Kansas Agriculture Education

Principles of Ag Science–Plant -18060

Name _____ SSN ____-___-_____

Instructor _____

RATING SCALE: 3: Skilled, works independently
2: Competent, may need assistance
1: Received instruction, skill undeveloped
0: No exposure, instruction or training

INTEGRATION: (M) Math (S) Science
(E) Language Arts (L) Lab Activity
(C) Career Development Skill

Enrollment Date ____/____/____ Completion Date ____/____/____ Hours completed _____

I certify that the student received the training in the area indicated.

Student Signature _____ Date _____

Instructor Signature _____ Date _____

I. History and Careers in Plant Science

3 2 1 0 1. Investigate the diversity of careers in plant science
3 2 1 0 2. Attend job or career fields
3 2 1 0 3. Contact plant science professional organizations
3 2 1 0 4. Job shadow a professional in the plant industry
3 2 1 0 5. Create a timeline of the history of plant science, relating the past, present and future

II. Supervised Agriculture Experience (SAE) & Record Keeping

3 2 1 0 1. Identify and maintain the SAE (C)
3 2 1 0 2. Construct a personal budget (M)
3 2 1 0 3. Utilize the Kansas FFA SAE Record book to monitor the SAE (C)
3 2 1 0 4. Complete a local and district proficiency award applications (E)
3 2 1 0 5. Complete chapter and/or State FFA Degree applications (E)
3 2 1 0 6. Use Quicken to track income and expense in cash, checking, and savings (C)
3 2 1 0 7. Track SAE skills developed, hours worked as well as FFA, school, and community activities using the Ag Ed record book (C)
3 2 1 0 8. Set appropriate SAE long and short term goals (E)

A. Lab Activities (L)

3 2 1 0 1. Prepare income and expense records (C, M)
3 2 1 0 2. Prepare monthly cash flow statements (C, M)
3 2 1 0 3. Record personal and business inventories, assets, and liabilities (C, M)

III. The National FFA Organization and Leadership

3 2 1 0 1. Participate in Student Development activities established by the local POA established by the local POA
3 2 1 0 2. Participate in Chapter Development activities
3 2 1 0 3. Participate in Community Development activities established by the local POA
3 2 1 0 4. Research a 3-8 minute speech on an agricultural topic (E)
3 2 1 0 5. Write a final manuscript for a 3-8 minute speech over an agriculture topic using MLA style with title page and works cited (C, E)
3 2 1 0 6. Present a memorized 3-8 minute agriculture speech to the class (C, E)
3 2 1 0 7. Participate in the Agronomy Career Development Event (C)

IV. Basic soil properties and fertility

3 2 1 0 1. Define soil texture and structure
3 2 1 0 2. Use the textural triangle to identify classification
3 2 1 0 3. Describe water holding capacity, available water, and wilting points, permeability, leaching are effected by soil texture and nutrient availability
3 2 1 0 4. Perform and Interpret soil test data and give objective recommendations
3 2 1 0 5. Describe how mass flow, diffusion, and root interception affect nutrient uptake
3 2 1 0 6. Illustrate the N-cycle and how climate, soil, and plants effect it
3 2 1 0 7. Describe and distinguish between the different soil management practices in Ag
3 2 1 0 8. Describe how pH affects soil health and nutrient availability
3 2 1 0 9. Distinguish between point and non-point sources in the environment
3 2 1 0 10. Illustrate the water cycle and how climate, soil, and plants effect it
3 2 1 0 11. List and differentiate between micro and macro soil nutrients (S)
3 2 1 0 12. Outline the impact of soils on crop yields (S)
3 2 1 0 13. Identify various types of parent material types and soil forming factors
3 2 1 0 14. Describe methods of building soil fertility (S)
3 2 1 0 15. Explain considerations for determining N, P, and K for soil fertility and plant growth
3 2 1 0 16. Formulate the proper mix of dry fertilizer (M)

