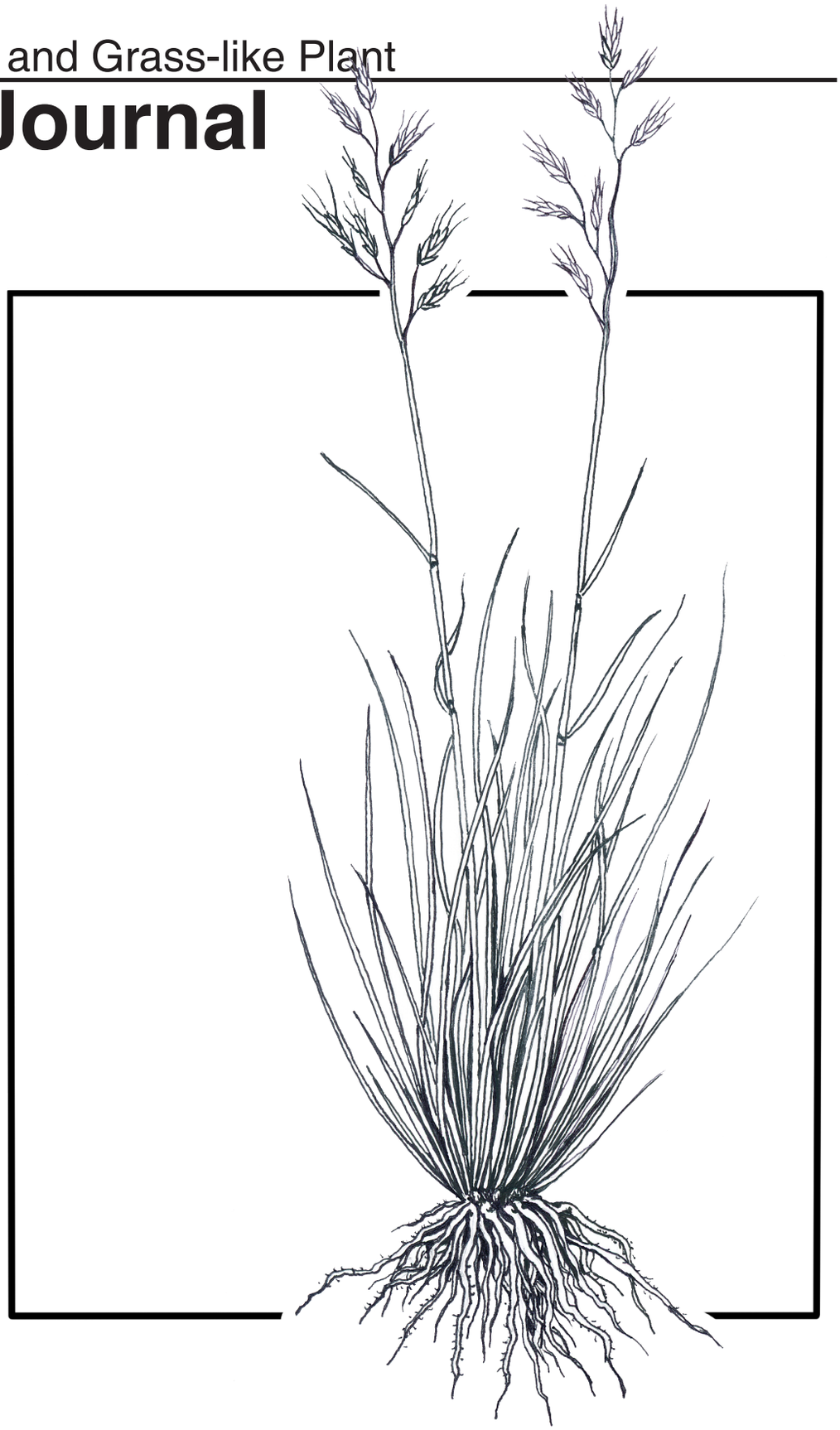
Idaho Grass and Grass-like Plant

Field Journal



Name: _____

Idaho Grass and Grass-like Plant Field Journal

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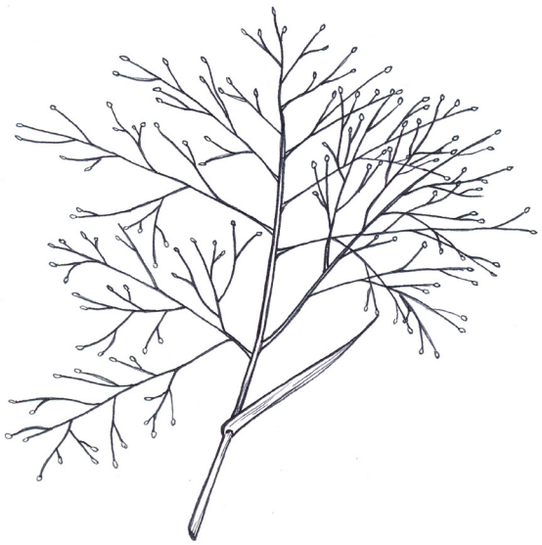
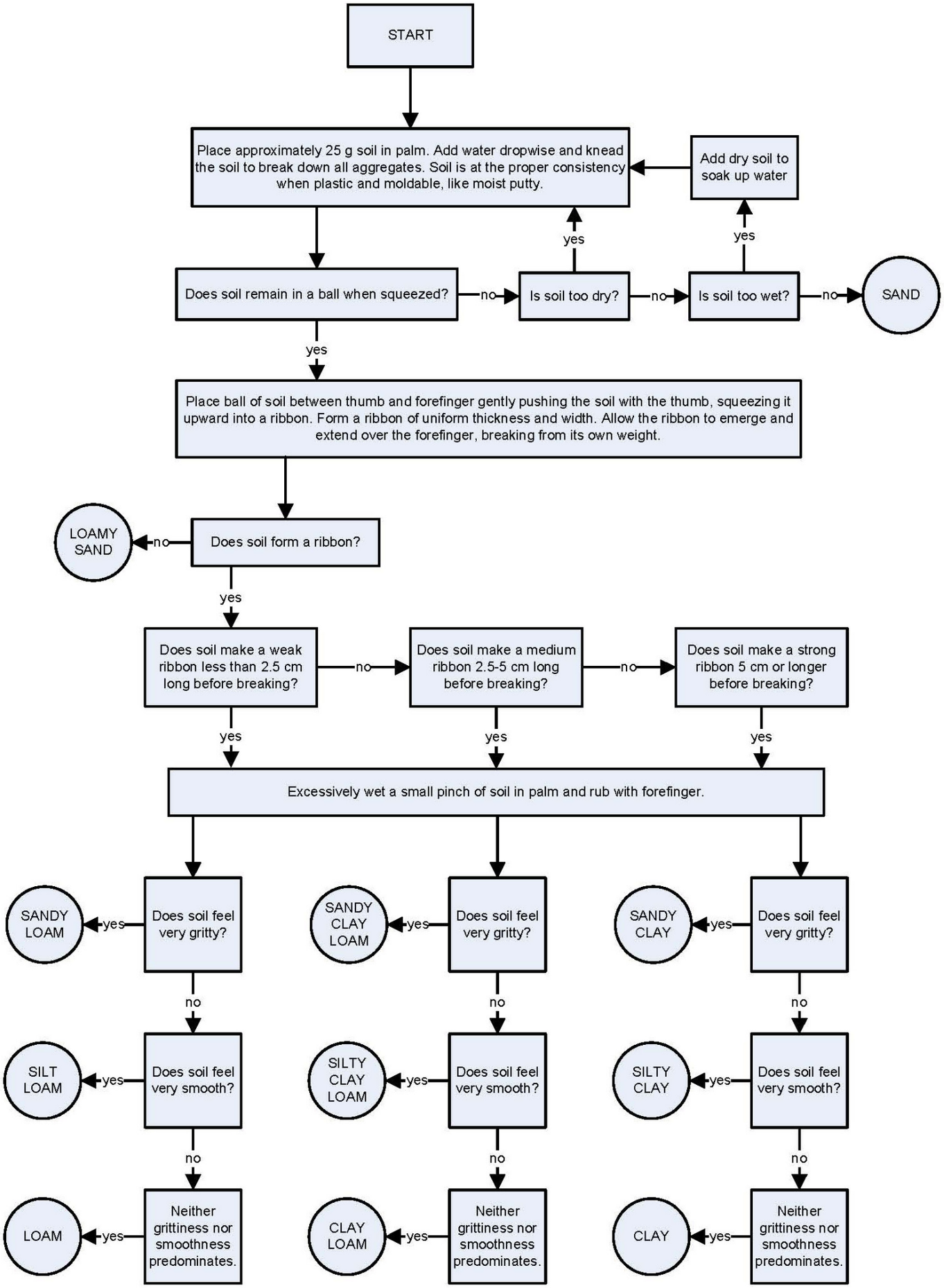
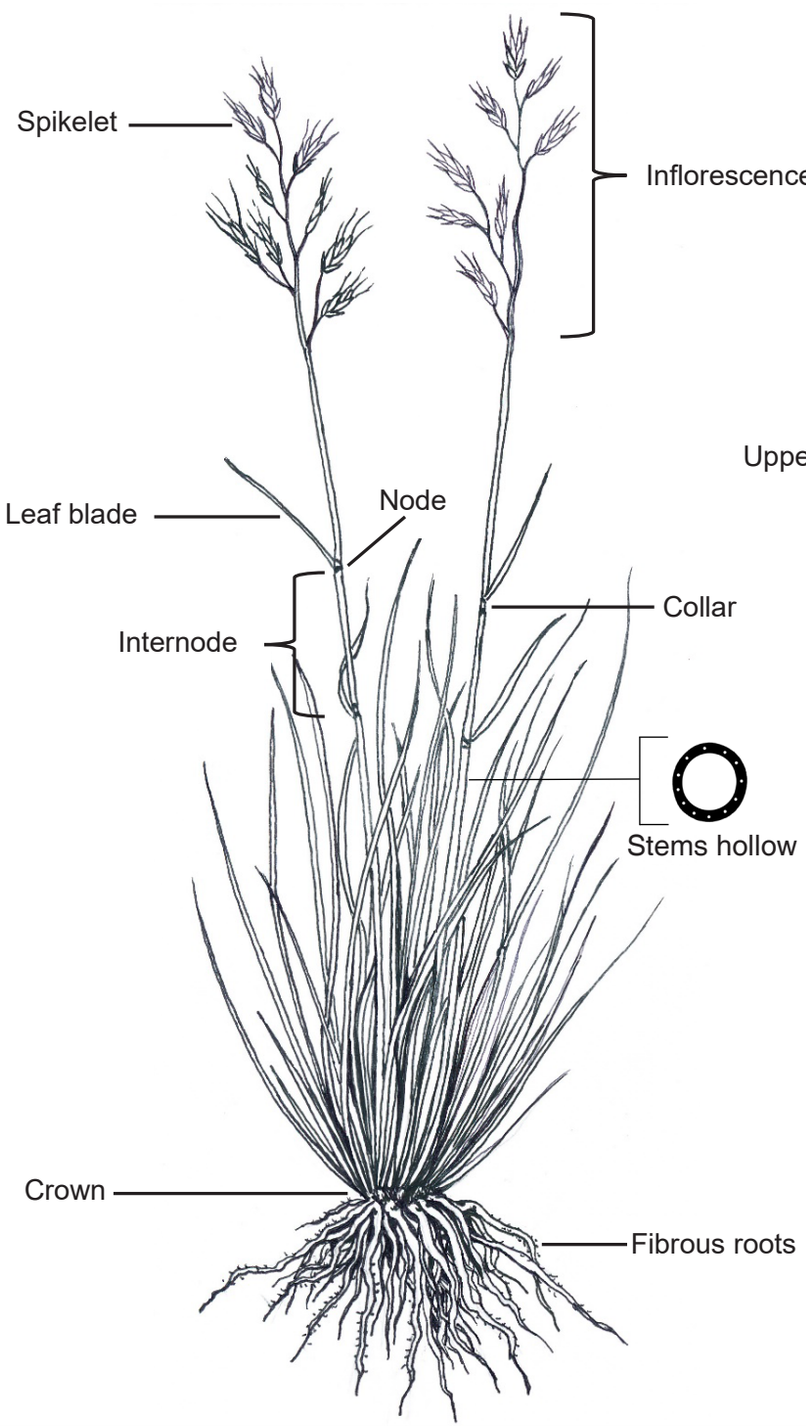


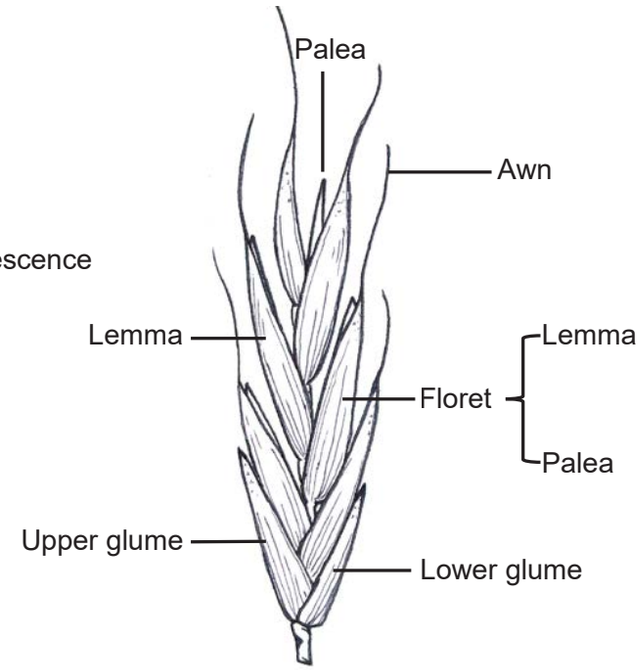


Modified from S.J. Thien. 1979. A flow diagram for teaching texture by feel analysis. Journal of Agronomic Education.

