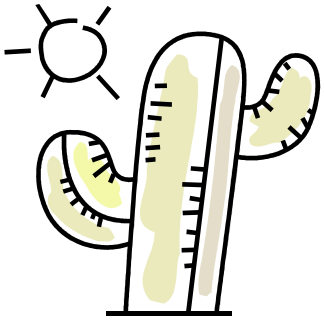
Lab #7: An Introduction to Plant Diversity

Animals, including ourselves, would not be here were it not for this Kingdom. Directly and indirectly, we depend on them for the majority of our food, oxygen and shelter. **What's so important about members of the Plant Kingdom?**



- About 40% of our medicinals are derived form plants.
- Plants moderate climate, hold rich soil in place and help retain moisture.
- They have sheltered and provided for us as long as we have been human.
- Plants enrich the beauty of the world, have inspired and taught us.

Today, we'll take a brief look at the major groups of plants today, and at major plant characteristics. Use this study guide and work with a partner to complete this lab. Be sure to sketch as many of the specimens as you can, and be sure you can respond to all the objectives included in the handout.

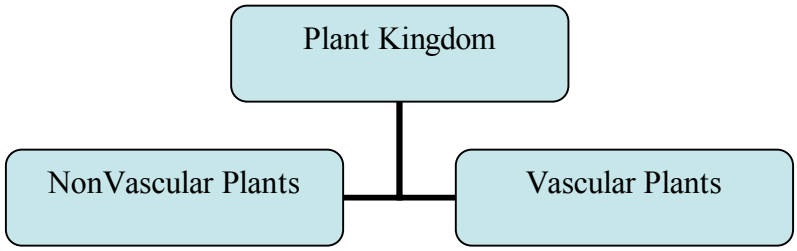
The Plant Kingdom includes all green plants (trees, shrubs, flowers, crops, mosses, ferns, algae etc). Be aware that classification schemes differ according to authority. For example, the algae are often placed in the kingdom Protists. The outline below is just a "bar bones" sort of classification. Be able to place specimens in the correct major group, and be able to ID more specific details such as flower parts and functions.

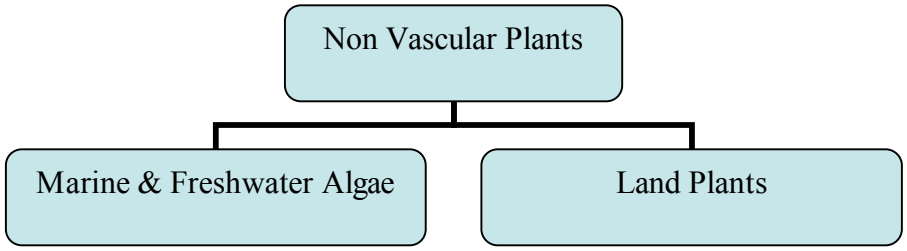
Use your text book and any materials provided in lab to answer the following:

What are the major characteristics of this kingdom?

Describe the major ecological roles of plants

Describe commercial, economic/medical importance to us.





Marine & Freshwater Algae	Nonvascular Land Plants
Seaweeds and freshwater algae Such as spirogyra No tissues specialized to carry Water, nutrients within the plantmany have stipes and blades resembling stems and leaves some with hollow, gas-filled floats to keep them near the surface of the water many have additional pitments which mask their chlorophyll (so they're not green in color absorb CO2, nutrients, H2O directly from the water	Bryophytes (mosses etc) lack vascular, conductive tissues. have aquatic, motile sperm Require water for reproduction and nutrition

VASCULAR PLANTS:

- Have vascular, conductive tissues
- Xylem conducts water and dissolved minerals generally upward in plants
- Phloem conducts sugars generally downward from the canopy to the rest of the plant.

2 TYPES

1. NONseed Vascular Land Plants
    - Ferns
    - Horsetails
    - Fairly primitive groups

2. SEED Vascular Land Plants (mature plants produce seeds as reproductive structures)
    - Gymnosperms: "naked seed"
        - Conifers such as pines, spruces, redwoods, firs, ginkgo etc
        - Seeds not enclosed in fleshy fruit but held in woody female reproductive structures (cones)
        - Staminate (male) cones produce pollen: wind pollinated
        - Vital contributors of timber for housing, fuelwood, habitat for many species etc.

