

Liverworts:

- Leafy structures are lobed and round; one cell thick without midribs
- They overlap and attach to the stem at a slanted angle
- Have oil bodies that secrete oils, possible for defense against herbivores
- Very thin or non-existent cuticle – dry up and rehydrate
- Leafy liverworts flourish in humid, shaded habitats and are often pioneers on rocks, tree trunks, decaying logs, stumps, and soil by streams, ponds, footpaths, and roads
- Reproduce by spores
- One-celled rhizoids (root-like structures)

Mosses:

- Small, under 7 cm in height
- Leaf-like tissue arranged spirally or alternately around a stem-like axis.
- Flattened blade and slightly thickened midrib
- “Stems” can conduct water only short distances.
- Small rhizoids (root-like structures) made of several cells that absorb water
- Reproduce by spores

Club mosses:

- Leaves are microphylls, meaning the leaf contains one unbranched strand of conducting tissue
- Individual plants connected by horizontal stems: either runners or rhizomes
- Stems are solid with simple vascular tissue
- Shallow roots
- Have vascular system, thus can grow taller, up to 25 cm.
- Reproduce by spores

Horsetails:

- Stems are jointed and photosynthetic; hollow in the center with ring of vascular tissue
- Photosynthetic branches arise from joints
- Whorls of tiny scale-like, non-photosynthetic leaves arise at each joint
- Spread by underground running stems (rhizomes) with roots at nodes
- Vascular system allows them to grow between 1-3 meters tall
- Reproduce by spores

Ferns:

- Well developed, proper complex leaves with more complex vein system
- Reproduces by spores; water dependent for sperm cell
- Spores often found on back of leaves as small brown “dots” – sori
- Vegetative reproduction as well via rhizomes that develop roots and fronds
- Some frond “stems” are hairy or scaly
- Have vascular system

PLANT SPECIMENS FOR CLASSIFICATION

ARNOLD ARBORETUM, AUGUST 21, 2017

Ginkgo:

- 2 lobe, fan shaped leaves with evenly forking veins; 2-3 inches long and wide
- Leathery, bright green leaves cluster at tips of short shoots along branch
- Seed resemble small plum with fleshy, ill-scented outer covering (NOT a fruit!)
- Male and female reproductive structures are produced on separate trees.
- Common urban tree because it is resistant to air pollution

Conifer: Pine

- Needles arranged in clusters of 2, 3, or 5 along stem
- Dark green, flexible needles, with lighter color on underside
- Thick cuticle and recessed stomata (look for a white line on the underside of needle)
- Male reproductive structures contain pollen; female cones contain ovules that when fertilized become seeds
- Woody stem/branch

Angiosperm: Stewartia

- Woody stem/branch
- Flowers hold reproductive structures: stamen, with pollen, and pistil, with an enclosed ovary
- Fertilization mostly through animals (insects, birds, mammals) and also wind
- Fruit containing seeds for next generation
- Seed dispersal aided by animals, wind, water, and mechanical structures

Angiosperm: Bamboo and Grasses

- Segmented, jointed stems (called culms) with nodes and internodes
- Internodes are hollow; vascular bundles throughout "ring" of culm
- Leaves grow at the nodes
- Spreads mainly through underground rhizomes/roots, with fibrous root system
- Small, inconspicuous flowers with wind pollination and wind seed dispersal

CAN YOU IDENTIFY THESE MAJOR GROUPS OF PLANTS?

ARNOLD ARBORETUM, AUGUST 21, 2017

Examine the plant specimens at each station, and make a labeled sketch of what you notice.

What plant features stand out the most? What plant type does it represent? What is your evidence?

BIG IDEA TO CONSIDER: What evolutionary innovations do these features represent?

Station # _____ Plant type: _____

Station # _____ Plant type: _____

Station # _____ Plant type: _____

Station # _____ Plant type: _____

CAN YOU IDENTIFY THESE MAJOR GROUPS OF PLANTS?

ARNOLD ARBORETUM, AUGUST 21, 2017

Station # _____ Plant type: _____

Station # _____ Plant type: _____

Station # _____ Plant type: _____

Station # _____ Plant type: _____

Station # _____ Plant type: _____

Station # _____ Plant type: _____