

Agriscience Standards

1) Synthesize research on the historical importance and purpose of agriculture and agriculture organizations, identifying major events, opportunities and technological developments influenced by agriscience theories and practices.

Explain how & when domestication of livestock is thought to have begun

Interpret how domestication led to human civilization

Construct a time line of major agricultural events and discoveries

List local, state and federal organizations dedicated to agriculture.

Relate how legislative acts on agriculture led to the creation of the Future Farmers of America

2) Identify and review general common laboratory safety procedures including but not limited to prevention and control procedures in agriscience laboratories. Incorporate safety procedures and complete safety test with 100 percent accuracy.

Discuss the need for safety and the results of unsafe practices.

List safety practices for laboratory, agriculture classroom & shop and land laboratory settings.

Demonstrate correct procedure in case of emergencies

Complete safety test with 100 percent accuracy

3) Gather and analyze information from multiple authoritative sources, such as the United States Bureau of Labor Statistics, United States Department of Agriculture website and Tennessee labor data, to summarize the economic impact of the agricultural industry. Describe major career trends in Tennessee, the United States, and worldwide.

Interpret current data on agriculture careers at local, state, national and worldwide

4) Determine how a Supervised Agricultural Experience (SAE) program functions as a method to apply concepts of the scientific investigation process (i.e. conducting an Agriscience Fair project). Compare and contrast the types of SAEs as related to their importance to the scientific investigation process.

Explain the difference between entrepreneurship and placement SAE's. Describe research and experimentation SAEs and exploratory SAE's. Explain the characteristics of a good SAE program and student responsibilities.

Identify the steps in planning an SAE Program.

Identify the parts of an annual SAE program plan.

5) Conduct a research project or literature review exploring a specific social and/or political impact on the agriculture industry at the local, state, national, or international level. For example, explore how the increase in availability of genetically modified organisms has impacted crop production and the green movement. Summarize findings in an informative essay. Revise, edit or rewrite as needed to strengthen writing

Choose a topic relevant to agriculture and prepare a written report, bulletin board, or oral report

6) Describe the biogeochemical cycles impacting the agriculture industry by creating illustrative models and informative texts for the following: a. Carbon cycle b. Nitrogen cycle c. Oxygen cycle d. Water cycle

Discuss and diagram the carbon cycle, nitrogen cycle, oxygen cycle, and water cycle

7) Critique the dynamics of biomass and energy flow in ecosystems by analyzing the major components of a food chain. Analyze the structure of the relationships among the concepts of carrying capacity, species populations, and organism interactions within multiple ecosystems and natural habitats.

Compare food chain, carrying capacity, species population

8) Produce an informative essay to distinguish between types of pollution and their sources, defining and applying ecology- and conservation-specific terminology. Compare and contrast important connections between pollution and its effects on environmental conditions (i.e. water, soil and air), animal populations, and plant populations.

Explain terms relevant ecology and conservation

Identify types and sources of pollution

9) Compare basic plant and animal cell biology, including structure and function. Create a visual representation that identifies cellular organelles and major cell processes.

Describe the cell's role as the structural unit.

Identify the various components of animal and plant cells and explain their functions.

10) Compare and contrast the roles of proteins, carbohydrates, lipids, and nucleic acids as they relate to cell growth and cell reproduction.

Define and discuss what are carbohydrates, lipids, and nucleic acids

11) determine the significance of and relationships between genes, chromosomes, proteins, and hereditary traits. Analyze the role of genes in determining genetic make-up, gender, and hereditary characteristics. Using systems of equations, explain the variation and distribution of genotypes and phenotypes expressed in plants and animals.

Describe how the gender of offspring is determined.

Explain how genotype and phenotype are different.

Distinguish between qualitative and quantitative inheritance

Define mitosis and discuss its importance.

Explain each step of mitosis.

Define meiosis and explain its importance.

Explain each step of meiosis.

12) Using graphic illustrations and supporting text, identify and describe major animal body systems (skeletal, muscular, respiratory, digestive, nervous, circulatory, respiratory, and reproductive) to establish a basic knowledge of their purpose, structure, and function.

Use graphic illustrations and supporting text to identify and describe the major animal body systems

13) Classify the types of digestive systems in domestic animals, and compare and contrast their anatomical and physiological differences. Synthesize research on animal nutrition (using academic journals or publications from Tennessee Extension Service) to produce informative narrative, including defining and applying nutrition specific terminology, to examine the stages of digestion and associated processes.

Compare and contrast monogastric and ruminant animals
Analyze different types of materials used as animal rations and how to calculate animal's needs based on type, sex, age and use

14) Use the periodic table and the atomic chart to compare differences between ionic and covalent bonding as related to digestion. Demonstrate an understanding of the interdependence of the complex chemical and biological processes involved in the digestion process including, but not limited to, the following: elements, compounds, mixtures, and acids.

