterinary treatments, such as aseptic techniques.

Unit 6: Parasitology

OVERVIEW

Summary

Students will gain experience in the procedures commonly used to diagnose internal parasites. They will perform several of the most common tests and analyze the results. Students will investigate common internal and external parasites of cats and dogs and be able to identify and name them using both common and scientific names. They will understand that the mode of transmission, life cycle, and effect on the host are all factors used to determine the best course of treatment. Students will gain experience operating a microscope to search for parasite eggs and gain the ability to identify parasites as well as other debris found in a fecal specimen.

Content to Be Learned

- Visual identification of common parasites found in cats and dogs.
- Microscope scan for parasites.
- Methods for diagnosing parasites.
- Clinical signs of an animal with a parasite infestation.
- Life cycles of internal and external parasites.
- Describe and explain the implications of heartworms.
- Egg and adult parasite characteristics.

Practices

- Obtaining, evaluating, and communicating data from fecal examinations to determine the presence or absence of parasites.
- Analyzing and interpreting data on the current status of Lyme disease in the New England region and its implication on common companion animals.

Crosscutting Concepts

- Cause and effect.
- Structure and function.

Essential Questions

- What impacts do parasites have on societies around the world?

AFNR Career Cluster Content Standards

- AS.03.01. Performance Indicator: Prescribe and implement a prevention and treatment program for animal diseases, parasites and other disorders.
    - AS.03.01.01.a. Explain methods of determining animal health and disorders.
    - AS.03.01.01.c. Perform diagnostic tests to detect health problems in animals.
    - AS.03.01.02.a. Identify common diseases, parasites and physiological disorders that affect animals.
    - AS.03.01.02.b. Diagnose illnesses and disorders of animals based on symptoms and problems caused by diseases, parasites and physiological disorders.
    - AS.03.01.02.c. Treat common diseases, parasites and physiological disorders of animals.

Unit 7: Laboratory Techniques

OVERVIEW

Summary

Students will gain an understanding of the circulatory system including its functions, major organs, and how it operates. They will view models, microscope slides, and dissect preserved specimens. Students will be able to identify the various cells that form blood and describe their functions. Students will explore various aspects of clinical hematology. They will gain practical experience performing several of the most common laboratory tests. Students will investigate the urinary system, including its functions, major organs, and how it operates. They will view models, microscope slides, and preserved specimens. They will perform several urinalysis and chart the results. Students will gain practical experience performing two types of antibiotic sensitivity tests and will chart the results. Students will be able to identify the different types and forms of bacteria.

Content to Be Learned

- Path of blood through the heart.
- Abnormalities seen in blood films.
- Importance of properly performed laboratory tests.
- Functions of the circulatory and urinary systems.

Practices

- Using models to examine the function of the circulatory and urinary systems.
- Obtaining, evaluating and communicating data regarding urine health.
- Analyzing and interpreting urinalysis data to determine animal urinary health.

Crosscutting Concepts

- Structure and Function.
- Systems and System Models.

Essential Questions

- How can proper use of laboratory techniques efficiently diagnose animals and expedite their treatment?

AFNR Career Cluster Content Standards

- AS.03.01. Performance Indicator: Prescribe and implement a prevention and treatment program for animal diseases, parasites and other disorders.
    - AS.03.01.01.c. Perform diagnostic tests to detect health problems in animals.
    - AS.03.01.02.a. Identify common diseases, parasites and physiological disorders that affect animals.

Unit 8: Principles of Disease

OVERVIEW

Summary

Students will explain the signs of disease in an animal as compared to a healthy animal and discuss factors that influence the health of an animal as well as factors that cause disease. Students will understand the path a disease takes and how it affects various body systems. They will also discuss the types of treatments available and how and when those treatments may be used.

Content to Be Learned

- Factors that influence health and wellness.
- Factors that cause disease.
- Signs of disease.
- Pathology of different diseases and methods used to treat those diseases.

Practices

- Constructing explanations for how diseases are transmitted.
- Obtaining, evaluating and communicating information regarding animal health indicators and contributors to health.
- Obtaining, evaluating and communicating information regarding signs of disease and factors causing disease.
- Analyzing and interpreting urinalysis data to determine animal urinary health.

Crosscutting Concepts

- Structure and Function.
- Systems and System Models.
- Cause and Effect.

Essential Questions

- What implications does disease transmission have on the general population - both animal and human?

AFNR Career Cluster Content Standards

- AS.02.03. Performance Indicator: Select animals for specific purposes and maximum performance based on anatomy and physiology
    - AS.02.03.01.a. Identify ways an animal's health can be affected by anatomical and physiological disorders.
    - AS.02.03.01.b. Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.
- AS.03.01. Performance Indicator: Prescribe and implement a prevention and treatment program for animal diseases, parasites and other disorders.
    - AS.03.01.01.c. Perform diagnostic tests to detect health problems in animals.
    - AS.03.01.02.a. Identify common diseases, parasites and physiological disorders that affect animals.
    - AS.03.01.02.b. Diagnose illnesses and disorders of animals based on symptoms and problems caused by diseases, parasites and physiological disorders animals.
    - AS.03.01.03.a. Explain characteristics of causative agents and vectors of diseases and disorders in animals.
    - AS.03.01.03.b. Evaluate preventive measures for controlling and limiting the spread of diseases, parasites and disorders among animals.