

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

ACADEMIC AFFAIRS

Course Number: BIOL 108 Department: Biological Sciences

Course Title: General Botany Semester: Spring Year: 1997

Objectives/Competencies

Course Objective	Competencies
1. Summarize and discuss the features of plants which distinguish them from members of other kingdoms of life.	1. Name the 5 kingdoms of life. 2. Explain distinguishing characteristics of each kingdom. 3. Compare and contrast members of each kingdom. 4. Cite examples of members of kingdoms. 5. Learn fundamentals of taxonomic classification.
2. Learn the process of scientific investigation and discovery.	1. Summarize steps of scientific method. 2. Apply the use of the scientific method to activities of daily life.
3. Understand basic concepts of chemistry especially those pertaining to plants.	1. Diagram basic structure of an atom. 2. Explain chemical formulas. 3. Learn types of chemical bonds. 4. Summarize properties of water and explain their importance to plants. 5. Explain and identify 4 types of macromolecules in plants. 6. Learn the important role of enzymes in plant metabolism.

Course Objective	Competencies
<p>4. Understand concepts regarding plant cell structure, functions, and types.</p>	<ol style="list-style-type: none"> 1. Know the 3 parts of a plant cell. 2. Understand functions of cellular organelles. 3. Define and describe different types of movements into and out of cells. These include diffusion, osmosis, facilitated diffusion and active transport. 4. Explain process and importance of cell division in plant meristematic tissues. 5. Identify and draw all representative plant cells.
<p>5. Learn the importance of respiration and photosynthesis to plants.</p>	<ol style="list-style-type: none"> 1. Define respiration and photosynthesis. 2. Summarize the main events of respiration. 3. Summarize the main events of photosynthesis. 4. Discuss the importance of photosynthesis to plants and all living organisms.
<p>6. Study of plant tissues and meristematic tissues.</p>	<ol style="list-style-type: none"> 1. Define: tissue. 2. Explain functions of various plant tissues and cell types which compose them. 3. Define: xylem, phloem, collenchyma, pith, cortex, epidermis, endodermis. 4. Define: meristematic tissue. 5. List and identify the 4 types of meristematic tissues found in plants.
<p>7. Study of plant roots.</p>	<ol style="list-style-type: none"> 1. List and discuss 4 functions of roots. 2. Know and identify various types of root systems found in plants. 3. Understand root growth and the 4 zones of each root.

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<p>8. Study of plant stems.</p>	<ol style="list-style-type: none"> 4. Draw and identify monocot and dicot root cross-sections. 5. Identify modified root structures. 6. Understand importance of roots to humans. 1. List and discuss 3 functions of plant stems. 2. Know functions of tissues composing herbaceous monocot and dicot stems. 3. Draw monocot and dicot stem sections. 4. Explain process of secondary tissue formation in woody stems. 5. Know functions of all secondary tissues found in stems. 6. Discuss economic importance of woody stems to humans.
<p>9. Study of plant leaves.</p>	<ol style="list-style-type: none"> 1. List and discuss functions of leaves. 2. Label external anatomy of leaves. 3. Describe major internal tissues of monocot and dicot leaves. Know all functions. 4. List 5 modifications to leaves which help the leaf conserve water. 5. Explain why leaves change colors in fall. 6. Explain why leaves have more than one photosynthetic pigment. 7. Discuss transpiration.
<p>10. Study of flowers, fruits, and seeds.</p>	<ol style="list-style-type: none"> 1. Define: Flower. Know major function of flowers. 2. Label parts of a flower and describe functions of each. 3. Explain process of meiosis, pollination, and double fertilization.

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	<ol style="list-style-type: none"> 4. Explain lifecycle of typical flowering plant as well as alternation of generations. 5. List 5 methods of pollination. 6. List 5 methods of fruit and seed dispersal. 7. Label and describe parts of a seed. 8. Distinguish between and cite examples of fruit types.
<p>11. Study of mineral nutrition in plants.</p>	<ol style="list-style-type: none"> 1. Define and list plant micronutrients. 2. Define and list plant macronutrients. 3. Know and identify symptoms of mineral deficiencies.
<p>12. Translocation in phloem and water transport in xylem.</p>	<ol style="list-style-type: none"> 1. Describe Cohesion-Tension Theory of water movement. 2. Describe translocation of sugars in phloem.
<p>13. Study and function of plant hormones.</p>	<ol style="list-style-type: none"> 1. Define: hormone. 2. List the 5 classes of plant hormones: auxin, abscisic acid, ethylene, gibberellin, and cytokinin. Know 4 functions of each.
<p>14. Kingdom Fungi.</p>	<ol style="list-style-type: none"> 1. Describe major distinguishing characteristics of fungi. 2. List characteristics of the 4 major classes of fungi: Basidiomycetes, Zygomycetes, Ascomycetes, Dueteromycetes. 3. Diagram lifecycles of Basidiomycetes, Ascomycetes, Zygomycetes. 4. Describe the destructive nature of fungi, especially to crops, ornamental trees, shrubs, and property. 5. Characterize the unique nature of lichen, and identify the

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15. Study of Bryophytes.	<p>3 morphological forms of lichen.</p> <ol style="list-style-type: none">1. Describe characteristics of mosses and liverworts.2. Draw lifecycles of mosses and liverworts. Compare gametophyte and sporophyte phases.3. Discuss environmental challenges plants face by colonizing land and adaptations evolved to meet these challenges.4. Understand ecological significance of mosses.
16. Study of seedless vascular plants: ferns.	<ol style="list-style-type: none">1. Summarize features of ferns which distinguish them from bryophytes.2. Diagram fern lifecycle. Compare gametophyte and sporophyte phases.3. Label external anatomy of ferns.4. Understand ecological significance of ferns.5. Learn process of coal formation.
17. Study of Gymnosperms.	<ol style="list-style-type: none">1. Summarize features of gymnosperms that distinguish them from ferns.2. Name and describe 4 classes of gymnosperms.3. Draw and label lifecycle of pine. Compare sporophyte and gametophyte phases of lifecycle.4. Distinguish between pines, spruces and firs.5. Understand the ecological significance of gymnosperms in the Boreal Forest region.6. Discuss adaptations for xeric environments.7. Realize economic importance of Coniferophyta.

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18. Study of flowering plant families of the world.	<ol style="list-style-type: none">1. Describe the ecological and economic significance of the following 10 flowering plant families of the world:<ol style="list-style-type: none">a. Magnoliaceaeb. Juglandaceaec. Cactaceaed. Brassicaceaee. Leguminosaef. Rosaceaeg. Poaceaeh. Solanaceaei. Orchidaceaej. Agavaceae