

Some Plant Basics

Introduction to plant physiology
and reproduction

Plant Kingdom

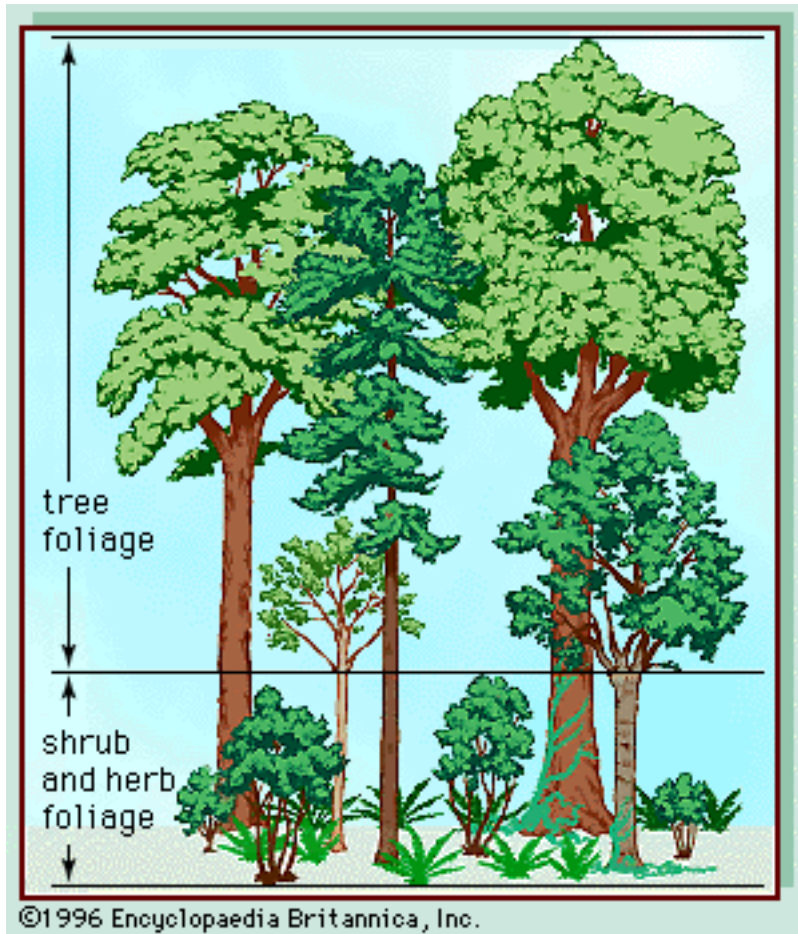
Plant Ecology

- **The forest floor** is often blanketed with decaying leaves, twigs, fallen trees, animal scat, moss, and other detritus. The forest floor is where recycling occurs, fungi, insects, bacteria, and earthworms are among the many organisms that break down waste materials and ready them for reuse and recycling throughout the forest system.
- **The herb layer** of the forest is dominated by herbaceous (or soft-stemmed) plants such as grasses, ferns, wildflowers, and other ground cover. Vegetation in the herb layer often gets little light and in forests with thick canopies, shade tolerant species are predominant in the herb layer.
- **The shrub layer** is characterized by woody vegetation that grows relatively close to the ground. Bushes and brambles grown where enough light passes through the canopy to support shrub growth.
- **The understory** of a forest consists of immature trees and small trees that are shorter than the main canopy level of the tree. Understory trees provide shelter for a wide range of animals. When gaps form in the canopy, often times understory trees take advantage of the opening and grow to fill in the canopy.
- **The canopy** is the layer where the crowns of most of the forest's trees meet and form a thick layer.
- **Emergents** are trees whose crowns emerge above the rest of the canopy.

[Source](#)

