Colorado CTE

Grades 9, 10, 11, 12, Higher Education

Adopted 2015

Understand the structure and significance of plant agriculture systems PLSC.01

01. Determine the meaning and importance of Plant Systems PLSC.01.01

- a. Define plant science and plant systems PLSC.01.01.A
- b. Explain the importance of plant systems locally, nationally and globally PLSC.01.01.B
- c. Integrate concepts of plant science into other pathways/agriculture PLSC.01.01.C
- d. Apply plant/crop science/system in a career pathway PLSC.01.01.D

02. Understand historical and future trends in plant systems PLSC.01.02

- a. Determine important historical trends in plant systems PLSC.01.02.A
- b. Describe evolution and technological advances in plant systems PLSC.01.02.B
- c. Analyze trends (population, societal, income, health, environmental) and their impact on plant systems PLSC.01.02.C
- d. Predict future trends in plant systems PLSC.01.02.D

03. Understand plant production industry segments PLSC.01.03

- a. Define plant system industry segments (seed producer, farmer/producer, processor, retailer) PLSC.01.03.A
- b. Describe the interrelationship of processing segments PLSC.01.03.B
- c. Evaluate the impact of a change in markets on the plant systems industry PLSC.01.03.C

04. Understand the distribution channels of the plant agriculture industry and relate these to the efficiencies of production PLSC.01.04

- a. Define Wholesalers, Local Markets/Direct Markets (CSA), Retailers, Governments/Institutional (School Lunch and Prison Lunch), Restaurant (Catering)/Hotel, Fast Food PLSC.01.04.A
- b. Describe the movement of products through channels PLSC.01.04.B
- c. Illustrate the impact of the distribution channels PLSC.01.04.C
- d. Design a new distribution channel (vertical integration) PLSC.01.04.D

Skip to main content

Understand issues and trends in the plant systems pathway PLSC.02

01. **Understand and describe sustainable agriculture** PLSC.02.01
    a. Explain sustainable agriculture and define objectives and strategies PLSC.02.01.A
    b. Describe sustainable agriculture practices and compare the ecological effects of traditional agricultural practices with those of sustainable agriculture PLSC.02.01.B
    c. Prepare a plan for an agricultural enterprise that involves practices in support of sustainable agriculture PLSC.02.01.C
    d. Implement a plan for an agricultural enterprise that involves practices in support of sustainable agriculture PLSC.02.01.D

02. **Understand the role of biotechnology in plant systems** PLSC.02.02
    a. Define biotechnology and its impact on agriculture PLSC.02.02.A
    b. Recognize some current uses in biotechnology in plant systems (i.e. round-up ready corn, sugar beets, etc.) PLSC.02.02.B
    c. Develop a management plan for the local agricultural industry incorporating new plant system biotechnology methods PLSC.02.02.C
    d. Predict new developments in biotechnology likely to affect the agricultural industry PLSC.02.02.D

03. **Understand alternative crops and the importance of crop diversity in plant systems** PLSC.02.03
    a. Identify alternative crops used in agriculture PLSC.02.03.A
    b. Explain the importance of crop diversity as a risk management method PLSC.02.03.B
    c. Explain non-traditional uses of alternative crops (i.e. soy based-artificial meat and dairy products) PLSC.02.03.C
    d. Evaluate how alternative crops can help meet world food demand for ag products PLSC.02.03.D

04. **Understand organic plant production and the impact of organic production on plant systems industry** PLSC.02.04
    a. Describe the difference between organic and natural foods PLSC.02.04.A
    b. Identify and explain the standards used by the USDA to certify organic food PLSC.02.04.B
    c. Analyze how organic food production can be a niche market in agriculture PLSC.02.04.C
    d. Analyze the advantages and disadvantages of organic production PLSC.02.04.D

05. **Understand community and social responsibility as it relates to plant systems** PLSC.02.05
    a. Identify the social responsibilities of agriculturalists PLSC.02.05.A

Skip to main content

b. Evaluate the difference between social responsibility and public perception PLSC.02.05.B

c. Analyze legal issues associated with social responsibilities in agriculture PLSC.02.05.C

d. Develop a management plan for agriculturalists to meet social responsibilities and public desires PLSC.02.05.D

Understand plant biology and apply principles in a plant systems production setting PLSC.03

