Advanced Plant Science
18057

Rationale Statement:

Advanced Plant Science is designed to give students advanced knowledge and skills in the plant science industry. The plant science industry is a large part of the economic structure in South Dakota, from crop and forage production, to horticulture and forestry. Every part of South Dakota is involved with the plant science field. The demand for careers in plant science is growing in the fields of research and commercial horticulture, especially. Classroom and laboratory content may be enhanced by utilizing appropriate equipment and technology. Mathematics, science, English and human relations skills will be reinforced in the course. Work-based learning strategies appropriate for this course are school-based enterprises, field trips and internships. Opportunities for application of clinical and leadership skills are provided by participation in FFA activities, conferences and skills competitions. Each student will be expected to complete a Supervised Agricultural Experience program.

Suggested grade level: 11th – 12th

Topics covered:

- Agronomic plants
- Rangelands and wildlife habitat
- Genetically modified organisms (GMOs)
- Fertilizers
- Integrated pest management (IPM)
- Sustainable plant agriculture
- Harvesting and storing crops
- Economics
- Decision making in business

Indicator #1: Appraise the principles of plant anatomy, classification and physiology for the production and management of plants.	
Bloom's Taxonomy Level	**Standard and Examples**
Analyzing	**APS 1.1 Classify agronomic plants according to the classification system, life cycles and plant use.** Examples: • Compare range, crop and horticultural plants. • Differentiate between major economic crops. • Examine pollination processes. • Interpret growth zones and identify SD zones.
Analyzing	**APS 1.2 Compare the benefits and risks of genetically modified plants (GMO).** Examples: • Analyze the steps in recombinant DNA technology. • Demonstrate tissue culture. • Describe the electrophoresis process. • Examine global issues with genetically modified plants.
Evaluating	**APS 1.3 Evaluate a fertilizer plan for specific plants or crops.** Examples: • Appraise soil moisture. • Experiment with soil nutrients with the addition of chemicals. • Appraise different soil types for different plant types. • Evaluate plant nutrients. • Evaluate common commercial fertilizers.
Evaluating	**APS 1.4 Evaluate data to manage range and pastures.** Examples: • Appraise range sites and ecological status. • Calculate carrying capacity. • Value desirable habitat for domestic and wildlife. • Evaluate a plan for animal rotation and optimum, ecological pasture care.

Applying	**APS 1.5 Apply knowledge of seed, fruit and vegetative parts for optimal plant reproduction.** Examples: • Employ methods of vegetative reproduction. • Describe germination process and conditions. • Demonstrate methods of asexual/sexual plant propagation. • Diagram the process of plant fertilization. • Sketch the difference between cross pollination and self pollination plants.
Indicator #2: Employ the principals and practices of sustainable agriculture in a plant-based operation.	
Bloom's Taxonomy Level	**Standard**
Applying	**APS 2.1 Incorporate the fundamentals of plant management and sustainable agriculture.** Examples: • Interpret variety selection factors. • Define sustainable agriculture. • Interpret variety test results. • Select crop rotation system. • Inoculate seed.
Analyzing	**APS 2.2 Examine the growth of a plant to determine when and how a crop should be harvested.** Examples: • Test hay for moisture content. • Examine crop samples for nutrient analysis. • Use Maximum Economic Yield concepts. • Calculate cost of labor. • Differentiate the stages of plant growth.

Evaluating	**APS 2.3 Evaluate crop and harvest success for future planning.** Examples: • Evaluate field densities. • Compare break-even verses selling price. • Evaluate field production utilizing GPS. • Calculate crop harvest loss.
Applying	**APS 2.4 Demonstrate proper practices to maintain a crop in storage.** Examples: • Illustrate a grain drying system. • Employ grain handling system. • Grade crop for quality.
Indicator #3: Implement a pest management plan.	
Bloom's Taxonomy Level	**Standard**
Understanding	**APS 3.1 Identify pest chemicals by formulation and use.** Examples: • Classify pesticides by purpose. • Solve chemical formulations. • Identify pests that can be controlled with certain chemicals.
Applying	**APS 3.2 Develop integrated pest management strategies to manage pest populations.** Examples: • Identify pests that need to be controlled. • Employ biological controls of plant pests. • Demonstrate pest management safety practices. • Employ integrated pest management strategies to control pests.
Applying	**APS 3.3 Demonstrate the safe handling, mixing and application of chemicals.** Examples: • Interpret environmental and chemical application regulations. • Obtain a license to use restricted pesticides. • Demonstrate proper calibration of spray equipment. Utilize GPS technology to accurately apply crop chemicals.