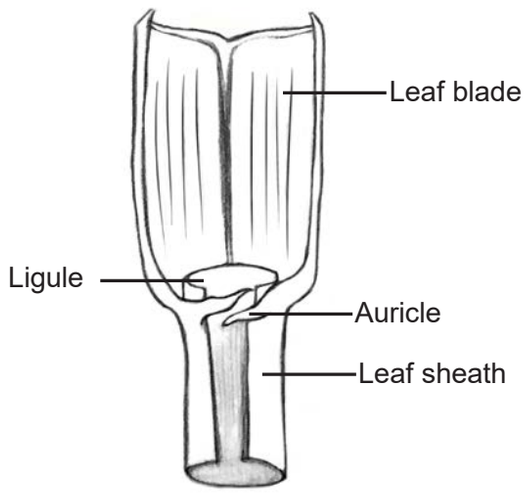
Morphological Features of Grass Plants (Poaceae)

In groups, begin to inspect the different morphological features of a grass. After observing the grass with your partner, turn to page 59 for a fill-in-the-blank exercise.





Close-up of spikelet with several florets



Close-up of the blade and sheath with its associated parts

Notes: _____

Diagram of Different Types of Grass Inflorescences

Search for a spike inflorescence and draw one:

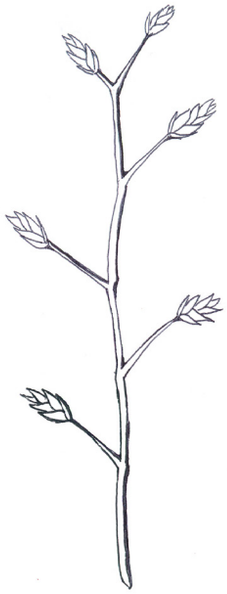
Spike

Spike-like panicle

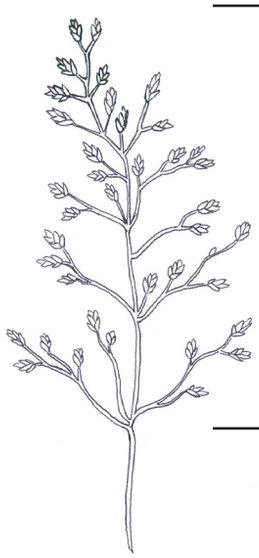
Have you seen one of these in the park?
Y or N
If so, where?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Although not very common, it is important to remember that some grasses have a raceme for an inflorescence (e.g. California oatgrass)



Raceme



Panicle

Find an example of a panicle inflorescence in the park and measure the distance of the seed head.

It is _____cm.

Notes: _____

_____

_____

Grass Spikelets with Representative Florets

One-flowered spikelet

Two-flowered spikelet

Three-flowered spikelet

Multiple-flowered spikelet

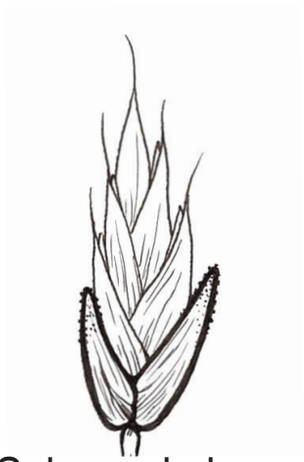
Search for a grass spikelet in the park that is either one, two, three, or multiple-flowered and draw it:

Challenge: Label all the different parts of the spikelet that you just drew.

Notes: _____

Glume Types and Awn Positions

Even glumes



Subequal glumes

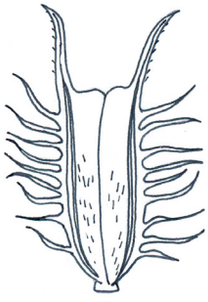
Uneven

Search for a grass with either even, subequal, or uneven glumes in the park. Once you find one, draw an example:

Lemma without awns

Single awn arising from back of lemma

Single awn arising from tip of lemma



Awns arising from glumes

Does your grass spikelet have awns? If so, where are they positioned?

_____

Notes: _____

_____

_____

Grass Ligule Types, Shapes, and Margins

Ligule Types

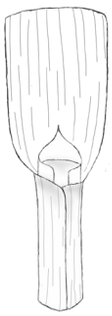
Absent

Membranous

Fringe of Hairs

Ciliate Membrane

Ligule Shapes



Acuminate

Acute

Obtuse

Truncate

Ligule Margins

Entire

Erose

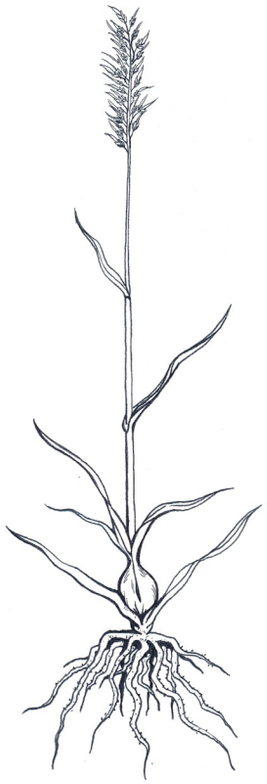
Lacerate

Inspect at least three different grasses in the park and draw their ligule types, apex shapes, and margins for each one:

Notes: _____

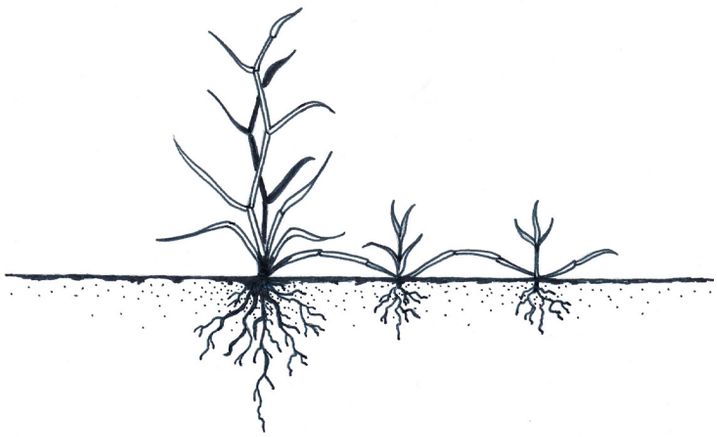
Different Types of Grass Growth Forms

Bunchgrass



Bulbous base

Rhizomes



Stolons

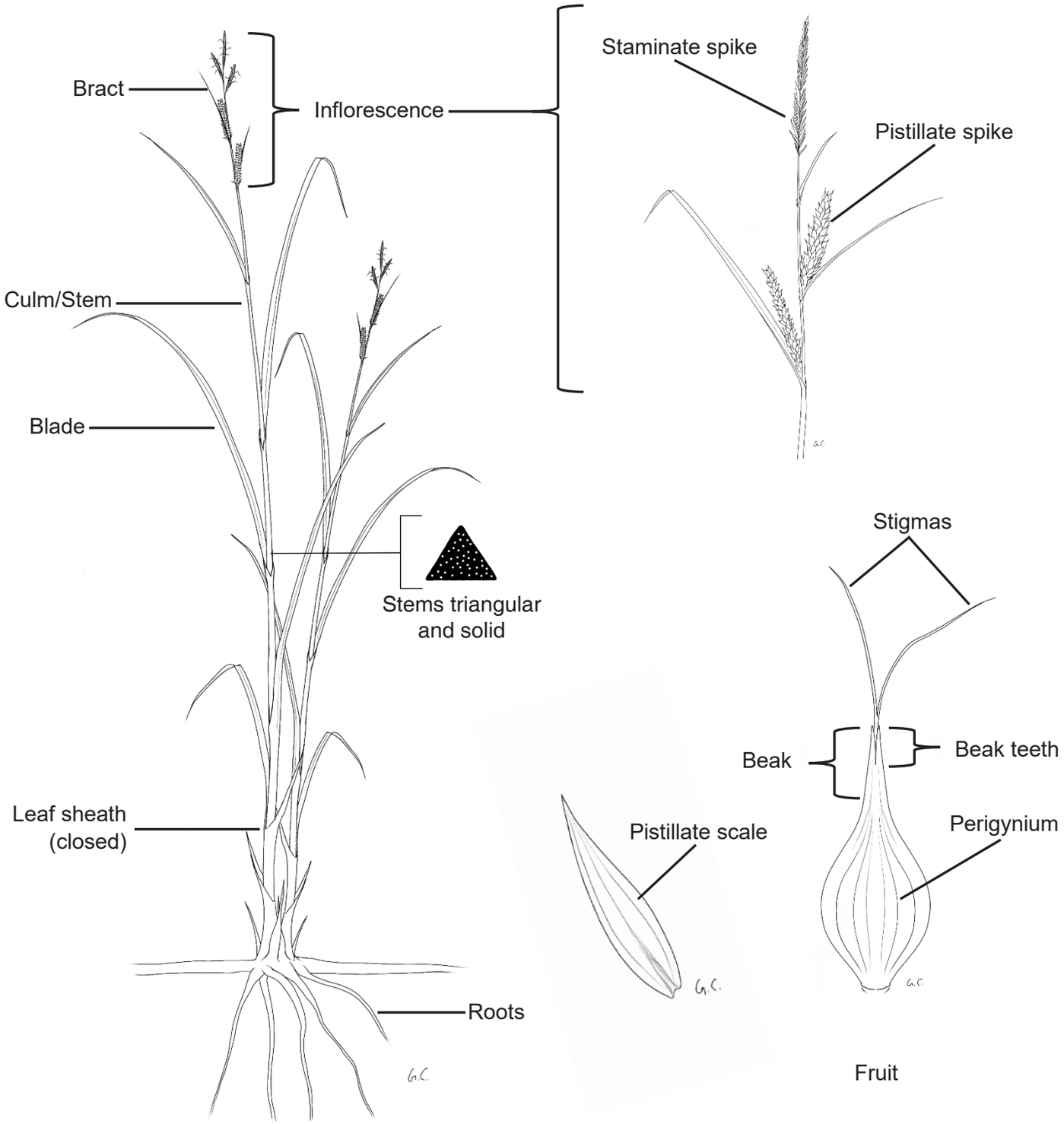
? Have you seen any of these growth forms in the park?
If so, where?_____

Notes: _____

_____

_____

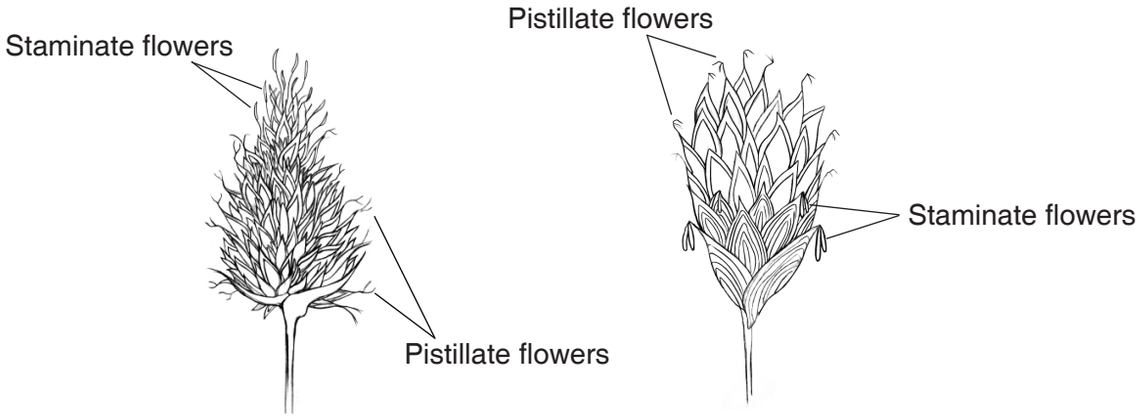
Morphological Features of Grass-like Plants (Cyperaceae)



Notes: _____

Morphological Features of Grass-like Plants (Cyperaceae)

Bisexual Spikes



Androgynous spike

Gynaecandrous spike

Examples of Solitary and Multiple Spike Inflorescences

Solitary spike inflorescence with few pistillate flowers (e.g., Geyer's sedge [*Carex geyeri*]).

Solitary spike inflorescence with numerous flowers (e.g., Common spikerush [*Eleocharis palustris*]).

Several sessile flowers densely crowded into a head) e.g., Hood's sedge [*Carex hoodii*]).

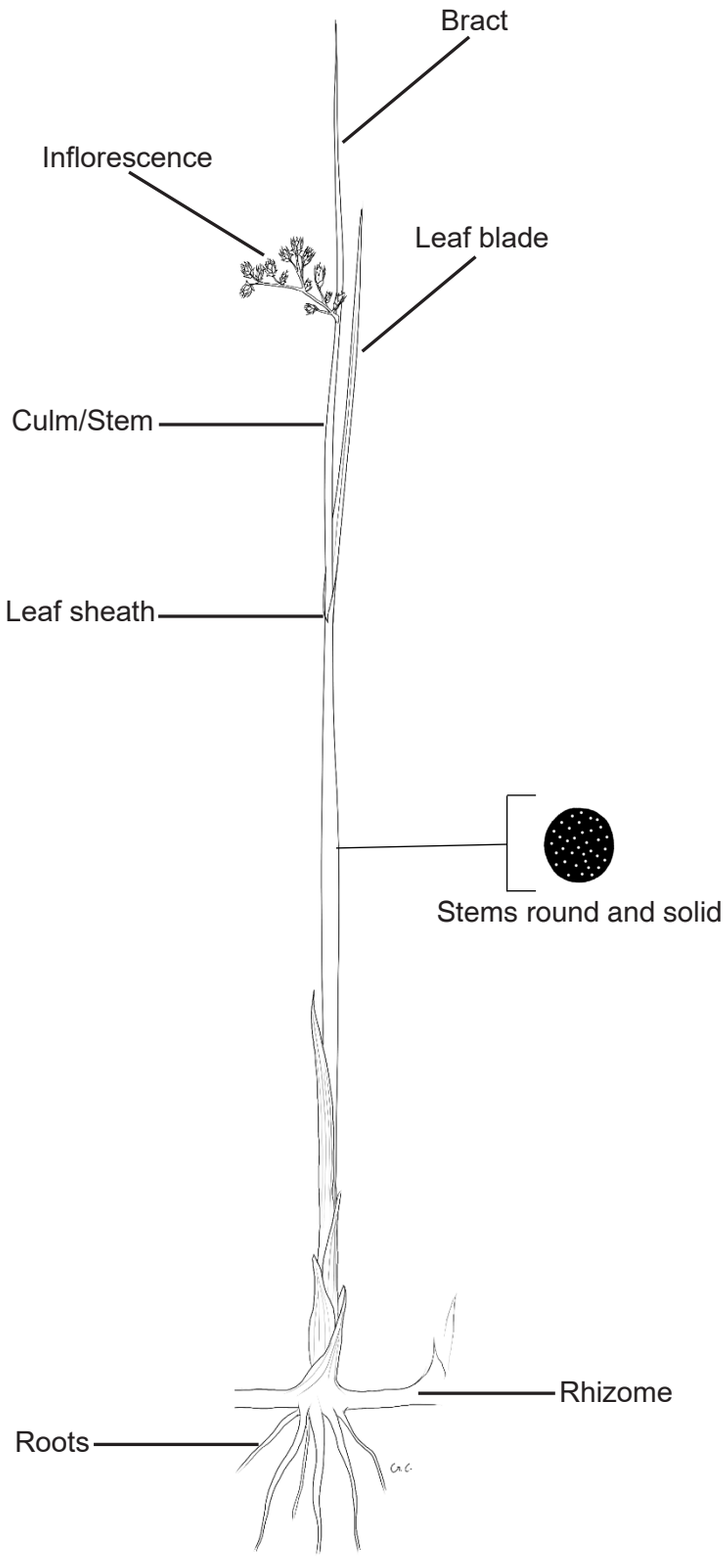
Multiple sessile spikes aggregated into a compact head (e.g., Analogue sedge [*Carex simulata*]).