01. Describe and utilize plant classification systems PLSC.03.01

a. Explain and justify the systems used to classify plants PLSC.03.01.A

b. Compare and contrast the hierarchical classification of agricultural plants PLSC.03.01.B

c. Classify agricultural plants according to the hierarchical classification system, life cycles, plant use, and as monocots or dicots PLSC.03.01.C

02. Identify plants according to different methods of classification and identification PLSC.03.02

a. Identify plant structures and functions and explain systems used to classify plants PLSC.03.02.A

b. Identify agriculturally important plants by common names PLSC.03.02.B

c. Identify agriculturally important plants by scientific names PLSC.03.02.C

d. Classify agricultural plants according to the hierarchical classification system, life cycles, plant use and as monocotyledons or dicotyledons PLSC.03.02.D

03. Understand plant growth and development PLSC.03.03

a. Distinguish growth processes of plants PLSC.03.03.A

b. Define life span and relate it to living condition; explain the stages of life PLSC.03.03.B

c. Analyze the growth factors that affect production enterprises PLSC.03.03.C

d. Explore the role that humans have in each of the life stages of agriculturally important plants PLSC.03.03.D

04. Understand cell structure and function PLSC.03.04

a. Describe the basics of a plant cell and describe the cellular organelles and their functions PLSC.03.04.A

b. Identify and explain DNA structure and replication processes PLSC.03.04.B

c. Diagram and label the cell cycle (mitosis and meiosis) and have understanding of each phase PLSC.03.04.C

05. Understand the anatomy and function of plants parts PLSC.03.05

a. Identify the components and functions of flowers, stems, leaves, and roots PLSC.03.05.A

Skip to main content

b. Explain the role flowers, stems, leaves, and roots play in overall plant health PLSC.03.05.B

c. Apply the knowledge of flower, stem, leaves, and root structures to plant breeding, production, and use PLSC.03.05.C

d. Utilize plant anatomy to identify and classify plants and determine the adaptability of plants to the plant environment PLSC.03.05.D

06. Describe photosynthesis and respiration and impact on plant production PLSC.03.06

a. Explain the basic processes of photosynthesis and respiration and their importance on earth PLSC.03.06.A

b. Explain the requirements necessary for photosynthesis and respiration to occur and identify the products and byproducts of each process PLSC.03.06.B

c. Explain the light dependent and light independent reactions that occur during photosynthesis and explain the stages of respiration PLSC.03.06.C

d. Perform experiments in the greenhouse testing light duration on overall plant development PLSC.03.06.D

07. Understand plant processes and impact on production PLSC.03.07

a. Identify the processes of transpiration and translocation PLSC.03.07.A

b. Explain the movement of nutrients through the plant processes PLSC.03.07.B

c. Describe signs of proper and improper physiological plant processes PLSC.03.07.C

08. Describe the processes of plant reproduction and replication PLSC.03.08

a. Discuss the importance of plant propagation and explain the difference between sexual and asexual propagation methods PLSC.03.08.A

b. Describe how to successfully plant seeds, use stem cutting propagation, and use grafting propagation PLSC.03.08.B

c. Produce plants using various propagation techniques PLSC.03.08.C

d. Conduct an experiment showing how plant environment affects reproduction PLSC.03.08.D

09. Describe the impact of plant genetics on plant production practices PLSC.03.09

a. Define principles of inheritance and genetic terms PLSC.03.09.A

b. Describe how improving plant genetics can improve plant production PLSC.03.09.B

c. Diagram and explain how characteristics are inherited (punnet square) PLSC.03.09.C

d. Explain how plant genetics impacts cultural reproductive practices (i.e. Cuttings, grafting, seed production, cross-pollination) PLSC.03.09.D

Skip to main content

Describe processes and techniques of plant environmental management PLSC.04

01. **Understand plant environment and impact on plant growth and development** PLSC.04.01
    a. Describe the effects air, temperature, nutrients, light and water have on plant metabolism and growth PLSC.04.01.A
    b. Determine the optimal air, temperature, nutrients, light and water conditions for plant optimal plant growth PLSC.04.01.B
    c. Describe plant responses to changes in the environment PLSC.04.01.C
    d. Design, implement and evaluate a growing plan to maintain optimal conditions for plant growth PLSC.04.01.D

