

Course	Agricultural Science II
Unit	Introduction to Grassland Management
Subunit	Grasslands and Grassland Plants
Lesson	Plant Classification
Estimated Time	Three 50-minute blocks
Student Outcome	

Identify plant classifications found in grasslands.

Learning Objectives

1. Describe how grassland plants can be classified.
2. Describe the characteristics of cool-season grasses.
3. Describe the characteristics of warm-season grasses.
4. Describe the characteristics of legumes.
5. Describe the characteristics of forbs.
6. Describe the characteristics of woody plants.
7. Identify what plant species are found in grasslands.



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 – Cool- and Warm-Season Grass Growth
 - ☐ PPt 2 – Grasses
 - ☐ PPt 3 – Legumes
 - ☐ PPt 4 – Forbs
 - ☐ PPt 5 – Woody Plants
2. Activity Sheets
 -  AS 1 – Constructing a Plant Press
 -  AS 2 – Identifying Grassland Plants
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

- ☐ Several samples of grassland plants or detailed pictures representing different types of foliage found in the local area.
- ☐ See AS 1 and AS 2 for materials and equipment needed to complete the Activity Sheets.

Supplemental Information

1. Internet Sites
 - ☐ Classification. Plants Database, USDA Natural Resources Conservation Service. Accessed on February 7, 2008, from <http://plants.usda.gov/classification.html>.
2. Print
 - ☐ *Crop and Grassland Plant Identification Manual* (Catalog #10-1203-S). University of Missouri-Columbia: Instructional Materials Laboratory, 1997.

Interest Approach

Have students bring in plant samples from grassland areas near their homes. Discuss what types of plants are found in grasslands and why grassland areas are important to agriculture.

Communicate the Learning Objectives

1. Describe how grassland plants can be classified.
2. Describe the characteristics of cool-season grasses.
3. Describe the characteristics of warm-season grasses.
4. Describe the characteristics of legumes.
5. Describe the characteristics of forbs.
6. Describe the characteristics of woody plants.
7. Identify what plant species are found in grasslands.

Instructor Directions	Content Outline
<p>Objective 1</p> <p><i>Bring in several samples of grassland plants that represent the different types of foliage found in the local area. Include at least one grass, legume, forb, and woody plant. Have the class, as a whole or in groups, brainstorm on what makes these plants similar and different. Make sure that annuals, perennials, and (if possible) biennials are among the samples. Compose a list and discuss the results as they relate to plant types and life cycles.</i></p> <p><i>Note: If live cuttings are not available, use detailed pictures of the different types of grassland plants from a reference, such as IML's Crop and Grassland Plant Identification Manual.</i></p>	<p>Describe how grassland plants can be classified.</p> <ol style="list-style-type: none">1. Life cycle: Classification system that identifies plants based on their yearly growth and seeding characteristics<ol style="list-style-type: none">a. Annuals – complete life cycle occurs in one growing seasonb. Biennials – complete life cycle occurs over two growing seasonsc. Perennials – grow year after year2. Plant type: Classification system that identifies plant species and groups them according to their physical characteristics<ol style="list-style-type: none">a. Grasses (cool- and warm-season)b. Legumesc. Forbsd. Woody plants
<p>Objective 2</p> <p><i>Separate the grasses from the other plant samples. Discuss how</i></p>	<p>Describe the characteristics of cool-season grasses.</p> <ol style="list-style-type: none">1. Herbaceous2. Hollow stems