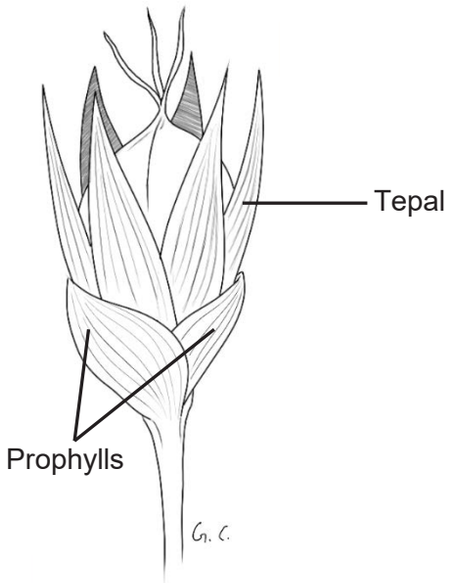
Notes: _____

_____

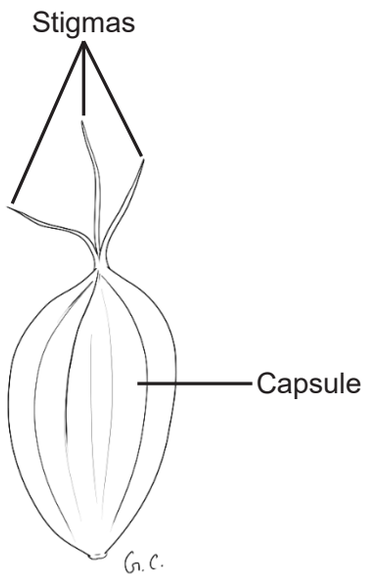
_____

Morphological Features of Grass-like Plants (Juncaceae)





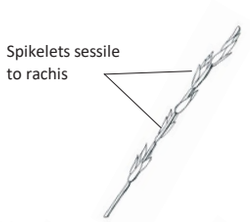
Flower



Fruit

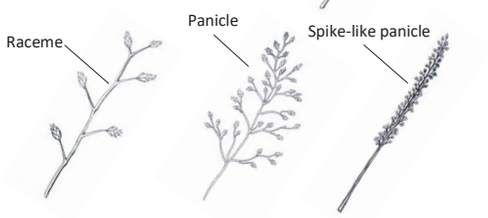
Notes: _____

Key to the Grass Tribes

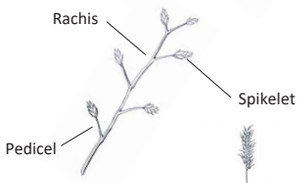


1a. Inflorescence a spike.....**Triticeae**

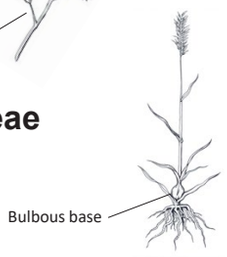
* Several grass species look like spikes, but upon close inspection they are panicles therefore we call them spike-like panicles in this key. Common genera with spike-like panicles include: *Alopecurus, Apera, Calamagrostis, Koeleria, Phalaris, Phleum, Polypogon, and Trisetum*.



1b. Inflorescence a raceme or panicle or a spike-like panicle

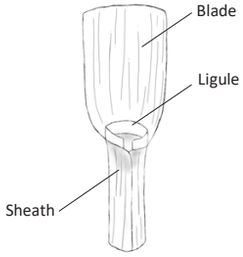


2a. Inflorescence a raceme (if ligule is absent, go to 16a)

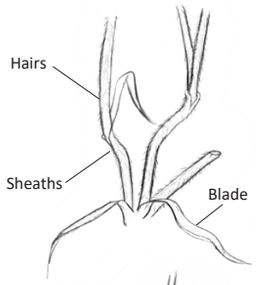


3a. Plants with a bulbous base……**Meliceae**

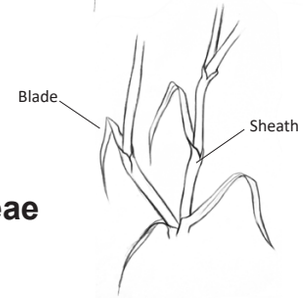
3b. Plants without a bulbous base



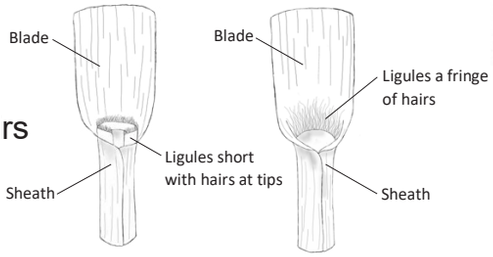
4a. Ligules membranous



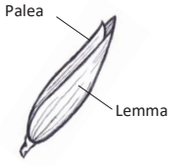
5a. Sheaths and blades with dense or spreading hairs, especially near the base of the plant……**Bromeae**



5b. Sheaths and blades not as above, but with short, soft hairs, or glabrous……**Poeae**

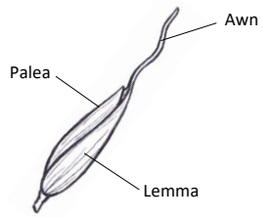


4b. Ligules a ciliate membrane or of hairs

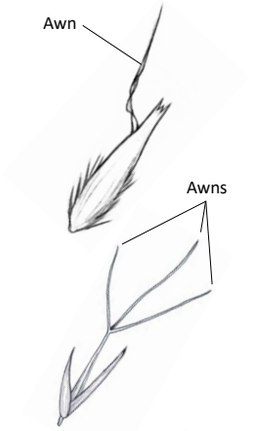


6a. Lemmas unawned.....**Cynodonteae**

6b. Lemmas awned

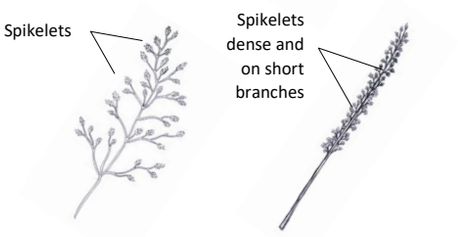


7a. Awns geniculate and twisted…….....**Danthonieae**

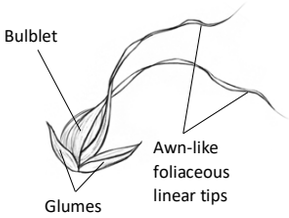


7b. Awns trifid…….....**Aristideae**

2b. Inflorescence a panicle (sometimes only appearing so in the lower inflorescence branches) or a spike-like panicle

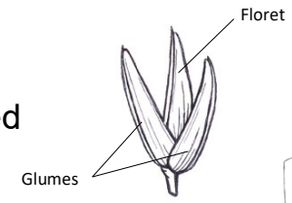


8a. Florets converted into bulblets.....**Poeae**

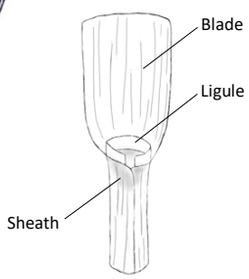


8b. Florets not converted into bulblets

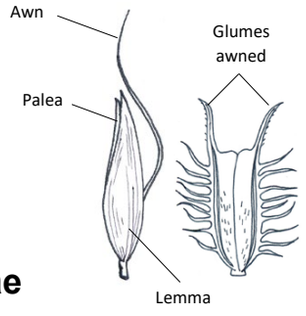
9a. Spikelets one-flowered



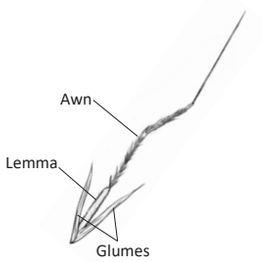
10a. Ligule membranous



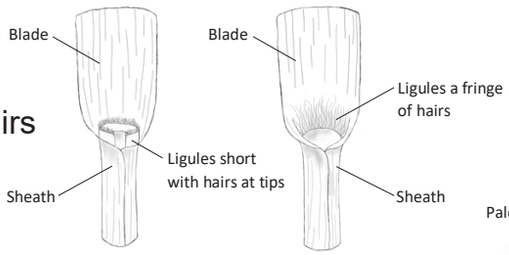
11a. Awns usually arising from back of lemma or glumes, sometimes to within 0.2 mm of apex, or no awns; sheaths of cauline leaves closed for at least ½ their length.....**Poeae**



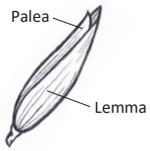
11b. Awns arising from the tip of the lemmas to within 0.8 mm of the tip, awns may be deciduous; sheaths of cauline leaves open for ½ their length or more .....**Stipeae**



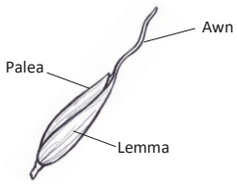
10b. Ligules a ciliate membrane or of hairs



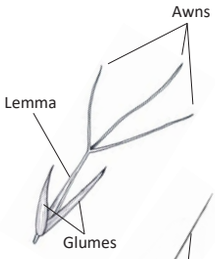
12a. Lemmas not bearing awns at the tip.....**Cynodonteae**



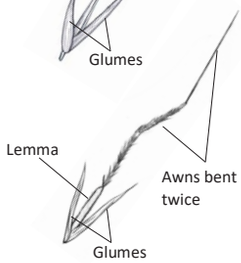
12b. Lemmas bearing awns



13a. Lemmas bearing 3 awns at the tip.....**Aristideae**

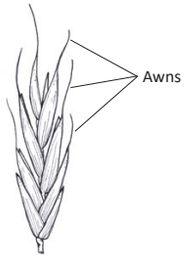


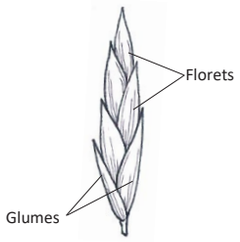
13b. Lemmas not bearing 3 awns at the tip, twice geniculate…….....**Stipeae**



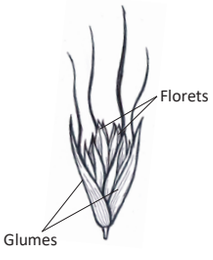
9b**.** Spikelets two or more flowered, sometimes with sterile florets

14a. Awns present

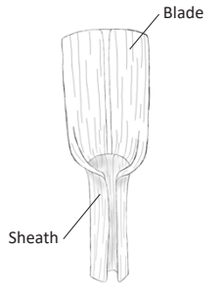




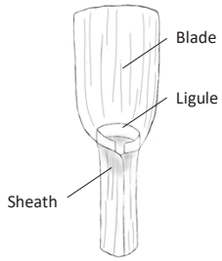
15a. Glumes enclosing florets or nearly so (some spikelets contain an upper glume that exceeds or nearly exceeds most florets and is included in this lead)



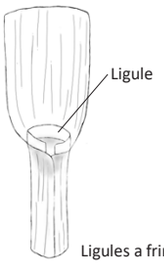
16a. Ligules absent…..**Paniceae**



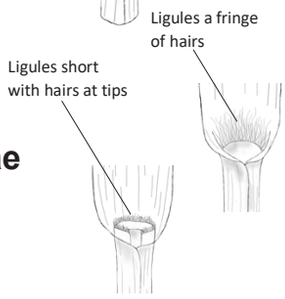
16b. Ligules present



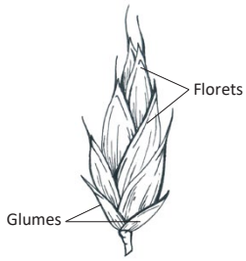
17a. Ligules membranous.....**Poeae**



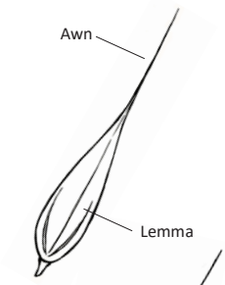
17b. Ligules a ciliate membrane or of hairs.....**Danthonieae**



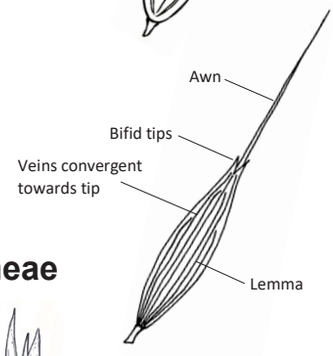
15b. Glumes not enclosing florets



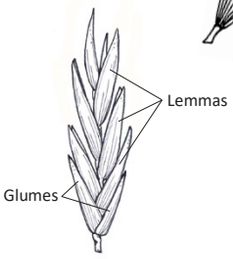
18a. Lemmas usually entire, never bifid with convergent veins; usually glabrous ovary apices.....**Poeae**



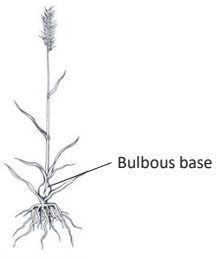
18b. Lemmas usually bifid at the tips, veins convergent towards tip; pubescent ovary …….....**Bromeae**



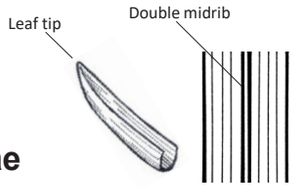
14b. Awns not present, sometimes lemmas acuminate