02. **Identify and describe different growth promotants and regulators used in Plant Systems** PLSC.04.02
    a. Identify growth promotants and regulators and their uses in production PLSC.04.02.A
    b. Describe the impact of growth promotants and regulators on the plant system PLSC.04.02.B
    c. Create a management plan using growth regulators and growth promotants PLSC.04.02.C
    d. Compare different types of actions of growth promotants and regulators PLSC.04.02.D

03. **Utilize nutrient identification and management in plant systems** PLSC.04.03
    a. Recognize essential nutrients and their roles in growth PLSC.04.03.A
    b. Describe nutrient deficiency symptoms PLSC.04.03.B
    c. Identify nutrient availability in a soil PLSC.04.03.C
    d. Determine the amount of fertilizer to apply to a soil PLSC.04.03.D

04. **Manage diseases and pests in plant systems** PLSC.04.04
    a. Define disease and pest triangle and how they can be used as a prevention tool PLSC.04.04.A
    b. Identify major pests for commonly grown local crops and ornamentals PLSC.04.04.B
    c. Describe how pests affect plants and define economic and aesthetic thresholds PLSC.04.04.C
    d. Evaluate the best treatments--both chemical and natural--for common diseases and plants PLSC.04.04.D

05. **Understand and implement an integrated pest management plan** PLSC.04.05
    a. Explain general overview and history of IPM/PHC (Integrated Pest Management/Plant Health Care) PLSC.04.05.A
    b. Explain generally accepted control methods and combinations for common insect, disease and weed groups based on pest life cycles PLSC.04.05.B

Skip to main content

c. Identify common weeds, disease and insects (including beneficials) PLSC.04.05.C

d. Implement an IPM plan for local agriculturalists PLSC.04.05.D

06. Understand safety practices and chemical pest control methods PLSC.04.06

a. Explain risks and benefits associated with the materials and methods used in plant pest management PLSC.04.06.A

b. Explain procedures for the safe handling, use and storage of pesticides PLSC.04.06.B

c. Develop a safe chemical control method plan for local agricultural producers PLSC.04.06.C

d. Evaluate environmental and consumer concerns regarding pest management strategies PLSC.04.06.D

07. Identify pests and diagnose diseases PLSC.04.07

a. Define terms for common plant disease signs and symptoms (i.e. Stunting, cholorosis, necrosis) PLSC.04.07.A

b. State difference between sign and symptoms of pests/diseases PLSC.04.07.B

c. Diagnose unknown pest/disease using diagnostic process PLSC.04.07.C

d. Hypothesize how pest and diseases can adapt and modify over time; analyze new ways to control modified pests and diseases PLSC.04.07.D

Understand the history and management of water resources in plant systems PLSC.05

01. Understand the history and background of water use in plant systems PLSC.05.01

a. Identify important historical events related to water use, pollution, and conservation PLSC.05.01.A

b. Describe how past events have shaped current policy regarding Colorado Water Law PLSC.05.01.B

c. Explain the major components of the current Colorado Water Law PLSC.05.01.C

02. Describe the water cycle PLSC.05.02

a. Define the term water cycle and explain how it relates to agriculture PLSC.05.02.A

b. Explain the components of the hydrologic cycle PLSC.05.02.B

c. Explain how the hydrological cycle is related to water storage PLSC.05.02.C

d. Monitor changes in precipitation over the past ten years in the local community and explain how the water cycle affects water sources in the community PLSC.05.02.D

03. Understand irrigation methods, systems, and equipment PLSC.05.03

a. Define irrigation and why it is needed in agriculture PLSC.05.03.A

Skip to main content

b. Identify common irrigation systems, methods and equipment and explain the main water users in agriculture PLSC.05.03.B

c. Discuss the advantages and disadvantages of common types of irrigation systems PLSC.05.03.C

d. Develop a model demonstrating common irrigation methods in Colorado PLSC.05.03.D

