

<b>Course</b>	Agricultural Science II
<b>Unit</b>	Plant Science
<b>Lesson</b>	Classification of Plants
<b>Estimated Time</b>	Two 50-minute blocks

### Student Outcome

The student will be able to list and describe methods to classify plants.

### Learning Objectives

1. Identify how plants can be classified.
2. Describe the botanical system of classification.
3. Explain why the botanical classification system is important.
4. Describe how monocots and dicots differ.
5. Describe what a legume is.
6. Explain how the life cycles of plants differ.

### Grade Level Expectations

SC/LO/1/E/09-11/a      SC/LO/1/E/09-11/b

### Resources, Supplies & Equipment, and Supplemental Information

#### Resources

1. PowerPoint Slides
  - ☐ PPt 1 – Botanical Classification (Wheat and Barley Example)
  - ☐ PPt 2 – Dicots vs. Monocots
2. *Plant Science* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1991.
3. *Plant Science Curriculum Enhancement*. University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

#### Supplies & Equipment

- ☐ Several different types of plants
- ☐ Examples of plants with different common names

#### Supplemental Information

1. Internet Sites
  - ☐ Classification of Plants. Access Excellence at the National Health Museum. Accessed January 22, 2008, from <http://www.accessexcellence.org/RC/Ethnobotany/page3.html>.
  - ☐ Monocots and Dicots. The Backyard Nature Website. Accessed January 22, 2008, from <http://www.backyardnature.net/monodico.htm>.
  - ☐ Monocots vs. Dicots. Center for the Study of Digital Libraries, Texas A&M University. Accessed January 22, 2008, from <http://www.csd.tamu.edu/FLORA/201Manhart/mono.vs.di/monosvsdi.html>.
  - ☐ Plants and Their Structure II. Estrella Mountain Community College, Arizona. Accessed January 22, 2008, from <http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookPLANTANATII.html>.

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- ❑ Root Development in Young Corn. Corny News Network Articles, Department of Agronomy, Purdue University. Accessed January 22, 2008, from <http://www.agry.purdue.edu/ext/corn/news/timeless/Roots.html>.
2. Print
- ❑ Parker, Rick. *Introduction to Plant Science*, rev. ed. Clifton Park, NY: Delmar Learning, 2003.
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### Interest Approach

1. Bring into the classroom several different types of plants (e.g., vines, grasses, woody, herbaceous, and flowering plants). Have students identify the characteristics of each sample. Organize and list on the board the characteristics and uses that students identify. When completed, ask students whether their notes would be understood if copied and sent to another country. If not, why? Relate this entire exercise to the topic of early methods of classification.
2. Bring in examples of plants with different common names. Examples include butterprint (velvetleaf, buttonweed), alfalfa (lucerne), and redroot (pigweed). Point out how using the botanical name can avoid confusion when identifying plants.

### Communicate the Learning Objectives

1. Identify how plants can be classified.
2. Describe the botanical system of classification.
3. Explain why the botanical classification system is important.
4. Describe how monocots and dicots differ.
5. Describe what a legume is.
6. Explain how the life cycles of plants differ.

Instructor Directions	Content Outline
<b>Objective 1</b>  <i>Plants have many forms and functions. Classification is a means of grouping plants according to their similarities.</i>	<b>Identify how plants can be classified.</b>  <ol style="list-style-type: none"><li>1. Botanical – a classification system that identifies plant species and groups them according to their physical characteristics</li><li>2. Descriptive – a classification system that identifies plants by such things as their use (e.g., food crops, feed crops, ornamental crops) and their life cycle (e.g., annual, perennial)</li></ol>
<b>Objective 2</b>  <i>Continued research with plants is vital. There are approximately 500,000 different species in the plant kingdom. Classification systems help eliminate confusion among researchers. Botanical classification plays a beneficial role in international research. Refer to PPT 1.</i>  <input type="checkbox"/> PPT 1 – Botanical Classification (Wheat and Barley Example)	<b>Describe the botanical system of classification.</b>  <ol style="list-style-type: none"><li>1. An internationally accepted system that places plants into discrete categories</li><li>2. It uses a system of eight categories:<ol style="list-style-type: none"><li>a. Kingdom</li><li>b. Division</li><li>c. Class</li><li>d. Subclass</li><li>e. Order</li><li>f. Family</li><li>g. Genus</li><li>h. Species</li></ol></li></ol>