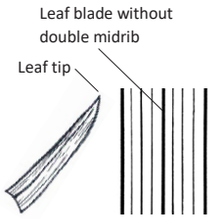
19a. Plants with a bulbous base



20a. Leaf tips keeled or prow-shaped; blades with a distinct double midrib.....**Poeae**

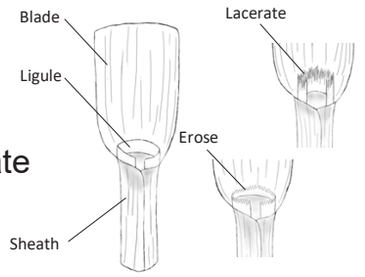


20b. Leaf tips not keeled or prow-shaped; blades without a distinct double midrib.....**Meliceae**

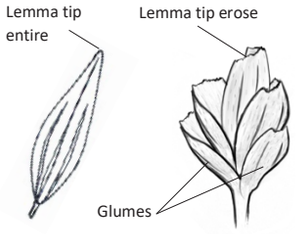


19b. Plants without a bulbous base

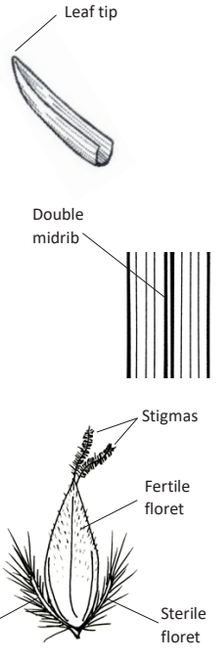
21a. Ligules membranous, sometimes erose or lacerate



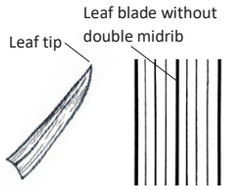
22a. Lemmas usually entire at the tips; except for water whorlgrass (*Catabrosa aquatica*), which is erose at the tips (go to lead 23a)



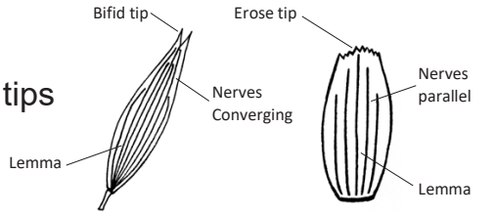
23a. Leaf tips keeled or prow-shaped; leaves with a distinct double midrib; except spike fescue (*Leucopoa kingii*), which has blades that are flat or loosely convolute and coarsely striate; or with one fertile floret and two reduced, sterile florets, sometimes superficially appearing as a single floret.….....**Poeae**



23b. Leaf tips not keeled or prow-shaped; leaves without a distinct double midrib.....**Meliceae**



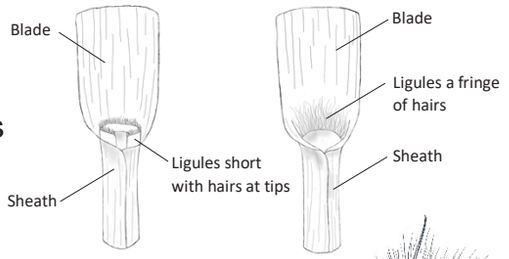
22b. Lemmas usually bifid or erose at the tips



24a. Lemmas small (<7 mm long); nerves parallel .....**Meliceae**

24b. Lemmas large (>7 mm long); nerves converging .....**Bromeae**

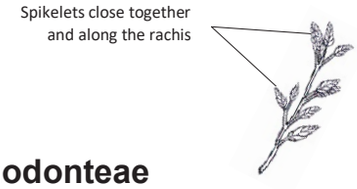
21b. Ligules a ciliate membrane or of hairs



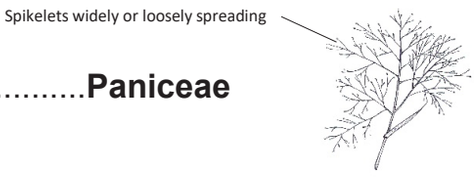
25a. Rachilla villous.....**Arundineae**

25b. Rachilla not villous

26a. Inflorescence a contracted panicle.....**Cynodonteae**



26b. Inflorescence a diffuse panicle.....**Paniceae**



Tribe-to-Species Key

ARISTIDEAE

Plants perennial; lemma awns trifid, awns usually 13-140 mm long; glumes usually unequal; inflorescence usually a sparingly branched panicle, occasionally racemose, often purplish or reddish……..**Purple threeawn (*Aristida purpurea*)**

ARUNDINEAE

Rachilla with long silky hairs (up to 10 mm long); glumes unequal; 100-400 cm tall; vigorous reed-like plants…….....**Common reed (*Phragmites australis* ssp. *australis*)**

BROMEAE

1a. Plants perennial
- 2a. Plants rhizomatous; awns absent or up to 3 mm long .....**Smooth brome (*Bromus inermis*)**
- 2b. Plants a bunchgrass; awns 4-8 mm long .....**Mountain brome (*Bromus marginatus*)**

1b. Plants annual, sometimes biennial
- 3a. Lemmas 7-12 mm long
  - 4a. Awns 4-12 mm long, if >8 mm long then twisted and geniculate
    - 5a. Awns 4-9 mm long, straight to recurved at maturity; sometimes biennial; leaf sheaths with pilose hairs ……**Soft brome (*Bromus hordeaceus*)**
    - 5b. Awns 7-12 mm long, twisted and geniculate at maturity; annual; leaf sheaths with appressed hairs .....**Field brome (*Bromus arvensis*)**
  - 4b. Awns 12-20 mm long, straight…….....**Cheatgrass (*Bromus tectorum*)**
- 3b. Lemmas 20-35 mm long……**Ripgut brome (*Bromus diandrus*)**

CYNODONTEAE

1a. Spikelets 1-flowered; not dioecious
- 2a. Plants cespitose; inflorescence a contracted to open panicle; ligules a line of dense hairs up to 1 mm long, hairs encircling the sheath apices; flag leaves perpendicular to culms……**Sand dropseed (*Sporobolus cryptandrus*)**
- 2b. Plants rhizomatous; inflorescence a panicle of 3-12 racemosely arranged unilateral branches with 18-28 appressed spikelets; ligules a fringe of hairs, 0.5-1.5 mm long.....**Alkali cordgrass (*Spartina gracilis*)**

1b. Spikelets many flowered (pistillate spikelets are 5- to 9-flowered, staminate spikelets 7- to 16-flowered); dioecious…….....**Saltgrass (*Distichlis spicata*)**

DANTHONIEAE

1a. 1-2 (sometimes 3) spikelets, if more than 1, inflorescence racemose .....**Onespike danthonia (*Danthonia unispicata*)**

1b. (Sometimes 2) 3-10 spikelets, if 2-3 then spikelets divergent and spreading
- 2a. Infloresence usually a raceme, pedicels or lower inflorescence branches divergent and spreading, (sometimes 2) 3-6 (sometimes 10) spikelets…….....**California oatgrass (*Danthonia californica*)**
- 2b. Inflorescence a narrow panicle or raceme, lower inflorescence branches erect and stiff, (sometimes 4) 5-10 spikelets…….....**Timber oatgrass (*Danthonia intermedia*)**

MELICEAE

1a. Plants with a bulbous base; lower glumes 1- to 5-nerved, 4-10.5 mm long
  2a. Leaf blades narrow, 1.5-5 mm wide; lemmas 6-12 mm long, 7- to 11-nerved, tips acute or occasionally emarginated.....**Oniongrass (*Melica bulbosa*) (p. 72)**
  2b. Leaf blades broad, 2-10 mm wide; lemmas 5.5-18 mm long, 7- to 9-nerved, nerves usually strigose, strongly tapering to a sharp, acuminate point.....**Alaska oniongrass (*Melica subulata*) (p. 74)**
1b. Plants without a bulbous base; lower glumes 1-nerved, 0.5-0.9 mm long .....**Fowl mannagrass (*Glyceria striata*) (p. 70)**

PANICEAE

1a. Inflorescence a diffuse panicle; sterile lemmas similar to upper glumes (both exceeding and enclosing the fertile florets); ligules a fringe of hairs up to 1.5 mm long.....**Witchgrass (*Panicum capillare*) (p. 78)**
1b. Inflorescence a contracted panicle with usually 5-12 racemosely arranged lateral branches; sterile lower lemmas unawned to awned to 50 mm long; ligules absent, though ligule area sometimes pubescent.....**Barnyardgrass (*Echinochloa crus-galli*) (p. 76)**

POEAE

1a. Spikelets 1-flowered (if florets are converted into bulblets, go to 1b)
  2a. Plants annual
    3a. Glumes unawned; lemma awns usually 4-10 mm long .....**Dense silkybent (*Apera interrupta*) (p. 84)**
    3b. Glume awns up to 10 mm long; lemma awns sometimes up to 4.5 mm long .....**Annual rabbitsfoot grass (*Polypogon monspeliensis*) (p. 124)**
  2b. Plants perennial
    4a. Plants a bunchgrass, sometimes loosely so
      5a. Glumes awned; lemmas unawned, sometimes with a minute awn
        6a. Base of plants not swollen or bulb-like; sheaths of flag leaves inflated .....**Alpine timothy (*Phleum alpinum*) (p. 108)**
        6b. Base of plants swollen or bulb-like; sheaths of flag leaves not inflated .....**Timothy (*Phleum pratense*) (p. 110)**
      5b. Glumes unawned; lemmas awned
        7a. Collars often pubescent; glumes keeled, glabrous, often scabrous at keel tips; lemmas with many hairs on the callus, 0.5-2.5 mm long; inflorescence a contracted to somewhat open panicle (can look spike-like).....**Pinegrass (*Calamagrostis rubescens*) (p. 90)**
        7b. Collars glabrous; glumes ciliate along the keels, pubescent on the sides; lemmas usually glabrous, sometimes ciliate along the keels distally; inflorescence a cylindrical, spike-like panicle.....**Meadow foxtail (*Alopecurus pratensis*) (p. 82)**
    4b. Plants rhizomatous, stoloniferous, or decumbent with rooting, lower nodes
      8a. Plants rhizomatous
        9a. Lemmas awned; sometimes loosely cespitose .....**Pinegrass (*Calamagrostis rubescens*) (p. 90)**
        9b. Lemmas unawned, or if awned only to 1 mm long

10a. Lemma tips acute to obtuse, entire or with excurrent veins to about 0.1 mm long…….....**Creeping bentgrass (*Agrostis stolonifera*)**

10b. Lemma tips rounded to truncate, scarious and erose .....**Water whorlgrass (*Catabrosa aquatica*)**

8b. Plants stoloniferous, or decumbent with rooting, lower nodes

11a. Glumes acute to acuminate, scabrous along keels, subequal to unequal; spikelets 1-flowered…….....**Creeping bentgrass (*Agrostis stolonifera*)**

11b. Glumes rounded to truncate, scarious, unequal; spikelets 1- to 2 (sometimes 3)-flowered.....**Water whorlgrass (*Catabrosa aquatica*)**

1b. Spikelets 2 or more flowered, sometimes superficially appearing as a single floret with the 2 lowest florets greatly reduced and sterile, as in 34a

12a. Plants annual

13a. Lemma awns arising at mid-length; or lower lemma awns arising at tips with upper lemma awns arising near mid-length

14a. Lemma awns 28-45 mm long, twisted and geniculate .....**Wild oat (*Avena fatua*)**

14b. Lemma awns up to 9 mm long, upper lemma awns 10-16 mm long .....**Wiregrass (*Ventenata dubia*)**

13b. Lemmas awns arising from tips

15a. Spikelets usually 3- to 5-flowered; lemma awns usually 6-15 mm long

16a. Glumes unequal, lower glume $^{1}/_{2}$ -$^{4}/_{5}$ the length of the upper glume…….....**Brome fescue (*Vulpia bromoides*)**

16b. Glumes extremely unequal, lower glume $^{1}/_{5}$-$^{1}/_{2}$ the length of the upper glume…….....**Annual fescue (*Vulpia myuros*)**

15b. Spikelets 6- to 12 (sometimes 15)-flowered; lemma awns sometimes up to 5 mm long…….....**Sixweeks fescue (*Vulpia octoflora*)**

12b. Plants perennial

17a. Plants a bunchgrass, sometimes loosely so

18a. Inflorescence a spike-like panicle

19a. Glumes subequal; lemma tips entire, acute or sometimes with a short awn.....**Prairie junegrass (*Koeleria macrantha*)**

19b. Glumes unequal; lemma tips acute, bifid, awns 3-8 mm long, geniculate…….....**Spike trisetum (*Trisetum spicatum*)**

18b. Inflorescence a narrow or open panicle

20a. Plants bulbous at base

21a. Florets converted into bulblets.....**Bulbous bluegrass (*Poa bulbosa*)**

21b. Florets not converted into bulblets .....**Tall oatgrass (*Arrhenatherum elatius*)**

20b. Plants not bulbous at base

22a. Auricles present and with hairy margins .....**Tall fescue (*Schedonorus arundinaceus*)**

22b. Auricles absent

23a. Glumes awn-tipped, equal to subequal .....**Orchardgrass (*Dactylis glomerata*)**

23b. Glumes not awn-tipped, unequal to subequal

24a. Lemma awns not present

25a. Sheaths closed for $^{1}/_{10}$ – $^{1}/_{4}$ their length, scabrous, smooth, or glabrous, never retrorsely scabrous; spikelets little compressed and rather terete; lemmas crisp-puberulent below, frequently with somewhat longer hairs on central and marginal nerves…….**Sandberg bluegrass (*Poa secunda*)**

25b. Sheaths closed $^{1}/_{3}$ – $^{3}/_{4}$ their length, (retrorsely) scabrous or smooth, glabrous or pubescent, or hispidulous; spikelets strongly compressed

26a. Sheaths closed ~$^{1}/_{3}$ their length, scabrous or smooth, glabrous or occasionally retrorsely pubescent; lemmas sericeous on the keel and marginal nerves; culm leaf blades greatly reduced along culm, up to 1 (sometimes 3) cm long, or absent; plants cespitose .....**Muttongrass (*Poa fendleriana*)**

26b. Sheaths closed $^{1}/_{3}$ – $^{3}/_{4}$ their length, densely retrorsely scabrous, pubescent, or hispidulous; lemmas glabrous or pubescent on the lower part of nerves; midculm leaf blades longer than lower blades or leaf blades gradually reduced along culm; plants loosely tufted .....**Wheeler's bluegrass (*Poa wheeleri*)**

