

Course	Agricultural Science II
Unit	Introduction to Grassland Management
Subunit	Grasslands and Grassland Plants
Lesson	Botanical Characteristics
Estimated Time	Four 50-minute blocks
Student Outcome	

Recognize the characteristics of grassland plants that are used in plant identification.

Learning Objectives

1. Identify the structural parts of grasses.
2. Describe how leaf parts can help identify grasses.
3. Describe how the root or modified stem can be used to identify grassland plants.
4. Describe how the type of inflorescence can help identify grassland plants.
5. Identify leaf structures and leaf arrangements used in grassland plant identification.
6. Describe how stem shape can be used to identify plants.
7. Identify the external parts of the woody plant stem.

Grade Level Expectations

Resources, Supplies & Equipment, and Supplemental Information

Resources

1. PowerPoint Slides
 - PPt 1 – Identifying Characteristics of Grasses
 - PPt 2 – Roots and Modified Stems
 - PPt 3 – Inflorescence
 - PPt 4 – Leaf Structure and Arrangement
 - PPt 5 – Stem Structure of Woody Plants
2. Activity Sheet
Refer back to the Activity Sheet on Identifying Grassland Plants from the previous lesson on Plant Classification.
3. *Introduction to Grassland Management* (Student Reference). University of Missouri-Columbia: Instructional Materials Laboratory, 1997.
4. *Introduction to Grassland Management Curriculum Enhancement, "Unit I – Grasslands and Grassland Plants."* University of Missouri-Columbia: Instructional Materials Laboratory, 2003.

Supplies & Equipment

- Samples of grassland plants collected in the previous lesson

Supplemental Information

1. Internet Sites

- Grassland Plants. Missouri Botanical Garden, St. Louis. Accessed February 8, 2008, from <http://www.mbgnet.net/sets/grasslnd/plants/index.htm>.
- Missouri Forage and Grassland Council/Grazing Lands Conservation Initiative. Accessed February 8, 2008, from <http://agebb.missouri.edu/mfgc/index.htm>.

2. Print

- Crop and Grassland Plant Identification Manual* (Catalog #10-1203-S). University of Missouri-Columbia: Instructional Materials Laboratory, 1997.
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Interest Approach

Have students observe botanical characteristics of the samples collected in the last lesson. Notice the structural parts that make each sample different, such as leaf shapes, leaf arrangement, root structure, flowers, and buds. List the differences for each part on the chalkboard.

Communicate the Learning Objectives

1. Identify the structural parts of grasses.
2. Describe how leaf parts can help identify grasses.
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5. Identify leaf structures and leaf arrangements used in grassland plant identification.
6. Describe how stem shape can be used to identify plants.
7. Identify the external parts of the woody plant stem.

Instructor Directions	Content Outline
<p>Objective 1</p> <p><i>Ask students to name the different structural parts that may be used to identify grasses. Along with the schematic drawing of Cool- and Warm-Season Grass Growth provided in the PowerPoint slide from the previous lesson, display a grass sample so they can see the actual parts. Try to obtain a plant sample with roots and flowers.</i></p>	<p>Identify the structural parts of grasses.</p> <ol style="list-style-type: none">1. Roots2. Culm (stem)3. Node4. Internode5. Leaf sheath6. Leaf blade7. Collar8. Auricle9. Ligule10. Inflorescence (flowering part of the plant)
<p>Objective 2</p> <p><i>Ask students how the structural parts can help in identifying grasses. Discuss the differences in the leaf that can be observed to help distinguish one grass from another. Refer to PPT 1.</i></p> <p><input type="checkbox"/> PPT 1 – Identifying Characteristics of Grasses</p>	<p>Describe how leaf parts can help identify grasses.</p> <ol style="list-style-type: none">1. Leaf blade shape<ol style="list-style-type: none">a. Tapering to tipb. Boat-shaped tipc. Parallel-sidedd. Narrowed to base2. Collar<ol style="list-style-type: none">a. Broadb. Narrowc. Dividedd. Obliquee. Hairyf. Hairy margins

Instructor Directions	Content Outline
	<ol style="list-style-type: none"> 3. Leaf blade arrangement <ol style="list-style-type: none"> a. Rolled b. Folded 4. Sheath <ol style="list-style-type: none"> a. Split b. Split, margins overlapping c. Closed 5. Auricle <ol style="list-style-type: none"> a. Large b. Small c. Absent 6. Ligule shapes <ol style="list-style-type: none"> a. Acuminate b. Acute c. Rounded d. Truncate e. Absent
<p>Objective 3</p> <p><i>Ask students to describe different types of root or modified stem structures they have seen on grassland plants, including trees, shrubs, grasses, forbs, and legumes. Discuss the basic structures found in grassland plants. Refer to PPT 2.</i></p> <p><input type="checkbox"/> PPT 2 – Roots and Modified Stems</p>	<p>Describe how the root or modified stem can be used to identify grassland plants.</p> <ol style="list-style-type: none"> 1. Roots <ol style="list-style-type: none"> a. Tap b. Fibrous 2. Modified stems <ol style="list-style-type: none"> a. Rhizomes b. Stolons
<p>Objective 4</p> <p><i>Ask students to describe different arrangements of flowers they have seen on grassland plants. Display examples of typical grassland flowers for the students to observe. Discuss the six basic</i></p>	<p>Describe how the type of inflorescence can help identify grassland plants.</p> <ol style="list-style-type: none"> 1. Spike 2. Raceme 3. Panicle 4. Umbel 5. Terminal 6. Axillary

