Philosophy:

For each lab (as possible), I have plants to examine. Even “farm kids” have seldom spent time looking closely at the crops they grow. Using live material reinforces ideas previously only heard during lecture and seen via pictures. Although a variety of plants is helpful, having a few key plants and careful planning can work just as well.

I have also purposely modified the concept of starting an experiment during one lab session and reading the results at a later time. It is my belief that having everything related to a particular topic “ready-to-go,” then discussed, seen, touched, and “done” at the time of the correlating lab and lecture sessions helps pull the idea together. Naturally, this puts more burden on the instructor to prepare ahead.

Organization of the guide:

In my course, each lab session has two components. In the Discussion, I go through the concepts with a hands-on, visual lecture portion, and the students fill in the notes segment of the text. In the Laboratory section, the students break into groups and participate in the lab exercises in the back section of the Lab Manual, and fill out the questions. Exercises are handed in to be graded the following week.

In this supplement, for each section (as necessary) I offer suggestions to help coordinate the activities more smoothly, list potential plants (a planting calendar is absolutely crucial) or other materials that can be used with examples of uses or terms, and outline class preparation methods including necessary materials and procedures for setting up each exercise activity. Finally, I provide potential answers to lab exercise questions. I change information or plants pertaining to certain questions each semester to encourage students to do their own work; therefore all answers given in this supplement are meant as examples to work from and change as allowed each time.

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Ordering and Information

This publication is available from ITCS Instructional Materials, College of Agricultural, Consumer and Environmental Sciences, University of Illinois, 1917 South Wright St., Champaign, IL 61820, (800) 345-6087, FAX (217) 333-3917.

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Chapter 1  Plant Classification

Discussion Section

Suggestions:

Use plants to demonstrate examples of various categories. Try and use plants that fit into several categories. Plants should be at least one month old.

Plants:

1. Alfalfa
2. Corn
3. Soybean
4. Kentucky bluegrass
5. Wheat
6. Sweet clover
7. Cotton
8. Field bindweed
9. Sorghum

Examples (classification):

1. Environmental types
   A. Temperature
      I. Cool season
         a. Alfalfa
         b. Wheat
      II. Warm season
         a. Corn
         b. Soybean
   B. Moisture
      I. Mesophyte
         a. Corn
         b. Soybean
         c. Wheat
      II. Xerophyte
         a. Sorghum

2. Agricultural types
   A. Use
      I. Edible
         a. Cereal/grain
            i. Corn
            ii. Wheat
            iii. Sorghum
         b. Legume
            i. Soybean
            ii. Sweet clover
            iii. Alfalfa
      c. Forages
         i. Legume
            1) Alfalfa
            2) Sweet clover
ii. Grass
   1) Kentucky bluegrass
   2) Sorghum

II. Industrial
   a. Fiber
      i. Cotton

III. Recreational
   a. Turf
      i. Kentucky bluegrass

IV. Agricultural
   a. Green manure
      i. Sweet clover

B. Cultural production
   I. Row
      a. Corn
      b. Soybean
   II. Drill
      a. Wheat
   III. Solid seed
      a. Alfalfa
      b. Sweet clover
      c. Kentucky bluegrass

C. Plant part
   I. Seed
      a. Corn
      b. Soybean
      c. Wheat
      d. Sorghum
   II. Entire plant
      a. Alfalfa
      b. Sweet clover
      c. Kentucky bluegrass

D. Usefulness
   I. Crop
      a. Corn
      b. Soybean
      c. Alfalfa
   II. Weed
      a. Field bindweed
      b. Corn (in a soybean field)

3. Morphological classification
   A. Life cycle
      I. Annual
         a. Summer annual
            i. Corn
            ii. Soybean
         b. Winter annual
            i. Wheat
      II. Biennial
         a. Sweet clover
      III. Perennial
         a. Alfalfa
         b. Kentucky bluegrass
   B. Structural features
      I. Herbaceous
         a. Corn (upright)
         b. Field bindweed (vine)
**Laboratory Section**

**Suggestions:**

Start plants one month prior to lab meeting. A wide variety allows instructor to have a large selection for all lab exercises in this and next lab chapter.

**Exercise 1. Group plants into families**

**Suggestions:**

Choose three families with at least two plants in each family represented. Pick eight plants that do not necessarily look similar within a family, such as white clover and birdsfoot trefoil as legumes. Remove labels with plant names and re-label as A-H. This exercise is to let students study plants; and few will succeed at proper categorization. If possible, take pictures of or bring back plants within families to show when exercise is complete. Compare and contrast characteristics of families used. See Table 1.2 on pages 8-10 of the lab manual.