V. Plant Structures/Systems

3 2 1 0 1. Explain the process of translocation
3 2 1 0 2. Identify and describe the function of plant cell (S)
3 2 1 0 3. Identify the parts of monocot and dicot seeds and list their functions (S)
3 2 1 0 4. Distinguish between GMO and PLS plants and seeds
3 2 1 0 5. Describe methods of plant classification/nomenclature and the action of variation in natural selection(S)
3 2 1 0 6. Define how evapo-transpirations relates to plant growth
3 2 1 0 7. Define photoperiodism (S)
3 2 1 0 8. Explain the processes of photosynthesis, respiration, and transpiration as a cyclical growth representation (S, E)
3 2 1 0 11. Illustrate the sink/source of the complete carbon cycle
3 2 1 0 12. Illustrate the sink/source of the complete oxygen cycle
3 2 1 0 13. Discuss the means and effects of pollination
3 2 1 0 14. Relate the growing degree day concept to crop development
3 2 1 0 15. Understand how temperature is important in plant development and growth (cardinal temperatures)

VI. Weed, Disease, and Pest Control

3 2 1 0 1. Identify weed, disease, and pest damage (S)
3 2 1 0 2. Show disease material handling techniques (S)
3 2 1 0 3. Identify safe procedures when handling pesticides
3 2 1 0 4. Calculate pesticide application rates (M)
3 2 1 0 5. Identify the components of a pesticide label
3 2 1 0 6. Demonstrate how to mix pesticides (S)
3 2 1 0 7. Describe the general principles of IPM
3 2 1 0 8. Distinguish between resistance and tolerance
3 2 1 0 9. Recognize the differences in pesticide formulation from climatic conditions, using additives for drift or volatilization
3 2 1 0 10. Identify weeds from broadleaf and grass seedlings
3 2 1 0 11. Relate how weed life cycles differ from crop life cycles
3 2 1 0 12. Recognize the role of natural selection in disease, weed, and pest control in a cropping practice
3 2 1 0 13. Determine the best control measure for a given pest
3 2 1 0 14. Relate how insect behavior is linked with a cropping practice
3 2 1 0 15. Generate a list of beneficial insects and plants that counteract harmful weeds, diseases, and pests
3 2 1 0 16. Describe strategies needed for disease management
3 2 1 0 17. Explain the use of pesticides as a pest management strategy
3 2 1 0 18. Explain how stewardship, pesticide safety, and government regulation impact common cropping decisions
3 2 1 0 19. Understand how factors of pressure, speed, nozzle type, and spacing affect pesticide treatment success
3 2 1 0 20. Describe the effects of herbicide: adjuvants, contact, systemic

A. Lab Activities (L)

3 2 1 0 1. Locate PPE, REI, and Mixing instructions on a pesticide

VII. Genetics

3 2 1 0 1. Define the terms in their relationship with plant science and agriculture: hybrid, heterosis, homozygous, heterozygous, genotype, and phenotype (S)
3 2 1 0 2. Use and analyze a Punnet square (S)
3 2 1 0 3. Specify how the principles of genetics are used in plant and animal breeding programs (S)
3 2 1 0 4. Explain how hybrid plant varieties are developed (S)
3 2 1 0 5. Differentiate between dominant and recessive genes (S)
3 2 1 0 6. List examples of genetically engineered products (S)
3 2 1 0 7. Summarize laws and environmental/social concerns associated with genetic engineering (S)

A. Lab Activities (L)

3 2 1 0 1. Monitor phenotypes in a plant breeding program (S)
3 2 1 0 2. Research genetic engineering (S)

VIII. Fertilizer Applications

3 2 1 0 1. List characteristics of solid, gas, and liquid fertilizers
3 2 1 0 2. Understand the effects of starter fertilizer on crop growth and yield
3 2 1 0 3. Distinguish how fertilizer placement and time of application affect nutrient availability

