

Program Concentration: **Agriculture**
Career Pathway: **Agriscience**
Course Title: **Animal Science and Biotechnology**

As part of the Agriscience pathway program of study, this course is designed to introduce students to the scientific principles that underlie the breeding and husbandry of agricultural animals, and the production, processing, and distribution of agricultural animal products. Introduces scientific principles applied to the animal industry; covers reproduction, production technology, processing, and distribution of agricultural animal products. Classroom and laboratory activities are supplemented through supervised agricultural experiences and leadership programs and activities.

AG-ASB-1: The student demonstrates the application of scientific methods in agricultural animal research and production.

- a. Distinguishes between basic and applied science.
- b. Discusses the advances made in American agriculture.
- c. Analyzes how agricultural research has benefited the consumer.
- d. Cites scientific discoveries in animal agriculture.
- e. Explains scientific developments that have revolutionized animal agriculture.
- f. Lists pharmaceuticals that are derived from animals and lists their uses.
- g. Discusses agriculture as a science.
- h. Performs the steps involved in the scientific method.
- i. Conducts a simple scientific research study.
- j. Investigates and reports on selected animal science technology/biotechnology careers.

Academic Standards:

ELA10RC4 (c) Determines strategies for finding content and contextual meaning for unfamiliar words or concepts

SCSh1 Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.

SCSh2 Students will use standard safety practices for all classroom laboratory and field investigations.

SCSh3 Students will identify and investigate problems scientifically.

SCSh4 Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.

SCSh6 Students will communicate scientific investigations and information clearly.

SCSh7 Students analyze how scientific knowledge is developed.

SCSh8 Students will understand important features of the process of scientific inquiry.

SCSh9 Students will enhance reading in all curriculum areas.

SB5 (d) Relate natural selection to changes in organisms. (e) Recognize the role of evolution to biological resistance (pesticide and antibiotic resistance).

AG-ASB-2: The student describes the various phases, segments, trends, consumption and economic scope of the large animal industry.

- a. Describes ecological balance.
- b. Describes the various segments of the beef industry.
- c. Researches the various phases of the sheep industry and the importance of wool as a consumer fabric.
- d. Assesses the various phases of the swine industry.
- e. Explains how horses are used historically and in modern times.
- f. Develops a chart of the per capita consumption of products from large animals grown in the United States.
- g. Justifies the use of agricultural land to produce meat animals.
- h. Identifies key production areas of beef cattle and hogs.
- i. Determines relationships between feed crop production and the production of meat animals.
- j. Identifies breeds of large animals.
- k. Locates on a map the states and regions foremost in the production of meat animals.

Academic Standards:

ELA10RC4 (a) Explores life experiences related to subject area content

SCSh4 Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.

SCSh6 Students will communicate scientific investigations and information clearly.

SCSh9 Students will enhance reading in all curriculum areas.

SSWG1 (a) describe the concept of place by explaining how physical characteristics such as landforms, bodies of water, climate, soils, natural vegetation, and animal life are used to describe a place.

SB3 (b) Examine the evolutionary basis of modern classification systems.

AG-ASB-3: The student describes the various phases, segments, trends, consumption and economic scope of the poultry industry.

- a. Summarizes the poultry industry's growth trends.
- b. Evaluates the production of poultry products in each state.
- c. Identifies on a map the states and regions foremost in production of poultry.
- d. Computes the per capita consumption of chicken, turkey and eggs.
- e. Describes vertical integration using segments of the poultry industry as examples.
- f. Outlines the operation of modern poultry operations.
- g. Explains the operation of modern hatcheries.
- h. Identifies breeds of poultry.
- i. Outlines a modern poultry production operation.
- j. Describes the process of egg development in poultry.

- k. Traces the biological processes involved in the production of eggs.
- l. Analyzes egg composition.
- m. Describes chick embryo development.
- n. Discusses proper storage conditions of hatching eggs.

Academic Standards:

ELA10RC2 (c) Relates messages and themes from one subject area to those in another area.

SCSh4 Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.

SCSh6 Students will communicate scientific investigations and information clearly.

SCSh9 Students will enhance reading in all curriculum areas.

SSEMI2 (a) Define the Law of Supply and the Law of Demand.

SB3 (b) Examine the evolutionary basis of modern classification systems.

