

Topic 1. Introduction to Plants

Introduction: Because of its history, many different unrelated groups, which are not plants, are included in the discipline of botany. In this first lab, we will carefully consider exactly what a plant is in order to better understand why fungi, algae and bacteria are each uniquely different. We will then apply what we learn about plants, in a short exercise, to identify winter twigs.

Plants are **photosynthetic autotrophs** which are also **structurally complex**. The tissues of higher plants are organized into **roots, stems, and leaves**. These are the organs of the plant body. The leaf and the stem, together, make up the **shoot**. Both leaves and stem are derived from growth at an **apical bud**. Each leaf along the stem is associated with an axillary bud which can give rise to lateral branches. The upper angle formed by the leaf and stem is called an **axil** and the buds formed in that location are called **axillary buds**.

Teaching resources: The learning objectives are clearly outlined below. We expect you to learn terms relating to plant structure and to be able to relate these to plants in general. We also want you to be able to apply what you learn, in the context of a simple identification guide to the winter twigs. To assist you in reviewing this activity, and others, we have a number resources on the course web site at

http://www.wisc.edu/botit.botany.wisc.edu/courses/botany_130

The site includes a pictorial glossary based on the terms below. We have a computer lab in room 113 which you may use by appointment through either your TA or through Mike Clayton. Also note that every Friday we have an open lab in room 122 from 10:00 until 12:00; and from 2:00 until 3:00, if you want additional help with these and future lab materials.

Learning objectives:

Gross morphology - terms you will be required to know and be able to use

Plant body

root
shoot
stem
leaf

Leaf structure

blade
petiole
compound leaf
stipule

Stem structure

axillary bud
apical (terminal) bud
node
internode
leaf scar
bud scales

Leaf arrangement

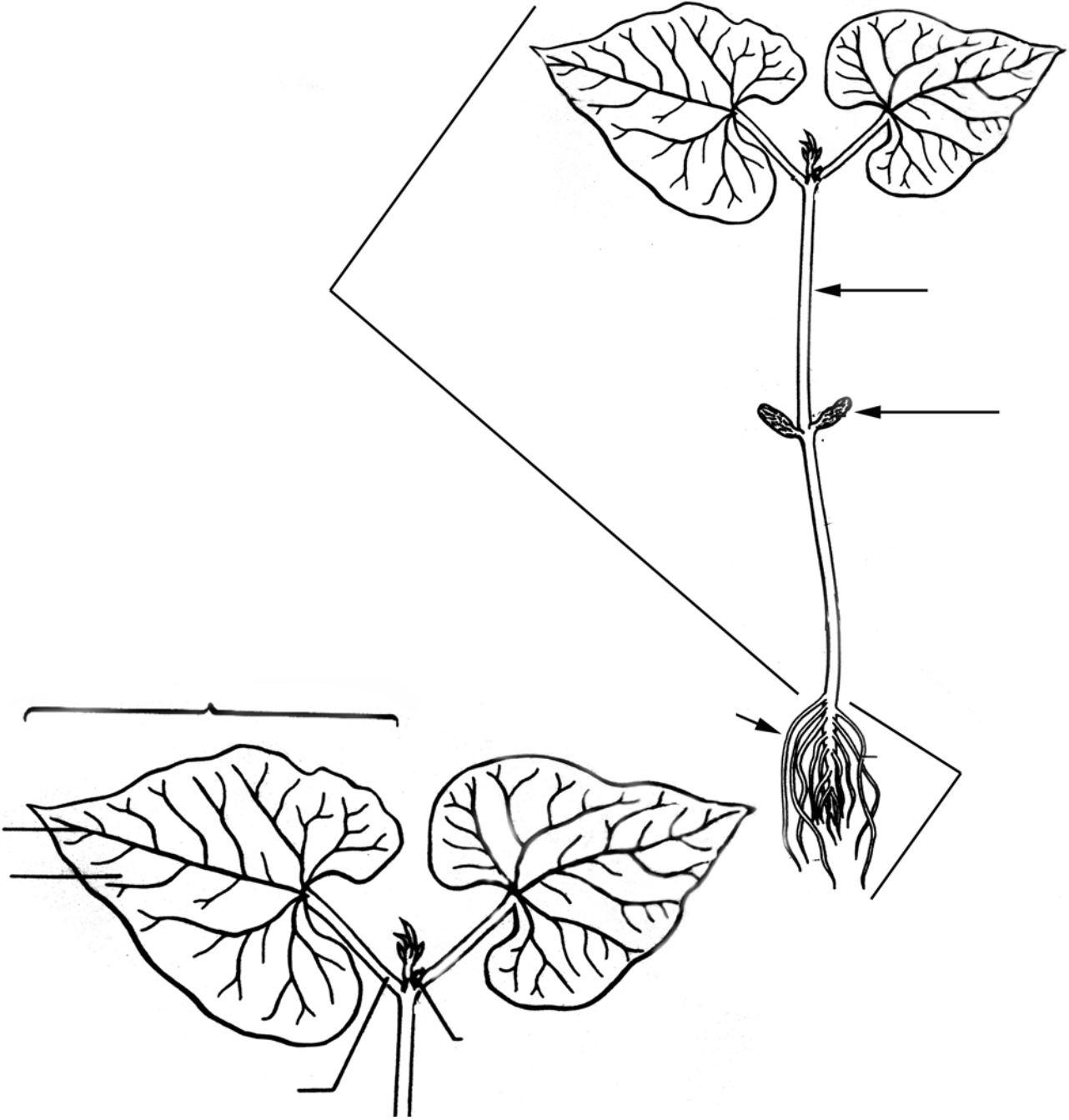
opposite
alternate
whorled

I. The Bean Seedling. Go to the side bench and carefully uproot a seedling growing in vermiculite. With the help of your teaching assistant, label the figure using the list of terms below:

Axillary Bud
Petiole
Stem
Cotyledon

Blade
Root
Vein

Root System
Shoot System
Leaf



II. Examples of Other Plants. Around the room are examples of plants with the following characteristics:

Opposite leaves

Whorled Leaves

Stipules

Alternate leaves

Compound Leaves

Draw an example of each character below:

View of leaf, and stem with a lateral bud
(label node and internode)

A compound leaf
(include a lateral bud)

Opposite leaves

Alternate leaves

Whorled leaves

**Stipule of *Hibiscus*
or *Geranium***

III. Morphology of a Woody Twig

Go to the front of the room and remove a sample twig from the bag. Study your twig for a few minutes and consider these questions.

What structure on this twig represents a leaf?

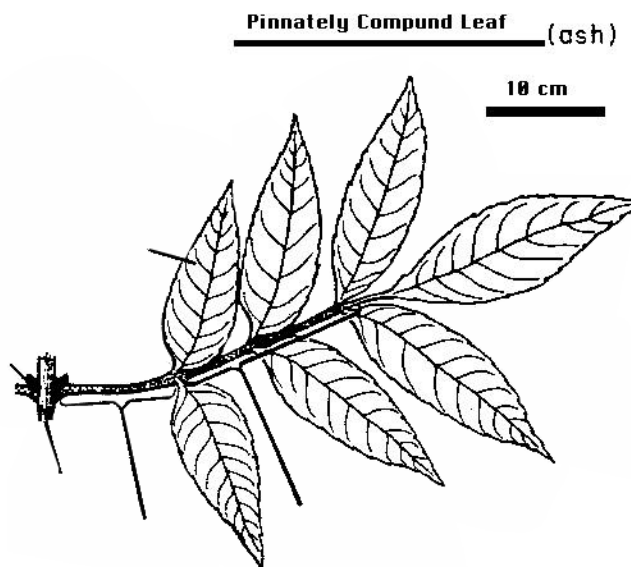
What marks this current years growth?

Can you recognize boundaries between the growth of other years?

What structure gives rise to lateral buds? What is its relationship with a leaf?

With the help of your TA, label the figure with the following terms:

Axillary Bud Leaf Leaflet Petiole Rachis
Stem



IV. Use of a Dichotomous Key

Included in the lab manual are *Keys to Selected Native and Cultivated Woody Plants of Madison, Wisconsin* a work written by Dr. Robert Kowal an emeritus professor in our department. Effective use of these keys will require applying what you have learned about plant structure.

Take the pages of *Keys to Selected Native and Cultivated Woody Plants of Madison, Wisconsin* out of your lab manual and staple them together. Your TA will now take you through the steps to identify your twig.

For the rest of your time in lab, work with a partner to identify unknown twigs available in the lab room. You should start out using the computer based picture version of your key while also following through your text-based key. After identifying each unknown, verify your identification with your TA.

Bring your keys to discussion where you will continue to practice using your keys outside.

