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| Course Name: | Horticulture | | |
| Credits: | 0.5 | | |
| Prerequisites: | None | | |
| Description: | This class is an overview incorporating basic plant science, floral design, gardening, and landscaping. Students will learn about all aspects of the reproduction, growth, design and marketing of plants. Students will create horticulture projects, make floral arrangements, and be involved in many other projects involving flowers, vegetables, and landscaping and outdoor projects. FFA projects will be incorporated. | | |
| Academic Standards: | Wisconsin Standards for Agriculture, Food and Natural Resources | | |
| Units: | Unit Length: | Unit Standards: | Unit Outcomes: |
| Plant Taxonomy | 4 days | PS1 | Classify agricultural plants according to taxonomy systems. Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems. |
| Anatomy & Structures | 24 days | PS1 | Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems. |
| Plant Requirements | 14 days | PS2 | Determine the influence of environmental factors on plant growth. Develop and implement a fertilization plan for specific plants, field crops and/or greenhouse crops. |
| Propagation | 11 days | PS3 FPP1 | Demonstrate plant propagation techniques. Develop and implement a plant management plan for crop production. Identify the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, irradiation). |
| Integrated Pest Management | 10 days | PS3 NR2 | Develop and implement a plant management plan for crop production. |
| Floral Design | 10 days | PS4 | Create designs using plants. |
| Landscaping | 4 days | PS4 4C1 | Create designs using plants. Develop original solutions, products and services to meet a given need. |
| Careers | 2 days | CD1 | Identify person strengths, aptitudes and passions. Become familiar with career and hobby opportunities in horticulture. |

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| Unit Name: Plant Taxonomy | Length: 4 days |
| Standards: PS1: Students will apply knowledge of plant classification, anatomy and physiology to the production and management of plants. | Outcomes: Classify agricultural plants according to taxonomy systems. Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems. |
| Essential Questions: Why do humans sort topics into groups? | Learning Targets: Identify how people use plants and match plant products to the appropriate plant class. Explain systems used to classify plants and compare and contrast the hierarchical agricultural plants. Identify agriculturally important plants by common names. Classify agricultural plants according to the hierarchical classification system, life cycles, plant use and as monocotyledons or dicotyledons. Describe the morphological characteristics used to identify agricultural plants. |
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| Topic 1: Plant Taxonomy | Length: 3 days |
| Standard(s): PS1 | Academic Vocabulary: common name, scientific name, kingdom, phylum, class, order, family, genus, species, nomenclature, taxonomist |
| Lesson Frame: Binomial System of Naming Plants | We will: explain why scientific names are used. I will: name 3 common plants by scientific name. |
| Lesson Frame: Genus, Species & Varieties | We will: explain the difference between binomial naming systems. I will: cite an example of each with my favorite flower. |
| Lesson Frame: Taxonomy Chart | We will: create a flower chart of plant taxonomy. I will: understand the relation of each taxonomic step. |
| Performance Tasks: sorting reviews, matching activities, word wall steps, plant identification | Notes: |
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| Topic 2: History of Taxonomy | Length: 1 day |
| Standard(s): PS1 | Academic Vocabulary: Linneus, botanist, generic, horticulturist, adjective |
| Lesson Frame: Greek and Latin Systems | We will: research the history of plant naming systems I will: write an exit ticket summary of the history of naming systems |
| Lesson Frame: Swedish Botanist Linnaeus | We will: learn the system of generic (group) and specific names I will: write an exit ticket explaining group and family names |