---

04. Describe soil plant and water Interactions PLSC.05.04

a. Define the terms gravitational water, capillary water, and hydroscopic water PLSC.05.04.A

b. Describe how different types of soil water affect plant growth PLSC.05.04.B

c. Apply tests that visually demonstrate the affects of different types of soil water PLSC.05.04.C

d. Create a model illustrating soil water interactions PLSC.05.04.D

---

05. Understand the principles of soil/water hydraulics PLSC.05.05

a. Define hydraulics and how it controls the movement of water through a system PLSC.05.05.A

b. Calculate dynamic and static water pressure PLSC.05.05.B

c. Apply soil/water hydraulics to a given scenario PLSC.05.05.C

---

06. Determine factors influencing water quality PLSC.05.06

a. Identify the major water pollution groups and explain different types of agricultural pollution PLSC.05.06.A

b. Explain common water pollution control measures PLSC.05.06.B

c. Perform water tests at local reservoirs, rivers, and municipal water sources to identify factors that determine water quality for both agricultural and municipal purposes PLSC.05.06.C

d. Evaluate the results of water tests and determine changes that need to be made to produce high quality water for agriculture and municipal purposes PLSC.05.06.D

---

07. Explain principles of water conservation PLSC.05.07

a. Define water conservation and why conservation is important in agriculture PLSC.05.07.A

b. Describe how irrigation practice and plant/crop choice is related to water consumption/water conservation PLSC.05.07.B

c. Relate water conservation to common soil conservation practices (i.e. waterways, runoff, no till, minimum till) PLSC.05.07.C

d. Develop a water conservation plan for a local enterprise PLSC.05.07.D

Skip to main content

08. Describe the relationship of water shed, and water sources on plant systems PLSC.05.08

- a. Describe properties of watersheds and identify the boundaries of local watersheds PLSC.05.08.A
- b. Relate the function of watersheds to natural resources PLSC.05.08.B
- c. Analyze ecosystem functions of a watershed PLSC.05.08.C
- d. Locate and analyze local watersheds PLSC.05.08.D

Identify and explain the principles of field production PLSC.06

01. Understand planting methods and procedures PLSC.06.01

- a. Define germination and identify favorable conditions for seed germination PLSC.06.01.A
- b. Identify methods to handle seeds to overcome seed dormancy mechanisms PLSC.06.01.B
- c. Conduct tests associated with seed germination rates, viability and vigor PLSC.06.01.C
- d. Demonstrate sowing techniques, propagate plants by micro propagation and asexual propagation PLSC.06.01.D

02. Understand harvest methods PLSC.06.02

- a. Determine harvest methods for major crops PLSC.06.02.A
- b. Assess the stage of growth to determine crop maturity PLSC.06.02.B
- c. Determine economic advantages & disadvantages of harvest methods PLSC.06.02.C
- d. Evaluate yield loss during harvest PLSC.06.02.D

03. Describe the principles of crop storage PLSC.06.03

- a. Identify storage methods for plants and plant products & determine size requirements PLSC.06.03.A
- b. Explain proper conditions to maintain the quality of plants/plant products held in storage PLSC.06.03.B
- c. Explain the reasons for preparing plants and plant products for distribution including grading, handling and packaging PLSC.06.03.C
- d. Monitor environmental conditions in storage facilities for plants and plant products PLSC.06.03.D

04. Understand the role and importance of a management plan in crop production PLSC.06.04

- a. Explain the importance and components of a management plan (environment, procedure, calendar, pest management) PLSC.06.04.A
- b. Develop a plant management plan for crop production PLSC.06.04.B

Skip to main content

c. Implement a plant management plan for crop production PLSC.06.04.C

Understand principles necessary to effectively manage range sites PLSC.07

01. Understand the principles of Range Management PLSC.07.01

a. Describe range management PLSC.07.01.A

b. Determine the purpose of range management PLSC.07.01.B

c. Analyze the impact of production levels relative to range conditions PLSC.07.01.C

d. Evaluate a range site and make recommendations PLSC.07.01.D

02. Understand and determine range condition PLSC.07.02

a. Identify conditions necessary for optimum range conditions PLSC.07.02.A

b. Analyze the condition of a range PLSC.07.02.B

c. Make range management recommendations such as water or stocking rates PLSC.07.02.C

d. Evaluate a range site and make recommendations PLSC.07.02.D

03. Identify and classify range plants PLSC.07.03

a. Identify range plants common to Colorado PLSC.07.03.A

b. Categorize plants according to increasers, decreasers, and invaders PLSC.07.03.B

c. Determine the optimum percentage of increasers, decreasers, or invaders that need to be in productive range site PLSC.07.03.C

d. Evaluate a range site and identify invaders, increasers, and decreasers PLSC.07.03.D