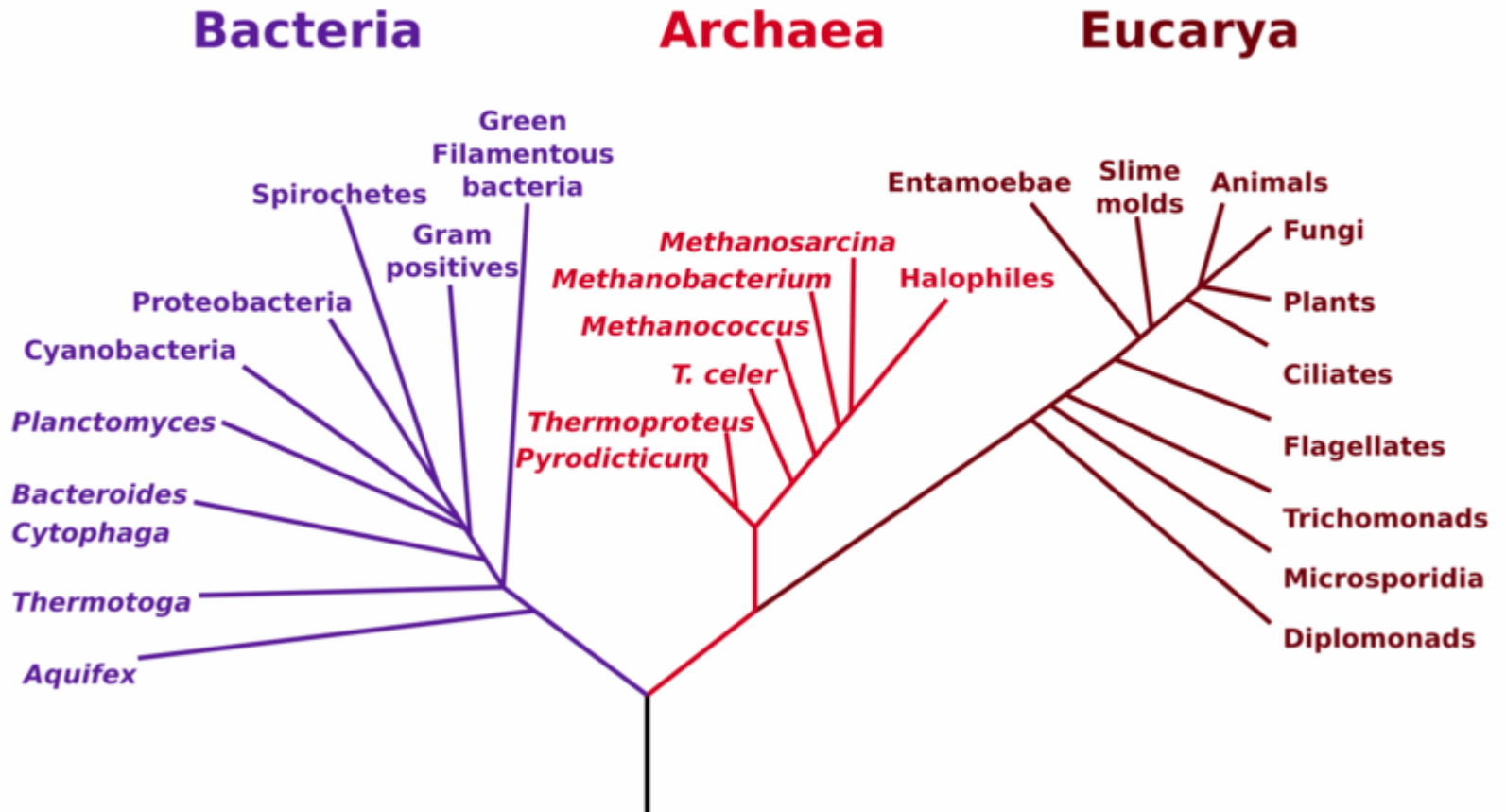
Plant Kingdom

Plant Ecology

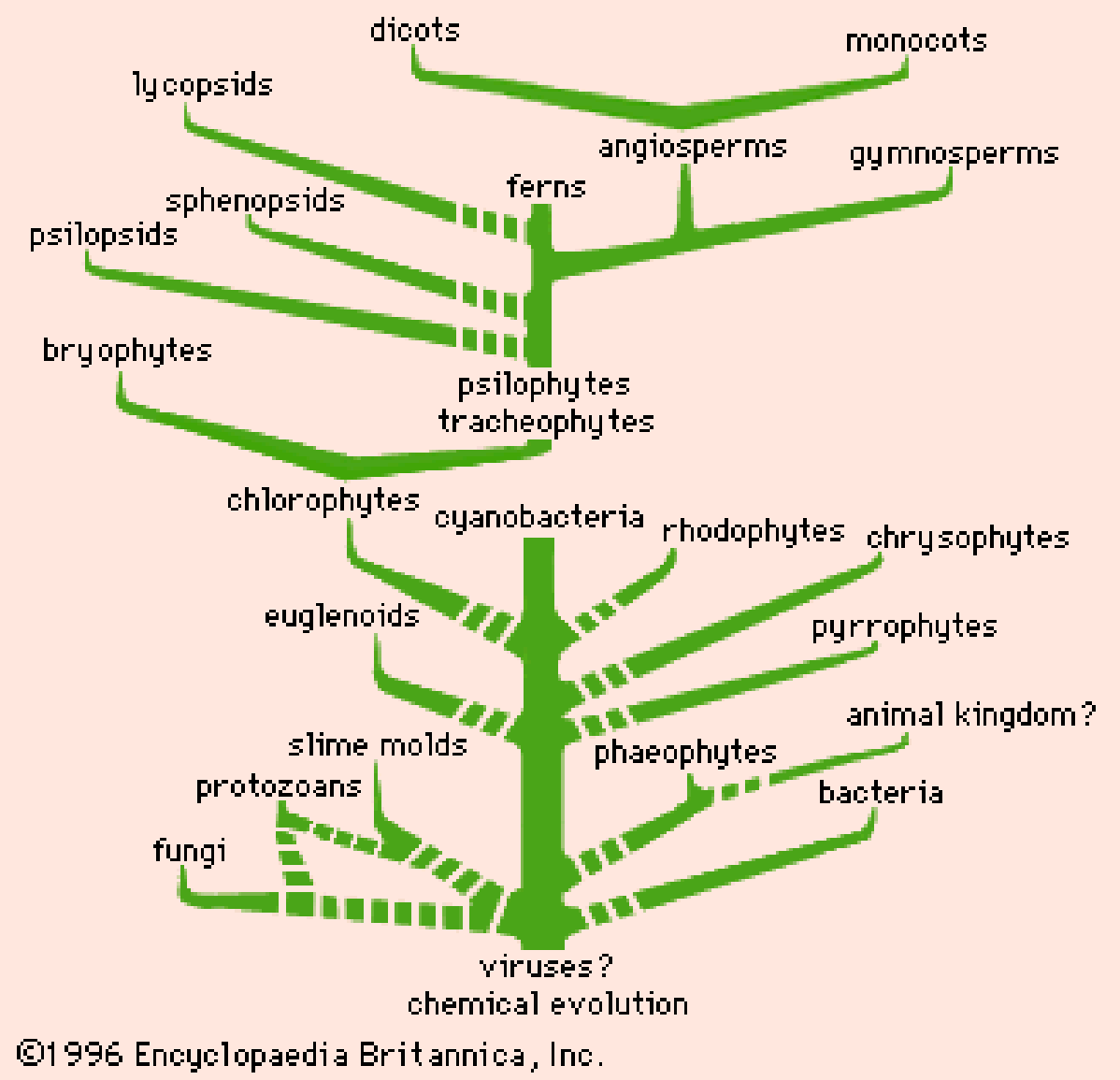


Plant Kingdom

Phylogenetic Tree of Life