Compare ionic and covalent bonding.
Define element, compound, mixture, and acid

15) Research the relationship between metabolism, energy, and nutrition. Evaluate life stage and activity level to determine the nutritional needs of animals. Differentiate types of rations to maximize animal performance.

Compare animal types, sex and use to determine ration type and formulation

16) Apply concepts related to the basic cellular and biochemical processes in plants to demonstrate the following: a. Create a graphic illustration of the parts and functions of plant cells b. Use quantitative reasoning to balance chemical equations related to plant processes c. Interpret the role of physics within the cohesion-tension theory and its significance to plant life d. Examine the roles of photo pigments and the effects of different colors of light on plant growth

Describe the cellular structure of plants.

Identify the major parts of plants and explain their functions.

17) Formulate a hypothesis about the correlation between plant nutrient deficiencies and soil composition. Conduct basic soil analysis to determine the chemical elements and nutritional levels available in soils essential for plant growth. Draw conclusions about the ability of soils to meet the nutritional requirements of plants.

Identify the essential nutrients for plant growth.

Distinguish between micronutrients and macronutrients.

Define pH and discuss its role in plant nutrition.

Explain the use of fertilizers.

Explain how the resources soil provides help in supporting life.

Explain the contents of soil.

Describe the biological nature of soil.

Describe the four ways plants use soil.

Describe some agricultural uses of soil.

Describe soil structure, its formation, and importance.

Identify various soil structures

18) Research and develop illustrative models that compare and contrast the reproductive structures of plants, drawing out key differences between sexual and asexual reproduction processes.

Identify the major parts of flowers & explain the functions of the parts.
Explain sexual reproduction of plants and its importance in plant survival.

Explain how pollination occurs and describe the different types of pollination

Explain asexual propagation. Explain tissue culture.

Discuss and identify the various methods of stem cutting propagation.

Discuss the methods of leaf and leaf-bud cuttings.

Describe the various types of growing media used for cuttings.

Describe grafting and identify three common methods.

Explain layering and the difference between separation and division in plant propagation.

19) Describe the structure and function of different seed components and summarize their roles in plant reproduction and propagation.

Explain the structure, formation and kinds of seed.

Describe the conditions for seed germination.

20) Describe the structures and functions of the male and female animal reproductive systems. Compare and contrast the differences of the reproductive systems between small and large animal species.

Explain the meaning of anatomy and physiology

Describe the importance and process of animal reproduction.

List the sexual classification of animals for major species.

List the parts and explain the functions of female and male reproductive systems.

Identify breeding systems used in animal science

21) Apply fundamental principles of physics as they relate to agricultural power and technology concepts in order to demonstrate the following: a. Analyze the relationship between speed, distance, and time b. Relate the types of simple machines to the law of machines and mechanical advantages c. Specify groups, sources, and forms of energy d. Analyze the principle of heat energy and describe the way heat travels e. Explain the law of conservation of energy f. Explain the production of energy and relate it to the invisible light spectrum

Relate how speed, distance, and time are interrelated

List the seven types of simple machines

Demonstrate how mechanical advantage is used in agriscience

Define the Law of conservation of energy

22) Identify different methods by which electrical energy can be produced. Discuss the safety hazards involved in each method as well as prevention and control methods relevant to electrical power supplies. Justify the use of different precautions for the prevention or management of electrical hazards and evaluate the efficacy of the prevention measures.

Distinguish between AC and DC currents

Discuss the safety hazards involved with the use of electricity

Identify careers associated with electricity

23) Utilize the appropriate instruments needed to calculate and measure voltage, amperage, resistance, and wattage.

Define and compare terms relevant to electricity

Measure and calculate electrical power and energy

24) Apply basic principles of thermodynamics to analyze the function of major components of gasoline and diesel fuel engines.

Identify parts of a 2 & 4 stroke engine.

Describe the difference between a 2 & 4 stroke engine.

Describe the difference between gasoline and diesel engine

Identify careers associated with small engines technology

25) Using quantitative reasoning and employing appropriate unit conversions, calculate horsepower and thermal efficiency in internal combustion engines by creating systems of equations that describe numerical relationships.

Explain the history of horsepower and its application in the field of agriculture

Calculate horsepower

Grading Criteria:

- Daily Grades/Labs 10%
- Course Notebook 20%
- SAE and Record Books 20%
- Class Participation 10%
- Tests/Quizzes 20%
- Final Exam 20% Make-up Work Policy: A student has three days from the day he/she returns to school to make up work missed as a result of an excused absence.