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<p><i>optimum temperature for growth divides them into cool-season or warm-season grasses, using PPt 1 to illustrate the differences in their growing seasons. Point out some examples of cool-season grasses from the samples, such as Kentucky bluegrass, orchardgrass, and smooth brome grass. Discuss the characteristics of cool-season grasses. PPt 2 can be used to illustrate the physical characteristics of grasses.</i></p> <p><input type="checkbox"/> PPt 1 – Cool- and Warm-Season Grass Growth</p> <p><input type="checkbox"/> PPt 2 – Grasses</p>	<ol style="list-style-type: none"> 3. Blades and stems joined directly at sheath 4. Parallel venation on leaf blade 5. Grows when soil temperature reaches 40° F in early spring, with optimum growth occurring when air temperatures fall in the 59° to 77° F range in the spring and fall 6. Dormant in summer 7. Annuals or perennials
<p>Objective 3</p> <p><i>Point out some examples of warm-season grasses, such as Indiangrass, big bluestem, and switchgrass. Discuss the characteristics of warm-season grasses.</i></p>	<p>Describe the characteristics of warm-season grasses.</p> <ol style="list-style-type: none"> 1. Herbaceous 2. Hollow stems 3. Blades and stems joined directly at sheath 4. Parallel venation on leaf blade 5. Grows when soil temperatures reach 60° F in spring, with optimum growth occurring when air temperatures fall in the 77° to 104° F range in summer 6. Dormant in winter 7. Annuals or perennials
<p>Objective 4</p> <p><i>Grasses are beneficial plants, but they are not the only ones. Because grasslands are made up of ranges and pasture, another plant type that is used for forage and is beneficial to the grassland is the legume. Point out some examples of legumes, such as clovers, alfalfa, and birdsfoot trefoil, and</i></p>	<p>Describe the characteristics of legumes.</p> <ol style="list-style-type: none"> 1. One-chambered fruit with seeds in a single row within the pod 2. Alternate leaf arrangement with leaves usually connected to petiole 3. Network of veins 4. Annuals, perennials, or biennials 5. Nodules with nitrogen fixing capacity on most rooting systems

Instructor Directions	Content Outline														
<p><i>discuss the characteristics of legumes. PPt 3 may also be used as an illustration.</i></p> <p><input type="checkbox"/> PPt 3 – Legumes</p>															
<p>Objective 5</p> <p><i>Other herbaceous plants that are neither grasses or legumes are forbs. Show examples of forbs, like sunflowers, thistles, and ragweed, from the grassland plant samples. Use PPt 4 to further illustrate forbs. Discuss the characteristics of forbs with the class.</i></p> <p><input type="checkbox"/> PPt 4 – Forbs</p>	<p>Describe the characteristics of forbs.</p> <ol style="list-style-type: none">1. Herbaceous (not woody)2. Broadleaf plants3. Annuals, perennials, or biennials														
<p>Objective 6</p> <p><i>The only nonherbaceous plant type found in grasslands is woody plants. In a grassland pasture or range, most woody plants will be weedy saplings or small immature trees and shrubs. Use PPt 5 to illustrate woody plants. Show examples of woody plants from the grassland plant samples, such as wild rose, red cedar, and oak, and discuss their characteristics.</i></p> <p><input type="checkbox"/> PPt 5 – Woody Plants</p>	<p>Describe the characteristics of woody plants.</p> <ol style="list-style-type: none">1. Woody (nonherbaceous) stems2. Shrubs, vines, or trees3. Perennials														
<p>Objective 7</p> <p><i>Ask students to list the various plant species found in grasslands with which they are familiar. Discuss different plant species found in grasslands. Assign AS 1 and AS 2.</i></p>	<p>Identify what plant species are found in grasslands.</p> <ol style="list-style-type: none">1. Grasses and grasslike plants: <table><tr><td>Barley</td><td><i>Hordeum vulgare</i></td><td>Annual</td></tr><tr><td>Barnyardgrass</td><td><i>Echinochloa crusgalli</i></td><td>Annual</td></tr><tr><td>Bermudagrass</td><td><i>Cynodon dactylon</i></td><td>Perennial</td></tr><tr><td>Big bluestem</td><td><i>Andropogon gerardi</i></td><td>Perennial</td></tr></table>			Barley	<i>Hordeum vulgare</i>	Annual	Barnyardgrass	<i>Echinochloa crusgalli</i>	Annual	Bermudagrass	<i>Cynodon dactylon</i>	Perennial	Big bluestem	<i>Andropogon gerardi</i>	Perennial
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Instructor Directions	Content Outline		
	Common lespedeza or Japanese bush clover	<i>Kummerowia striata</i>	Annual
	Common vetch	<i>Vicia sativa</i>	Annual
	Crimson clover	<i>Trifolium incarnatum</i>	Annual
	Crown vetch	<i>Coronilla varia</i>	Perennial
	Hairy vetch	<i>Vicia villosa</i>	Annual/ biennial
	Illinois bundleflower	<i>Desmanthus illinoensis</i>	Perennial
	Korean lespedeza	<i>Kummerowia stipulacea</i>	Annual
	Lead plant	<i>Amorpha canescens</i>	Perennial
	Little hop clover	<i>Trifolium dubium</i>	Annual
	Low hop clover	<i>Trifolium campestre</i>	Annual
	Partridge pea	<i>Cassia fasciculata</i>	Annual
	Red clover	<i>Trifolium pratense</i>	Biennial
	Sericea lespedeza or silky bush clover	<i>Lespedeza cuneata</i>	Perennial
	Slender lespedeza	<i>Lespedeza virginica</i>	Perennial
	Soybean	<i>Glycine max</i>	Annual
	Tick trefoil	<i>Desmodium spp.</i>	Perennial
	White clover	<i>Trifolium repens</i>	Perennial
	Yellow sweet clover	<i>Melilotus officinalis</i>	Biennial
	3. Forbs:		
	Black nightshade	<i>Solanum americanum</i>	Annual
	Bracted plantain	<i>Plantago aristata</i>	Annual
	Buckwheat	<i>Fagopyrum esculentum</i>	Annual
	Bull nettle	<i>Cnidoscolus texanus</i>	Perennial
	Bull thistle	<i>Cirsium vulgare</i>	Biennial
	Bur cucumber	<i>Sicyos angulatus</i>	Annual
	Butterfly milkweed	<i>Asclepias tuberosa</i>	Perennial
	Canada thistle	<i>Cirsium arvense</i>	Perennial
	Cinquefoil	<i>Potentilla simplex</i>	Perennial
	Common chickweed	<i>Stellaria media</i>	Annual
	Common chicory	<i>Cichorium intybus</i>	Perennial
	Common cocklebur	<i>Xanthium strumarium</i>	Annual
	Common milkweed	<i>Asclepias syriaca</i>	Perennial
	Common morning glory	<i>Ipomoea purpurea</i>	Annual
	Common plantain	<i>Plantago major</i>	Annual
	Common ragweed	<i>Ambrosia artemisiifolia</i> L.	Annual
	Common sunflower	<i>Helianthus annuus</i>	Annual
	Common yarrow	<i>Achillea millefolium</i>	Perennial
	Corn cockle	<i>Agrostemma githago</i>	Annual
	Cotton	<i>Gossypium hirsutum</i>	Annual