24b. Lemma awns present, usually 1-20 mm long, or acute, acuminate, or slightly awned

27a. Lemma awns attached below apex of lemma

28a. Lemma awns usually up to 5 mm long

29a. Inflorescence a contracted panicle .....**Slender hairgrass (*Deschampsia elongata*)**

29b. Inflorescence a shiny, often nodding, contracted to open, diffuse panicle .....**Tufted hairgrass (*Deschampsia cespitosa*)**

28b. Lower lemma awns 10-20 mm long, attached at mid-length, twisted and geniculate; upper lemma awns absent or up to 5 mm long, straight, attached just below the tips....**Tall oatgrass (*Arrhenatherum elatius*)**

27b. Lemma awns attached at apex of lemma, sometimes acute, acuminate, or slightly awned

30a. Lemma awns usually 2-6 mm long; ligules 0.2-0.6 mm long, membranous, longer on the sides .....**Idaho fescue (*Festuca idahoensis*)**

30b. Lemmas acute or acuminate, usually unawned or with a subterminal short awn; ligules sometimes up to 4 mm long, membranous, truncate, erose-ciliolate, glabrous, and in the shape of a king's crown.....**Spike fescue (*Leucopoa kingii*)**

17b. Plants rhizomatous, stoloniferous, or decumbent with rooting, lower nodes

31a. Culms strongly flattened…….**Canada bluegrass (*Poa compressa*)**

31b. Culms mostly terete (round)
32a. Auricles present……....**Tall fescue (*Schedonorus arundinaceus*)**
32b. Auricles absent
33a. Spikelets 1- to 3-flowered, if 3-flowered lowest 2 florets reduced and sterile, superficially appearing as 1 floret total or florets pedicellate
34a. Spikelets 3-flowered, 4-5 mm long, uppermost floret fertile and lowest 2 florets reduced and sterile, superficially appearing as 1 floret; ligules usually 4-10 mm long, membranous, obtuse to truncate, and entire to lacerate.....**Reed canarygrass (*Phalaris arundinacea*)**
34b. Spikelets 1- to 2 (sometimes 3)-flowered, all florets fertile, sometimes lowest floret staminate and upper florets pistillate or occasionally rudimentary
35a. Spikelets 1- to 2 (sometimes 3)-flowered, 1.5-3.5 (sometimes 4) mm long, florets pedicellate; ligules 1-8 mm long, membranous, entire to erose, acute to truncate .....**Water whorlgrass (*Catabrosa aquatica*)**
35b. Spikelets 2-flowered, 7-11 mm long, lower floret staminate, upper floret bisexual, pistillate, or occasionally rudimentary; ligules 1-3 mm long, membranous, obtuse to truncate, usually ciliate .....**Tall oatgrass (*Arrhenatherum elatius*)**
33b. Spikelets 2- to 7-flowered, if 3-flowered lowest 2 florets not reduced and sterile, superficially appearing as 1 floret total or florets not pedicellate
36a. Blades coarsely striate above; ligules erose-ciliolate (in the shape of a king's crown).....**Spike fescue (*Leucopoa kingii*)**
36b. Blades not coarsely striate above; ligules usually entire, ciliolate
37a. Spikelets 2- to 5-flowered, usually 3.5-6 mm long; lemmas webbed at the base…….....**Kentucky bluegrass (*Poa pratensis*)**
37b. Spikelets 2- to 7-flowered, 5.5-10 mm long; lemmas not webbed at base…….....**Wheeler's bluegrass (*Poa wheeleri*)**

STIPEAE

1a. Inflorescence an ascending to diffuse, spreading, dichotomous panicle; awns deciduous……....**Indian ricegrass (*Achnatherum hymenoides*)**
1b. Inflorescence a narrow to open panicle
2a. Awns strongly once-geniculate, especially at maturity; awns 3.9-7 mm long .....**Little ricegrass (*Piptatheropsis exigua*)**
2b. Awns twice-geniculate, especially at maturity; awns >7 mm long
3a. First two segments of awns scabrous, or with hairs <1 mm long
4a. Awns 12-45 mm long; terminal segments straight
5a. Awns 12-25 mm long; apical hairs on paleae generally exceeding the apices; leaf blades 0.5-2 mm wide .....**Letterman's needlegrass (*Achnatherum lettermanii*)**
5b. Awns 19-45 mm long; apical hairs on paleae generally not exceeding the apices; leaf blades usually 1.2-5 mm wide .....**Columbia needlegrass (*Achnatherum nelsonii* ssp. *nelsonii*)**

4b. Awns 65-225 mm long; terminal segment straight, sinuous, or curled
.....**Needle-and-thread (*Hesperostipa comata*)**

3b. First two segments of awn pilose, hairs up to 2 mm long

6a. Ligules 0.2-1.5 mm long, entire to slightly erose-ciliate; awns 15-55 mm long; hairs about 1 mm long
.....**Western needlegrass (*Achnatherum occidentale*)**

6b. Ligules 1.5-8 mm long, membranous, hyaline, acute, lacerate; awns 32-56 mm long; hairs 0.8-2 mm long
.....**Thurber's needlegrass (*Achnatherum thurberianum*)**

TRITICEAE

1a. Spikelets 1 per rachis node

2a. Plants annual or biennial

3a. Lemmas 5-7.5 mm long; awns up to 2 mm long
.....**Annual wheatgrass (*Eremopyrum triticeum*)**

3b. Lemmas 8-18 mm long, awns 1-80 mm long

4a. Lemmas 8-11 mm long, lower lemma awns usually 1-3 mm long, upper lemma awns usually 40-80 mm long
.....**Jointed goatgrass (*Aegilops cylindrica*)**

4b. Lemmas 14-18 mm long, awns 7-50 mm long
.....**Cereal rye (*Secale cereale*)**

2b. Plants perennial

5a. Plant a bunchgrass

6a. Spikelets loose to open (spikelets slightly overlapping, especially near the top of the inflorescences)

7a. Glume tips acute; lemmas awned or unawned (awns up to 25 mm long), widely divergent.....**Bluebunch wheatgrass (*Pseudoroegneria spicata*)**

7b. Glume tips obtuse to truncate; lemmas unawned
.....**Tall wheatgrass (*Thinopyrum ponticum*)**

6b. Spikelets closely imbricate

8a. Glumes often extending into awns up to 3 mm long, 3-nerved; lemmas acute or usually with awns 1-6 mm long, not divergent; spikelets diverging at angles of more than 40 degrees along the rachis
.....**Crested wheatgrass (*Agropyron cristatum*)**

8b. Glumes acute to awned-tipped, 5- to 7-nerved; lemmas unawned or with awns up to 9 mm long and straight or sometimes curved; spikelets appressed along the rachis
.....**Slender wheatgrass (*Elymus trachycaulus* ssp. *trachycaulus*)**

5b. Plants rhizomatous

9a. Glumes unawned

10a. Glumes usually stiff and either blunt-tipped, acute, or sometimes mucronate; spikelets not imbricate or slightly so, internode space 7-12 mm long
.....**Intermediate wheatgrass (*Thinopyrum intermedium*)**

10b. Glumes acute; spikelets strongly imbricate, internode space usually 4-6 mm long.....**Quackgrass (*Elymus repens*)**

9b. Glumes awned to acuminate

11a. Blades coarsely veined above; glumes usually 3- to 5-nerved; lemmas glabrous or pubescent

12a. Glumes linear-lanceolate to lanceolate, rigid, gradually tapering from below mid-length to an acuminate tip that is often slightly curved, asymmetrical, glabrous to scabrous on nerves; lemmas unawned or with awns 0.5-5 mm long .....**Western wheatgrass (*Pascopyrum smithii*)**

12b. Glumes oblong-lanceolate, broadest at or above mid-length with shortly tapering acute to acuminate tips, pubescent, rarely glabrous; lemmas acute to awned-tipped, awns up to 2 mm long and straight .....**Thickspike wheatgrass (*Elymus lanceolatus* ssp. *lanceolatus*)**

11b. Blades finely veined above but more prominent below with unequally spaced lengths; lower glumes 3- to 6-nerved, upper glumes 5- to 7-nerved; lemmas glabrous to scaberulous apically .....**Quackgrass (*Elymus repens*)**

1b. Spikelets 2 or more per rachis node

13a. Spikelets mostly 2 at each node of rachis, often up to 7; spikelets with 2 or more florets

14a. Plants perennial

15a. Glumes acicular

16a. Lemma awns up to 3.5 mm long

17a. Spikelets sometimes 2 or 3 per rachis node; height usually 30-80 cm tall.....**Russian wildrye (*Psathyrostachys juncea*)**

17b. Spikelets occasionally 2-7 per rachis node; height 70-270 cm tall…….....**Basin wildrye (*Leymus cinereus*)**

16b. Lemma awns up to 80 mm long .....**Bottlebrush squirreltail (*Elymus elymoides*)**

15b. Glumes not acicular….....**Blue wildrye (*Elymus glaucus*)**

14b. Plants annual.....**Medusahead (*Taeniatherum caput-medusae*)**

13b. Spikelets 3 at each node of the rachis; spikelets with a single floret

18a. Plants perennial; glumes slender, rarely flattened, and not ciliate along the margins

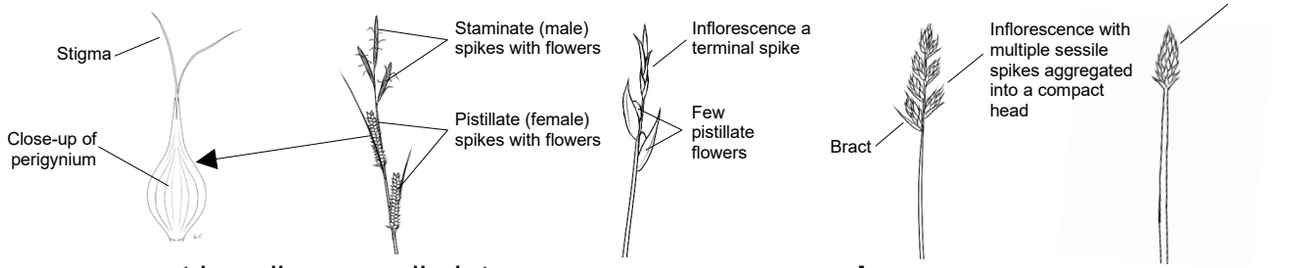
19a. Glumes of the central and lateral spikelets awn-like, ascending to somewhat divergent at maturity, and 7-20 mm long; lemmas of the central spikelet up to 10 mm long and awned up to 14 mm long, lemmas of the lateral spikelets rudimentary to well developed and awned up to 7.5 mm long .....**Meadow barley (*Hordeum brachyantherum*)**

19b. Glumes of the central spikelets awn-like and usually 35-85 mm long, glumes of the lateral spikelets are 17-83 mm long and similar in shape and texture; lemmas of the central spikelet are up to 8.5 mm and awned (awns 11-90 mm long and straight to ascending), lemmas of the lateral spikelets up to 6.5 mm long and awned (awns up to 15 mm long and divergent).....**Foxtail barley (*Hordeum jubatum*)**

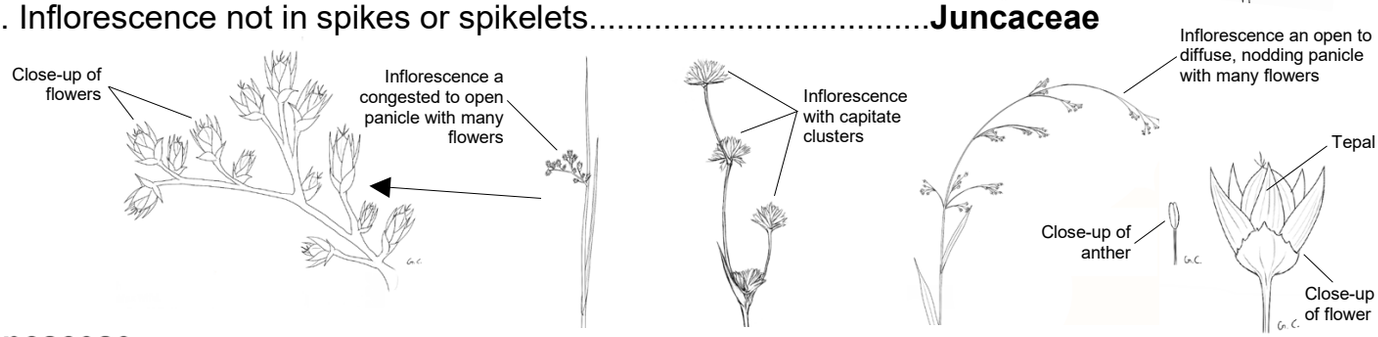
18b. Plants annual; glumes flattened with distinctly ciliate hairs along the margins; lemmas of the central spikelet with awns as long as or longer than the awns on the lateral florets; rachilla of the lateral spikelets scarcely 2 mm long, yellow .....**Smooth barley (*Hordeum murinum* ssp. *glaucum*)**

Grass-like Plants Key

1a. Inflorescence in spikes or spikelets.....**Cyperaceae**

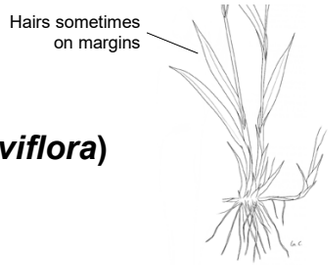


1b. Inflorescence not in spikes or spikelets.....**Juncaceae**



Juncaceae

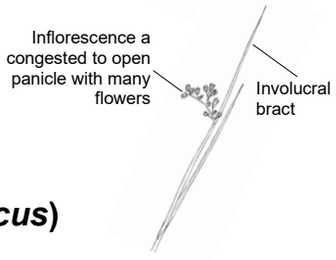
1a. Leaf blades hairy, sometimes only on margins with a few long, white hairs.....**Smallflowered woodrush (*Luzula parviflora*)**



1b. Leaf blade glabrous or hairless

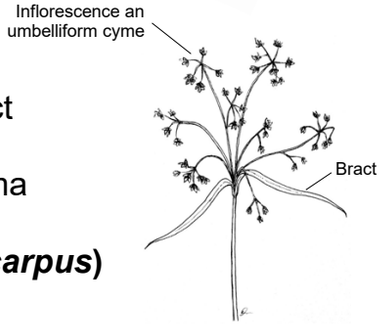
2a. Inflorescence terminating stem or nearly so and of capitate clusters; leaves flat and tightly folded, iris-like .....**Swordleaf rush (*Juncus ensifolius*)**

