WILD PLANT INTENSIVE : LINDSAY HUETTMAN

One Story of Plant Evolution : WPI

Ways of Gathering Knowledge

How to we give credence to one over another? What is a more holistic way to walk with knowledge?

Ethnobotany & Indigenous Ways of Learning

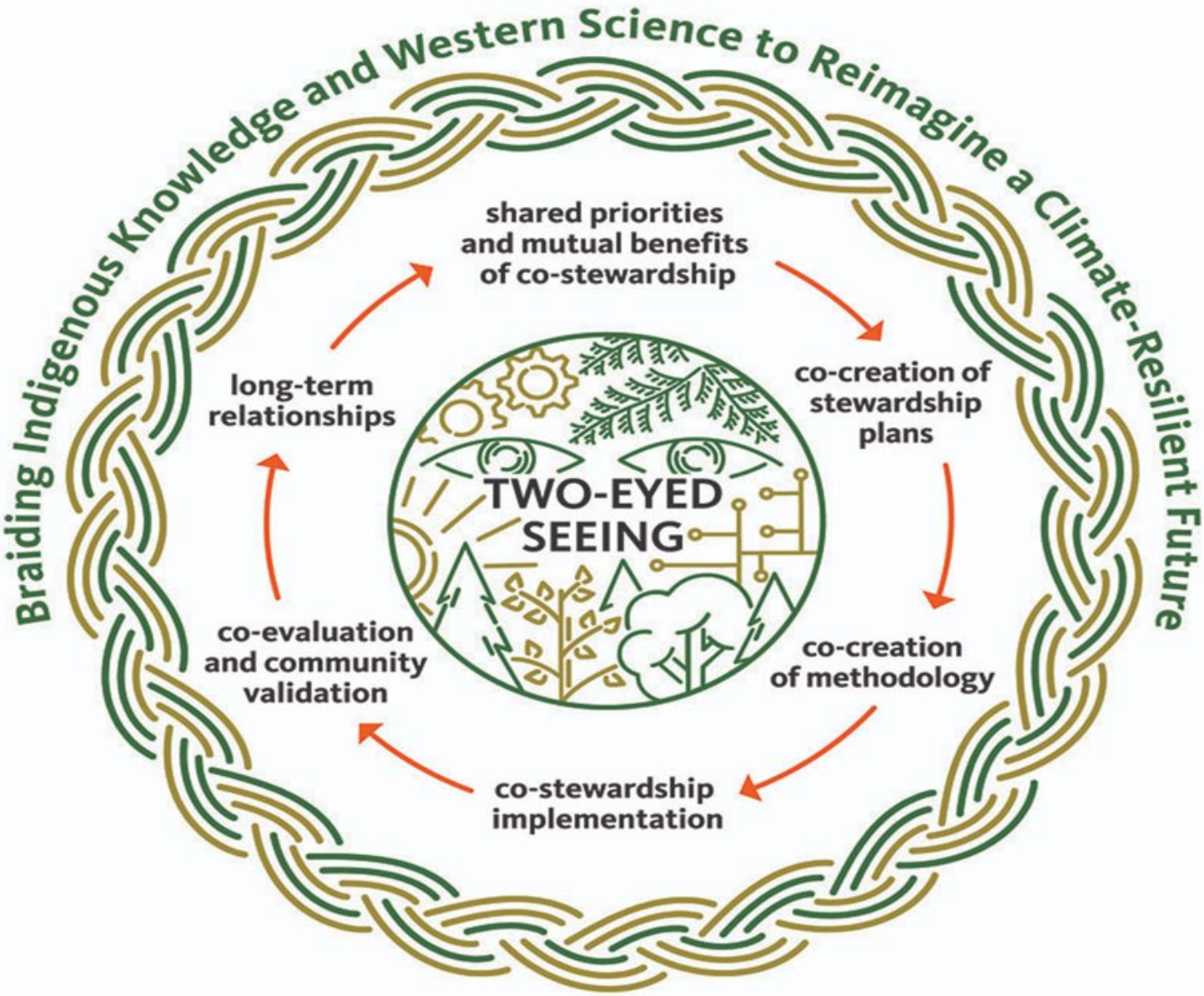
TEK (Traditional Ecological Knowledge)

"TEK (also known as Indigenous Local Knowledge—ILK, and Indigenous Traditional Knowledge, ITK) is defined as knowledge and practices passed from generation to generation informed by cultural memories, sensitivity to change, and values that include reciprocity. TEK observations are qualitative and long-term, often made by persons who hunt, fish, and gather for subsistence.