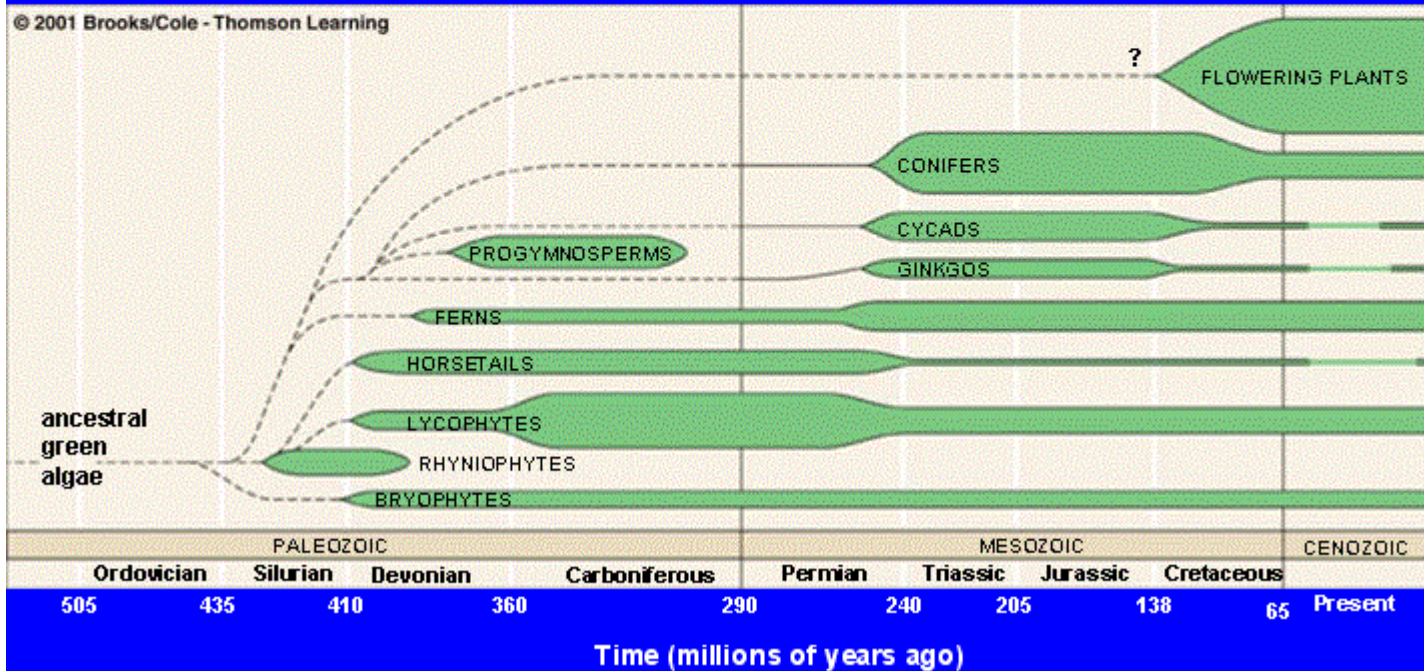


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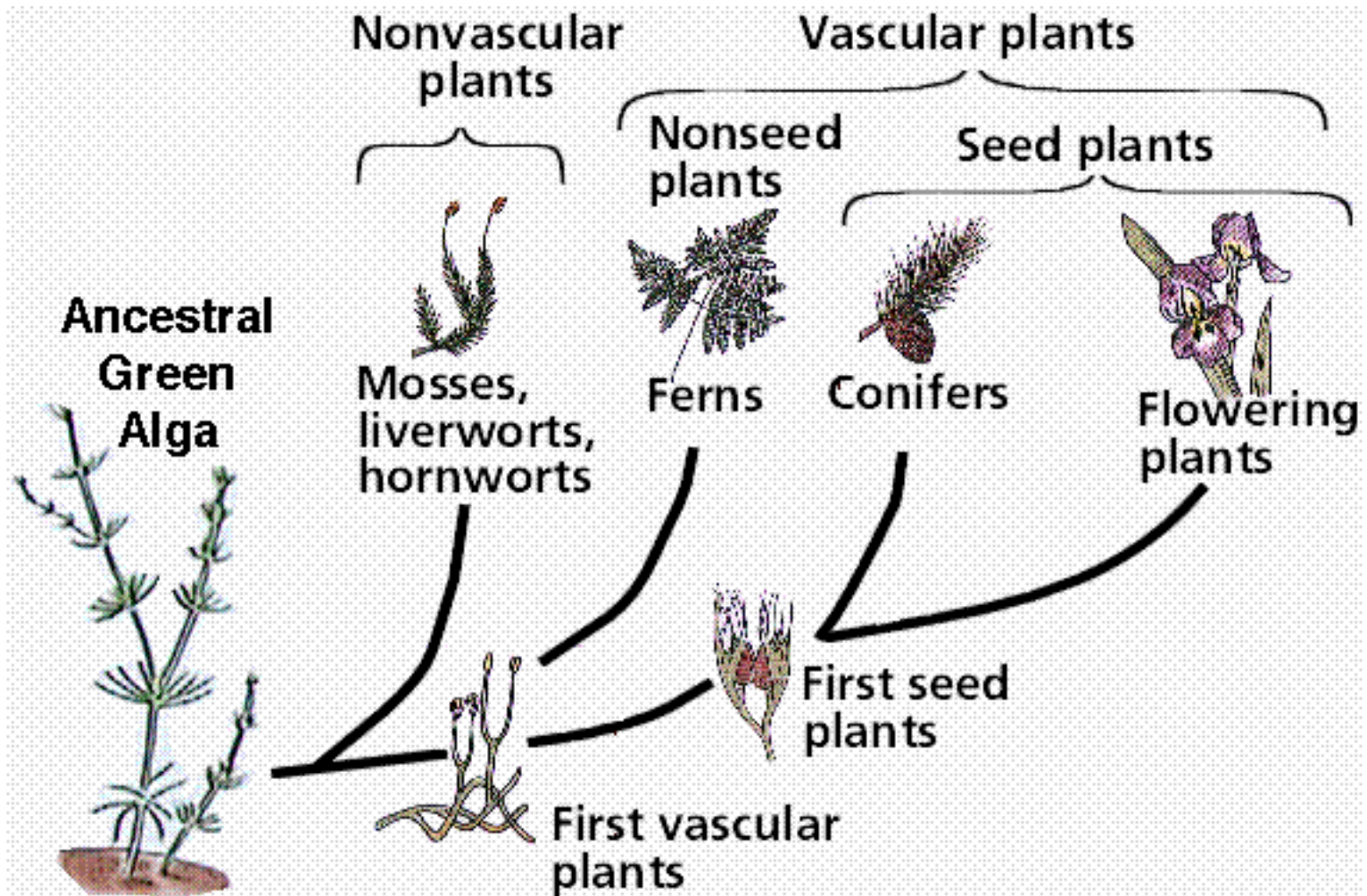