Understand and apply principles of greenhouse management PLSC.08

01. Understand greenhouse function, design and structure PLSC.08.01

a. Explain the purposes of greenhouse production and identify crops grown in greenhouses PLSC.08.01.A

b. Identify types of greenhouse structures and framework and compare and contrast their uses PLSC.08.01.B

c. Recommend the best type of greenhouse structure and framework in different scenarios PLSC.08.01.C

d. Design a greenhouse for a specific location encompassing all aspects of structure and management PLSC.08.01.D

02. Identify and compare greenhouse glazing materials for various applications PLSC.08.02

a. Describe types of glazing materials and the factors to consider when selecting a glazing material PLSC.08.02.A

b. Compare and contrast glazing materials PLSC.08.02.B

c. Design a greenhouse for a specific location encompassing all aspects of structure and management PLSC.08.02.C

Skip to main content

d. Recommend the best type of glazing material in different scenarios PLSC.08.02.D

03. Understand and selection of greenhouse environmental systems PLSC.08.03

a. Identify the factors that are involved with the climate of a greenhouse (Heating, Cooling, Humidity, Light) and the importance of each factor on plant production PLSC.08.03.A

b. Describe the purpose and use of common environmental controls PLSC.08.03.B

c. Recommend the best type of heating, cooling, and ventilation in different scenarios PLSC.08.03.C

d. Design a greenhouse for a specific location encompassing all aspects of structure and management PLSC.08.03.D

04. Understand and selection of greenhouse irrigation systems PLSC.08.04

a. Identify the types of irrigation systems used in greenhouse production PLSC.08.04.A

b. Compare and contrast irrigation systems PLSC.08.04.B

c. Recommend the best type of irrigation in different scenarios PLSC.08.04.C

d. Design a greenhouse for a specific location encompassing all aspects of structure and management PLSC.08.04.D

05. Understand the process for selection of Greenhouse Growing Media PLSC.08.05

a. Identify and compare growing media PLSC.08.05.A

b. Describe properties and components of growing media PLSC.08.05.B

c. Recommend the best type of growing media in different scenarios PLSC.08.05.C

d. Design a greenhouse for a specific location encompassing all aspects of structure and management PLSC.08.05.D

06. Understand and apply practices for greenhouse plant nutrition and growth PLSC.08.06

a. Describe plant nutrition and the importance of nutrient management in a greenhouse setting PLSC.08.06.A

b. Identify micro- and macronutrients PLSC.08.06.B

c. Describe fertilization practices and growth regulation practices PLSC.08.06.C

d. Calculate and recommend the best fertilization practices and growth regulation practices in different scenarios PLSC.08.06.D

07. Understand and apply practices for greenhouse disease and pest management PLSC.08.07

a. Identify major plant diseases and pests in a greenhouse production PLSC.08.07.A

b. Describe methods of control for major plant diseases and pests in a greenhouse production PLSC.08.07.B

Skip to main content

c. Develop standard operating procedures for control of major plant diseases and pests PLSC.08.07.C

d. Design a greenhouse for a specific location encompassing all aspects of structure and management PLSC.08.07.D

08. Identify and analyze greenhouse operation practices PLSC.08.08

a. Describe safety procedures for greenhouse production PLSC.08.08.A

b. Identify common operations in a greenhouse (pot filling, transplanting, watering, inventory) PLSC.08.08.B

c. Identify automated systems and their advantages and disadvantages in greenhouse production PLSC.08.08.C

d. Design a greenhouse for a specific location encompassing all aspects of structure and management PLSC.08.08.D

Understand and apply practices for design, establishing and maintaining turf and landscape areas PLSC.09

01. Identify and explain utilization of landscape drafting tools and equipment PLSC.09.01

a. Identify and properly use the traditional tools of the landscape designer PLSC.09.01.A

b. Measure and interpret dimensions to scale PLSC.09.01.B

c. Design a landscape scheme using the proper tools and equipment PLSC.09.01.C

d. Compare and contrast landscape designs based on cost, climate conditions, and amount of maintenance PLSC.09.01.D