2b. Inflorescence not terminating stem, congested to open panicle with usually 10-50 or more flowers appearing laterally on the stem, the involucral bract looking like a continuation of the stem; leaves cylindrical, erect.....**Baltic rush (*Juncus balticus*)**



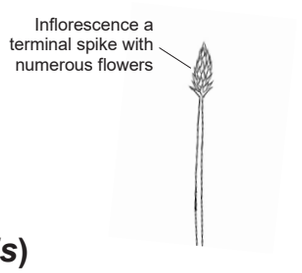
Cyperaceae

1a. 2- to many spikes per culm; achene not enclosed in a sac-like bract (the perigynium) surrounding achene except for the tip where stigma may be exerted.....**Panicled bulrush (*Scirpus microcarpus*)**

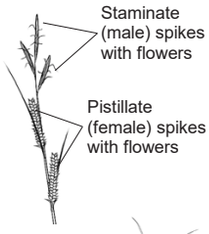


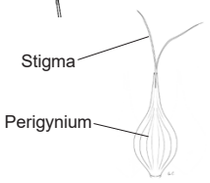
1b. 1 spike terminating each culm; or achene enclosed in a perigynium

2a. 1 spike terminating each culm; flowers displaying both male and female sexual organs; achene not enclosed in a perigynium .....**Common spikerush (*Eleocharis palustris*)**

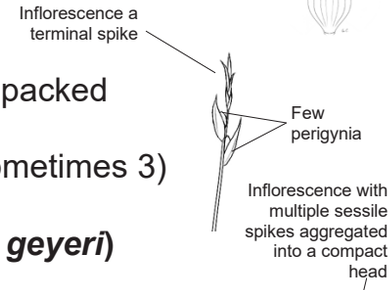


2b. Usually more than one spike per culm; flowers separated into male (staminate) and female (pistillate) flowers, though both genders are often within the same inflorescence spike; achene enclosed in a perigynium (a sac-like bract surrounding the achene except for the tip where the stigma may be exerted)

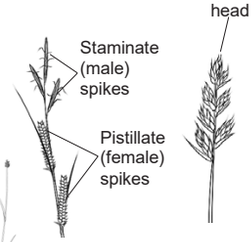




3a. Only one spike per culm (not to be confused with a densely packed head of spikes), terminating the stem, perigynium few 1- (sometimes 3) .....**Geyer's sedge (*Carex geyeri*)**

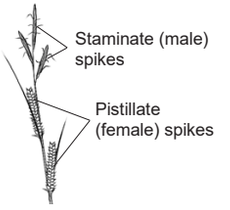


3b. More than one spike per culm (sometimes multiple spikes appear as a single spike if densely packed in a head), many perigynium

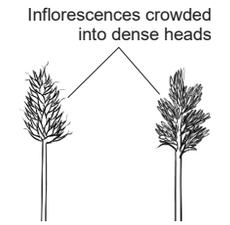


4a. Plants cespitose, growth habit similar to a bunchgrass, growing in dense tufts or clumps

5a. Inflorescence with 1-4 terminal, staminate (male) spikes, and 2-6 lateral, pistillate (female) spikes, spaced out, not crowded into a dense head .....**Water sedge (*Carex aquatilis*)**

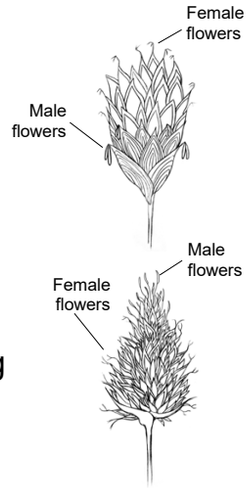


5b. Inflorescence crowded into a dense head



6a. Perigynium planoconvex, flat on one side with the other convex

7a. Spikes gynaecandrous, female (pistillate) flowers on top of male (staminate) flowers in spikelets .....**Manyrib sedge (*Carex multicostata*)**

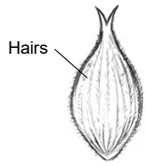


7b. Spikes androgynous, male (staminate) flowers on top of female (pistillate) flowers in spikelets; perigynium tending to have green margins with a coppery-brown center .....**Hood's sedge (*Carex hoodii*)**

6b. Perigynium more or less flat, without a distinctly convex side; spike usually conspicuously bicolored; perigynium typically paler than the pistillate scales .....**Smallwing sedge (*Carex microptera*)**

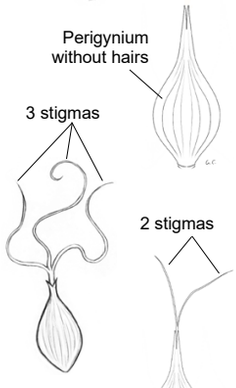
4b. Plants rhizomatous, shoots arising from nodes of modified subterranean, horizontally elongated shoots

8a. Perigynium densely covered in velvety or silky hairs, stiff walled, inflated, achene loosely filling the perigynium .....**Woolly sedge (*Carex pellita*)**



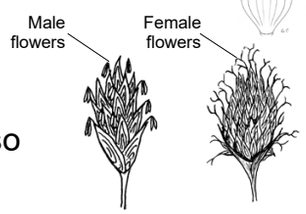
8b. Perigynium not densely covered in velvety or silky hairs

9a. 3 stigmas, trigonous achenes; sheaths 6 mm or greater at the base of lowest inflorescence bract .....**Northwest Territory sedge (*Carex utriculata*)**

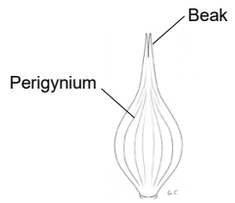


9b. 2 stigmas, lenticular achenes

10a. Each stem unisexual, bearing exclusively male (staminate) or female (pistillate) flowers, or nearly so

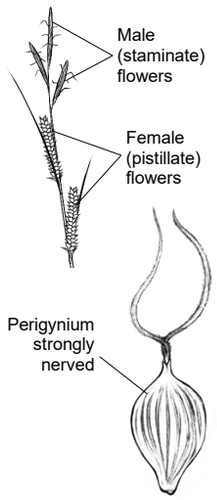


11a. Culm edges smooth towards tip; perigynium 3.5-4.5 mm long, beak 1-2 mm long .....**Douglas' sedge (*Carex douglasii*)**



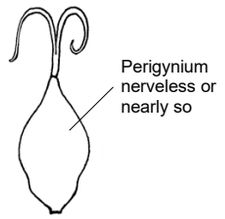
11b. Culm edges becoming roughened or scabrous towards tip; perigynium 1.7-2.5 mm long, beak up to 0.5 mm long .....**Analogue sedge (*Carex simulata*)**

10b. Stems bisexual, bearing male (staminate) and female (pistillate) flowers on each stem



12a. Perigynium surfaces strongly 5- to 9-nerved, mouth of beak roughened or scabrous .....**Nebraska sedge (*Carex nebrascensis*)**

12b. Perigynium surfaces nerveless, with weak nerves, or nerves only on margin, beak roughened or smooth; stem bases thickened, swollen, or spongy .....**Water sedge (*Carex aquatilis*)**



Site Description

Date:_____ Observers: _____
Site ID/Name: _____
Driving directions and general description: _____

_____

_____

_____

GPS Location: _____ Datum: _____
----OR---- Coordinates (Lat/Long) _____
Elevation:_____ (m or ft) Aspect: _____ Slope: _____(%)
Site location in landscape: _____
(i.e., Top of Watershed, Mid-slope, Lower slope, Floodplain/Riparian)
Soil description - Texture: _____
Color: _____ Is soil moist or, dry? _____
Unique/interesting soil characteristics: _____

_____

Evidence of soil erosion or disturbance: _____

_____

_____

Animal activity noted: _____

_____

_____

Vegetative cover distribution (e.g., sparse, even, clumped, patchy, etc.) :

_____

_____

General description of plant community: _____

_____

_____

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_____

Dominant grasses: _____

Dominant forbs: _____

Major woody plants: _____

Noxious weeds present: _____

Other unique/identifying characteristics: _____

Optional Site Sketch: (include GPS location, photoprints, north arrow, approx scale and legend)

Monday Notes:

Tuesday Notes:

Wednesday Notes:

Thursday Notes:

Friday Notes:

Glossary

achene – a small, dry, indehiscent, one-seeded fruit; seed is attached to the pericarp at a single point; type of fruit found in sedges

acicular – needle-shaped

acuminate – tapering to a sharp point with concave sides (see *acute*, *obtuse*, and *truncate*)

acute – tapering to a point with straight sides (see *acuminate*, *obtuse*, and *truncate*)

abaxial – side away from the central axis of the stem or plant; lower surface of a leaf

adaxial – side toward the central axis of the stem or plant; upper surface of a leaf (see *ventral*)

alkaline – a soil having a pH greater than 7 and properties with a high exchangeable sodium content; more basic than acidic

alternate – arranged singly at different levels or points along an axis (see *opposite* and *whorled*)

androecium – collective name for all the stamens in a flower; includes anthers and filaments

androgynous – having both staminate (male) and pistillate (female) flowers in the same inflorescence; staminate flowers are located above the pistillate flowers

annual – a plant with a one-year life span, within which the plant germinates, flowers, puts out seed, and dies (see *perennial* and *biennial*)

anther – the pollen-producing male part of a plant; part of the stamen

anthesis – the period when a flower is fully open and functioning

apex (pl. **apices**) – at the tip or distal end

apical – referring to the tip or apex

apiculate – terminating in an abrupt, sharp point

appressed – flattened against another organ

auricle – a small, ear-like appendage at the base of a leaf blade

awn – a stiff, bristle-like extension from the glumes or lemmas of a grass plant (can be straight, twisted, and/or bent); or from the pistillate scales of a grass-like plant (mostly *Carex* spp.)

axis (pl. **axes**) – central, longitudinal structure, e.g., the stem of a plant

basal – originating from the base of the plant at ground level

beak – a firm, narrow, or prolonged tip (often with two teeth) found on the distal end of the perigynium in *Carex* spp.

biconvex – convex on both sides (see *convex*)

bidentate – having two teeth at the tip

biennial – a plant that takes two years to complete its growth cycle; usually grows a basal rosette of leaves the first year, then produces flowers and fruits the second year

bifid – two-lobed or two-cleft, usually from the tip and deeply divided

bisexual – a flower having both male and female reproductive parts (e.g., stamens and pistils) (see *perfect* and *unisexual*)

blade – the broad or flat portion of a leaf (as distinguished from the stalk)

bract – a modified leaf structure at the base of a flower or inflorescence

bracteole – a small bract (e.g., the prophylls in some *Juncus* spp.)

bud – an undeveloped leaf or flower

bulb – a modified, underground shoot that is formed from thickened, fleshy scales; a storehouse for nutrients

bulblet – a bulblike structure borne above ground (e.g., bulbous bluegrass [*Poa bulbosa*] has florets that are usually converted into bulblets, which are capable of rooting and asexually producing new plants)

bulbous – having or pertaining to bulbs; bulblike

bunchgrass – a grass that is tufted, forming a dense cluster of stems and basal leaves

cespitose (caespitose) – growing in dense bunches; synonymous with *bunchgrass*

callus – a hard, thickened basal extension of the lemma; found in many grasses

canescent – having a gray or white color due to a dense covering of short, fine hairs

capillary – very slender and hair-like

capitate – head-like or borne in a head

capsule – a dry, dehiscent fruit containing few to many seeds and more than one carpel; type of fruit found in rushes

caryopsis – a dry, indehiscent fruit with a single seed; seed is fused to the pericarp or ovary wall; type of fruit found in grasses and grains

cauline – of or on the stem

ciliate – having a fringe of hairs on the margin (see *ciliolate*)

ciliolate – having a fringe of minute hairs on the margin (see *ciliate*)

cleistogamous – a self-pollinating flower that never opens

collar – the region on the outside of a grass leaf at the junction of the blade and sheath

compressed – flattened laterally

concave – appearing hollowed out or curved inward

connate – fusion of like parts

contracted – an inflorescence that is narrow and dense with short or appressed branches

convex – with the surface rounded and curved outward (see *concave*)

convolute – rolled up longitudinally

cool-season – a type of plant that grows when the temperatures are cooler (e.g., spring and fall)

coriaceous – having a leathery texture

corm – a short, swollen, fleshy, underground shoot functioning as food storage for a plant; usually covered with thin, papery, modified leaves; often (incorrectly) called a bulb

corymb – an indeterminate inflorescence that is racemose and either flat- or round-topped; lower pedicels vary in length and are usually longer than the upper; outermost flowers open first

crown – the persistent base of a perennial plant (as with, for instance, bunchgrass)

culm – the stem or stalk of grasses or grass-like plants; grass plant culms have nodes and internodes and are either hollow or pithy; grass-like plants (sedges and rushes) are not jointed and are solid

cuticle – a waxy layer found on the surface of leaves and stems

cylindrical – shaped like a cylinder

cyme – having a flat- or round-topped cluster in which the central or terminal flowers bloom before the lateral or bottom flowers; a determinate inflorescence (see *panicle*)

cymose – having flowers in a cyme

deciduous – plant parts falling off at maturity; not persistent or evergreen; e.g. deciduous awns

decumbent – growing or trailing on the ground with ascending tips

decurrent – continuing downward from the point of attachment, as in certain ligules

dehiscent – a type of fruit naturally splitting open when fruit is mature (see *indehiscent*)

determinate – a type of inflorescence with terminal flowers that bloom first, thus preventing any further extension of the flowering axis (see *indeterminate*)

dichotomous – divided or forked into two more-or-less equal branches

diffuse – widely open or loosely branched

dioecious – having staminate (male) and pistillate (female) flowers on different individual plants (see *monoecious*)

disarticulate – detaching, at maturity, at a joint or node (e.g., florets disarticulating above the glumes)

distal – toward the tip or far end

divergent – diverging or widely spreading

dorsal – pertaining to the back of an organ

elliptic (Elliptical) – widest at the middle with two narrowly pointed equal ends; oval-shaped

elongate – lengthened

emarginate – having a small notch at the apex

ensiform – sword-shaped; like those of an *Iris* leaf

entire – having a smooth edge or margin; not toothed, notched, or divided (see *erose* and *lacerate*)