Plant Kingdom

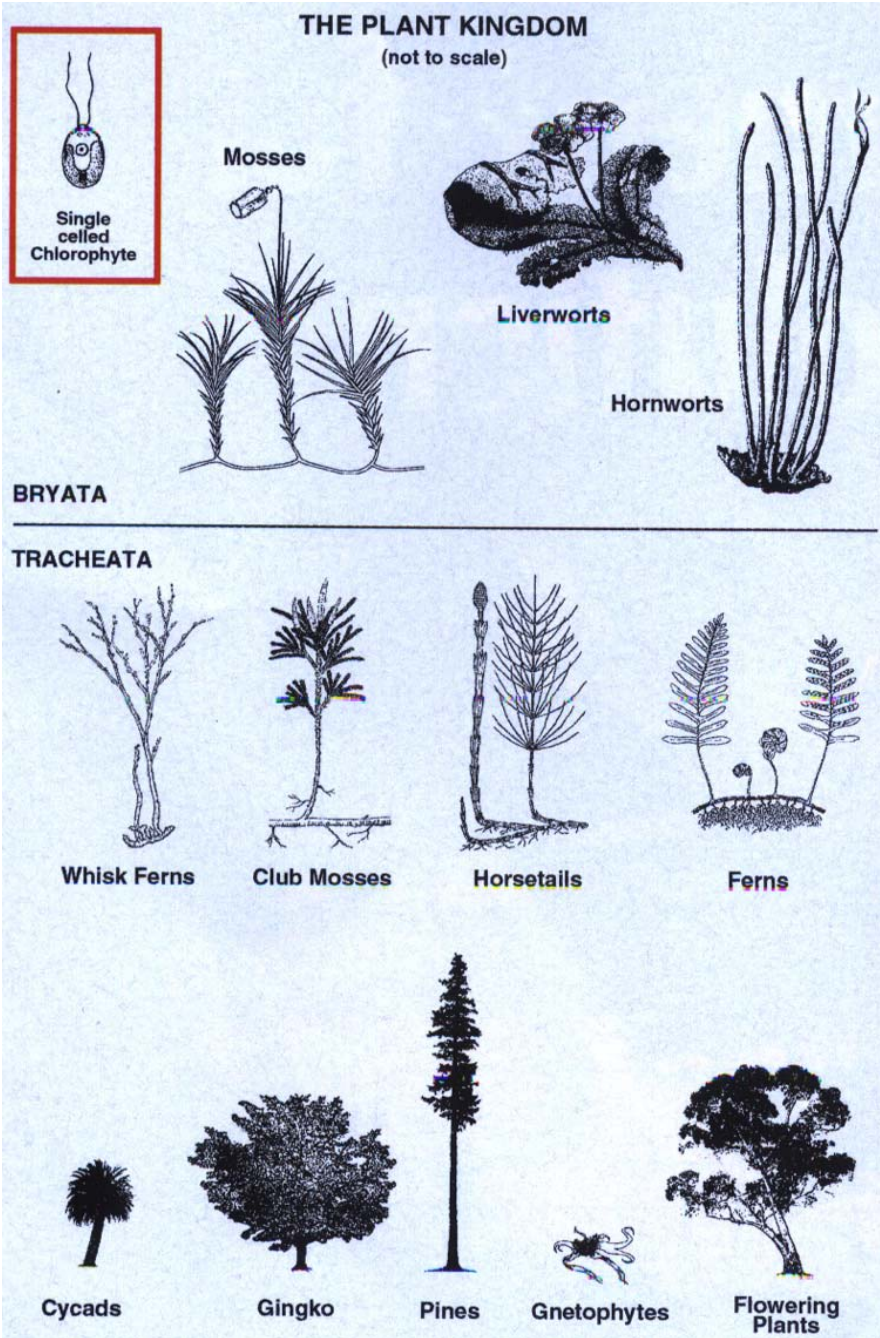
Milestones in Plant Evolution



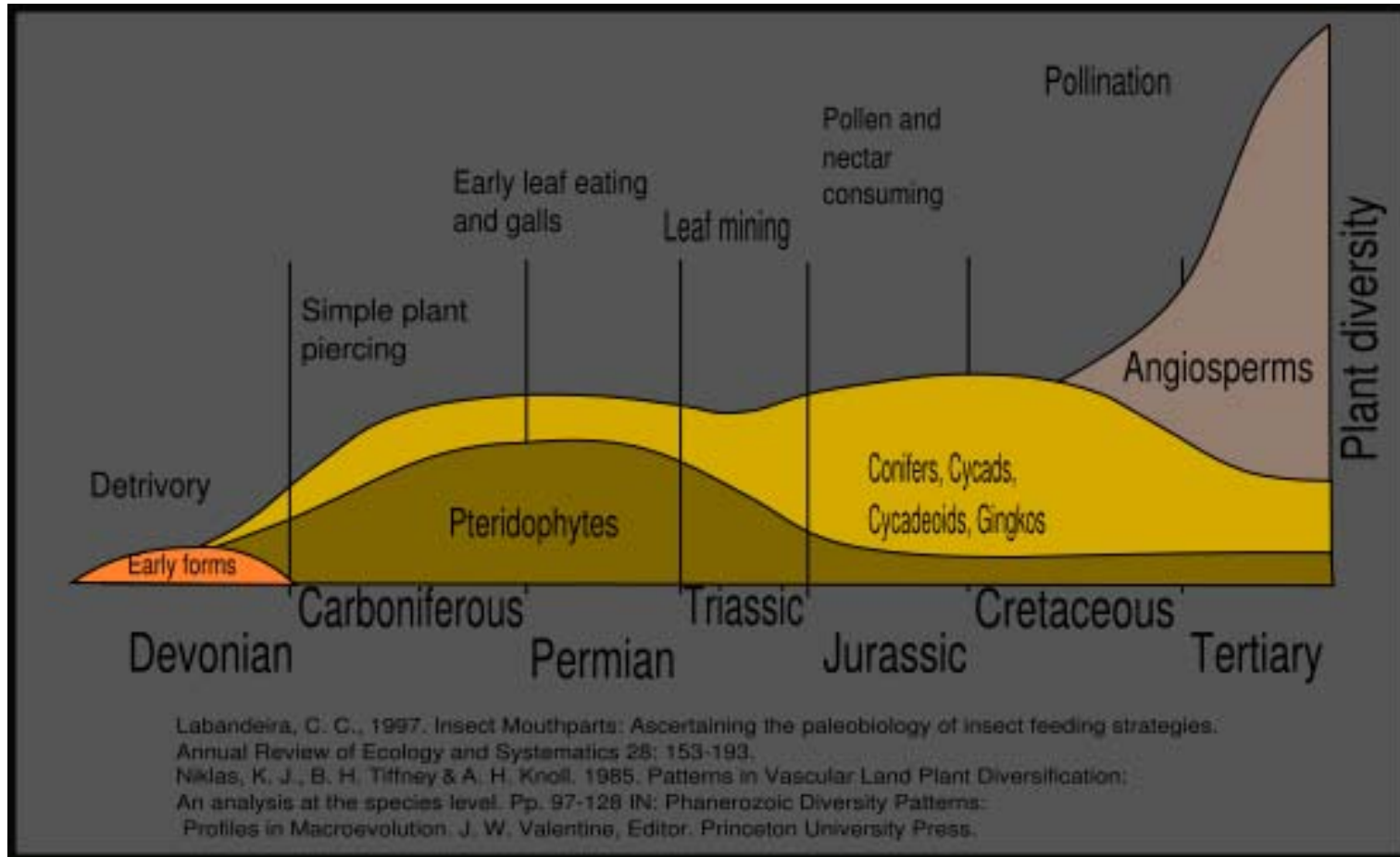
Plant Kingdom



Plant Kingdom



Plant Kingdom



Plant Kingdom

Non-Tracheophytes

- Bacteria
- Fungus
- Lichens
- Bryophytes (Moss, *Liverworts)
 - “Leaves”, spores, no vascular system, gametophyte stage
 - *Hepatikophyta (Liverworts)

Plant Kingdom

Tracheophytes

- Vascular Plants
 - **Lycophytes**
 - Club Moss, Lepidodendrales, Zosterophylls
 - Vascular, microphyll **leaves**, **roots**, **wood**, spores, gametophyte
 - **Pteridophytes**
 - Ferns, Sphenopsids, Psilotopsids
 - Vascular, **leaves***, roots, spores, gametophyte
 - **Spermatophytes** (seeds)
 - Gymnosperms (Pino- Ginkgo- Cycado- Gneto- phytes)
 - Vascular, leaves, roots, **seeds**, wood
 - Angiosperms
 - Vascular, leaves, roots, seeds, wood, flowers

Plant Kingdom

Algae

- Algae
 - Marine



Plant Kingdom

Algae

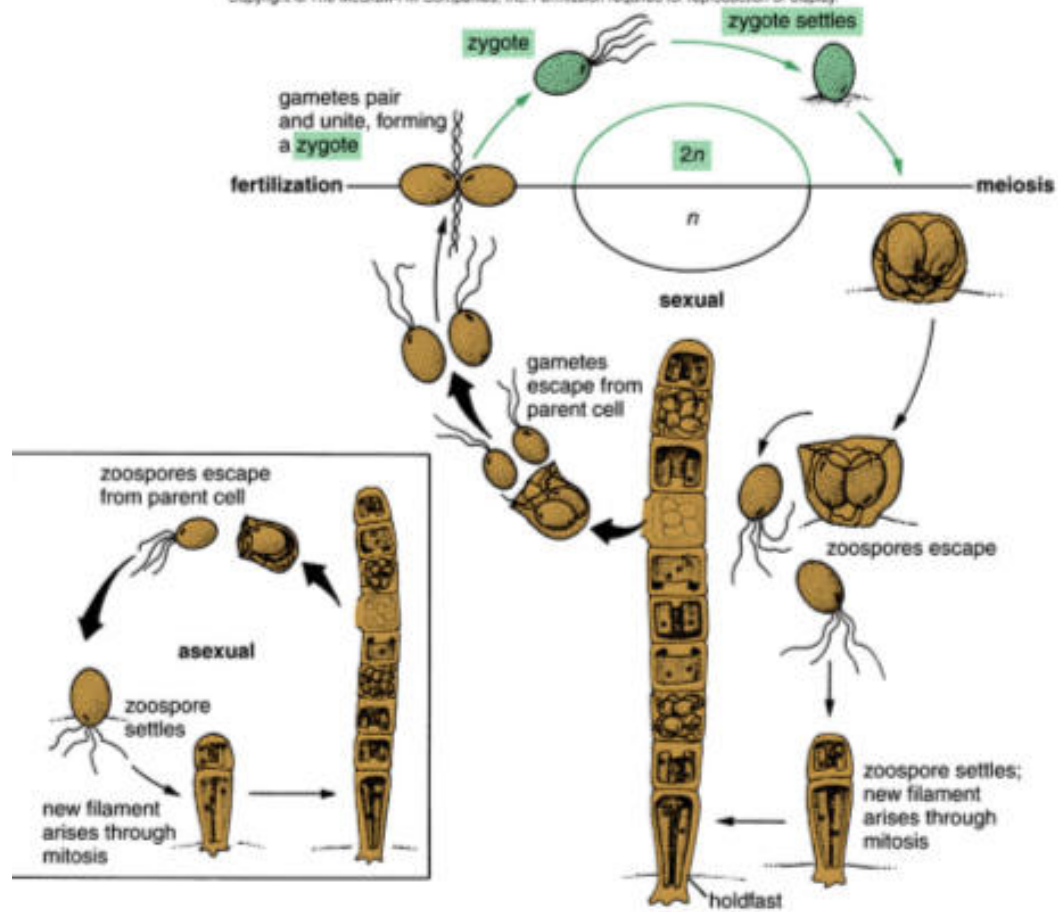
- Algae
 - Freshwater



Plant Kingdom

Ulothrix Life Cycle

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Plant Kingdom

- Fungus- **not** the plant Kingdom!
- Heterotrophic
 - Mycelium
 - Hyphae
 - Spores
 - Sexual
 - Asexual