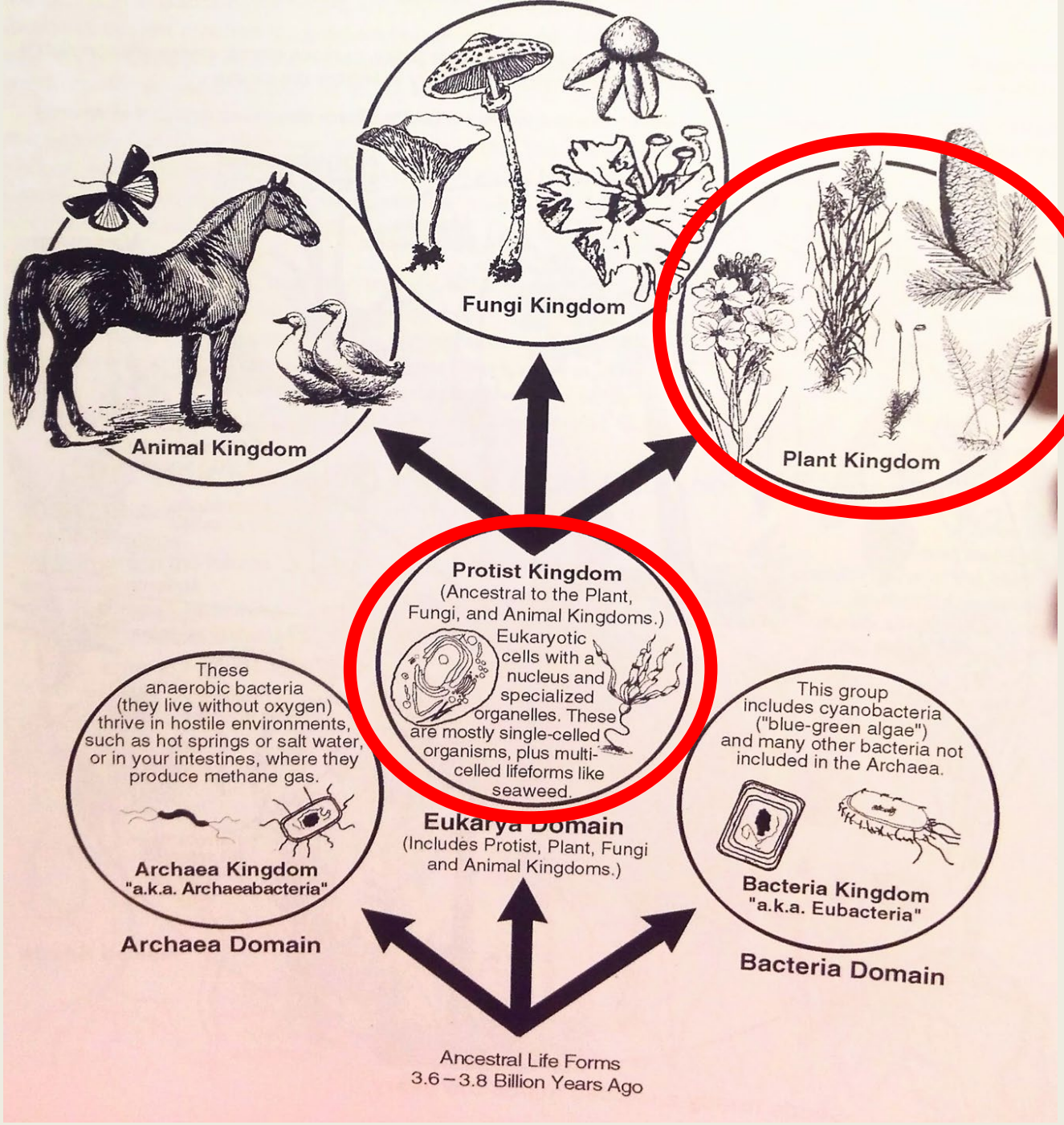
***Most importantly,** TEK is inseparable from a culture's spiritual and social fabric, offering irreplaceable ecocultural knowledge that can be thousands of years old and incorporates values, such as kinship with nature and reciprocity, that can help restore ecosystems."*