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| Performance Tasks: Fake Facebook Family review, word walls, critical writing activities, online review games | Notes: |
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| Unit Name: Anatomy and Structures | Length: 24 days |
| Standards: PS1: Students will apply knowledge of plant classification, anatomy and physiology to the production and management of plants. | Outcomes: Apply knowledge of plant anatomy and the functions of plant structures to activities associated with plant systems. |
| Essential Questions: What is essential in plant structures for survival? What special traits does a plant cell have in comparison to animals? How are plants important in society and how do they affect daily life? | Learning Targets: Draw the life cycle of a plant. Diagram a typical plant cell and identify plant cell organelles and their functions. Identify the components, the types and the functions of plant roots and stems. Discuss leaf morphology and the functions of leaves. Identify the components of a flower, the functions of a flower and the functions of flower components. Explain the basic process of photosynthesis and its importance to life on Earth. |
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| Topic 1: Life Cycle of a Plant | Length: 5 days |
| Standard(s): PS1 | Academic Vocabulary: life cycle, primary source, plant purposes |
| Lesson Frame: Plant Life Cycles | We will: discuss life cycles of plants. I will: note two contributions of plants to life cycles. |
| Lesson Frame: Life Cycle Variations | We will: sketch life cycles of plants. I will: compare and contrast the differences in cycles. |
| Lesson Frame: Internal Stem Processes | We will: differentiate between monocots and dicots. I will: explain the structural differences. |
| Performance Tasks: monocot vs. dicot cross-section, life cycle usage activity, class presentation | Notes: |
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| Topic 2: Parts of a Plant | Length: 10 days |
| Standard(s): PS1 | Academic Vocabulary: petiole, whorled, midrib, guard cells, stoma, transpire, chloroplasts, photosynthesis, oxidation, respiration, cambium, phylem, xylem, margins, shapes, arrangements, epidermis |
| Lesson Frame: Basic Plant Parts | We will: identify the 4 major parts and purposes of a plant. I will: create a poster illustrating plant parts. |
| Lesson Frame: Leaf Morphology | We will: identify plant margins, arrangements and shapes. I will: complete matching activity of margins, arrangements and shapes. |
| Lesson Frame: Internal Leaf Structure | We will: investigate plant processes. |

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| | I will: summarize each of the processes. |
| Performance Tasks: edible botany lab, shapes and margins presentation, plant processes investigations, crossword puzzle creation, vocabulary enrichment | Notes: |
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| Topic 3: Internal and External Complete Flower Parts | Length: 6 days |
| Standard(s): PS1 | Academic Vocabulary: stamen, pistil, anther, filament, petal, ovary, style, receptacle, sepal, pollination |
| Lesson Frame: Reproduction of Plants | We will: research the name and reproductive function of each part of a complete flower. I will: sketch the complete flower into my notes. |
| Lesson Frame: Cellular Level of Plants | We will: diagram a plant cell . I will: compare and contrast animal and plant cells. |
| Performance Tasks: complete flower model, reproduction bingo, edible plant cells, online quiz activities | Notes: |
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| Topic 4: Root Systems | Length: 3 days |
| Standard(s): PS1 | Academic Vocabulary: propagate, absorption, phloem, xylem, cambium, fibrous, tap root |
| Lesson Frame: Structure | We will: create a systems analysis of root structures. I will: understand the roles and functions in roots. |
| Lesson Frame: Type of Root System | We will: contrast the external and internal structures of tap and fibrous roots. I will: sketch a summary into notes. |
| Performance Tasks: root systems investigation, fibrous and taproot lab, vocabulary enrichment | Notes: |

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| Unit Name: Plant Requirements | Length: 14 days |
| Standards: PS2: Students will prepare and implement a plant management plan that addresses the influence of environmental factors, nutrients and soil on plant growth. | Outcomes: Determine the influence of environmental factors on plant growth. Develop and implement a fertilization plan for specific plants, field crops and/or greenhouse crops. |
| Essential Questions: What do plants need to survive and thrive? How can we manipulate plant needs? What do humans need from plants? What affect do nutritional deficiencies and excesses have on plants as well as animals? | Learning Targets: Distinguish between media that is too dry or too wet for seeds or plants to grow efficiently. Compare and contrast different plant medias. Describe what elements plants use for food. Identify the essential nutrients for plant growth and development and their major functions and monitor plants for signs of nutrient deficiencies. Identify fertilizer sources of essential plant nutrients, explain fertilizer formulations and describe different methods of fertilizer application. Describe nutrient deficiency symptoms, recognize environmental causes of nutrient deficiencies and prepare a scouting report. |
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| Topic 1: Environmental Factors | Length: 3 days |
| Standard(s): PS2 | Academic Vocabulary: optimal, environmental systems, photoperiodism, short-day plants vs long-day vs indifferent, humidity, girdle, enzymes |
| Lesson Frame: Aboveground Environment | We will: explore the 6 factors affecting the above ground environment. I will: briefly summarize each . |
| Lesson Frame: Enzymes | We will: identify how enzymes can change plant sugars and starches into other foods. I will: identify results of enzymatic products. |
| Performance Tasks: poster, iMovie or WeVideo trailer, light experiment | Notes: |
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| Topic 2: Soil & Plant Medias | Length: 4 days |
| Standard(s): PS2 | Academic Vocabulary: texture triangle, earation, sand, silt, loam, clay, organiz matter, profile, subsoil, bedrock |
| Lesson Frame: Soil Types | We will: review the soil textural triangle. I will: make predictions of soil types in our area. |
| Lesson Frame: Alternative Growing Media | We will: identify components of soil media. I will: list advantages and disadvantages for each. |
| Lesson Frame: Media Selection | We will: distinguish proper texture, temperature and moisture for seed germination. I will: create an interactive notebook entry. |