AG-ASB-4: The student describes the various phases, segments, trends, consumption and economic scope of the dairy industry.

- a. Identifies the major areas and characteristics of dairy production in the United States and compares dairy production among the states.
- b. Discusses breeds of dairy cows and their characteristics.
- c. Demonstrates the steps used to milk cows in the modern dairy.
- d. Determines the per capita consumption of various dairy products.
- e. Assesses the uses of milk from species other than cows and their importance in the dairy industry.
- f. Identifies dairy products, their use and their economic importance.
- g. Examines the scientific process by which milk is produced.
- h. Traces the hormonal activity that controls lactation.
- i. Reviews the equipment and procedures involved in milking.
- j. Identifies the breeds of dairy cattle.
- k. Contrasts the breeds of dairy cattle, including their origin and breed characteristics.
- l. Assesses the uses of goat and sheep milk in cheese manufacturing.
- m. Describes the nutritive content of milk.
- n. Explores the scientific processes of pasteurization and homogenization in milk processing.
- o. Recognizes and explains the differences in milk classifying and grading.
- p. Demonstrates the conversion of milk to butter, cheese and ice cream products.

Academic Standards:

ELA10RC3 (c) Explores understanding of new words found in subject area texts.

SCSh4 Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.

SCSh6 Students will communicate scientific investigations and information clearly.

SCSh9 Students will enhance reading in all curriculum areas.

SB5 (d) Relate natural selection to changes in organisms. (e) Recognize the role of evolution to biological resistance (pesticide and antibiotic resistance).

SSEMI2 (a) Define the Law of Supply and the Law of Demand.

AG-ASB-5: The student evaluates trends in the aquaculture industry and the scientific principles involved in the production of aquatic animals.

- a. Explores the scope of the aquaculture industry.
- b. Classifies the characteristics of ectothermic animals.
- c. Evaluates the feed-conversion efficiency of fish.
- d. Researches types of aquatic animal production in the United States.
- e. Investigates the physical characteristics of water and its relationship to fish production.
- f. Estimates fish populations in production operations by scientific sampling.
- g. Measures and adjusts water pH as it relates to fish growth and development.
- h. Describes how fish attain oxygen.
- i. Explains how oxygen is dissolved into and depleted from water.
- j. Tests pond and river and other water for dissolved oxygen levels.
- k. Provides for the addition of oxygen to water by mechanical agitation.
- l. Describes the methods and facilities used in the production of various aquatic animals.
- m. Interprets the behavioral characteristics of bullfrogs and alligators that make them difficult to produce in confinement.

Academic Standards:

ELA10LSVI (c) Responds to questions with appropriate information; (d) Actively solicits another person's comments or opinion.

SCSh3 Students will identify and investigate problems scientifically.

SCSh4 Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.

SC5 Students will understand that the rate at which a chemical reaction occurs can be affected by changing concentration, temperature, or pressure and the addition of a catalyst.

SC7 Students will characterize the properties that describe solutions and the nature of acids and bases.

SES6 (a) Relate the nature and distribution of life on Earth, including humans, to the chemistry and availability of water. , (b) Relate the distribution of biomes (terrestrial, freshwater, and marine) to climate regions through time.

SPS6 (a) Describe solutions in terms of, solute/solvent, conductivity, concentration (b) Observe factors affecting the rate a solute dissolves in a specific solvent. (c) Demonstrate that solubility is related to temperature by constructing a solubility curve.

SSWG1 (a) describe the concept of place by explaining how physical characteristics such as landforms, bodies of water, climate, soils, natural vegetation, and animal life are used to describe a place

SSEMI2 (a) Define the Law of Supply and the Law of Demand.

AG-ASB-6: The student describes the various phases, segments, trends, demand, consumption and economic scope of the alternative and laboratory animals.

- a. Analyzes the advantages and disadvantages of raising alternative agricultural animals.
- b. Describes alternative animal agriculture industry.
- c. Explains the potential of ostriches, goats and other alternative animals as food animals.
- d. Describes the production of certified laboratory animal.
- e. Lists the animals most often used in scientific research and explains reasons for their selection and use.
- f. Lists the distinguishing characteristics of insects used in agricultural animal production.
- g. Explains the importance of the honeybee to agriculture and the society of the honeybee.
- h. Discusses the threat to American agriculture by the Africanized honeybee and explains the biological reasons for the problem.
- i. Outlines production practices to produce organic and natural animal products.

