

# Agricultural Science - Unit 2 - Greenhouse

## Unit Focus

This unit is designed to introduce students to gardening and horticulture techniques. Greenhouse time will be spent in the care of individual plant projects. In addition, students will spend time outdoors working on landscaping projects and caring for established plantings on school property and Bauer Farm. The students will learn to use reference sources in planning and implementing their projects. Throughout the course, students will be in the greenhouse germinating seeds and growing plants. Depending on the trimester, students will either grow plants that can be used for holiday decorations (mums, poinsettias, etc.) or plants that can be used for the Bauer Farm garden plot or home gardens (tomatoes, vegetables, herbs).

## Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
<p><b>Next Generation Science Standards (DCI)</b> <i>Science: 10</i></p> <ul style="list-style-type: none"> <li>Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. <i>LS1.9.A4</i></li> </ul> <p><i>Science: 11</i></p> <ul style="list-style-type: none"> <li>The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen. <i>LS1.9.C1</i></li> <li>As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products. <i>LS1.9.C3</i></li> <li>Photosynthesis and cellular respiration (including anaerobic processes) provide most of the energy for life processes. <i>LS2.9.B1</i></li> </ul>	<p><b>T1</b> Communicate effectively based on purpose, task, and audience to promote collective understanding and/or recommend actions.</p>	
	Meaning	
	Understanding(s)	Essential Question(s)
	<p><b>U1</b> Plant growth is dependent on proper input of moisture, nutrients and sunlight.</p> <p><b>U2</b> Decisions of seed selection, container types and soil types can enhance or deter success in the greenhouse.</p> <p><b>U3</b> Location of work space, tools and plant benches plays an important role in greenhouse management.</p> <p><b>U4</b> Control of plant growth factors can be accomplished in a well-managed greenhouse.</p> <p><b>U5</b> Variables in conditions and procedures can impact germination rate.</p>	<p><b>Q1</b> How does an understanding of science impact how people utilize greenhouses and horticultural techniques?</p> <p><b>Q2</b> How do conditions, media, and other variables impact success rates in a greenhouse?</p> <p><b>Q3</b> What can you do to affect seed germination?</p>
	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<p><b>K1</b> Factors such as water and light availability as well as temperature and media are key components of successful seed germination and plant growth.</p> <p><b>K2</b> Pre-soaking seeds typically leads to higher</p>	<p><b>S1</b> Organizing and collaborating with classmates to care for greenhouse and plants.</p> <p><b>S2</b> Evaluating different plant species and choose best plants for greenhouse growing.</p>

## Stage 1: Desired Results - Key Understandings

### NGSS/NSTA Science & Engineering Practices

*NGSS Science & Engineering Practices: 9-12*

- Make directional hypotheses that specify what happens to a dependent variable when an independent variable is manipulated. *SE.9-12.3.5*
- Evaluate the impact of new data on a working explanation and/or model of a proposed process or system. *SE.9-12.4.5*
- Analyze data to identify design features or characteristics of the components of a proposed process or system to optimize it relative to criteria for success. *SE.9-12.4.6*
- Make a quantitative and/or qualitative claim regarding the relationship between dependent and independent variables. *SE.9-12.6.1*

### Student Growth and Development 21st Century Capacities Matrix

*Collaboration/Communication*

- Product Creation: Students will be able to effectively use a medium to communicate important information (findings, ideas, feelings, issues, etc.) for a given purpose. *MM.3.2*

*Self-Direction*

- Perseverance: Students will be able to identify problem(s) and use appropriate strategies to continue toward a desired goal. *MM.4.2*

germination rates.

**K3** Select and use proper containers and soils when planting seeds.

**K4** Maintaining the proper regimen of watering, transplanting and feeding seedlings is important to success in growing plants.

**K5** Use fertilizers and pesticides in a safe and responsible manner to ensure that plant growth is maximized.

**K6** Appropriate placement of seeds and plants can impact the growth of plants and germination of seeds.

**S3** Analyzing factors to determine a procedure for germination, planting, and maintenance of plants.

**S4** Manipulating and maintaining factors and conditions for optimal plant growth.