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	Croton	<i>Croton monanthogynus</i>	Annual
	Daisy fleabane	<i>Erigeron strigosus</i>	Annual
	Dandelion	<i>Taraxacum officinale</i>	Perennial
	Field bindweed	<i>Convolvulus arvensis</i>	Perennial
	Four-leaf milkweed	<i>Asclepias quadrifolia</i>	Perennial
	Giant ragweed	<i>Ambrosia trifida</i> L.	Annual
	Hedge bindweed	<i>Convolvulus sepium</i>	Annual
	Hemp	<i>Cannabis sativa</i>	Annual
	Henbit	<i>Lamium amplexicaule</i>	Perennial
	Horse nettle	<i>Solanum carolinense</i>	Perennial
	Ironweed	<i>Vernonia baldwini</i>	Perennial
	Ivyleaf morning glory	<i>Ipomoea hederacea</i>	Annual
	Jimsonweed	<i>Datura stramonium</i>	Annual
	Kochia or burning bush	<i>Kochia scoparia</i>	Annual
	Lamb's quarters	<i>Chenopodium album</i>	Annual
	Lance-leaf ragweed	<i>Ambrosia bidentata</i>	Annual
	Musk thistle	<i>Carduus nutans</i>	Biennial
	Ox-eye daisy	<i>Chrysanthemum leucanthemum</i>	Perennial
	Pale dock	<i>Rumex altissimus</i>	Perennial
	Pennsylvania smartweed	<i>Polygonum pennsylvanicum</i>	Annual
	Pepper grass	<i>Lepidium virginicum</i>	Annual
	Pigweed	<i>Amaranthus spp.</i>	Annual
	Prairie dogbane	<i>Apocynum cannabinum</i>	Perennial
	Prairie goldenrod	<i>Solidago missouriensis</i>	Perennial
	Prickly lettuce	<i>Lactuca serriola</i>	Biennial
	Prickly sida	<i>Sida spinosa</i>	Annual
	Queen Anne's lace or wild carrot	<i>Daucus carota</i>	Biennial
	Sheep sorrel or field sorrel	<i>Rumex acetosella</i>	Perennial
	Shepherd's purse	<i>Capsella bursa-pastoris</i>	Annual
	Smartweed	<i>Polygonum lapathifolium</i>	Annual
	Tabacco	<i>Nicotiana tabacum</i>	Annual
	Tall thistle	<i>Cirsium altissimum</i>	Perennial
	Three-seeded mercury	<i>Acalypha ostryaefolia</i>	Annual
	Velvetleaf	<i>Abutilon theophrasti</i>	Annual
	Venice mallow or flower of an hour	<i>Hibiscus trionum</i>	Perennial
	Water hemp	<i>Amaranthus tamariscinus</i>	Annual
	White avens	<i>Geum canadense</i>	Perennial
	White mustard	<i>Brassica hirta</i>	Annual