Plant Kingdom

Algae, Fungi, Lichens

- Lichens
 - Fungus and Algae



Plant Kingdom

Bryophytes

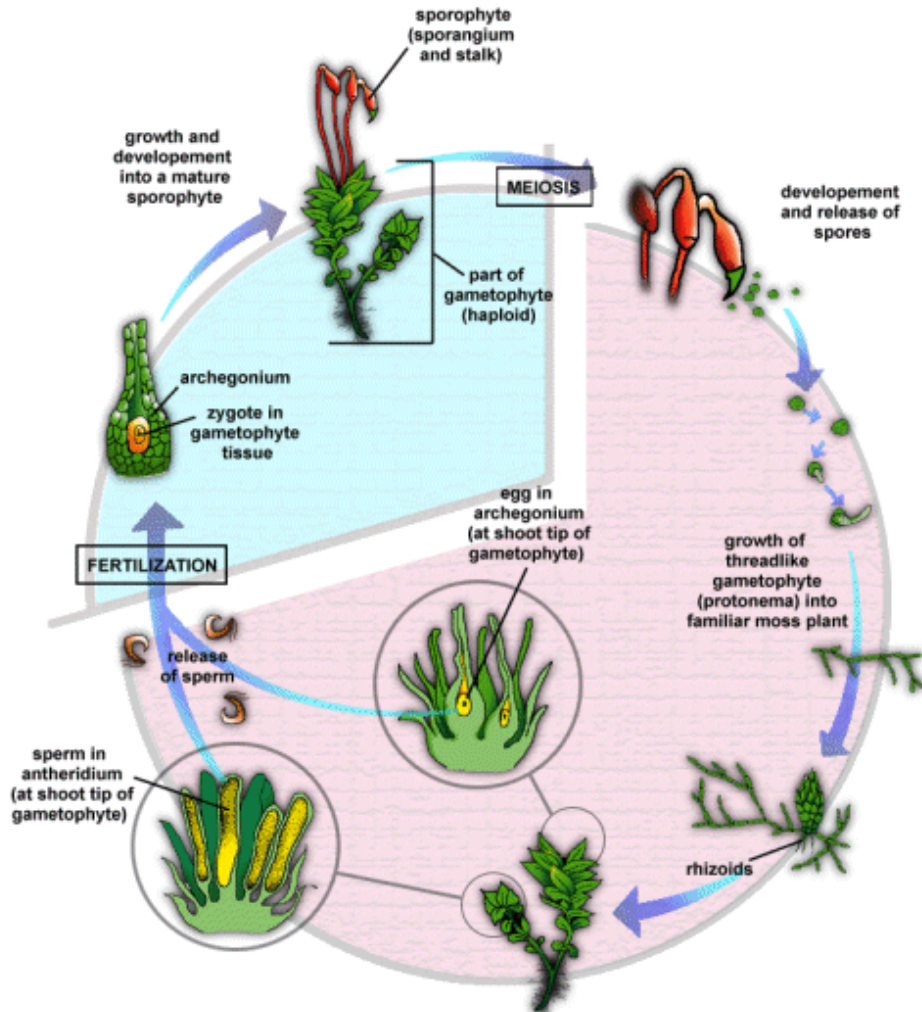
- Mosses
- Liverworts
- Hornworts
 - No vascular system
 - Lack any vascular tissue
 - Leaf-like structures are present
 - Spores (not seeds)
 - Gametophyte is free-living
 - Photosynthetic



Plant Kingdom

- Reproductive Terms

- Sporophyte
- Gametophyte
- Antheridium
- Archegonium
- Zygote
- Haploid
- Diploid



Plant Kingdom

Pteridophytes

- Psilophyta (whisk ferns)
 - Simple Branching
 - No leaves
 - Spores
 - Rhizomes
 - Small and low



Plant Kingdom

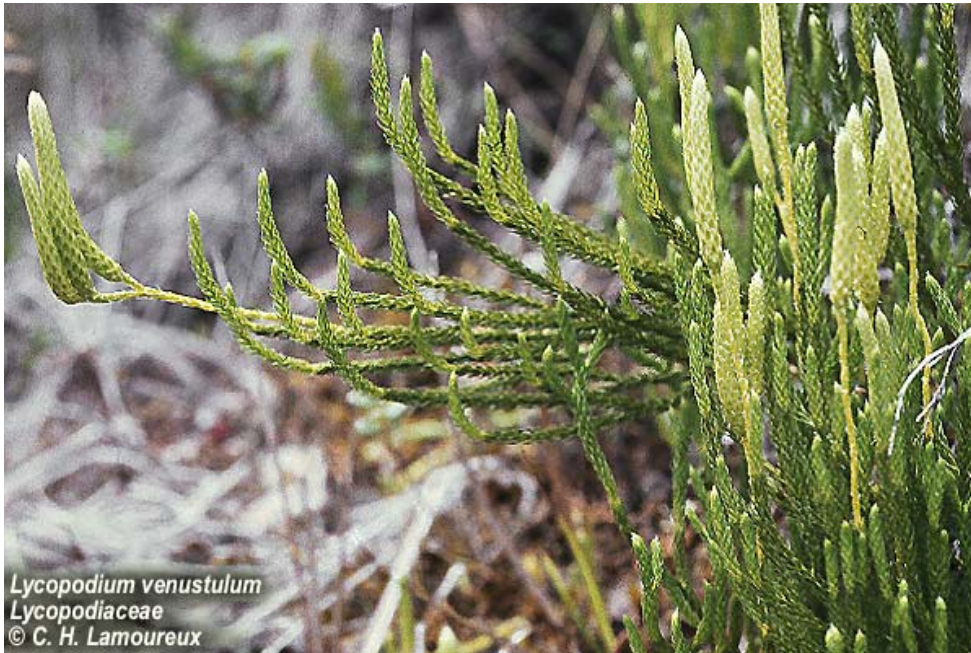
Pteridophytes

- Lycopsidea (club moss and spike moss)
 - Most ancient trees with living relatives
 - Leaves and roots differentiate
 - Megaphylls branching in one plane
 - photosynthetic webbing
 - Vertical growth limited (weak)
 - Lateral (secondary) growth (wood)
 - Spores
 - Homosporous
 - Heterosporous

Plant Kingdom

Pteridophytes

- Class Lycopsidea



Plant Kingdom

Spenopsida

- Spenopsida
 - Horsetails
 - Scour Rushes
 - Spores
 - Cone-like *Strobilus*



Plant Kingdom

Spenopsida

- Spenopsida (horsetails)



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<http://www.henriettesherbal.com>

