



SCHOOL DISTRICT OF MONROE

Preparing for the Future, One Child at a Time

Plant Soil Science ES / TC

Course Description:

The curriculum for this elective course is developed from [Wisconsin Standards for Agriculture, Food and Natural Resources](#). This course is designed to give students a progressive knowledge of plant and soils science and the surrounding industry. Students will learn about the cellular structure and functions of plants, plant reproduction, plant anatomy, growing requirements of plants, soil elements, crops, forages and common greenhouse operations. Students will gain an understanding of technical areas such as growth hormones, effects on germination, structure and function of plant components, weed and water management, and methods to improve efficiency of crop production. Hands-on laboratories activities will be included through the duration of the course. This course is science equivalents and count for part of the three high school units of science required for admission to UW institutions and is articulated with Blackhawk Technical College. The information in this course overview outlines what students should understand and be able to do by the end of the semester/year.

Mastery Standards:

Students will apply knowledge of plant classification, anatomy, and physiology to the production and management of plants. (PS1)

Students will prepare and implement a plant management plan that addresses the influence of environmental factors, nutrients and soil on plant growth. (PS2)

Students will propagate, culture, and harvest plants. (PS3)

Unit	Description of Unit and Learning Targets
<p>Unit Title: 1. Introduction to Plant Science</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • How common are plants in everyday life? • How are plants important for human survival? 	<p>Students will.....</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • Survey their personal dependency upon plants. • Determine different ways to group plants. • Research the taxonomic classification for a plant species.
<p>Unit Title: 2. Plant Cells</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • What is the function of cell organelles and how do they work together? • How do cells perform plant functions? • Why is understanding cells important to understanding plants and plant systems? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • Develop a pictorial representation of cell function. • Identify and label plant cell organelles. • Represent relationships between organelles using a graphic organizer. • Correctly prepare slides of plant cells for viewing under a microscope. • Collect and analyze data to provide evidence of cell metabolism.
<p>Unit Title: 3. Plant Physiology and Growth</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • How do the four major parts of a plant function together? • What provides the structure for plant stems needed to support the weight of leaves, flowers, and fruit? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • Describe the function of the major plant parts. • Examine a root structure and sketch representations of the structural form of a root. • Identify differences between internal structures of monocotyledon and dicotyledon features.

<ul style="list-style-type: none"> • What is a plant's fuel source? • What value do flowers have for humans? 	<ul style="list-style-type: none"> • Identify the characteristics of simple and compound leaves. • Explain why leaves are important to plants. • Explain the process plants use to produce and store food. • Identify the parts of a flower and explain the function for each part. • Classify flowers using a dichotomous key and predict type of pollination for each flower.
<p>Unit Title: 4 Environmental Factors Affecting Plant Growth</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • Why is phototropism important to understand when raising plants? • How does temperature affect transpiration, respiration, and photosynthetic rates? • How are plant environments altered to provide optimal temperature for plant growth? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • Identify the effects of nutrient deficiencies in plants by observing anatomical differences. • Examine how the rate of water loss is altered by environmental conditions. • Compare wilting points among various species. • Monitor soil moisture to determine the wilting point of different plant species. • Conduct an investigation determining the effects of light intensity on plant growth. • Manipulate environmental factors to test their effects on plants. • Explore hardiness zones and assign plants to appropriate zones according to temperature requirements.
<p>Unit Title: 5. Soils</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • What effects does soil texture have on porosity, permeability, and water holding capacity? • Why do certain types of soil structure formations indicate soil quality? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • Conduct tests to determine soil texture by feel. • Illustrate soil structure and determine how structure influences soil permeability. • Collect and identify macroscopic and microscopic organisms found in a soil sample. • Describe soil hue, value, and chroma and assess soils for drainage-related characteristics based on color. • Conduct an inquiry lab making predictions of soil characteristics using knowledge of the properties of the whole system.