equal – equal in length (e.g., the lower and upper glumes are equal to each other) (see *subequal* and *unequal*)

equitant – folded lengthwise; like the leaves of an *Iris* plant

erose – having an irregularly toothed margin; not smooth or entire (see *entire* and *lacerate*)

excurrent – extending beyond the apex or margin

fascicle – tight bundles or clusters (e.g., spike trisetum [*Trisetum spicatum*] has spikelets that are in fascicles)

fertile – capable of producing seeds and pollen

fibrillose – having delicate fibers or hairs

fibrous roots – a root system with root branches resembling fibers, which are approximately equal in thickness (e.g., Idaho fescue [*Festuca idahoensis*] has a network of black fibrous roots)

filament – in a stamen, the stalk supporting the anther; or a thread-like structure

filamentose – see *filamentous*

filamentous – having or simulating filaments

filiform – thread-like

flexuous – having a wavy form

floret – a small, individual flower that includes the lemma, palea, and flower parts; usually a spikelet includes one to many florets

foliaceous – leaf-like in appearance

foliage – the leaves from a plant, collectively

fruit – a mature ovary that contains seeds (see *achene* and *capsule*)

geniculate – bending abruptly (e.g., like a knee)

glabrate – glabrous because of age

glabrous – having a smooth surface without hairs

glaucous – covered with a bluish or whitish waxy coating that rubs off (e.g., on grapes or plums)

globose – globe-shaped

glomerule – small, dense clusters

glume – the pair of bracts located at the base of a grass spikelet, known as the lower (or first) glume and the upper (or second) glume

granular – having small granules or grains; grainy in texture

gynaecandrous – on the same spike having pistillate flowers above staminate flowers (e.g., *Carex* spp.) (see *androgynous*)

hirsute – covered with coarse, stiff, straight hairs

hispid – having stiff or rigid hairs

hispidulous – minutely hispid (see *hispid*)

hyaline – thin and translucent or transparent

hygroscopic – absorbing moisture from the atmosphere; often altering form and position because of changes in moisture content (e.g., needle-and-thread [*Hesperostipa comata*] have hygroscopic awns that can wind and unwind due to changes in moisture content, which allows the sharp-tip of the seed to penetrate through the vegetation and soil)

imbricate – overlapping in sequence, like shingles on a roof (e.g, wheatgrasses normally have inflorescence types where spikelets overlap each other in an alternating pattern)

indehiscent – a type of fruit not splitting open at maturity (see *dehiscent*)

indeterminate – a type of inflorescence with lower or outer flowers that bloom first, thus allowing an indefinite extension of the flowering axis (see *determinate*)

indurate – hardened

inflorescence – the flower-producing portion of a plant; in grasses, the inflorescence can be a spike, raceme, or panicle; in grass-like plants, such as the *Carex* spp., the inflorescence can have staminate or pistillate spikes, and bracts, usually arranged in a raceme, panicle, or head, staminate and pistillate spikes can either be separated from each other or on one spike (see *androgynous* and *gynaecandrous*); the *Juncus* spp. can have an inflorescence that is a congested or open panicle with usually 10-50 or more flowers appearing laterally on the stem

inrolled – curved or rolled inward

internode – the portion of a plant stem between two nodes

interrupted – not continuous (e.g., inflorescence having space in the order of branching)

introduced – intentionally brought in from another region or country; non-native

invasive (plant) species – a competitive non-native or native plant that can displace local plant communities, causing dominance and harm on the environment, economy, and/or human health

involucral bract – a bract that subtends an inflorescence; it can be longer, shorter, or equal with the inflorescence (e.g., *Carex* and *Juncus* spp.) (see *bract*)

involute – an edge of a leaf blade rolled inward toward the upper surface (see *revolute*)

keel – a ridge that resembles the keel of a boat; e.g., bluegrass (*Poa* spp.) often have blade apices that are keeled

lacerate – having an edge that is irregularly cut or cleft; edges are deeper and more shredded than described for *erose*

lanceolate – lance-shaped; narrow and tapering at the apex, widest below the middle

lateral – borne on the side (see *terminal*)

leaf – the photosynthetic and transpiring organ of a green plant

leaf sheath – a cylindrical structure surrounding the culm, starting at a node

lemma – the lower, larger bract of the floret that usually partially surrounds the palea; the lemma, palea, and flower parts make up the floret; lemmas can either be awned or unawned

lenticular – the shape of a lens; biconvex; lentil-shaped

ligule – an outgrowth found on the upper, inner surface of a leaf at the junction of the leaf sheath and blade; may be membranous, ciliate (hairy), or absent; can be found in grasses and grass-like plants

lobe – a projecting part of an organ containing shallow divisions

lobed – exhibiting a rounded profile or outline (e.g., reed canarygrass [*Phalaris arundinacea*] has a contracted, dense, lobed or interrupted panicle inflorescence) (see *interrupted*)

margin – the edge or border of a leaf

membranaceous – see membranous

membranous – like a membrane; thin, soft, flexible, and somewhat transparent

meristem – actively dividing, undifferentiated cells and tissues at certain growing points of a plant (e.g., shoots or roots)

midrib – having a central rib or vein on a leaf, bract, or scale

monoecious – having staminate (male) and pistillate (female) flowers on the same individual plant (see *dioecious*)

mouth – an opening found at the highest point of a leaf sheath

mucronate – a short, abruptly pointed tip that is sharp

mucronulate – minutely mucronate (see *mucronate*)

native plant species – a plant occurring naturally in an area or region without direct or indirect introduction by humans

nerve – prominent veins on a leaf or other organ (e.g., glume, lemma, palea)

nigrescent – blackish

node – the joint of a stem where leaves arise; nodes are frequently swollen and often dark-colored

notched – having a small cut or notch

noxious – a plant that has become problematic and has caused economic, ecological, or deleterious losses; control of these types of plants is required under noxious weed laws

oblanceolate – inversely lanceolate; broadest part near apex

oblique – having unequal sides

oblong – two to four times longer than wide with sides that are nearly equal

obovate – egg-shaped, with widest part above the middle (see *ovate*)

obovoid – opposite of ovoid, with attachment at narrow end (see *ovoid*)

obtuse – blunt or rounded at the tip (see *acuminate*, *acute* and *truncate*)

opposite – arranged at the same levels or points directly across from each other along an axis (see *alternate* and *whorled*)

orbicular – nearly circular in outline

oval – broadly elliptic; the width greater than half the length

ovary – the enlarged basal portion of a pistil, enclosing the ovules

ovate – egg-shaped, with widest part below the middle (see *obovate*)

ovoid – an egg-shaped object that is three-dimensional; broadest diameter below the middle

ovule – a tiny, unfertilized, egg-shaped structure produced and stored in the ovary of a flower; after fertilization, the ovule develops into a seed

palea (pl. **paleae**) – the upper bract opposite the lemma that encloses the flowers (stamens and pistils)

panicle – an inflorescence that contains a main axis and branched branches; matures from the bottom upwards (see *raceme* and *spike*)

papilla (pl. **papillae**) – having small, round nipple-like projections (see *papillose*)

papillose – having minute papillae (see *papilla*)

pectinate – having a comb-like appearance

pedicel – a stalk bearing a single grass spikelet or flower in an inflorescence

pedicellate – having a pedicel

pedicelled – borne on a pedicel

peduncle – the stalk of an inflorescence or solitary flower

peduncled – see *pedunculate*

pedunculate – borne on a peduncle

perennial – a plant living for more than two years (see *annual*)

perfect – flowers having both male and female reproductive parts (e.g., stamens and pistils) in the same structure (see *bisexual* and *unisexual*)

pericarp – the wall of the fruit

perigynium (pl. **perigynia**) – an inflated sac- or scale-like structure enclosing the ovary (achene); characteristic of the *Carex* spp.

persistent – remaining attached to the plant for an extended time

pilose – having long, soft, straight hairs

pistil – the female reproductive unit of the flower; comprised of the stigma, style, and ovary

pistillate flower – having only a pistil or pistils, but no stamens

pistillate scale – can be found as a small bract subtending a perigynium

plano-convex – one side flat and round on the other

plumose – feathery; main axis with hairs or fine bristles on both sides

pollen – a mass of microspores produced and stored in the anther of a flower; the fertilizing element of flowering plants

pollination – a process that includes the transfer of pollen grains from the stamen (anther) to the pistil (stigma)

proliferous – bearing plantlets or bulblets, especially in the inflorescence (e.g., bulbous bluegrass [*Poa bulbosa*] contains spikelets that are usually modified into bulblets)

prominent – noticeable to the eye; sticking out past the surface (e.g., a lemma or grass blade with *prominent* veins)

prophyll – paired bracteoles (small leaf-like structures) at the base of a flower (e.g., *Juncus* spp.)

prow-shaped – similar to the projecting front part of a ship (see *keel*)

puberulent – minutely pubescent

pubescent – with short, soft hairs

raceme – an unbranched inflorescence consisting of spikelets borne on pedicels; matures from the bottom upwards (see *panicle* and *spike*)

racemose – resembling a raceme

rachilla – main axis of a spikelet in grasses and sedges; a small extension between the glumes and florets; a secondary rachis within the spikelet

rachis – main axis of a grass or grass-like inflorescence

reduced – diminished in size

reflexed – abruptly bending backward or downward

retrorsely – pointing downward or backward

revolute – rolling backward toward the underside, as in edges of a leaf blade (see *involute*)

rhizomatous – having rhizomes (see *rhizome*)

rhizome – a modified, horizontal underground stem capable of rooting and producing a new plant from the nodes; a vegetative reproductive structure

root – an underground structure, lacking nodes or leaves, which anchors a plant, and absorbs nutrients and water

rudimentary – imperfectly developed

scaberulose – somewhat rough to the touch

scaberulous – see *scaberulose*

scabrid – roughened

scabridulous – minutely roughened

scabrous – rough to the touch

scale – a small, thin, flat, scarious structure; can be found as a small bract subtending a perigynium (*pistillate scale*) or male flower (*staminate scale*) in *Carex* spp.; reduced leaves at base of shoot or rhizome

scarious – thin, dry, and membranous in texture; not green

scenese – to grow old

secund – having parts (e.g., spikelets) arranged on one side of the axis only

seed – a ripened ovule

septate – divided by one or more partitions

sericeous – having long, fine silky hairs

serrate – with short, saw-toothed margins pointing forward (see *entire*)

serrulate – minutely serrated (see *serrate*)

sessile – without a stalk; directly attached to a stem or different structure (see *subsessile*)

setaceous – bristle-like

sheath – the basal portion of a grass, sedge, or rush leaf that surrounds the plant stem

sheathing – the formation of a sheath at the leaf base of a grass, sedge, or rush as it encircles the culm

shoot – a young stem or branch

sinuous – having a wavy form

simple – unbranched; single; not divided or lobed

sod-forming – a grass or grass-like species characterized by producing either rhizomes or stolons

solitary – existing individually and not borne in a cluster

spike-like – resembling a spike inflorescence, but is a dense panicle with very short branches

spike – unbranched inflorescences containing spikelets that are sessile on a rachis (e.g., bluebunch wheatgrass [*Pseudoroegneria spicata*] has spike inflorescences); sedges (*Carex* spp). can have staminate and pistillate spikes (see *panicle and raceme*)

spikelet – a flower cluster consisting of one or more florets subtended by two glumes

stamen – the male, pollen-producing organ in a flowering plant; consisting of a filament and anther

staminate flowers – bearing stamens and not pistils (see *pistillate*)

staminate scale – can be found as a small bract subtending a male flower

stem – the portion of a plant found above the ground and consisting of nodes, leaves, and buds

sterile – infertile; not producing seed, pollen, or flowers

stigma – the apical part of a pistil receptive to pollen; usually sticky or with fine hairs

stolon – modified, horizontal, aboveground creeping stem capable of rooting or producing a new plant from the nodes or the tip; vegetative reproductive structure

stoloniferous – bearing stolons

stramineous – having a straw-like color or texture

striate – marked with slender, parallel lines or grooves; appearing striped

strigose – having short stiff appressed hairs usually pointing in the same direction

style – the narrow, elongated portion of the pistil that is connected between the stigma and ovary

sub- (prefix) – meaning under, almost, or not quite.

subentire – almost entire

subequal – nearly equal in length (e.g., the lower glume is nearly equal to the upper glume) (see *equal* and *unequal*)

subobtuse – partially blunt or rounded at the tip (see *obtuse*)

subsessile – nearly sessile (e.g., a spikelet containing a very short pedicel) (see *sessile*)

subtend – located below (e.g., the subtending sheath of needle-and-thread [*Hesperostipa comata*] or a pistillate scale subtending the perigynium in a *Carex* spp.)

subterminal – situated or occurring near an end (e.g., some *Bromus* species have awns that are attached just below the lemma tips)

subulate – awl-shaped (e.g., sharp or narrowly pointed)

succulent – fleshy and juicy

summer annual – annual plant that mainly grows during the summer months; the germination process begins in the spring or early summer, puts on growth during the summer months, produces seed and completes its flowering cycle by late summer or early fall, and then dies (e.g., witchgrass [*Panicum capillare*])

superior ovary – ovary position that is attached above the sepals, petals, and stamens

tawny – tan in color

tepals – flowering parts not differentiated as sepal or petal (e.g., Baltic rush [*Juncus balticus*] contain flowers with tepals)

terete – round in cross section

terminal – borne at the tip or apex (see *lateral*)

throat – the upper edge or opening of a leaf sheath

tiller – an erect shoot developing from an adventitious bud at the basal portion of a plant

tillering – a vegetative reproductive process that is capable of tiller production

translucent – nearly transparent

trifid – separated into three parts

trigonous – three-angled (e.g., the achenes in some *Carex* spp.)