02. Explain the principles of xeriscaping PLSC.09.02

a. Define xeriscaping and explain its benefits PLSC.09.02.A

b. Describe the seven principles of xeriscaping PLSC.09.02.B

c. Design a landscape scheme incorporating the seven xeriscaping principles PLSC.09.02.C

d. Compare water usage between traditional and xeriscaped areas PLSC.09.02.D

03. Explain the design and operation of a landscape irrigation system PLSC.09.03

a. Identify common types of landscape irrigation systems and their components PLSC.09.03.A

b. Calculate working water pressure and select appropriate sized pipe PLSC.09.03.B

c. Design a landscape irrigation system for a newly landscaped area PLSC.09.03.C

d. Demonstrate how to set an irrigation timer and set irrigation zones to turn on at the proper time PLSC.09.03.D

04. Understand the selection, utilization and installation of turf grasses in the landscape PLSC.09.04

Skip to main content

a. Identify common turf grasses and classify to growth type PLSC.09.04.A

b. Select turf grasses species for specific uses or location PLSC.09.04.B

c. Calculate amount of seed or sod needed for a specific area PLSC.09.04.C

d. Relate turf grasses use to necessary maintenance equipment PLSC.09.04.D

05. Understand the selection, placement and installation of plants in the landscape PLSC.09.05

a. Identify ornamental trees and shrubs common to Colorado PLSC.09.05.A

b. Select trees and shrubs for appropriate landscape use PLSC.09.05.B

c. Design, plant, and maintain a landscape scheme incorporating all key elements of design PLSC.09.05.C

d. Calculate the most economical landscape scheme using a variety of trees and shrubs PLSC.09.05.D

06. Perform identification and treatment of plant injuries and diseases PLSC.09.06

a. Identify common turf and landscape plant injuries caused by insects or the environment PLSC.09.06.A

b. Describe integrated pest management and how it can be applied to turf and landscape maintenance PLSC.09.06.B

c. Develop an IPM plan for a turf and landscape area PLSC.09.06.C

d. Diagnose plant injuries and diseases and recommend chemical and natural solutions PLSC.09.06.D

07. Understand and apply practices of turf and landscape maintenance PLSC.09.07

a. Identify the steps for proper landscape including pruning, mowing, aerating, and fertilization PLSC.09.07.A

b. Describe how to maintain lawn equipment ensuring the proper health of the turf PLSC.09.07.B

c. Recognize how to determine fertilizer requirements for a turf and make recommendations to properly maintain the turf PLSC.09.07.C

d. Compare lawn mower types and their applications, advantages & disadvantages PLSC.09.07.D

Understand and apply the principles of floral design PLSC.10

01. Explain the history of floral design PLSC.10.01

a. Identify the origins of popular floral designs PLSC.10.01.A

b. Identify the characteristics of mass, line-mass, and line designs PLSC.10.01.B

c. Recognize the differences in classical, European and Oriental design PLSC.10.01.C

d. Analyze how European historical periods of floral design have affected modern design PLSC.10.01.D

Skip to main content

Explain and apply the principles of floral design PLSC.10.02

a. Recognize primary, secondary and tertiary colors as they apply to basic color themes in floral design PLSC.10.02.A

b. Define the principles and elements of design PLSC.10.02.B

c. Develop a rating scale in order to critique the use of the basic design principles in an arrangement PLSC.10.02.C

d. Construct & critique an arrangement using a rating scale based on the principles of design PLSC.10.02.D

03. Identify and classify design material PLSC.10.03

a. Classify flowers according to the four groups based on form and shape PLSC.10.03.A

b. Identify most commonly used cut flowers, foliage and tools PLSC.10.03.B

c. Investigate the seasonal availability of flowers and foliages PLSC.10.03.C

d. Organize a method of pricing and packaging of the most commonly used flowers and foliage PLSC.10.03.D

04. Understand handling & processing procedures PLSC.10.04

a. Identify the steps of handling a shipment of flowers PLSC.10.04.A

b. Demonstrate proper stem treatment and explain the benefits of floral preservatives PLSC.10.04.B

c. Identify the causes and signs of premature flower deterioration PLSC.10.04.C

d. Design a set of standard operating procedures to apply when shipping and receiving products PLSC.10.04.D