Academic Standards:

SCSh4 Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.

SCSh6 Students will communicate scientific investigations and information clearly.

SCSh9 Students will enhance reading in all curriculum areas.

AG-ASB-7: The student classifies animals using scientific binomial nomenclature as well as classifies agriculture animals by breed and use.

- a. Explains how agricultural animals are classified scientifically.
- b. Explains the use of the binomial system of classification.
- c. Utilizes kingdoms to classify all living organisms.
- d. Identifies characteristics of animals that place them in different classifications.
- e. Explains how breeds of livestock were developed.
- f. Explains the purpose of breed associations.
- g. Classifies agricultural animals.
- h. Identifies characteristics that can be used to group objects.
- i. Categorizes common and distinguishing characteristics of several agricultural animals.

Academic Standards:

ELA10RC2 (a) Identifies messages and themes from books in all subject areas.

SCSh9 Students will enhance reading in all curriculum areas.

SB3 (a) Relate the complexity and organization of organisms to their ability for obtaining, transforming, transporting, releasing, and eliminating the matter and energy used to sustain the organism. (b) Examine the evolutionary basis of modern classification systems. (six kingdoms);

SB5 Students will evaluate the role of natural selection in the development of the theory of evolution.

AG-ASB-8: The student describes and addresses the general public's food safety and environmental concerns.

- a. Rationalizes the consumers concerns for food safety.
- b. Explains the causes of problems with meat.
- c. Demonstrates knowledge of how safety problems can be solved.
- d. Differentiates between meat grading and meat inspection.
- e. Discusses examples of how genetic engineering has benefited the producer and consumer as well as the concerns over genetic engineering.
- f. Evaluates producers of agricultural animals as caretakers of the environment.
- g. Describes the concept of the greenhouse effect.
- h. Summarizes how the balance of oxygen and carbon dioxide is maintained in the atmosphere.
- i. Discusses how bacteria can be beneficial to the environment.
- j. Determines consumer concerns with various phases of the animal and meat industry.
- k. Explains the growth in organically produced animal products.

Academic Standards:

ELA10RC4 (b) Discusses in both writing and speaking how certain words and concepts relate to multiple subjects.

SCSh3 Students will identify and investigate problems scientifically.

SCSh6 Students will communicate scientific investigations and information clearly.

SCSh9 Students will enhance reading in all curriculum areas.

SC1 (a) Relate the role of nuclear fusion in producing essentially all elements heavier than hydrogen

SC5 (b) Investigate the effects of a catalyst on chemical reactions and apply it to everyday examples

ELA10LSVI (i) Employs group decision-making techniques such as brainstorming or a problem-solving sequence (e.g., recognizes problem, defines problem, identifies possible solutions, selects optimal solution, implements solution, and evaluates solution)

ELA10LSVI (e) Offers own opinion forcefully without domineering; (f) Contributes voluntarily and responds directly when solicited by teacher or discussion leader; (g) Gives reasons in support of opinions expressed.

AG-ASB-9: The student describes crucial animal welfare issues and explains the benefits of treating animals in a human manner and providing for the animals needs.

- a. Discerns the difference between animal welfare and animal rights.
- b. Researches potential problems brought about by animals being raised in confinement.
- c. Interprets the reasons given by some people for their objections to raising farm animals.
- d. Debates the use of production practices such as confinement operations.
- e. Debates management practices used in the production of agricultural animals.
- f. Investigates the benefit to producers of content and healthy animals.
- g. Explains potential problems of animal production such as the continuous use of antibiotics.
- h. Cites examples of how the use of animals in research has benefited humans.
- i. Investigates the laws that govern the use of laboratory animals for research.
- j. Interprets the laws governing the use of agricultural animals.
- k. Discusses the production and increasing popularity of natural and organically produced animal products.

Academic Standards:

ELA10RL4 (d) Includes a formal works cited or bibliography when applicable.

SCSh1 Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.

SCSh3 Students will identify and investigate problems scientifically.

SCSh6 Students will communicate scientific investigations and information clearly.

SCSh9 Students will enhance reading in all curriculum areas.