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| <p>Performance Tasks: soil and media preparation lab, soil texture triangle activity, soil testing, seed germination comparison lab</p> | <p>Notes:</p> |
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| <p>Topic 3: Nutrients</p> | <p>Length: 7 days</p> |
| <p>Standard(s): PS2</p> | <p>Academic Vocabulary: macro and micronutrients, potash, alkaline, acidity, pH, leaching</p> |
| <p>Lesson Frame: Essential Nutrients</p> | <p>We will: determine if a nutrient is a macro or micronutrient for a plant. I will: create a mnemonic device for memorization (e.g. CHOPKINS CaFE, mg).</p> |
| <p>Lesson Frame: Nutrient Function</p> | <p>We will: explore the major plant food elements. I will: list two functions of each.</p> |
| <p>Lesson Frame: Fertilizer</p> | <p>We will: compute fertilizer ratios and application rates. I will: demonstrate knowledge of NPK formulations.</p> |
| <p>Performance Tasks: presentation, deficiency coloring books, fertilizer math computations, reading a label</p> | <p>Notes:</p> |

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| Unit Name: Propagation/Harvest | Length: 11 days |
| Standards: PS3: Students will propagate, culture and harvest plants. FPP1: Students will examine components of the food industry and historical development of food products and processing. | Outcomes: Demonstrate plant propagation techniques. Develop and implement a plant management plan for crop production. Identify the issues of safety and environmental concerns about foods and food processing (e.g., Genetically Modified Organisms, microorganisms, contamination, irradiation). |
| Essential Questions: How are plants reproduced? How can alternative propagation methods be superior to growing from seeds? | Learning Targets: Conduct tests associated with seed germination rates, viability and vigor. Handle seed to overcome seed dormancy mechanisms and to maintain seed viability and vigor. Describe optimal conditions for asexual propagation and demonstrate techniques used to propagate plants by cuttings, division, separation and layering. Give examples of the risks and advantages associated with genetically modified plants. |
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| Topic 1: Seed Propagation | Length: 3 days |
| Standard(s): PS3 | Academic Vocabulary: propagating, self pollination, cross-pollination, hybrids, cultivars, viability, scarification |
| Lesson Frame: Seed Selection | We will: learn the important steps in selection of seeds. I will: determine Waupaca County's Plant Hardiness Zone. |
| Lesson Frame: Seed Composition | We will: identify the basic parts and functions within a seed. I will: sketch and label the parts of a seed. |
| Lesson Frame: Seed Treatment | We will: research methods of seed preparation. I will: properly scarify a seed. |
| Performance Tasks: rag doll experiment for germination trials, seed scarification and treatment labs, Hardiness Zone map project, seed selection activity | Notes: |
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| Topic 2: Vegetative Propagation | Length: 4 days |
| Standard: PS3 | Academic Vocabulary: cuttings, layering, grafting, layering, division, scion |
| Lesson Frame: Methods of Propagating Plants | We will: research techniques for propagating plants. I will: identify vegetative propagation by pictures. |
| Lesson Frame: Purposes of Propagation | We will: determine which method is best for common plants. I will: sort advantages and disadvantages of propagation. |
| Lesson Frame: Demonstration | We will: demonstrate a propagation or grafting technique. |