05. Understand and demonstrate floral construction techniques PLSC.10.05

a. Identify tools and materials used in floral design and their appropriate use PLSC.10.05.A

b. Apply wiring and taping techniques to different types of flowers PLSC.10.05.B

c. Explain the steps to designing a bud vase, circular arrangement, angular arrangement and line arrangement PLSC.10.05.C

d. Construct a bud vase arrangement, circular arrangement, angular arrangement and line arrangement PLSC.10.05.D

Understand, evaluate and apply management practices for soils PLSC.11

01. Understand and relate the factors of soil formation PLSC.11.01

a. Identify the components of soil (water, mineral particles, air, organic matter) PLSC.11.01.A

b. Describe the process of soil formation through the five soil forming factors--time, topography, weathering, soil organisms, and climate PLSC.11.01.B

c. Differentiate soils based on soil horizons, parent material, etc. PLSC.11.01.C

Skip to main content

d. Describe the soil classification system and relate it to geographic landforms, etc. PLSC.11.01.D

02. **Identify soil physical characteristics and relate to soil management** PLSC.11.02

- a. Identify physical properties of soil (bulk density, aeration/drainage, water holding capacity, texture, structure) PLSC.11.02.A
- b. Explain how the physical qualities of the soil influence the infiltration and percolation of water PLSC.11.02.B
- c. Diagnose plant growth problems due to the physical qualities of the soil PLSC.11.02.C
- d. Relate soil formation and soil physical characteristics to suitable land uses, or land capability classes PLSC.11.02.D

03. **Explain soil structure and relate to soil management** PLSC.11.03

- a. Describe the main types of soil peds and define the difference between soil texture from structure PLSC.11.03.A
- b. Describe how soil structure is related to soil treatment (plowing, cultivation, organic matter amendments, etc.) and soil treatment is related to the degradation or improvement of soil Structure PLSC.11.03.B
- c. Diagnose and prescribe treatments for potential plant growth related problems Associated with soil structure (pans, compaction, etc.) PLSC.11.03.C
- d. Analyze how soil and water chemistry impact soil structure PLSC.11.03.D

04. **Explain soil texture and relate to soil management** PLSC.11.04

- a. Identify different methods of determining soil texture (soil ribbon test and the USDA soil texture triangle, solids separation) PLSC.11.04.A
- b. Recognize potential plant growth problems associated with soil texture (tightness, poor drainage, temperature variations, etc) PLSC.11.04.B
- c. Propose possible treatments for certain soil texture problems PLSC.11.04.C
- d. Analyze how soil texture relates to crop selection PLSC.11.04.D

05. **Explain soil color and relate to soil management** PLSC.11.05

- a. Identify factors that determine soil color such as hue, chroma, and value PLSC.11.05.A
- b. Utilize a Munsell color chart to determine soil color PLSC.11.05.B
- c. Determine how soil color is related to subsurface drainage problems like glaying and mottling PLSC.11.05.C
- d. Prescribe treatments for soils lacking suitable characteristics for plant growth based on their soil color (i.e. glaying and mottling) PLSC.11.05.D

06. **Explain soil water holding capacity and relate to soil management** PLSC.11.06

- a. Describe how soil serves as a reservoir for plant available water PLSC.11.06.A
- b. Compare and contrast the different categories of soil water PLSC.11.06.B

Skip to main content

c. Compare the relationship between root volume and soil water available to the plant PLSC.11.06.C

d. Evaluate how soil drainage and water holding capacity can be improved PLSC.11.06.D

07. Explain soil water movement and relate to soil management PLSC.11.07

a. Discuss how water moves into and through soil and how it is retained PLSC.11.07.A

b. Describe how water is lost to evapo-transpiration PLSC.11.07.B

c. Predict the amount of water lost to ET when given specific data on soil moisture retention and irrigation practices PLSC.11.07.C

d. Evaluate irrigation based upon soil moisture vs. soil water holding capacity PLSC.11.07.D

08. Explain soil microbiology/biology and its impact on soil management PLSC.11.08

a. State the conditions necessary for a healthy soil microbiological ecosystem PLSC.11.08.A

b. Recognize situations where a soil's ecosystem will be damaged by human impacts PLSC.11.08.B

c. Recommend ways in which a soil's microbiology environment can be improved PLSC.11.08.C

