Building: RCHS **Course:** Plant Science **Grade:** 9-10 **Tier:** 4 **Approved:** E (Fetting) C (Troxel) A (Lemke / Perkins)

PLC Question #1: What do we want all students to know and be able to do?

Unit 1: Importance of Plants✅

Priority Standard(s)

- **AFNR.PS.1:** Students will examine the components, applications, historical development, global implications, future trends, and career opportunities of the plant industry.

Supporting Standard(s)

- N/A

Learning Outcomes

Students need to know (Learning Priorities)	DOK Level
• **AFNR.PS.1.B**: Describe global distribution of plant specimens. • **AFNR.PS.1.C**: Describe how data influences plant systems.	

Students will understand (Performance Indicators)	DOK Level
• **AFNR.PS.1.B.i.2**: Classify plants by origin and compare economics of plant distribution and supply chain. • **AFNR.PS.1.C.i.4**: Predict trends in plant data.	

Unit 2: Plant Anatomy and Classification✅

Priority Standard(s)

- **AFNR.PS.2:** Students will apply knowledge of plant classification, anatomy, and physiology to the production and management of plants.

Supporting Standard(s)

- N/A

Learning Outcomes

Students need to know (Learning Priorities)	DOK Level
• **AFNR.PS.2.A**: Classify agricultural plants according to taxonomy systems • **AFNR.PS.2.B**: Apply knowledge of plant anatomy and functions of plant structures to activities associated with plant systems.	

Students will understand (Performance Indicators)	DOK Level
• **AFNR.PS.2.A.i.5**: Identify agriculturally important plants by scientific name. • **AFNR.PS.2.B.i.3**: Explain functions and components of seeds and fruit. • **AFNR.PS.2.B.i.4**: Identify the components, types, and functions of plant roots. • **AFNR.PS.2.B.i.5**: Discuss leaf morphology and the functions of leaves. • **AFNR.PS.2.B.i.6**: Identify the components and functions of plant stems. • **AFNR.PS.2.B.i.7**: Identify the components of a flower and their functions • **AFNR.PS.2.B.i.8**: Draw or build a plant cell with its organelles.	

Unit 3: Greenhouse Management✅

Priority Standard(s)

- **AFNR.PS.3:** Students will evaluate plant growth requirements and develop a plant management plan.
- **AFNR.PS.4**: Students will propagate, culture, harvest, and market plants.

Supporting Standard(s)

- N/A

Learning Outcomes

Students need to know (Learning Priorities)	DOK Level
• **AFNR.PS.3.A:** Determine influence of environmental factors on plant growth. • **AFNR.PS.4.A**: Demonstrate plant propagation techniques	

Students will understand (Performance Indicators)	DOK Level
• **AFNR.PS.3.A.i.1.a:** Describe the qualities of light that affect plant growth. • **AFNR.PS.3.A.i.1.b**: Describe plant responses to light color, intensity, and duration. • **AFNR.PS.3.A.i.1.c**: Describe the effects that air, temperature, and water have on plant metabolism and growth. • **AFNR.PS.3.A.i.1.d**: Determine optimal air, temperature, and water conditions for plant growth. • **AFNR.PS.4.A.a.3.a:** Produce herbaceous, softwood, or hardwood cuttings. • **AFNR.PS.4.A.b.1**: Demonstrate sowing techniques and provide favorable conditions for seed germination.	

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				• **AFNR.PS.4.A.i.2**: Conduct tests associated with seed germination rates, viability, and vigor.	
Students will do (Active Application)	**DOK Level**	**Students will do (Active Application)**	**DOK Level**	**Students will do (Active Application)**	**DOK Level**
Data and Trends in Plant Systems • I can predict trends in plant data and how they affect agricultural production and sustainability. • I can analyze how advancements in technology influence the future of the plant industry. **Careers in the Plant Industry** • I can identify various career opportunities within the plant industry and their roles in global agriculture and how they contribute to food production, conservation, and sustainability. • I can research and report on the diversity of plant system career pathways and their impact on global economies.		**Plant Classification and Taxonomy** • I can classify agricultural plants based on taxonomy systems. • I can compare different plant classification methods and explain their importance in agriculture. **Plant Anatomy and Functions** • I can explain the functions and components of seeds and fruit. • I can identify the components, types, and functions of plant roots. • I can discuss leaf morphology and describe the functions of leaves in plant growth and development • I can identify the components and functions of plant stems and their role in nutrient and water transport. • I can identify the components of a flower and explain their functions in plant reproduction. **Plant Structures and Cellular Biology** • I can draw or build a model of a plant cell and label its organelles. • I can explain how different plant structures work together to support plant growth and reproduction. • I can analyze how plant anatomy influences plant health, productivity, and management in agriculture.		**Environmental Factors and Plant Growth** • I can describe the qualities of light that affect plant growth. • I can explain how plants respond to different light colors, intensities, and durations. • I can describe how air, temperature, and water impact plant metabolism and growth. • I can determine the optimal air, temperature, and water conditions for healthy plant growth. **Plant Propagation Techniques** • I can demonstrate plant propagation techniques, including herbaceous, softwood, and hardwood cuttings. • I can use proper sowing techniques and create favorable conditions for seed germination. I can conduct tests to determine seed germination rates, viability, and vigor. **Greenhouse Management and Plant Care** • I can evaluate how environmental factors in a greenhouse setting influence plant health and productivity. • I can develop a plant management plan that includes proper watering, lighting, and temperature control. • I can monitor plant growth and make adjustments to greenhouse conditions for optimal results.	
Domain-specific Vocabulary		**Domain-specific Vocabulary**		**Domain-specific Vocabulary**	
• agronomy • cereal grain • fiber crops • fibers • field crops • floriculture • foliage • food crop		• angiosperms • annuals • biennials • bryophytes • Carl von Linne • common name • conifers • Cotyledon		• Pest • Irrigation • Hanging basket • Pots • Grafting • Seedling • Germination • Pruning	