Plant Kingdom

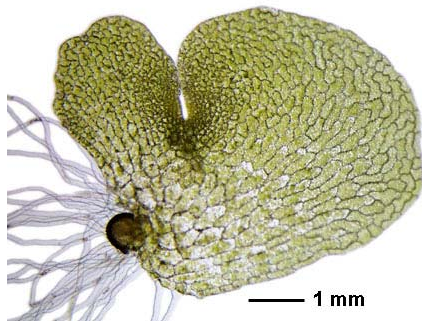
Pteridophytes

- Filicopsida
 - Ferns and Tree Ferns
 - Homosporous spores
 - Sporophyte and Gametophyte generations
 - Require water for fertilization

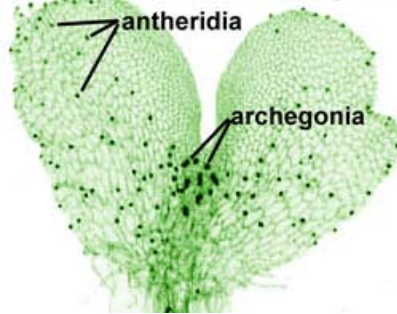


Plant Kingdom

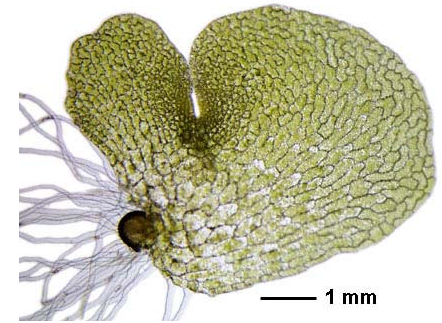
Pteridophytes



Fern Gametophyte

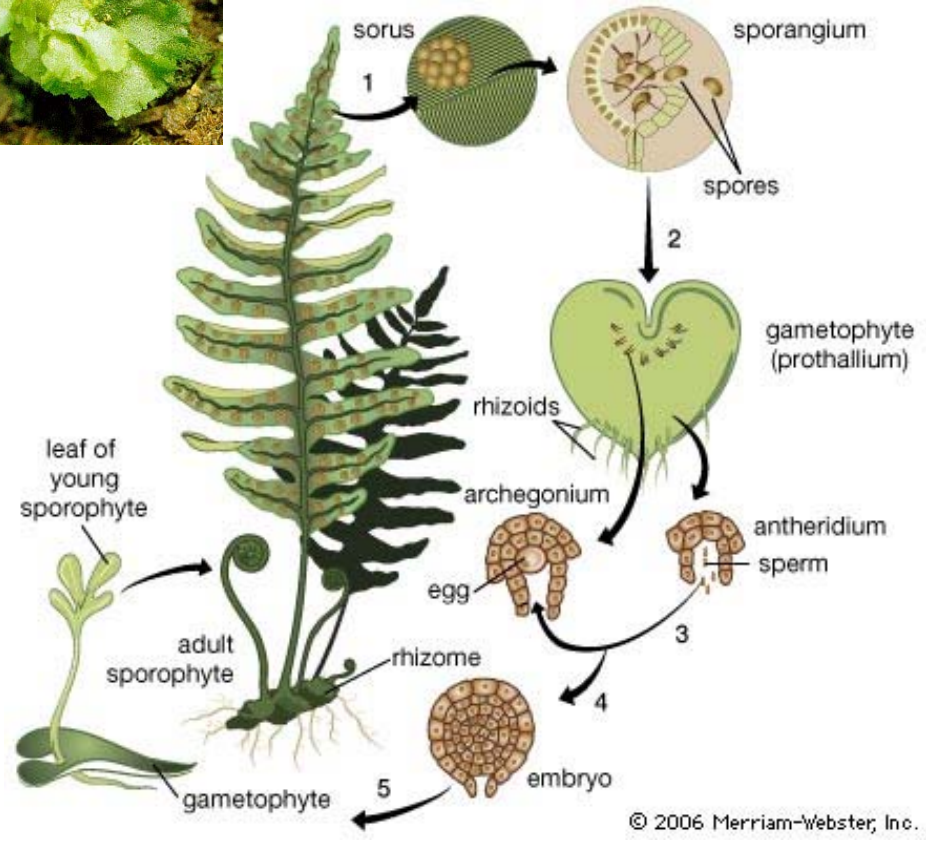


Plant Kingdom Pteridophytes



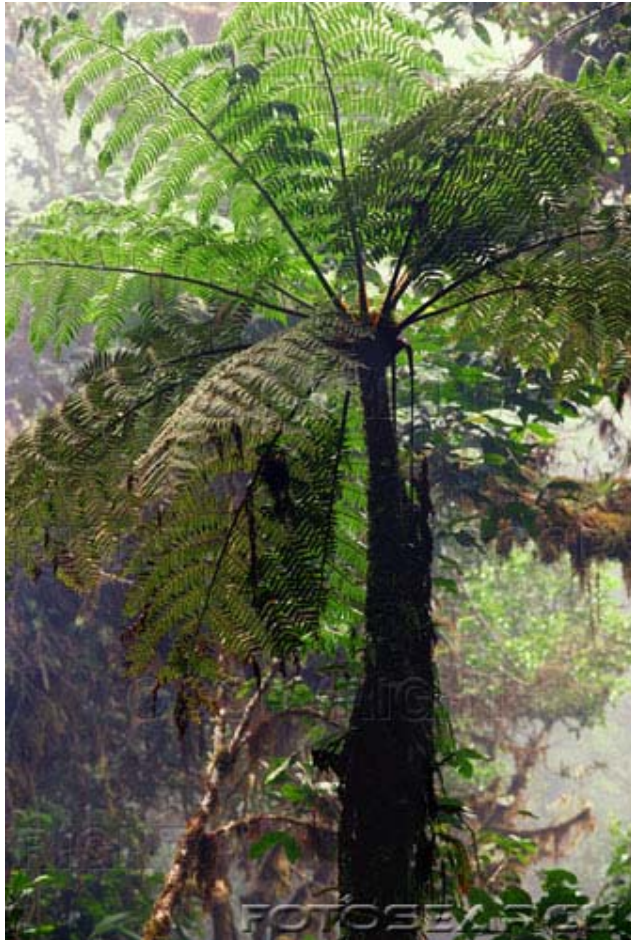
The gametophyte generation of ferns are small, heart-shaped, plants called prothallia (singular: prothallium). They are less than an inch (1 - 2 cm) in diameter and look very much like thalloid liverworts or hornworts. Male and female sex organs are located on the underside of the prothallium and, when conditions are right, the sperm swims from the male antheridium to fertilize the egg in the archegonium.

