

Fundamental Plant Science

18051

Rationale Statement:

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 corner of South Dakota is involved in the plant science field. The demand for careers in plant science is expected to grow by 10% by 2016. In this course, students develop the necessary knowledge, skills, habits and attitudes for entry-level employment and advancement in areas such as production agriculture, research and horticulture. Classroom and laboratory content may be enhanced by utilizing appropriate equipment and technology. Algebra, biology, English and human relations skills will be reinforced in the course. 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: 9th – 10th

Topics covered:

- Plant anatomy
- Plant physiology
- Biotechnology
- Plant nutrition
- Soil
- Plant selection
- Plant reproduction
- Plant propagation
- Plant production
- Pest management
- Harvesting, handling, storing and marketing

Indicator #1: Explain the principles of anatomy and physiology in plants in both a domesticated and natural environment.

Bloom's Taxonomy Level	Standard and Examples
Understanding	<p>PS1.1 Describe functional differences in plant structures including roots, stems, flowers, leaves and fruit.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Identify plant parts and functions. • Contrast between monocotyledon and dicotyledon. • Describe types of root systems. • Identify plant growth stages. • Describe the absorption process. • Paraphrase photosynthesis. • Describe respiration. • Explain the transpiration process.
Understanding	<p>PS1.2 Classify plants based on physiology for taxonomic or other classifications.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Explain agricultural plants and their uses. • Recognize major crops of South Dakota. • Classify plants as monocots or dicots. • Classify plants as annuals, biennials or perennials. • Identify common and noxious weeds. • Classify growth characteristics of weeds.
Applying	<p>PS1.3 Interpret biotechnology's use in plant science.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Demonstrate tissue culture techniques. • Illustrate principles and practices of biotechnology to plant propagation. • Write a paper on the controversy of using biotechnology in food production. • Illustrate the impact that biotechnology has had on the agricultural industry and/or the global population.

Indicator #2: Manipulate the environment to promote optimal growth in plants.

Bloom's Taxonomy Level	Standard and Examples
Analyzing	<p>PS2.1 Determine nutritional requirements for optimal plant growth.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Experiment with plant growth regulators. • Compare plant nutritional requirements. • Illustrate the nitrogen cycle. • Differentiate plant nutrient deficiency symptoms. • Describe nutrient application methods and appropriate practices.
Analyzing	<p>PS2.2 Examine data to evaluate and manage soil/media and nutrients.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Test soil/media and plant tissue for nutrient levels. • Interpret tests of soil/media and/or plant tissue. • Compare soil slopes, textures and structures. • Experiment with soil/media permeability and water-holding capacity. • Compare environmental factors that influence and optimize plant growth. • Determine land use capability.

Indicator #3: Evaluate the fundamentals of production and harvesting of plants.

Bloom's Taxonomy Level	Standard and Examples
Evaluating	<p>PS3.1 Employ plant selection techniques for optimal growth and production.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Identify factors affecting crop selection. • List steps used in plant variety development. • Evaluate seed and plant samples for planting.

Analyzing	<p>PS3.2 Compare the basic methods for reproducing and propagating plants.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Examine the methods of vegetative reproduction. • Experiment with plant germination rate factors. • Compare methods of asexual/sexual plant propagation. • Distinguish between the components and functions of plant reproductive parts.
Analyzing	<p>PS3.3 Analyze a production plan for optimal plant production.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Appraise a moisture test. • Compare methods for seedbed preparation. • Examine method of seeding. • Compare conventional, reduced-tillage and no-till concepts.
Evaluating	<p>PS3.4 Evaluate an integrated pest management plan.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Select biological controls of plant pests. • Recommend pest management safety practices. • Appraise pest management safety practices. • Judge an integrated pest management and management strategy to control pests.
Analyzing	<p>PS3.5 Examine the fundamentals to harvest, handle, store and market crops.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Examine crop maturity. • Appraise methods of crop harvesting. • Compare crop storage facilities. • Monitor crop quality in storage. • Question market grade factors of crops.