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- horticulture
- forage
- forestry
- fruit
- grain crops
- grasses
- herb
- horticulture
- legumes
- nursery/landscape
- nut crops
- oil crops
- olericulture
- ornamental horticulture
- plant domestication
- plant science
- pomology
- spice
- sucrose sugar crops
- tree farms
- turf
- vegetable, fruit, and nut crops

- cultivar
- deciduous
- dichotomous key
- dicots
- Evergreen
- ferns
- gymnosperms
- herbaceous
- perennials
- monocots
- nomenclature
- perennials
- scientific name
- species
- taxonomy
- tracheophytes
- varieties
- vascular plants
- winter annuals
- woody perennial

- Hydroponic
- Flood table
- Drip irrigation
- Sprinkler irrigation

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PLC Question #1: What do we want all students to know and be able to do?

Unit 4: Floriculture and Landscape Design ✅

Priority Standard(s)
- **AFNR.PS.6:** Students will employ elements of design to enhance an environment.

Supporting Standard(s)
- N/A

Learning Outcomes

• Students need to know (Learning Priorities)	DOK Level
• **AFNR.PS.6.A**: Create landscape designs using plants. • **AFNR.PS.6.B**: Create floral and other non-landscape designs using plants.	

• Students will understand (Performance Indicators)	DOK Level
• **AFNR.PS.6.A.i.1:** Locate the design elements in a landscape. • **AFNR.PS.6.A.i.2**: Classify plants used in landscaping. • **AFNR.PS.6.A.i.4.a:** Analyze a landscape for functionality, design, and purpose. • **AFNR.PS.6.B.i.1**: Locate the design elements in non landscaping designs. • **AFNR.PS.6.B.i.4.a**: Analyze a floral design, interior scape, floral arrangement, or other design using plants.	

Students will do (Active Application)	DOK Level
Landscape Design and Plant Selection • I can identify and explain the elements of design used in landscaping. • I can classify plants used in landscaping based on their characteristics and functions. • I can analyze a landscape for functionality, design, and purpose. **Floral and Interior Plant Design** • I can identify the elements of design in floral arrangements and other non-landscape a plant designs. • I can analyze a floral arrangement, interior scape, or other plant-based design for	

Unit 5: Agronomy ✅

Priority Standard(s)
- **AFNR.PS.3:** Students will evaluate plant growth requirements and develop a plant management plan.
- **AFNR.PS.4** Students will propagate, culture, harvest, and market plants.
- **AFNR.PS.5** Students will recognize different systems in which plants grow.

Supporting Standard(s)

Learning Outcomes

Students need to know (Learning Priorities)	DOK Level
• **AFNR.PS.3.C**: Develop and implement a fertilization plan for specific plants in various production systems, including agronomy, fruit systems, gardens, nurseries, or CEA/greenhouse crops. • **AFNR.PS.4.E**: Harvest, handle, and store crops. • **AFNR.PS.5.D**: Manage equipment in a plant-production system.	

Students will understand (Performance Indicators)	DOK Level
• **AFNR.PS.3.C.b.2**: Identify essential nutrients for plant growth and development, and describe major functions • **AFNR.PS.3.C.b.3:** Identify fertilizer sources of essential plant nutrients. • **AFNR.PS.4.E.b.1**: Describe how agricultural crops travel from farm to table. • **AFNR.PS.4.E.i.2**: Identify storage methods for plants and plant products. • **AFNR.PS.5.C.b.1**: Recognize tasks that need to be completed in a plant production system. • **AFNR.PS.5.D.i.1.a**: Research equipment needs and use for a plant-production system.	

Students will do (Active Application)	DOK Level
Plant Growth and Fertilization • I can identify essential nutrients for plant growth and development and describe their major functions. • I can identify fertilizer sources of essential plant nutrients and explain their role in plant health. **Harvesting and Storing Crops** • I can describe how agricultural crops travel from farm to table, including the steps involved in harvesting, handling, and processing.	

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balance, harmony, and visual appeal.
- I can apply principles of design to create floral arrangements and other decorative plant displays.

Enhancing Environments Through Design
- I can explain how landscape and floral design contribute to aesthetics, functionality, and sustainability.
- I can evaluate how plant selection and placement influence the success of a design.
- I can use creativity and problem-solving skills to design plant-based environments that enhance spaces.

Domain-specific Vocabulary

- Aesthetic
- Balance
- Color Theory
- Contrast
- Focal Point
- Functionality
- Symmetry
- Proportion
- Hardscape
- Perennial plants
- Annual plants

- I can identify different storage methods for plants and plant products to ensure quality and prevent spoilage.
- I can explain the importance of proper harvesting techniques to maximize crop yield and quality.

Plant Production Systems and Equipment Management
- I can recognize tasks that need to be completed in a plant production system to ensure effective and efficient operation.
- I can research equipment needs for a plant-production system and describe their appropriate use to enhance plant growth and productivity.
- I can demonstrate the proper maintenance and use of equipment in plant production systems to ensure their longevity and effectiveness.

Domain-specific Vocabulary

- Agronomy
- Crop rotation
- Soil fertility
- Monoculture
- Cover crops
- Green manure
- Tillage
- No-till farming
- Precision agriculture
- Irrigation
- Fertilizer
- Hydroponics
- Pesticides
- GMO (Genetically Modified Organism)
- Yield
- Soil erosion
- Agrochemical
- Plant breeding
- Compost
- Soil pH
- Legume
- Pest management
- Biodiversity
- Soil structure