



## G-E-T High School Curriculum

### Align, Explore, Empower

Scope and Sequence

Crop Science

#### Unit 1 - Plant Growth and Physiology

Length of Unit - 1.5 weeks

- Students will study plant structures and use that knowledge to propagate and manage plant growth.

In this unit, students will ...

identify a working knowledge of plant structures including, roots, stems, leaves, and flowers. Students will use their knowledge to dissect, graft, take cuttings, pollinate and develop growing conditions suited for a plant species.

#### Standards for Crop Science

PS1.b.1.e: Draw the life cycle of a plant.

PS1.b.2.e: Match fruit to the plant structure that produces it and compare seeds of plants.

PS1.b.4.m: Identify the components, the types and the functions of plant roots.

PS1.b.5.m: Identify the components and the functions of plant stems.

PS1.b.7.m: Identify the components of a flower, the functions of a flower and the functions of flower components.

PS1.b.10.h: Identify root tissues and explain the pathway of water and nutrients into and through the root tissues.

PS1.b.11.h: Relate the active and passive transport of minerals into and through the vascular system to plant nutrition.

PS1.b.14.h: Identify the different types of flowers and flower forms and apply the knowledge of flower structures to plant breeding, production and use.

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PS1.d.2.e: Observe the effects of light on plant growth.

PS1.d.3.m: Compare and contrast monocot and dicot seed and plant growth characteristics.

PS1.d.4.m: Identify different types of plant growth regulators and forms of tropism.

PS1.d.5.h: Define primary growth and the role of the apical meristem.

#### Unit 2 - Soils and Plant Media

Length of Unit - 0.75 weeks

- Apply knowledge of soil horizon, texture, structure, and slope to crop management applications.

In this unit, students will ...

Evaluate soil characteristics including; texture, structure, moisture holding, and drainage.

#### Standards for Crop Science

PS3.b.1.e: Identify acceptable media for growing plants.

PS3.b.2.e: Prepare growing media for planting.

PS2.b.4.m: Compare and contrast different plant medias

PS2.b.5.h: Describe the physical characteristics of growing media and explain the influence they have on plant growth.

PS5.a.2.m: Compare and contrast growing plants in soil versus growing plants in water.

PS5.a.3.h: Compare and contrast various plant growing systems including, but not limited to greenhouse, hydroponics, and aquaponics.

Unit 3 - Plant Nutrients and Fertility Needs

Length of unit 0.75 weeks

- Students will identify major and trace minerals associated with plant growth. Evaluation of the soil and water and requirements for different growth stages of the plant.

In this unit, students will ...

Evaluate growing media for fertility and recommend adjustments for specific crop.

#### Standards for Crop Science

PS2.c.5.m: Collect soil and plant tissue samples for testing and interpret the test results.

PS2.c.6.m: Identify fertilizer sources of essential plant nutrients, explain fertilizer formulations and describe different methods of fertilizer application.

PS2.c.7.h: Describe nutrient deficiency symptoms, recognize environmental causes of nutrient deficiencies and prepare a scouting report.

PS2.c.8.h: Discuss the influence of pH and cation exchange capacity on the availability of nutrients.

PS2.c.10.h: Determine the nutrient content of soil using appropriate laboratory procedures and prescribe fertilization based on results.

PS2.c.12.h: Calculate the amount of fertilizer to be applied and calibrate equipment to apply the prescribed amount of fertilizer.

Unit 4 - Develop Management Strategies for a Specific Crop)

Length of Unit - 1 week

- Students will use scientific and industry information to make crop management decisions. Using the hydroponic system students will develop a grow out plan for lettuce. Students will be given a management area to research and make recommendations on for one of the major commodity crops

In this unit, students will ...

Research and develop management strategies for commercial crop production.

#### Standards for Crop Science

PS3.d.3.h: Prepare and implement a plan for an agricultural enterprise that involves practices in support of sustainable agriculture.

PS2.a.1.e: Define the elements that plants need to grow successfully.

PS2.a.8.h: Design, implement and evaluate a plan to maintain optimal conditions for plant growth.

PS3.b.15.h: Demonstrate proper techniques to control and manage plant growth through mechanical, cultural or chemical means.

PS3.b.16.h: Create and implement a plan to control and manage plant growth.

Unit 5 - Handling Problems Associated with Plant Growth

Length of Unit - 1 week

- Students will identify common pests and diseases associated with plant production.

In this unit, students will ...

Identify and develop management strategies for plant pests.

#### Standards for Crop Science

PS3.b.11.h: Produce pest- and disease-free propagation material.

PS3.c.1.e: Identify the ways chemicals are used safely in the growing of plants.

PS3.c.2.e: Identify helpful insects as an alternative to chemicals.

PS3.c.3.m: Identify types of plant pests and disorders.

PS3.c.4.m: Identify major local weeds, insect pests and infectious and noninfectious plant diseases.

PS3.c.5.m: Design and implement a crop scouting program.

PS3.c.6.m: Describe damage caused by plant pests and diseases.

PS3.c.7.m: Diagram the life cycles of major plant pests and diseases.

PS3.c.8.h: Predict pest and disease problems based on environmental conditions and life cycles.

PS3.c.9.h: Describe pest control strategies associated with integrated pest management.

PS3.c.10.h: Describe types of pesticide controls and formulations.

PS3.c.12.h: Explain risks and benefits associated with the materials and methods used in plant pest management.

PS3.c.13.h: Explain procedures for the safe handling, use and storage of pesticides.

PS3.c.14.h: Evaluate environmental and consumer concerns regarding pest management strategies.

PS3.d.1.m: Explain sustainable agriculture and objectives associated with the strategy.

Unit 6 - Genetically Modified Organisms and Their Role in Plant Production      Length of Unit - 0.75 of week

Students will explore GMO's use and role in modern agriculture production.

In this unit, students will ...

Identify the development and use of GMO crops in agriculture and be able explain pros and cons for their use.

#### Standards for Crop Science

PS3.a.8.m: Give examples of the risks and advantages associated with genetically modified plants.

PS3.a.13.h: Explain the principles behind recombinant DNA technology and the basic steps in the process.

PS3.a.14.h: Evaluate the performance of genetically modified crops.

BT1.a.3.m: Investigate current applications of biotechnology in agriculture.

BT1.a.4.m: Examine potential future applications of biotechnology in agriculture and compare them with alternative approaches to improving agriculture.

BT1.b.2.e: Identify reasons why people would either support or not support breakthroughs in biotechnology.

BT1.b.5.m: Explore the emergence, evolution and implications of bioethics.

BT1.b.8.h: Evaluate the benefits and risks associated with biotechnology.

BT1.b.9.h: Examine an ethical dilemma associated with biotechnology by identifying its components.

Unit 7 - Precision Agriculture

Length of Unit - 1 week

- Students will look at precision equipment and how it's application is used in the management of crops.

In this unit, students will ...

Explore the use of precision and agriculture and its role in crop management.

#### Standards for Crop Science

PST1.r.1.e: Identify the importance and uses of computer-based systems in agriculture, food and natural resources.

PST1.r.2.m: Use common computer-based programs to analyze agricultural data.

PST1.r.3.h: Assess database summaries to draw conclusions and propose plans of action.

PST1.s.1.e: Identify geospatial technologies, including global positioning, geographical information and remote sensing.

PST1.s.3.m: Describe equipment and processes used in geospatial technologies.

PST1.s.7.h: Output and apply maps using GIS/GPS systems.

PST1.s.8.h: Describe principles of precision agriculture for map-and sensor-based systems..