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| | I will: take notes on peer demonstrations. |
| Performance Tasks: demonstration, video, research, chart creation | Notes: |
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| Topic 3: Genetically Modified Organisms (GMO) | Length: 4 days |
| Standard: FPP1 | Academic Vocabulary: genetic engineering, selective breeding, hybrid, modification, GRAS, biotechnology, gene transfer |
| Lesson Frame: Environmental and Safety Concerns | We will: give examples of risks and advantages of GMOs. I will: brainstorm questions about GMOs. |
| Lesson Frame: Economic Impact | We will: research the economic impact of GMOs. I will: use technology to create a chart of the findings. |
| Lesson Frame: GMO Performance | We will: evaluate the performance of genetically modified crops. I will: summarize the risks and rewards of GMOs. |
| Performance Tasks: classroom debate, polling, online research organization | Notes: |

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| Unit Name: Integrated Pest Management | Length: 10 days |
| Standards: PS3: Students will propagate, culture and harvest plants. NR2: Students will apply scientific principles to natural resource management activities. | Outcomes: Develop and implement a plant management plan for crop production. |
| Essential Questions: How can weed and insect pests be managed? What environmental, economic, and social impacts of pests exist? | Learning Targets: Inspect propagation material for evidence of pests or disease. Develop and implement a plan for integrated pest management. Identify helpful insects as an alternative to chemicals. Identify major local weeds, insect pests and infectious and noninfectious plant diseases. Evaluate environmental and consumer concerns regarding pest management strategies. Discuss factors that influence the establishment and spread of invasive species. |
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| Topic 1: Types of Pesticides | Length: 3 days |
| Standard(s): PS3 | Academic Vocabulary: insecticide, miticide, fungicide, herbicide, rodenticide, nematocides, molluscicides, signal words, inconsistent, inhalation, dermal, dilution, toxicity |
| Lesson Frame: Types of Pesticides | We will: categorize the seven types of pesticides. I will: contrast each of the seven areas. |
| Lesson Frame: Reading a Label | We will: read pesticide labels for the 11 standard points of information. I will: identify signal words on the label. |
| Lesson Frame: Safety Precautions | We will: determine necessary safety precautions when using pesticides. I will: create a flow-chart of safety procedures. |
| Performance Tasks: pesticide label test-out, poster, quizlet, flow chart | Notes: |
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| Topic 2: IPM (Integrated Pest Management) | Length: 3 days |
| Standard(s): PS3 | Academic Vocabulary: IPM, biological control, predators, resistance |
| Lesson Frame: Biological Control | We will: identify biological control agents and how they work. I will: list examples of 6 specific methods of control. |
| Lesson Frame: Insect and Disease Resistant Plants | We will: discuss varieties of disease and insect resistant plants. I will: share advantages in a group setting. |
| Lesson Frame: Pest Control Plans | We will: outline a pest control program. I will: explain when biological control or chemicals are recommended. |

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| <p>Performance Tasks: biological control plans, poster of control methods, plant inspection protocol test</p> | <p>Notes:</p> |
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| <p>Topic 3: Weeds, Pests & Diseases</p> | <p>Length: 4 days</p> |
| <p>Standard(s): PS3, NR2</p> | <p>Academic Vocabulary: pest, weed, vermin, dormancy, invasive species,</p> |
| <p>Lesson Frame: Weeds</p> | <p>We will: identify 15 major weeds found in Wisconsin. I will: be able to identify by sight.</p> |
| <p>Lesson Frame: Pests</p> | <p>We will: identify 8 common pests in Wisconsin. I will: be able to identify by sight.</p> |
| <p>Lesson Frame: Diseases</p> | <p>We will: identify 5 common plant diseases. I will: create a treatment plan for common diseases in plants.</p> |
| <p>Performance Tasks: biological control plans, "most wanted outlaws" presentation, identification tasks</p> | <p>Notes:</p> |