IX. Crop Evaluation

3 2 1 0 1. Properly classify common crops and weeds
3 2 1 0 2. Describe standards used in USDA grain grading
3 2 1 0 3. Identify principles of irrigated water vs. dry land in crop growth, seed formation, and quality

A. Lab Activities (L)

3 2 1 0 1. Identify noxious weeds and their seeds
3 2 1 0 2. Identify restrictive weeds and their seeds
3 2 1 0 3. Identify common weeds and their seeds
3 2 1 0 4. Identify forage crops and their seeds
3 2 1 0 5. Identify grain crops and their seeds
3 2 1 0 6. Perform USDA Grain Grading (M)
3 2 1 0 7. Perform seed analysis

X. Biotechnology Issues

3 2 1 0 1. Access and review material from biotechnology firms; i.e. Monsanto, Pioneer, etc.
3 2 1 0 2. Discuss the most recent advances; i.e. Bt Corn, Round-Up Ready crops
3 2 1 0 3. Discuss moral issues in biotechnology and gene tampering
3 2 1 0 4. Discuss the role of biotechnology to improve plant genetics and production

XI. Crop Storage

3 2 1 0 1. Describe how temperature, aeration, pests, crop condition at harvest, length of storage, and additives influence crop quality
3 2 1 0 2. Discuss the difference between retained ownership and storage under warehouse receipt
3 2 1 0 3. Calculate volume of bins and storage areas
3 2 1 0 4. Calculate relative humidity, dew point, wet/dry bulb temperature, and saturation point
3 2 1 0 5. Calculate moisture content, drying efficiency, and gas consumption for drying high moisture corn.

XII. Mathematics Career Development Skills (C)

3 2 1 0 1. Estimate, apply, and solve problems involving fractions, decimals, and percentages (M)
3 2 1 0 2. Translate written and verbal statements into math expressions (M)
3 2 1 0 3. Convert common units of measurement within and/or across measurement systems (M)
3 2 1 0 4. Apply concepts of measurement such as distance, direction, rate, and time (M)
3 2 1 0 5. Construct or interpret tables, charts, maps, and/or graphs (M)
3 2 1 0 6. Decide whether a problem is best solved with a computer, calculator, paper, and pencil, or mental arithmetic techniques (M)

XIII. Communications Career Development Skills (C)

3 2 1 0 1. Follow oral instructions (E)
3 2 1 0 2. Participate in group communication activities (E)
3 2 1 0 3. Give oral directions (E)
3 2 1 0 4. Use language and format appropriate to the subject matter, purpose, and audience (E)

XIV. Other Career Development Skills (C)

3 2 1 0 1. Set priorities that several tasks will be accomplished (C)
3 2 1 0 2. Utilize time management to reduce conflicts (C)
3 2 1 0 3. Apply rules including punctuality, attendance, and work ethic (C)
3 2 1 0 4. Access and use information to develop educational and career options (C)
3 2 1 0 5. Demonstrate stress management skills (C)

XV. Computer Literacy (C)

3 2 1 0 1. Define, understand, and use common computer technology terms (C)
3 2 1 0 2. Compose, organize, and edit information using a computer (C)
3 2 1 0 3. Use presentation software to design and create a presentation (C)
3 2 1 0 4. Use agricultural related software/websites (C)
3 2 1 0 5. Access, navigate, and use on-line services (C)
3 2 1 0 6. Send and receive email messages with enclosures (C)
3 2 1 0 7. Use Quicken to manage personal finance (C)
3 2 1 0 8. Use Microsoft Office (Word, Excel, Powerpoint, and Internet Explorer) to complete projects (C)

XVI. LifeKnowledge Lessons

3 2 1 0 1. My decisions and the opinions of others (HS 20)
3 2 1 0 2. Critical thinking skills (HS 24)
3 2 1 0 3. The value of diversity on teams (HS 70)
3 2 1 0 4. Human potential (HS 100)