ELA10LSVI (i) Employs group decision-making techniques such as brainstorming or a problem-solving sequence (e.g., recognizes problem, defines problem, identifies possible solutions, selects optimal solution, implements solution, and evaluates solution)

ELA10LSVI (e) Offers own opinion forcefully without domineering; (f) Contributes voluntarily and responds directly when solicited by teacher or discussion leader; (g) Gives reasons in support of opinions expressed.

AG-ASB-10: The student observes and interprets the natural behavior of agricultural animals and relates these behaviors to production practices yielding more content, healthier, and productive animals.

- a. Describes the importance of ethology in the production of agricultural animals.
- b. Differentiates between instinctive and learned behaviors of animals.
- c. Judges animal intelligence based on behavior.
- d. Describes the conditioning response and its use in animal production.
- e. Explains how animal behaviors are developed.
- f. Infers how unusual stimuli and surroundings affect animals.
- g. Examines how cattle view their surroundings and how that behavior is used to design cattle facilities.
- h. Describes and identifies social, dominate, flight, and protective behaviors in animals.
- i. Investigates the social behaviors of agricultural animals.

- j. Identifies dominant animals in a group.
- k. Discusses how dominant behavior contributes to natural selection.
- l. Analyzes the types of sexual and reproductive behaviors in agricultural animals.
- m. Observes animal behavior and successfully collects data for an ethogram.
- n. Describes the methods used by agricultural animals to communicate.
- o. Describes the types of ingestive behaviors in agricultural animals.
- p. Explains how the natural behaviors of agricultural animals can be used to provide the animals with a safer, more comfortable environment.

Academic Standards:

SCSh4 Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.

SCSh9 Students will enhance reading in all curriculum areas.

SB5 Students will evaluate the role of natural selection in the development of the theory of evolution.

AG-ASB-11: The student applies genetic principles to animal selection, breeding, and production.

- a. Explains the basic function of deoxyribonucleic acid (DNA) and ribonucleic acid (RNA).
- b. Explains how traits are passed from parent to offspring through genetic transfer.
- c. Researches and explains the concept of dominant genes versus recessive genes.
- d. Describes the concept of co-dominant genes.
- e. Explains how producers use the genetic principles to produce desired types of animals.
- f. Explains how the sex of an animal is determined.
- g. Explains the difference between phenotypic and genotypic characteristics.
- h. Computes mathematically the expected color of offspring.
- i. Compares the expected coat color with results obtained through scientific observation.
- j. Describes how the concept of heritability is used in the selection of livestock.
- k. Predicts phenotypic and genotypic characteristics in animals.
- l. Utilizes performance data in the selection of livestock.
- m. Describes Expected Progeny Difference (EPD).

Academic Standards:

ELA10RC2 (c) Relates messages and themes from one subject area to those in another area;

SCSh9 Students will enhance reading in all curriculum areas.

SB2 Students will analyze how biological traits are passed on to successive generations.

MM1D2 Students will use the basic laws of probability.

MM2P1 Students will solve problems (using appropriate technology).

SB2 (d) Describe the relationships between changes in DNA and potential appearance of new traits including; Alterations during replication, Insertions, Deletions, Substitutions, Mutagenic factors that can alter DNA, High energy radiation (x-rays and ultraviolet), Chemical, (f) Examine the use of DNA technology in forensics, medicine, and agriculture.

ELA10LSVI (e) Offers own opinion forcefully without domineering; (f) Contributes voluntarily and responds directly when solicited by teacher or discussion leader; (g) Gives reasons in support of opinions expressed.

AG-ASB-12: The student applies scientific methods of animal selection and explains the advantages and disadvantages.

- a. Explains the concept of natural selection.
- b. Discusses how humans have influenced the development of animals.
- c. Illustrates how scientific research has influenced the development of animals.
- d. Cites examples of how problems have developed in animals because of the selection process controlled by humans.
- e. Compares and contrasts the benefits of scientific animal selection and breeding by the producer with natural selection and random mating.
- f. Traces the stages in the development of modern swine.
- g. Discusses problems associated with overly muscled pigs.
- h. Interprets the reasoning behind the selection of sex character in agricultural animals.
- i. Outlines selection criteria for specific agricultural animals and uses.
- j. Outlines the physical characteristics associated with growth in animals.
- k. Compares and contrasts the characteristics of modern beef, swine, and dairy animals with those of their ancestors.
- l. Cites examples of heterosis in agricultural animal production.