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| Unit Name: Floral Design | Length: 10 days |
| Standards: PS4: Students will employ elements of design to enhance an environment. | Outcomes: Create designs using plants. Learn about uses of floral design in society. |
| Essential Questions: What role does floral design play in society? What transferable skills are developed in learning floral design? | Learning Targets: Draw a picture using the elements of design. Define, design and identify design elements. Discuss the applications of art in agriculture/horticulture. Explain design elements of line, form, texture and color and express the visual effect each has on the viewer. Select plants, hard goods, supplies and other materials for use in a design based on a range of criteria. |
| Topic 1: Basic Floral Design | Length: 10 days |
| Standard(s): PS4 | Academic Vocabulary: balance, focal point, proportion, scale, accent, repetition, rhythm, harmony, unity, round, triangle, horizontal, crescent, hogarth, and right angle. |
| Lesson Frame: Principles of Design | We will: create collages illustrating the principles of design. I will: be able to identify each of the 9 major principles. |
| Lesson Frame: Floral Design Shapes | We will: identify the six basic floral design shapes. I will: create an arrangement using one of the basic shapes. |
| Lesson Frame: Common Flower Identification | We will: research which flowers are commonly used in arrangements. I will: be able to identify 12 commons flowers by sight. |
| Performance Tasks: presentation, collages, design challenges, flower calendar, tools of the trade ID | Notes: |

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| Unit Name: Landscaping | Length: 4 days |
| Standards: PS4: Students will employ elements of design to enhance an environment. 4C1: Students will think and work creatively to develop innovative solutions to problems and opportunities. | Outcomes: Create designs using plants. Develop original solutions, products and services to meet a given need. |
| Essential Questions: What are the main objectives of landscaping? | Learning Targets: Draw a picture using the elements of design. Define, design and identify design elements. Explain design elements of line, form, texture and color and express the visual effect each has on the viewer. Select plants, hard goods, supplies and other materials for use in a design based on a range of criteria. |
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| Topic 1: Principles of Landscape Design | Length: 4 days |
| Standard(s): PS4, 4C1 | Academic Vocabulary: simplicity, balance, focalization of interest, rhythm/line, scale/proportion, unity, hardscape, xeriscape, mulch |
| Lesson Frame: Design Principles | We will: study the five principles of landscape design. I will: sketch an example of each principle. |
| Lesson Frame: Objectives of Residential Landscaping | We will: brainstorm needs and desires of people in developing outdoor environments. I will: interview a homeowner as a practice client. |
| Lesson Frame: Landscape Maintenance | We will: study technical procedures for landscape maintenance. I will: identify landscape accessories. |
| Performance Tasks: landscape maintenance proposal plan, interview for design, structure building for principles, electronic review games | Notes: |
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| Unit Name: Careers | Length: 2 days |
| Standards: CD1: Students will consider, analyze and apply an awareness of self, identity and culture to identify skills and talents. Students will identify the connection between educational achievement and work opportunities in order to reach personal and career goals. | Outcomes: Identify person strengths, aptitudes and passions. Become familiar with career and hobby opportunities in horticulture. |
| Essential Questions: How does my schooling relate to my future? What SMART goals will help me find the path to my future? | Learning Targets: Evaluate various occupations and career pathways to identify personal, academic and career goals based on personal strengths, aptitudes and passions. Assess education and training opportunities to acquire new skills necessary for career advancement. |
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| Topic 2: Careers | Length: 2 days |
| Standard(s): CD1 | Academic Vocabulary: pomology, horticulture, olericulture, floriculture, landscaping, nursery, working conditions, qualifications |
| Lesson Frame: Career Exploration | We will: evaluate careers in horticulture (including landscaping) for needed skills, training and opportunity. I will: research a related career in Career Cruising and write a brief summary. |
| Lesson Frame: Horticultural Overview | We will: discuss the scope, size, and economic importance of the horticulture industry. I will: learn about selected career pathways related to horticulture. |
| Lesson Frame: | We will: summarize pathway of choice. I will: create an exit ticket of plus delta for pathways. |
| Performance Tasks: career essay, personal career research, Career Cruising survey, vocabulary word wall | Notes: |
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