09. Explain soil pH and its management PLSC.11.09

a. Define soil pH and how it relates to soil health and productivity PLSC.11.09.A

b. Determine the ideal pH for most plants and how pH can affect the solubility/availability of certain nutrients PLSC.11.09.B

c. Analyze how pH can be adjusted (i.e. by liming or acid injection/sulfur application) PLSC.11.09.C

d. Summarize and analyze the problems Associated with pH ranges above and below the ideal (i.e. Nutrient deficiencies in calcareous soils, deflocculation in high pH sodic soils, toxic metal solubility in acidic soils PLSC.11.09.D

10. Explain soil cation exchange and its management PLSC.11.10

a. Identify CEC and how it is related to soil health and productivity PLSC.11.10.A

b. Relate how CEC is a measure of the nutrient holding capacity of the soil PLSC.11.10.B

c. Describe how CEC varies by soil texture and is related to clay and organic matter content and soil chemistry PLSC.11.10.C

d. Analyze the relationship of CEC to pH, colloid content and water chemistry PLSC.11.10.D

Skip to main content

Explain soil salinity, sodacity and their management PLSC.11.11

a. Recognize the difference between soluble salts and soil sodacity PLSC.11.11.A

b. Discuss the sources of soluble salts, the EC test and EC test values that limit plant growth PLSC.11.11.B

c. Recommend appropriate corrective action for a salt affected soil PLSC.11.11.C

12. **Explain soil-carbon cycling and its impact on plant production** PLSC.11.12

a. Diagram the carbon cycle PLSC.11.12.A

b. Describe the various forms carbon takes in the carbon cycle PLSC.11.12.B

c. Discuss the ecological importance of the various forms of carbon in the carbon cycle PLSC.11.12.C

d. Hypothesize the historical and future impact the carbon cycle has on our environment (i.e. global warming) PLSC.11.12.D

13. **Explain soil nutrient cycling** PLSC.11.13

a. State the sources of N, P, and K in a soil PLSC.11.13.A

b. Diagram and explain the N, P, and K cycle PLSC.11.13.B

c. Describe how nutrients are "gained" and "lost" in the soil nutrient cycle PLSC.11.13.C

14. **Explain soil organic matter and its impact on soil management** PLSC.11.14

a. Define organic matter and identify sources of organic matter in the soil PLSC.11.14.A

b. Recognize ways in which organic matter may be managed in the soil PLSC.11.14.B

c. Utilize a soil test to measure organic matter PLSC.11.14.C

d. Make recommendations to improve organic matter content based on soil test results PLSC.11.14.D

15. **Explain soil compaction and management** PLSC.11.15

a. Define soil compaction and its effects on growing conditions PLSC.11.15.A

b. Describe ways of preventing and correcting compaction problems PLSC.11.15.B

c. Make recommendations to improve soil compaction problems (i.e. rotational grazing, etc) PLSC.11.15.C

d. Perform a bulk density test and predict growth problems based upon test results PLSC.11.15.D

16. **Understand and apply soil surveys** PLSC.11.16

a. Recognize the USDA soils survey system and discuss why soils varies from place to place PLSC.11.16.A

b. Interpret a USDA soil survey and state the soil type that is shown for a parcel in the soil survey PLSC.11.16.B

Skip to main content

c. Utilize soil survey to determine best land uses (crop land, homesite, etc) PLSC.11.16.C

d. Analyze soil survey to determine factors that make a site unworthy for use and determine factors to increase usability PLSC.11.16.D

---

17. Explain soil testing processes PLSC.11.17

a. Collect, document, and submit or test a composite soil sample PLSC.11.17.A

b. Interpret the results of a soil test PLSC.11.17.B

c. Make recommendations to improve soil after interpreting the soil test PLSC.11.17.C

d. Complete a soil test, prepare results, and make recommendations PLSC.11.17.D

---

18. Explain and manage soil erosion PLSC.11.18

a. Identify types of erosion and predict when they will occur PLSC.11.18.A

b. Identify prevention/control methods for various types of soil erosion PLSC.11.18.B

c. Develop a management plan to control soil erosion in the local community PLSC.11.18.C

d. Research the advancements in agricultural production and it's impact on soil erosion PLSC.11.18.D