Academic Standards:

ELA10RC3 (c) Explores understanding of new words found in subject area texts.

SCSh8 Students will understand important features of the process of scientific inquiry.

SCSh9 Students will enhance reading in all curriculum areas.

SB2 Students will analyze how biological traits are passed on to successive generations.

SB5 Students will evaluate the role of natural selection in the development of the theory of evolution.

AG-ASB-13: The student demonstrates an understanding of the reproductive anatomy and biological processes involved in the reproduction of agricultural animals.

- a. Distinguishes between asexual and sexual reproduction.
- b. Explains the process by which gametes are produced in both the male and female.
- c. Diagrams and explains the steps involved in meiosis.
- d. Describes the parts and functions of the male and female reproductive system.
- e. Analyzes the functions of the hormones that control reproduction.
- f. Describes the phases of the female reproductive cycle.
- g. Explains the process by which fertilization takes place.
- h. Compares the size and shape of sperm cells and egg cells.
- i. Demonstrates the procedures used in artificial insemination.
- j. Explains the use and procedures of embryo transfer and evaluates its economic importance.

- k. Describes the process and advantages of estrus synchronization.
- l. Researches and predicts new scientific technology that will be of benefit to livestock producers.

Academic Standards:

SCSh9 Students will enhance reading in all curriculum areas.

SB1 (a) Explain the role of cell organelles for both prokaryotic and eukaryotic cells, including the cell membrane, in maintaining homeostasis and cell reproduction.

SB2 Students will analyze how biological traits are passed on to successive generations.

SB5 Students will evaluate the role of natural selection in the development of the theory of evolution.

AG-ASB-14: The student describes the physiological processes involved in prenatal and postnatal growth and development of agricultural animals.

- a. Measures the growth process in an animal.
- b. Analyzes the circumstances of growth that affect production enterprises.
- c. Distinguishes between prenatal and postnatal growth and illustrates the phases of each.
- d. Describes and explains the phases of mitosis.
- e. Explains the layers of the blastula and the organs that are derived from each layer.
- f. Describes the functions of the placenta.
- g. Identifies characteristics of twenty-four, forty-eight, and seventy-two hour old chick embryos.
- h. Differentiates between body cells and explains the functions of each type cell.
- i. Sequences fat deposition in an animal's body.
- j. Investigates and explains why selection for muscling in animals is important.
- k. Compares and contrasts the growth and reproductive phases in an animal's life.
- l. Describes the effects of hormones in the growth process.
- m. Describes the effects castration has on the growth of an animal.
- n. Explains the aging process in animals.
- o. Distinguishes between chronological and physiological age.

Academic Standards:

ELA10RC4 (a) Explores life experiences related to subject area content. (b) Discusses in both writing and speaking how certain words and concepts relate to multiple subjects.

SCSh7 Students analyze how scientific knowledge is developed.

SCSh9 Students will enhance reading in all curriculum areas.

SB1 (a) Explain the role of cell organelles for both prokaryotic and eukaryotic cells, including the cell membrane, in maintaining homeostasis and cell reproduction.

SB2 Students will analyze how biological traits are passed on to successive generations.

AG-ASB-15: The student describes nutrient sources and functions as they relate to

monogastric and ruminant agricultural animals.

- a. Lists nutrients that are essential to the growth and development of animals.
- b. Describes the role water plays in supporting animal growth and development.
- c. Discusses the relationship between proteins and amino acids.
- d. Identifies protein feed sources.
- e. Distinguishes between carnivores, omnivores, and herbivores and gives examples.
- f. Explains the role and importance of protein, carbohydrates, and fats in the diets of animals.
- g. Identifies types of common sugars and their role in animal nutrition.
- h. Identifies the common grains that are used as a source of carbohydrates.
- i. Distinguishes between concentrates and roughages and gives examples of each.
- j. Lists the sources of fats, minerals, vitamins, roughages, starches, sugars, proteins, etc., in animal rations.
- k. Discusses the role that minerals play in animal growth and development.
- l. Demonstrates the use of chemical tests to indicate the presence of nutrients.
- m. Distinguishes between a monogastric and a ruminant digestive system.
- n. Lists and defines the function of the organs of monogastric and ruminant digestive systems.
- o. Explains the differences in feed used by monogastrics and feed used by ruminants.
- p. Classifies agricultural animals as monogastrics or ruminants and predicts feed sources of each.