**Plants (choose 8):**

1. **Fabaceae/Leguminoseae**
   - A. Clover spp.
   - B. Soybean
   - C. Bush bean, lima bean
   - D. Alfalfa
   - E. Birdsfoot trefoil
   - F. Lespedeza spp.
   - G. Vetch spp.
   - H. Pea
2. **Asteraceae/Compositae**
   - A. Sunflower
   - B. Lettuce
   - C. Chicory
   - D. Common, giant ragweed
3. **Apiaceae/Umbelliferae**
   - A. Carrot, wild carrot
   - B. Dill
   - C. Celery
4. **Chenopodaceae**
   - A. Spinach
   - B. Pigweed spp., waterhemp
   - C. Beet
   - D. Common lambsquarters
5. **Cucurbitaceae**
   - A. Pumpkin
   - B. Cucumber
   - C. Squash
   - D. Gourd
6. **Cruciferae/Brassicaceae**
   - A. Turnip
   - B. Mustard
   - C. Radish
   - D. Canola
   - E. Cabbage
7. Solanaceae
   A. Tomato
   B. Jimsonweed
   C. Tobacco
   D. Green pepper
   E. Eastern black nightshade

8. Polygonaceae
   A. Common, wild buckwheat
   B. Smartweed spp.
   C. Curly dock

9. Malvaceae
   A. Cotton
   B. Prickly sida
   C. Venice mallow
   D. Okra
   E. Velvetleaf

10. Poaceae/Graminaeae
    A. Corn
    B. Tall fescue
    C. Reed canarygrass
    D. Smooth bromegrass
    E. Timothy
    F. Orchardgrass
    G. Kentucky bluegrass
    H. Sorghum
    I. Sudangrass
    J. Perennial, annual ryegrass
    K. Winter rye
    L. Yellow, green, giant foxtail
    M. Quackgrass
    N. Wheat
    O. Sugarcane
    P. Oat
    Q. Barley
    R. Fall panicum
    S. Triticale
    T. Rice

**Exercise 2. Place terms into categories for each plant**

**Suggestions:**

Choose four plants that can fit into a wide variety of categories. “Re-mix” terms after each group.
Try not to repeat vocabulary that will be used in Exercise 3. Have list of terms for each group or have each
term (weed is one, crop is one) on separate laminated pieces of paper. As much as possible, I try to use
plants and terms that are well known or were mentioned in class.

**Plants (other than those used as examples in discussion):**

1. Legume (soybean, clover, alfalfa, hairy vetch)
2. Cereal crop (oat, barley, wheat)
3. Weed (morningglory)
4. Vegetable (radish, spinach)
Examples (terms):

1. Weed, crop
2. Root, leaf, stem, seed, entire plant
3. Grain, forage
4. Turf, aesthetic
5. Industrial, medicinal
6. Cover crop
7. Row, drilled, solid seed
8. Upright, vine
9. Cool, warm season
10. Mesophyte, hydrophyte, xerophyte

Answers:

1. Morningglory: 1) vine, 2) weed, 3) aesthetic (look for seed packets in spring at garden stores)
2. Hairy vetch: 1) cover crop, 2) forage, 3) legume, 4) cool season
3. Barley: 1) upright, 2) grain, 3) mesophyte
4. Radish: 1) root, 2) herbaceous, 3) crop

Exercise 3. Agricultural, life cycle, and taxonomic categorization of plants

Suggestions:

Choose three plants with varying uses, life cycles, and families. Any available plant can be described. Usually, I see what has grown well from initial broad-scale planting and choose plants for this and above exercises shortly prior to lab, then write descriptions and terms using what is present. Family names are available in chapter 1 of the text.

Examples (descriptions):

1. Turnip: This vegetable crop, related to radish, is planted in the early spring. The below-ground portion is harvested to eat, and any unharvested plants die by fall.
2. Sweet clover: This legume lives for only two seasons. It is used to feed cattle and other livestock.
3. Oat: In Illinois, this cereal crop is planted in the early spring and harvested in the fall. The grain is utilized for animal feed and human consumption.

Answers:

1. Turnip: Agricultural: root crop; Life cycle: summer annual; Taxonomic: Cruciferae
2. Sweet clover: Agricultural: forage; Life cycle: biennial; Taxonomic: Fabaceae
3. Oat: Agricultural: cereal/grain; Life cycle: summer annual; Taxonomic: Poaceae

Exercise 4. Create key

Suggestions:

Eight related items are needed. I use eight different bags of candy and pour them onto paper plates with labels. Students can eat and key out items. A good ice breaker for the first lab session.
**Examples:**

1. Potato chips/pretzels/crackers
2. Candy (example)
   A. Snickers
   B. Hershey’s Kisses
   C. Plain M&Ms (from bag)
   D. Peanut M&Ms (from bag)
   E. Peppermint Candy
   F. Starburst
   G. Twix
   H. Reese’s Peanut Butter Cups
3. Nuts/bolts/screws

**Answers:**

A. Contains chocolate
   1. Unwrapped
      a. With peanuts
      b. Without peanuts
   2. Wrapped
      a. Chocolate only
      b. Chocolate plus other ingredients
         i. With peanuts
            a) Square shaped
            b) Round
      ii. Without peanuts
            b) Round

B. No chocolate
   1. Square shaped
   2. Round