    - Angiosperms All flowering plants
        - Biggest group of plants today. Includes all grasses, crop plants, shrubs, most trees (oaks, willows, beeches, sycamores, eucalyptus, etc)
        - Seeds enclosed in fleshy fruits
        - Flowers contain male & female reproductive structures
        - Examine models of flowers on display
        - Diagram a flower in the margin and label the following structure: stigma, style, ovary, stamen, anther, filament. Include the function of these structures as well.

Answer The Following:

1. What is the function of flowers?

2. What is pollination?

3. Examples of pollinators?

4. Why are most plants animal-pollinated rather than wind?

Examine some fruits (ripened ovary). The fruits nourish and protect seeds until they're mature. Fruits aide in seed dispersal. How?

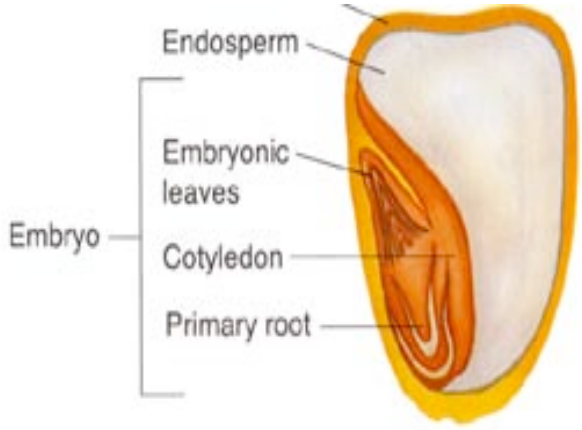
Pollination systems are among the very oldest of species partnerships or symbiosis, beginning several hundred million year ago. Flowers exist not for us, but for the attraction and reward of the plants' hard working animal go betweens.

Wind Pollination: Some plants, such as grasses, oaks, alders, willows etc, rely on wind to carry their pollen. Wasteful, though, as most of it doesn't make it to the next plant and as pollen is energetically expensive to make. So, most flowering plants use more efficient carriers. (animals such as insects, birds, mammals and even reptiles)

Most flowers combine male and female parts. The male structure, the stamen (made up of anther & filament) produces the pollen. The female stigma receives it, and the pollen grain sends a tube down the stigma to the ovary, where the egg is fertilized. In addition , plants which are animal-pollinated frequently produce rewards for the their pollinators: nectar, wax, pollen. Further, flowers are often attractive just to specific pollinators, and this specificity is determined by flower color, scent, location, reward, and time of blooming. SO for example, flowers which attract bats bloom just at night, are light-colored, and often have heavy duty landing platforms. Plants which use birds have flowers which are most often red in

color, have no scent, and which produce copious nectar as a reward/ Flowers which attract flies often have an aroma like that of a dead cow!

SEEDS:
What evolutionary advantage do seeds offer? Describe each part of the seed below.



Dicotyledonous and monocotyledonous plants

Dicotyledonous Plants

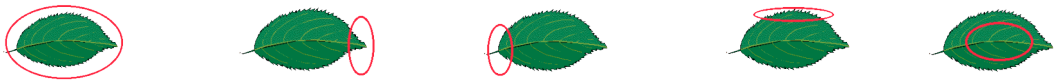
- One embryo leaf - cotyledon
- Tap root system - one main root with side roots
- Leaves with net venation
- Secondary growth in stems
- Whorls in flowers made up of four or five parts

Monocotyledons Plants

- One embryo leaf or cotyledon
- Adventitious root system - no one root dominant
- Leaves with parallel venation
- Usually no secondary growth in stems
- Whorls in flowers made up of three parts

The leaf blade: varies greatly in shape and there are numerous terms to describe its general shape. These terms describe the leaf's

general shape, apex, base, margin, and veins

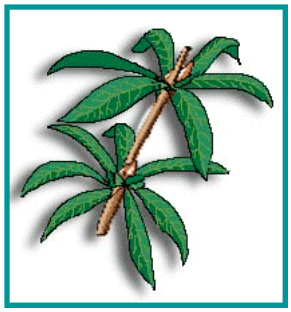


The leaf blade has two types of configuration. It may be in one unit, in which case the leaf is called a simple leaf, or it may be divided into numerous small parts that look like individual leaves and which form a compound leaf.

Leaves may be arranged on the stem in a variety of ways. The place on the stem from where the leaves grow is called a node and the part between the nodes is the internode. If only one leaf arises at a node the leaves are said to be **alternate**, if there are two leaves they are **opposite** and if there are more than two they are **whorled**.

Alternate leaves

Opposite leaves



Leaves in whorls