Instructor Directions	Content Outline
<p><b>Objective 3</b></p> <p><i>There are hundreds of thousands of plants on this planet. Humans depend on many of these plants for survival.</i></p>	<p><b>Explain why the botanical classification system is important.</b></p> <ol style="list-style-type: none"> <li>1. It clearly identifies plant species.</li> <li>2. It identifies how plant species differ from other members of the plant kingdom.</li> <li>3. It is a universal language.</li> </ol>
<p><b>Objective 4</b></p> <p><i>Plants that are produced as food for humans or feed for livestock are called crop plants. To better understand crop plants, their parts, and their functions, they have been divided into two groups: monocotyledons and dicotyledons. Refer to PPt 2.</i></p> <p><input type="checkbox"/> PPt 2 – Dicots vs. Monocots</p>	<p><b>Describe how monocots and dicots differ.</b></p> <ol style="list-style-type: none"> <li>1. Monocots (e.g., corn, wheat) <ol style="list-style-type: none"> <li>a. One cotyledon in a seed</li> <li>b. Leaves with parallel veins</li> <li>c. Vascular bundles scattered throughout stems, no vascular cambium</li> <li>d. Root system composed of many fibrous roots with many root hairs</li> <li>e. Flower parts in threes or multiples of three</li> </ol> </li> <li>2. Dicots (e.g., soybeans, alfalfa) <ol style="list-style-type: none"> <li>a. Two cotyledons in each seed</li> <li>b. Leaves with network of veins</li> <li>c. Vascular bundles forming a ring around outside of stem</li> <li>d. Root system composed of primary tap root and many root hairs</li> <li>e. Flower parts in fours or fives or multiples of four or five</li> </ol> </li> </ol>
<p><b>Objective 5</b></p> <p><i>All crop plants need nutrients for proper growth and development. Nitrogen (N), phosphorus (P), and potassium (K) are the three primary nutrients that are needed. As a rule, primary nutrients are supplied to plants through the application of commercial fertilizers. However, legumes are quite different.</i></p>	<p><b>Describe what a legume is.</b></p> <ol style="list-style-type: none"> <li>1. A family of plants whose seeds are formed in fruit and the fruits are formed in pods</li> <li>2. Some have the ability to obtain nitrogen from the soil air</li> </ol>
<p><b>Objective 6</b></p> <p><i>Throughout the life of a plant there are several stages of plant growth. The first stage begins when the seed is planted and the</i></p>	<p><b>Explain how the life cycles of plants differ.</b></p> <ol style="list-style-type: none"> <li>1. Annuals – complete life cycle occurs in one growing season <ol style="list-style-type: none"> <li>a. Summer: seeded in spring, harvested in fall (corn, etc.)</li> </ol> </li> </ol>

Instructor Directions	Content Outline
<p><i>last stage involves the production of more seed. This process is called a life cycle. Life cycles differ depending on the plant.</i></p>	<p>b. Winter: seeded in late summer, harvested the following summer (winter wheat, etc.)</p> <ol style="list-style-type: none"> <li>Biennials – complete life cycle occurs over two growing seasons (sugar beets, carrots)</li> <li>Perennials – live year after year (many forage and pasture crops, shrubs, and some flowers)</li> </ol>
<p><b>Application</b></p>	<p>Other activities</p> <ol style="list-style-type: none"> <li>Have the class start a collection of dried beans that can be classified by genus and species. (This can be done in small, clear, baby food jars.)</li> <li>Have students select, from a teacher-generated list, one plant and do a report on its origin and botanical classification.</li> </ol>
<p><b>Closure/Summary</b></p>	<p>Botanical and descriptive classification systems can be used to classify plants. Both methods help us understand more about the plant world. With continued research, a better understanding of plants will continue to enable farmers to provide food that humans need for survival.</p>
<p><b>Evaluation: Quiz</b></p>	<p>Answers:</p> <ol style="list-style-type: none"> <li>False</li> <li>False</li> <li>True</li> <li>Division (2)</li> <li>Kingdom (1)</li> <li>Class (3)</li> <li>Subclass (4)</li> <li>Family (6)</li> <li>Order (5)</li> <li>Species (8)</li> <li>Genus (7)</li> <li>D</li> <li>M</li> <li>M</li> <li>D</li> <li>B</li> <li>WA</li> <li>B</li> <li>P</li> <li>SA</li> </ol>