Instructor Directions	Content Outline
<p><i>inflorescence structures found in grassland plants. Refer to PPT 3.</i></p> <p>☐ PPT 3 – Inflorescence</p>	
<p>Objective 5</p> <p><i>Point out to students that the leaf on a legume, forb, or woody plant is just as important in identifying the plant as the leaf blade on a grass plant. Discuss the different parts and arrangements of leaves. Refer to PPT 4.</i></p> <p>☐ PPT 4 – Leaf Structure and Arrangement</p>	<p>Identify leaf structures and leaf arrangements used in grassland plant identification.</p> <ol style="list-style-type: none"> 1. Parts of a leaf <ol style="list-style-type: none"> a. Petiole b. Stipules c. Base d. Blade, surface texture <ul style="list-style-type: none"> - Glabrous - Pubescent - Glaucous 2. Arrangement of leaves and buds <ol style="list-style-type: none"> a. Alternate b. Opposite c. Whorled d. Basal 3. Types of venation <ol style="list-style-type: none"> a. Parallel b. Netted <ul style="list-style-type: none"> - Palmate - Pinnate 4. Types of leaves <ol style="list-style-type: none"> a. Simple, may be lobed b. Compound <ul style="list-style-type: none"> - Palmate - Pinnate - Bipinnate - Trifoliolate 5. Leaf anatomy <ol style="list-style-type: none"> a. Leaf shapes: ovate, obovate, oblong, oval, orbicular, linear, lanceolate, oblanceolate b. Margin shapes: entire, serrulate, serrate, doubly serrate, dentate, crenate, sinuate, undulate, lobed, incised c. Base shapes: truncate, cordate, rounded, cuneate d. Tip shapes: emarginate, obtuse, cuspidate, acute

Instructor Directions	Content Outline
<p>Objective 6</p> <p><i>Display cross sections of plants with different stem shapes. Discuss how stem shape can be used to identify plants.</i></p>	<p>Describe how stem shape can be used to identify plants.</p> <ol style="list-style-type: none"> 1. Square 2. Round 3. Oval 4. Triangular
<p>Objective 7</p> <p><i>Ask students to identify the external parts of the woody plant stem. Refer to PPT 5.</i></p> <p><input type="checkbox"/> PPT 5 – Stem Structure of Woody Plants</p> <p><i>Have students complete the Activity Sheet on Identifying Grassland Plants from the previous lesson. The student's individual plant sheets should have the plant sample attached and the type of plant (forb, grass, legume, or woody plant) written in the blank provided. The students can use IML's Crop and Grassland Plant Identification Manual or any other illustrated guides available to identify the plant and fill in the other sections of the guide page. The instructor will need to show the students how to use the plant guide to identify the plants. This activity may be done individually or in groups.</i></p>	<p>Identify the external parts of the woody plant stem.</p> <ol style="list-style-type: none"> 1. Buds <ol style="list-style-type: none"> a. Terminal bud <ul style="list-style-type: none"> - Bud at the tip of the stem where new growth starts - Usually the largest bud - Can be flowering or vegetative b. Axillary or lateral bud <ul style="list-style-type: none"> - Bud found on the side of the stem - Can be flowering or vegetative 2. Nodes: joints from which leaves or branches grow 3. Internodes: distance between two adjacent nodes 4. Terminal bud scar: scar left from previous year's terminal bud 5. Lenticels: breathing pores found scattered around stem 6. Leaf scar: scar where leaf was attached to stem
<p>Application</p>	<p>Other activities</p> <ol style="list-style-type: none"> 1. Take a field trip to a grassland so that students can relate the drawings in this lesson to actual plants. 2. Supply students with examples of less common grassland plants and have them identify them based on their characteristics.

Instructor Directions	Content Outline
<p>Closure/Summary</p>	<p>Plants can be identified by many characteristics. Grasses are usually identified in their vegetative state since they do not flower until late in the season. The structural parts of grasses are used to identify the plant. Each forb, legume, and woody plant is unique, with its own distinct stem structure, bud shape and size, leaf structure, leaf arrangement, and inflorescence. The types of plant species present determine the care a grassland needs.</p>
<p>Evaluation: Quiz</p>	<p>Answers:</p> <ol style="list-style-type: none"> 1. c 2. b 3. a 4. a 5. d 6. c 7. a 8. d 9. b 10. b