[Source](#)



Plant Kingdom

Pteridophytes



Plant Kingdom

Gymnosperms

- Conifers, Ginkgos,, Cycads
 - Roots, Wood (lignin)
 - Small leaves, Cones
 - Homosporous, Heterosporous
 - Male and female trees
 - Wind dispersal
 - Fertilization on the tree

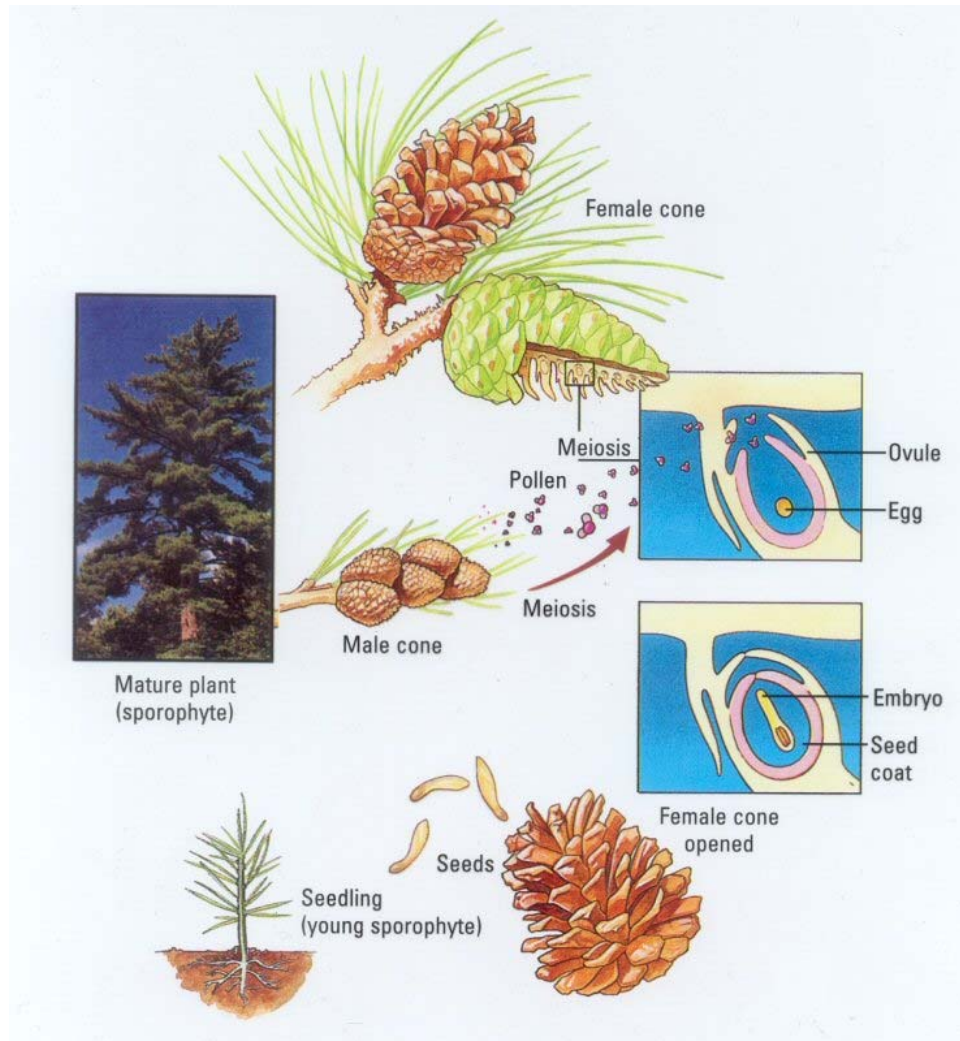
Plant Kingdom

Gymnosperms

- Class Pinales/Coniferales



Plant Kingdom Gymnosperms



Plant Kingdom

Gymnosperms

- Class Ginkgoales
 - Male Trees
 - Female Trees



Plant Kingdom

Gymnosperms

- Class Ginkgoales
- Ginkgos
 - Male and Female Flowers



Plant Kingdom

Gymnosperms

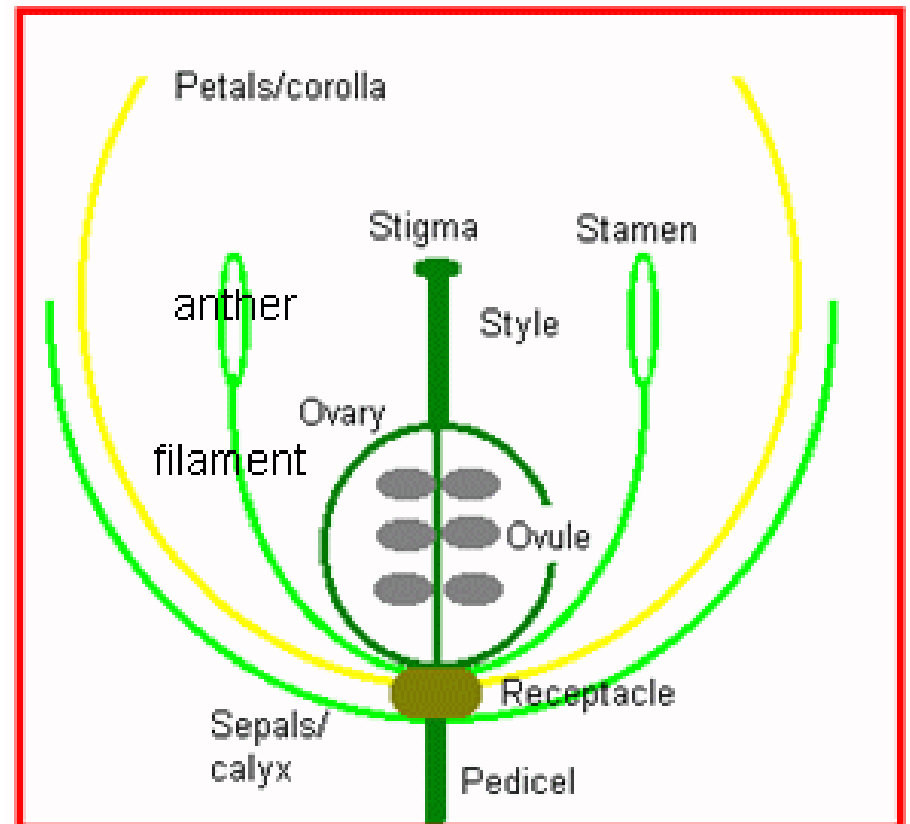
- Class Cycadales
- Cycads



Plant Kingdom

Angiosperms

- Flowering Plants



Plant Kingdom

Angiosperms

- Flowering Plants
- Trees (upper story)
- Shrubs (Middle story)
- Ground layer (lower story)
- Perennials (>2 growing seasons)
- Annuals
- Herbaceous (die back to ground level)
- Deciduous trees

Plant Kingdom

Angiosperms

- Flowering Plants
 - Monocots
 - Grasses
 - Some shrubs
 - Dicots
 - Shrubs
 - Flowering trees

MONOCOTS

Cotyledons



One cotyledon

Veins in leaves



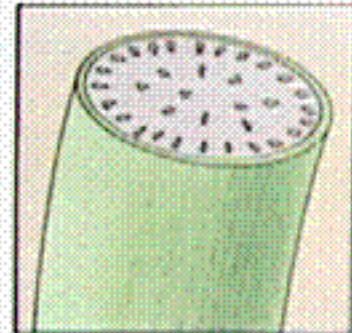
Usually Parallel

Flower parts



Usually in multiples of three

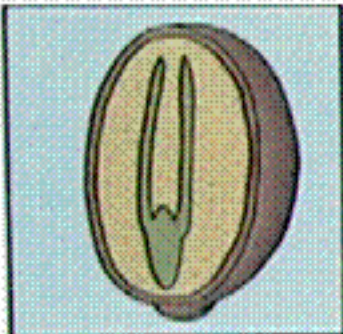
Arrangement of primary vascular bundles in stem