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	<div>Wild cucumber <i>Echinocystis lobata</i> Annual</div> <div>Wild garlic <i>Allium canadense</i> Perennial</div> <div>Wild strawberry <i>Fragaria virginiana</i> Perennial</div> <div>4. Woody plants:</div> <div>Black cherry <i>Prunus serotina</i> Perennial</div> <div>Black locust <i>Robinia pseudoacacia</i> Perennial</div> <div>Black oak <i>Quercus velutina</i> Perennial</div> <div>Black raspberry <i>Rubus occidentalis</i> Perennial</div> <div>Coralberry or buckbrush <i>Symphoricarpus orbiculatus</i> Perennial</div> <div>Dewberry <i>Rubus flagellaris</i> Perennial</div> <div>Elm <i>Ulmus spp.</i> Perennial</div> <div>Flowering dogwood <i>Cornus florida</i> Perennial</div> <div>Grape <i>Vitis spp.</i> Perennial</div> <div>Hawthorn <i>Crataegus spp.</i> Perennial</div> <div>Hickory <i>Carya spp.</i> Perennial</div> <div>High bush blackberry <i>Rubus pensilvanicus</i> Perennial</div> <div>Honey locust <i>Gleditsia triacanthos</i> Perennial</div> <div>Osage orange <i>Maclura pomifera</i> Perennial</div> <div>Persimmon <i>Diospyros virginiana</i> Perennial</div> <div>Poison ivy <i>Rhus radicans</i> Perennial</div> <div>Redcedar <i>Juniperus virginiana</i> Perennial</div> <div>Rose <i>Rosa spp.</i> Perennial</div> <div>Sassafras <i>Sassafras albidum</i> Perennial</div> <div>Smooth sumac <i>Rhus glabra</i> Perennial</div> <div>White oak <i>Quercus alba</i> Perennial</div> <div>Wild plum <i>Prunus spp.</i> Perennial</div> <div>Willow oak <i>Quercus phellos</i> Perennial</div>
Application	<p>Other activities</p> <p>Take a field trip to a nearby pasture or range and discuss the different types of plants found there. Have the students explain the different uses of the plants found for farmers, consumers, wildlife, hunters, landowners, and wildlife enthusiasts.</p>
Closure/Summary	<p>All plants in the grassland, whether cultivated or native, can be classified as grasses, legumes, forbs, or woody plants. The plants in each classification share characteristics that make the plants in that group similar. With an understanding of these plants and their importance, it is possible to reach reasonable forage crop</p>

Instructor Directions	Content Outline
	production goals and satisfy the needs of a healthy wildlife population.
Evaluation: Quiz	<p>Answers:</p> <ol style="list-style-type: none"> 1. c 2. b 3. h 4. d 5. a 6. e 7. f 8. g 9. b 10. c 11. They are nonherbaceous, with woody stems. 12. The life cycle classification system identifies plants based on their yearly growth and seeding characteristics. The plant type classification system identifies plant species and groups them according to their physical characteristics.