truncate – squared-off apex or base (see *acuminate*, *acute* and *obtuse*)

tuber – the thickened fleshy part of a rhizome, containing nodes and buds; underground modified stems for food storage (see *bulb* and *corm*)

tuft – cluster; bunch (e.g., a *tuft* of hairs at the throat of a sheath)

tufted – growing in a dense cluster (see *caespitose* and *bunchgrass*)

turgid – swollen

umbel – an inflorescence that is either flat-topped or convex with several to many stalked flowers branching out from a common point

umbelliform – umbel-like (see *umbel*)

unequal – unequal in length (e.g., the lower glume is much shorter than the upper glume) (see *equal* and *subequal*)

unisexual – flower having either male or female reproductive parts, but not both (see *bisexual* and *perfect*)

vein – the vascular tissue of an organ; often visible externally in leaves

ventral – of the upper or inner surface of an organ that is facing toward the axis (e.g., the upper surface of a leaf) (see *adaxial*)

villous – having long, soft, often wavy, unmatted hairs; similar to *pilose*, but with a greater quantity of hairs

warm-season – a type of plant that grows when the temperatures are warmer (e.g., summer)

webbed – bearing long, soft, tangled hairs (e.g., Kentucky bluegrass [*Poa pratensis*] has lemmas that are webbed at the base)

whorl – an arrangement of similar parts arranged in a circle along an axis (see *alternate* and *opposite*)

winter annual – annual plant that germinates in late summer or fall, becomes dormant during the winter months, produces seed and completes its flowering cycle by spring or early summer the following year, and then dies (e.g., cheatgrass [*Bromus tectorum*] is a winter annual)

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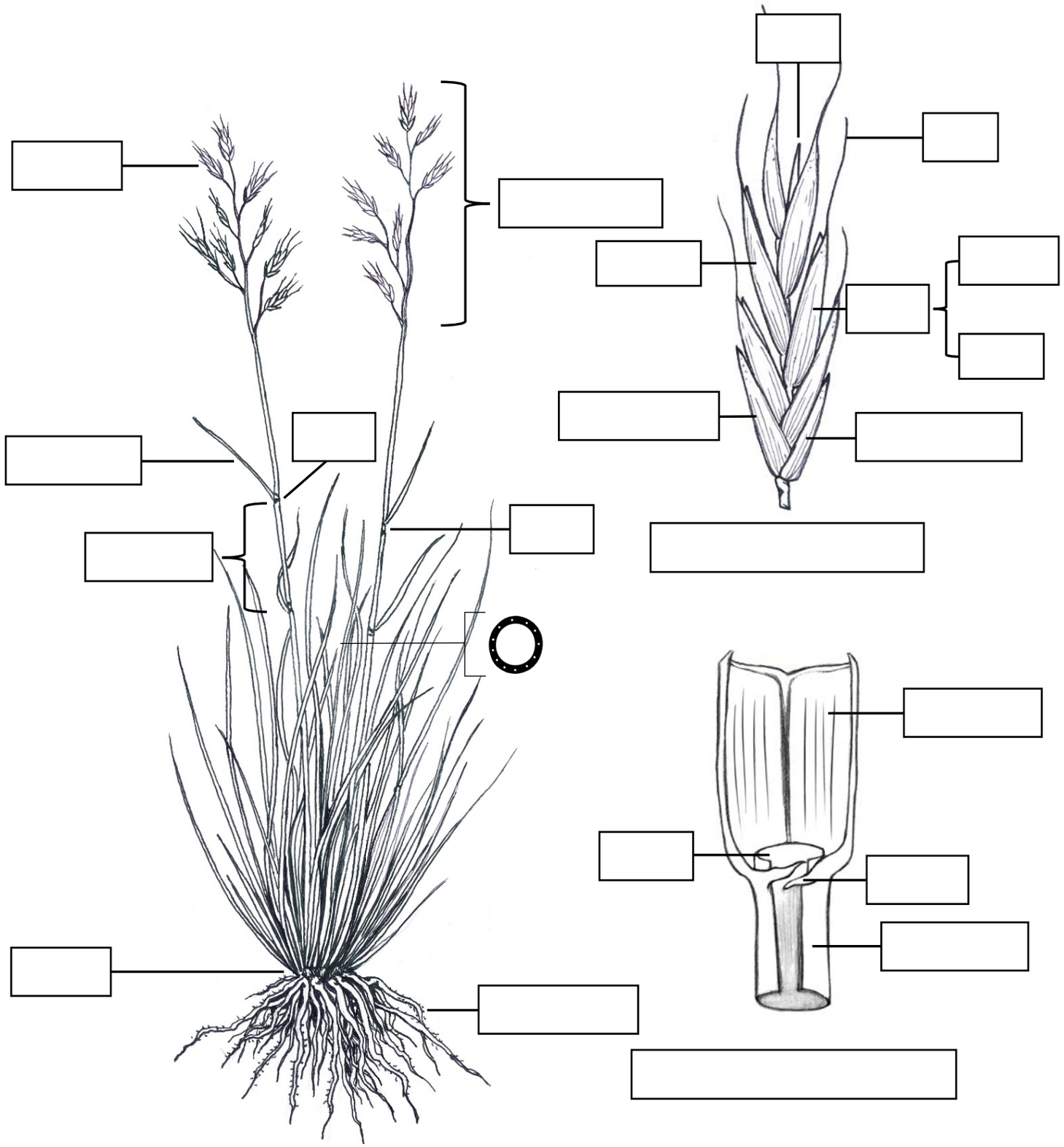
Grass Plant Fill-in-the-blank Exercise (Poaceae)



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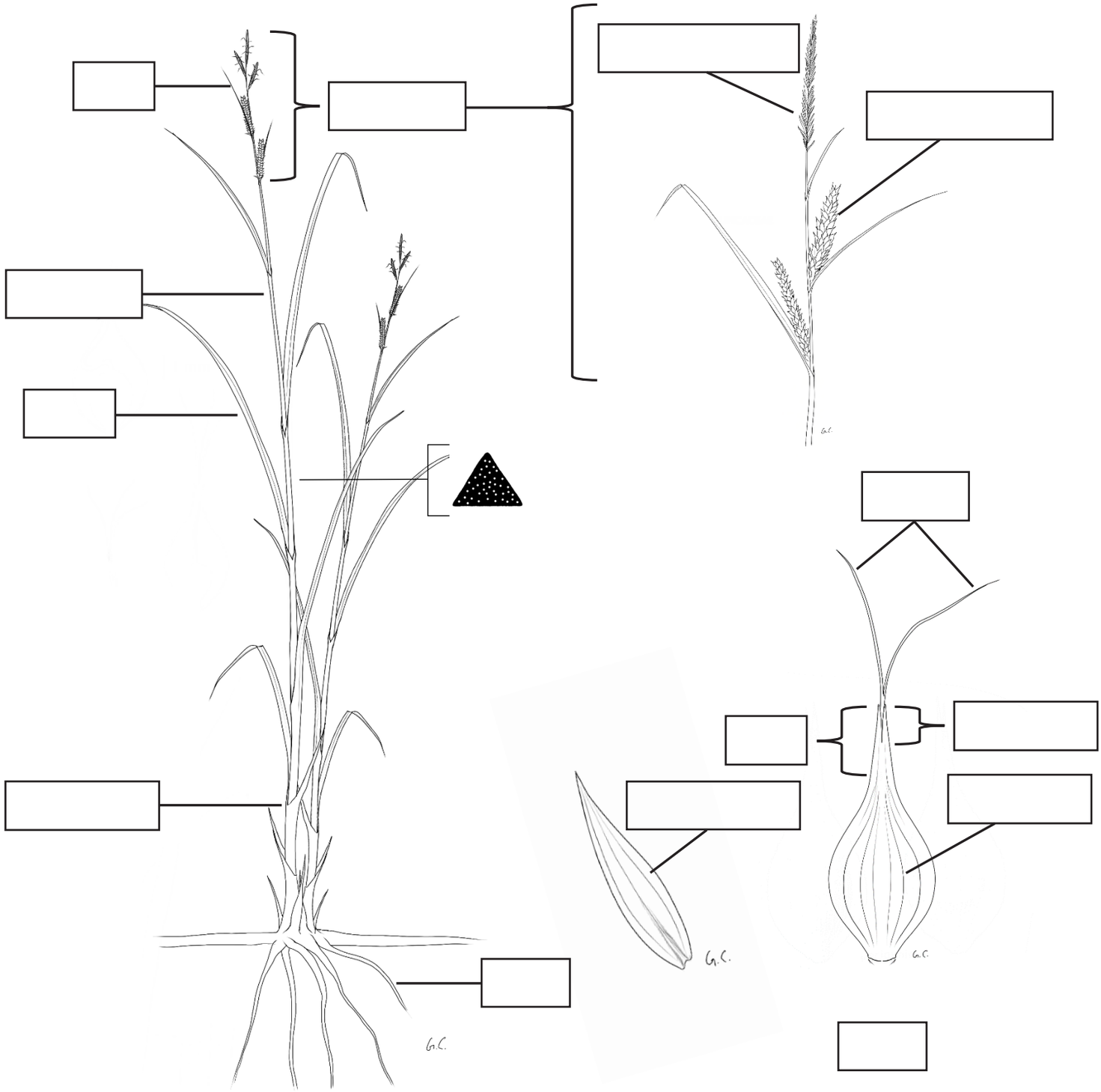

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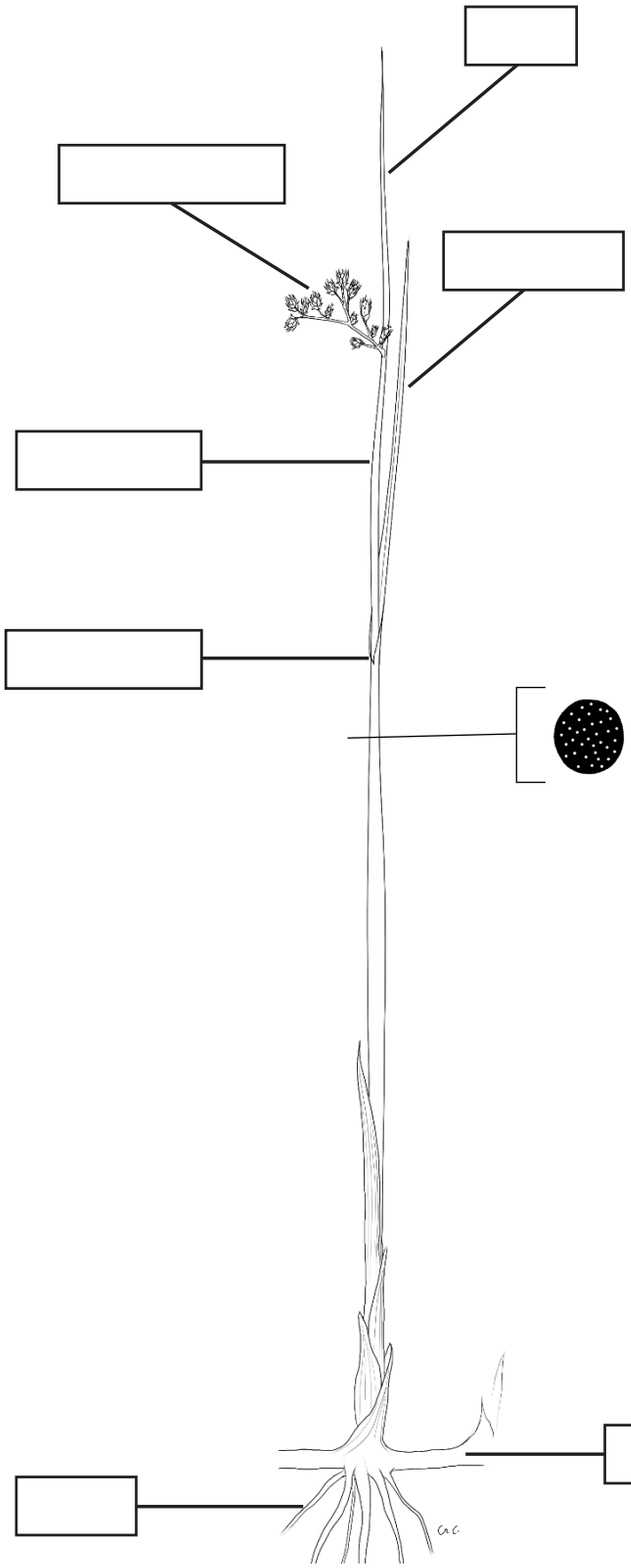

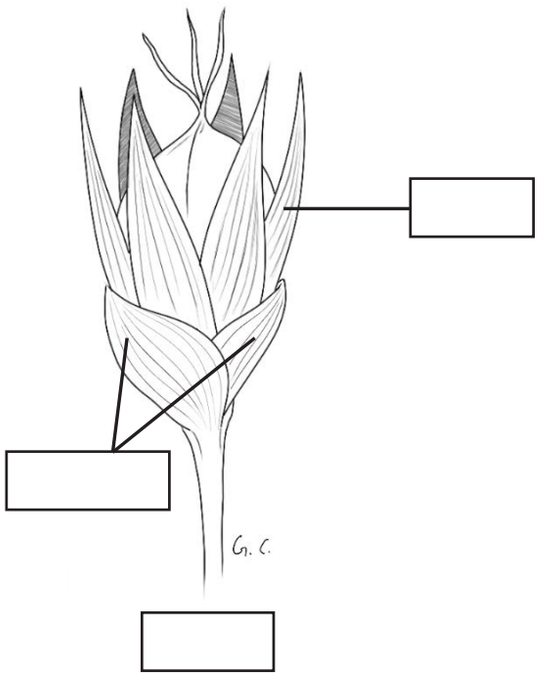

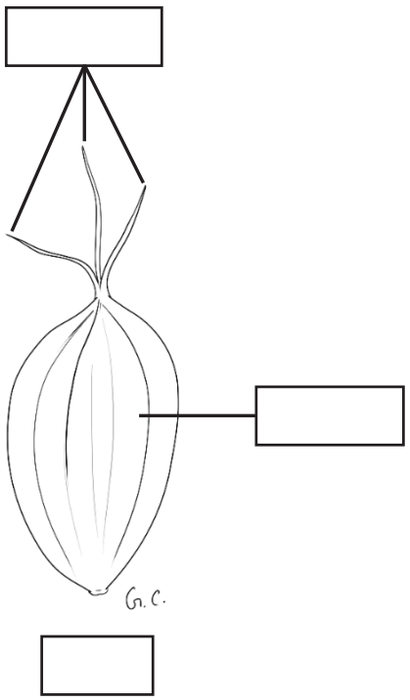

Conversion Chart

1 foot	12 inches
1 yard	3 feet
1 yard	36 inches
1 yard	91.44 centimeters
1 mile	5280 feet
1 chain	66 feet
1 inch	25.4 millimeters
1 inch	2.54 centimeters
1 inch	.254 decimeters
1 inch	.0254 meters