Academic Standards:

SCSh2 Students will use standard safety practices for all classroom laboratory and field investigations.

SCSh3 Students will identify and investigate problems scientifically.

SCSh6 Students will communicate scientific investigations and information clearly.

SCSh9 Students will enhance reading in all curriculum areas.

SBI (c) Identify the function of the four major macromolecules (i.e., carbohydrates, proteins, lipids, nucleic acids)

SB3 Students will derive the relationship between single-celled and multi-celled organisms and the increasing complexity of systems.

SES6 (a) Relate the nature and distribution of life on Earth, including humans, to the chemistry and availability of water

AG-ASB-16: The student investigates the physiological and chemical properties of meat products and preservation.

- a. Describes the physiological processes that take place in the animal's body at death.
- b. Explains the steps in the slaughter of meat animals.
- c. Describes the biological process of ossification.
- d. Estimates the marbling of beef.
- e. Explains the value of high versus low yield grades.

- f. Calculates the quality and yield grades for beef.
- g. Identifies the wholesale and retail cuts of beef, pork, and lamb.
- h. Explains the different types of tissues that compose muscles.
- i. Describes the factors that affect the palatability of meats and the sensation of taste.
- j. Describes the importance of meat to the human diet.
- k. Evaluates the value of nutrients provided by meat.
- l. Discusses the types of microbes that cause spoilage of meat products.
- m. Lists the factors that favor the growth of microbes.
- n. Researches the scientific principles involved in meat preservation.
- o. Demonstrates the preservation of meat products using various curing methods.

Academic Standards:

SCSh2 Students will use standard safety practices for all classroom laboratory and field investigations.

SCSh3 Students will identify and investigate problems scientifically.

SCSh9 Students will enhance reading in all curriculum areas.

SB1 (c) Identify the function of the four major macromolecules (i.e., carbohydrates, proteins, lipids, nucleic acids)

SSEMI2 (a) define the Law of Supply and the Law of Demand

AG-ASB-17: The student describes the effects, development, and control of parasites in agricultural animals.

- a. Explains symbiotic relationships.
- b. Distinguishes between mutualism, commensalism, and parasitism.
- c. Discusses how parasitism causes harm to the host animal.
- d. Identifies parasites of agricultural animals and matches the parasite to the host.
- e. Estimates production losses due to parasites of agricultural animals.
- f. Diagrams the phases of a parasite's life cycle and identifies how knowledge of life cycle can be used to control the parasite.
- g. Differentiates between internal and external parasites.
- h. Explains how scientific research is used in the control and/or eradication of parasites.
- i. Explains the conventional means of controlling parasites of agricultural animals.

Academic Standards:

SCSh9 Students will enhance reading in all curriculum areas.

SB4 Students will assess the dependence of all organisms on one another and the flow of energy and matter within their ecosystems.

SB3 (a) Relate the complexity and organization of organisms to their ability for obtaining, transforming, transporting, releasing, and eliminating the matter and energy used to sustain the organism

SB5 (a) Trace the history of the theory. (d) Relate natural selection to changes in organisms. (e) Recognize the role of evolution to biological resistance (pesticide and antibiotic resistance).

AG-ASB-18: The student identifies and describes animal diseases, animal immune systems, and disease prevention and control programs.

- a. Lists the types and characteristics of disease-causing organisms.
- b. Describes three types and characteristics of bacteria.
- c. Characterizes viruses and protozoa.
- d. Identifies signs and symptoms that are used to recognize and quarantine sick animals.
- e. Lists agricultural animal diseases caused by microorganisms.
- f. Determines sources of disease-causing organisms in the environment.
- g. Describes how an animal's immune system works.
- h. Explains the function of red and white blood cells.
- i. Describes how disease vaccines are developed and the success of their uses.
- j. Discusses how antigens enter the body and explains the body's reactions.
- k. Distinguishes between active and passive immunity.
- l. Differentiates between naturally acquired immunity and artificially acquired immunity.
- m. Differentiates between infectious and noninfectious diseases.
- n. Describes how diseases are spread and prescribes methods to limit infection.
- o. Lists examples of diseases caused by genetic disorders.
- p. Cites examples of diseases caused by improper nutrition.
- q. Researches plants that are poisonous to agricultural animals.
- r. Provides examples of government disease-eradication programs.
- s. Lists zoonotic diseases and concerns for human health.