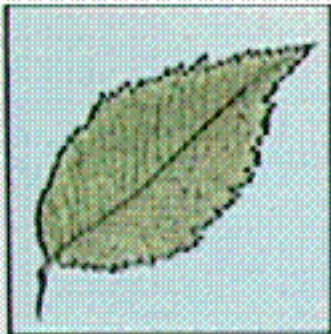
Scattered

DICOTS

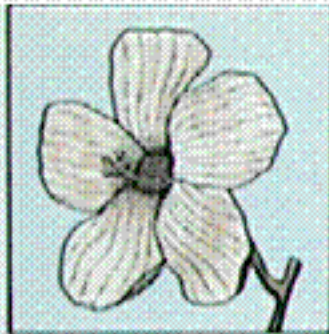
Two cotyledons



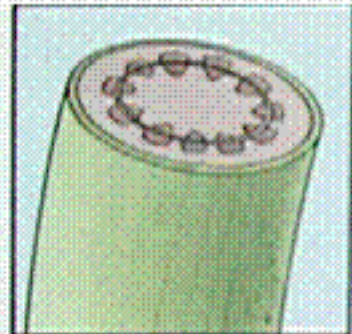
Usually netlike



Usually in fours or fives



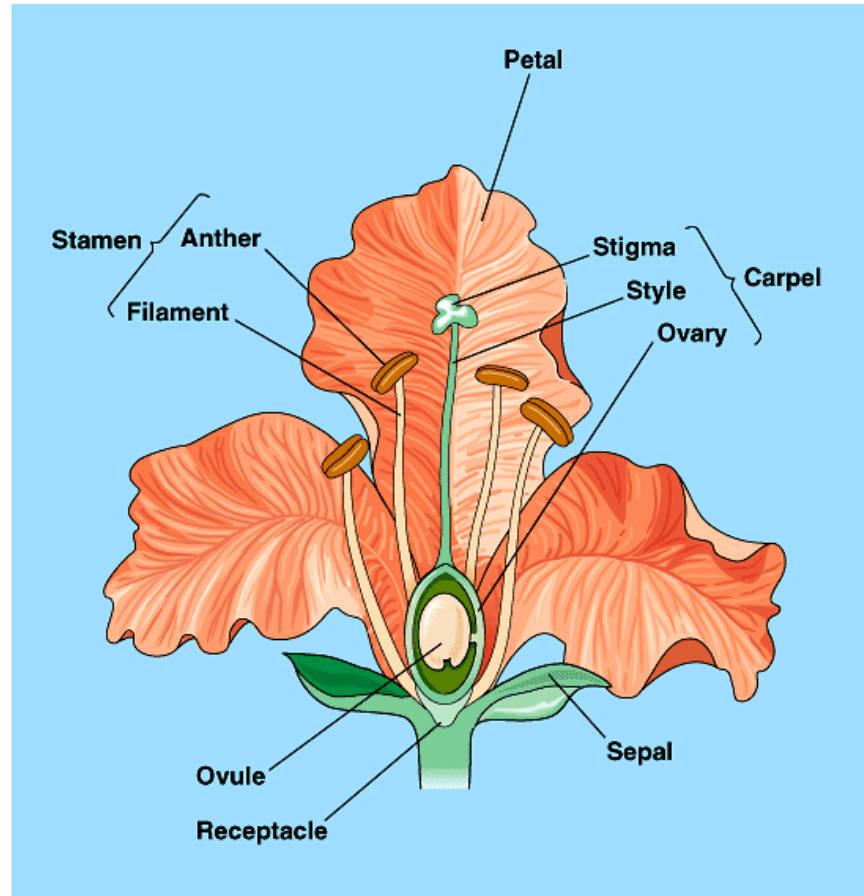
In a ring

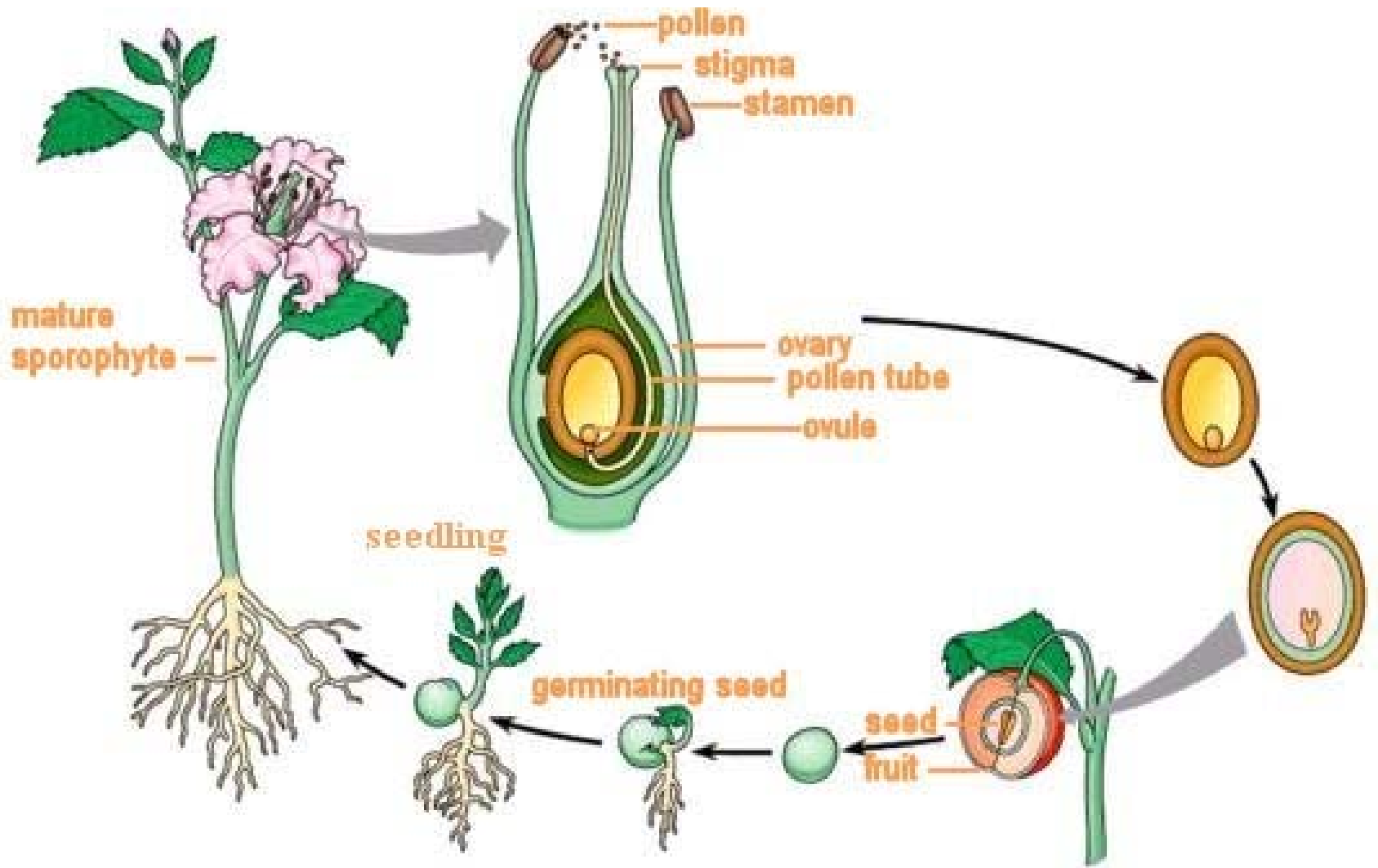


Plant Kingdom

Angiosperms

- Stamen
 - Anther
 - Filament
- Carpel
 - Stigma
 - Style
 - Ovary
 - Sepal
 - Petal





Grasslands