Academic Standards:

ELA10RL4 (d) Includes a formal works cited or bibliography when applicable

ELA10RL5 (c) Uses general dictionaries, specialized dictionaries, thesauruses, or related references as need to increase learning

SCSh9 Students will enhance reading in all curriculum areas.

SB3 Students will derive the relationship between single-celled and multi-celled organisms and the increasing complexity of systems.

SB5 Students will evaluate the role of natural selection in the development of the theory of evolution.

AG-ASB-19: The student becomes oriented to the comprehensive program of agricultural education, learns to work safely in the agriculture lab and work sites, demonstrates selected competencies in leadership through the FFA and agricultural industry organizations, and develops plans for a supervised agricultural experience program.

- a. Explains the role of the Agriculture Education program and the FFA in personal development.
- b. Demonstrates knowledge learned through a Supervised Agricultural Experience Program (SAEP).
- c. Develops leadership and personal development skills through participation in the FFA.

- d. Explores career opportunities in animal science through the FFA and Agriculture Education Program.
- e. Explores the professional agricultural organizations associated with the course content.

Academic Standards:

ELA10C1 The student demonstrates understanding and control of the rules of the English language, realizing that usage involves the appropriate application of conventions and grammar in both written and spoken formats.

SCSh6 Students will communicate scientific investigations and information clearly.

SCSh9 Students will enhance reading in all curriculum areas.

ELA10LSVI (d) Actively solicits another person's comments or opinion. (e) Offers own opinion forcefully without domineering.

ELA10LSVI (i) Employs group decision-making techniques such as brainstorming or a problem-solving sequence (e.g., recognizes problem, defines problem, identifies possible solutions, selects optimal solution, implements solution, evaluates solution)

ELA10LSVI (e) Offers own opinion forcefully without domineering; (f) Contributes voluntarily and responds directly when solicited by teacher or discussion leader; (g) Gives reasons in support of opinions expressed.

CTAE Foundation Skills

The Foundation Skills for Career, Technical and Agricultural Education (CTAE) are critical competencies that students pursuing any career pathway should exhibit to be successful. As core standards for all career pathways in all program concentrations, these skills link career, technical and agricultural education to the state's academic performance standards.

The CTAE Foundation Skills are aligned to the foundation of the U. S. Department of Education's 16 Career Clusters. Endorsed by the National Career Technical Education Foundation (NCTEF) and the National Association of State Directors of Career Technical Education Consortium (NASDCTEc), the foundation skills were developed from an analysis of all pathways in the sixteen occupational areas. These standards were identified and validated by a national advisory group of employers, secondary and

postsecondary educators, labor associations, and other stakeholders. The Knowledge and Skills provide learners a broad foundation for managing lifelong learning and career transitions in a rapidly changing economy.

CTAE-FS-1 Technical Skills: Learners achieve technical content skills necessary to pursue the full range of careers for all pathways in the program concentration.

CTAE-FS-2 Academic Foundations: Learners achieve state academic standards at or above grade level.

CTAE-FS-3 Communications: Learners use various communication skills in expressing and interpreting information.

CTAE-FS-4 Problem Solving and Critical Thinking: Learners define and solve problems, and use problem-solving and improvement methods and tools.

CTAE-FS-5 Information Technology Applications: Learners use multiple information technology devices to access, organize, process, transmit, and communicate information.

CTAE-FS-6 Systems: Learners understand a variety of organizational structures and functions.

CTAE-FS-7 Safety, Health and Environment: Learners employ safety, health and environmental management systems in corporations and comprehend their importance to organizational performance and regulatory compliance.

CTAE-FS-8 Leadership and Teamwork: Learners apply leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.

CTAE-FS-9 Ethics and Legal Responsibilities: Learners commit to work ethics, behavior, and legal responsibilities in the workplace.

CTAE-FS-10 Career Development: Learners plan and manage academic-career plans and employment relations.

CTAE-FS-11 Entrepreneurship: Learners demonstrate understanding of concepts, processes, and behaviors associated with successful entrepreneurial performance.