Albuquerque, U.P., Ludwig, D., Feitosa, I.S. *et al.* Integrating traditional ecological knowledge into academic research at local and global scales. *Reg Environ Change* **21**, 45 (2021). https://doi.org/10.1007/s10113-021-01774-2

Indigenous Food Symposium 2025 UW (May 2 &3rd)



https://tek.forestry.oregonstate.edu/what-tek



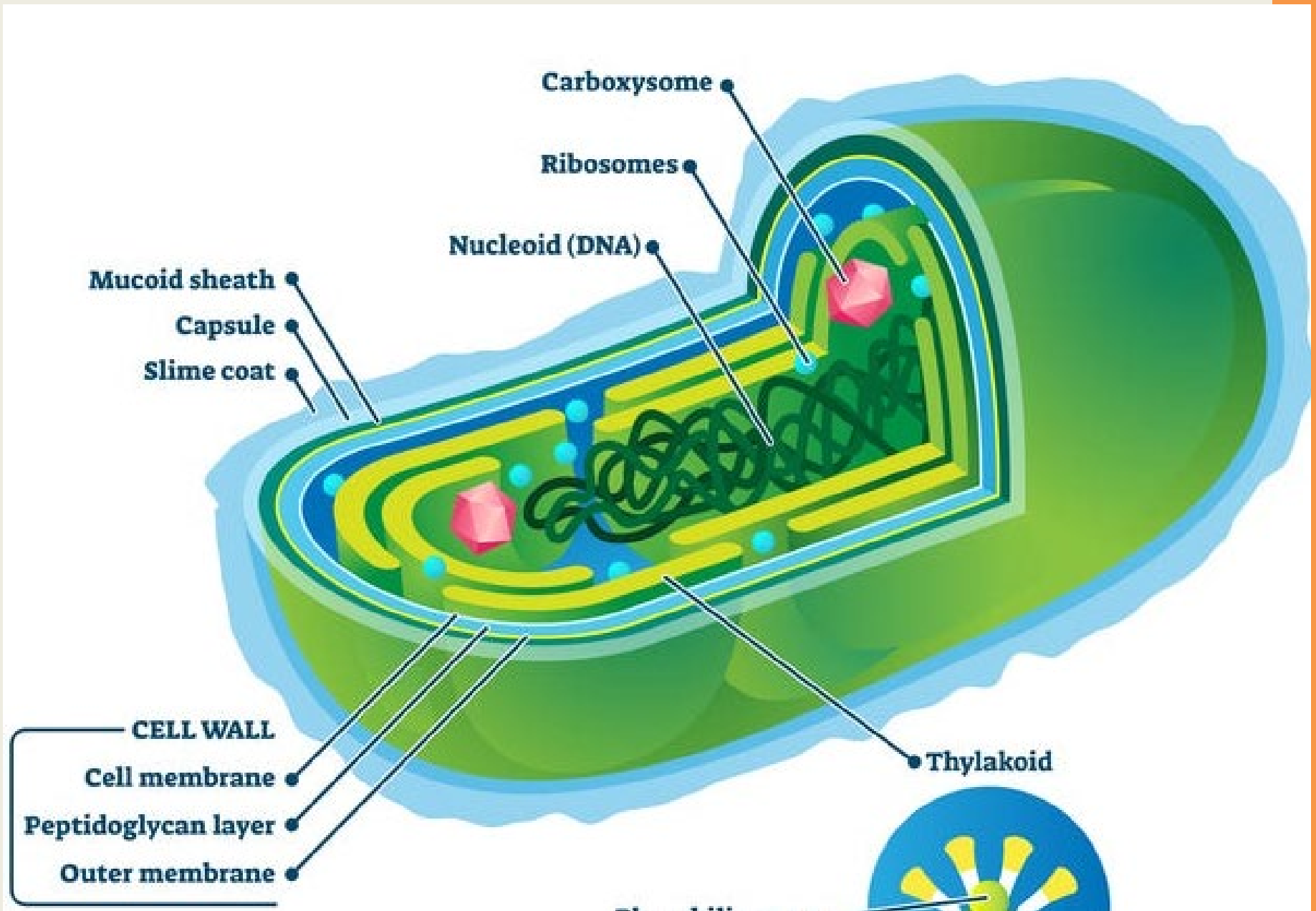
3 Domains:

Archea
Eukaraya
Bacteria

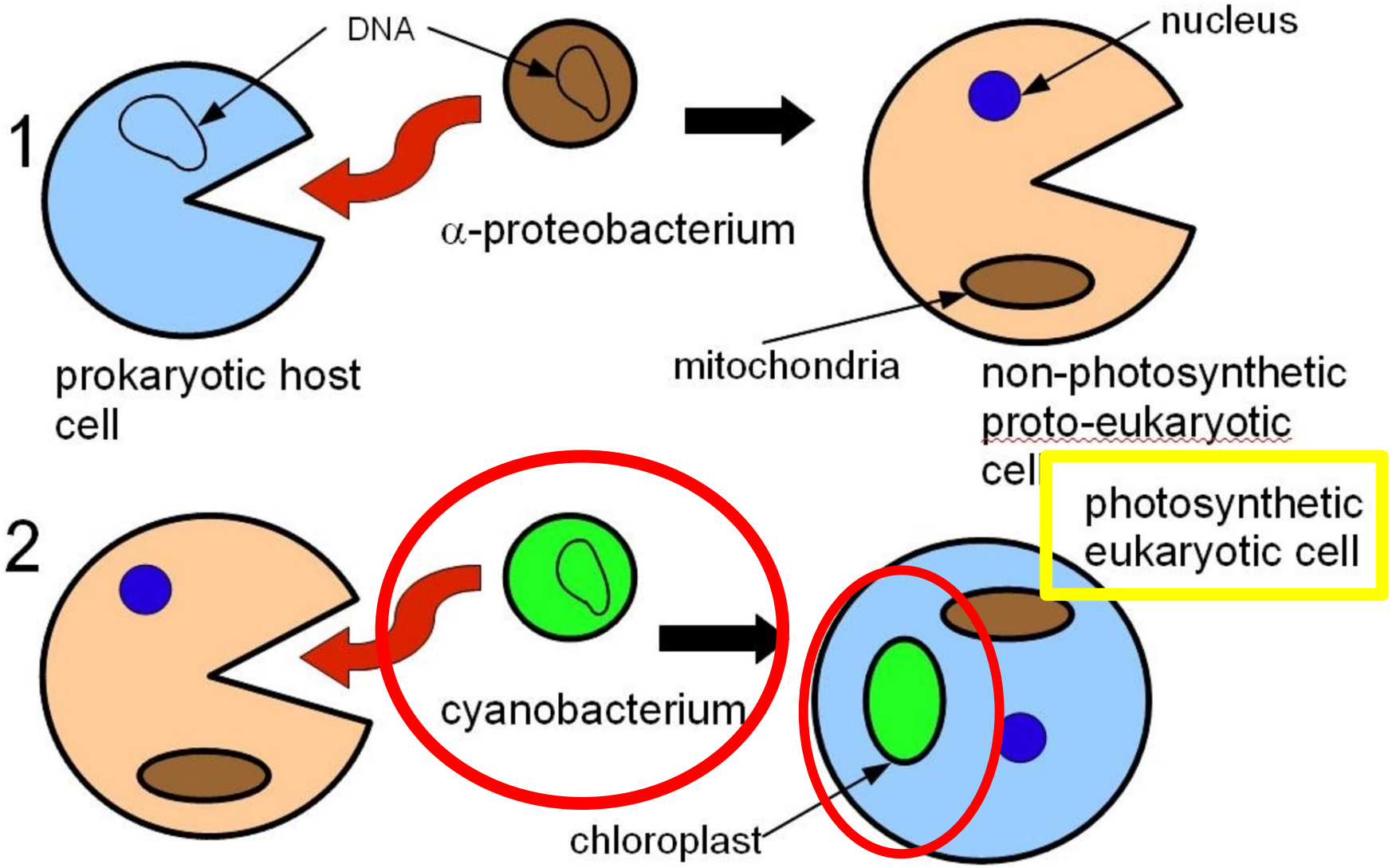
6 Kingdoms:

Animal
Fungi
Protist
Bacteria
Acrchea

CYNOBACTERIA-BACTERIA THAT PHOTOSYNTHESIZE



Two endosymbiotic events c.2.7 bya



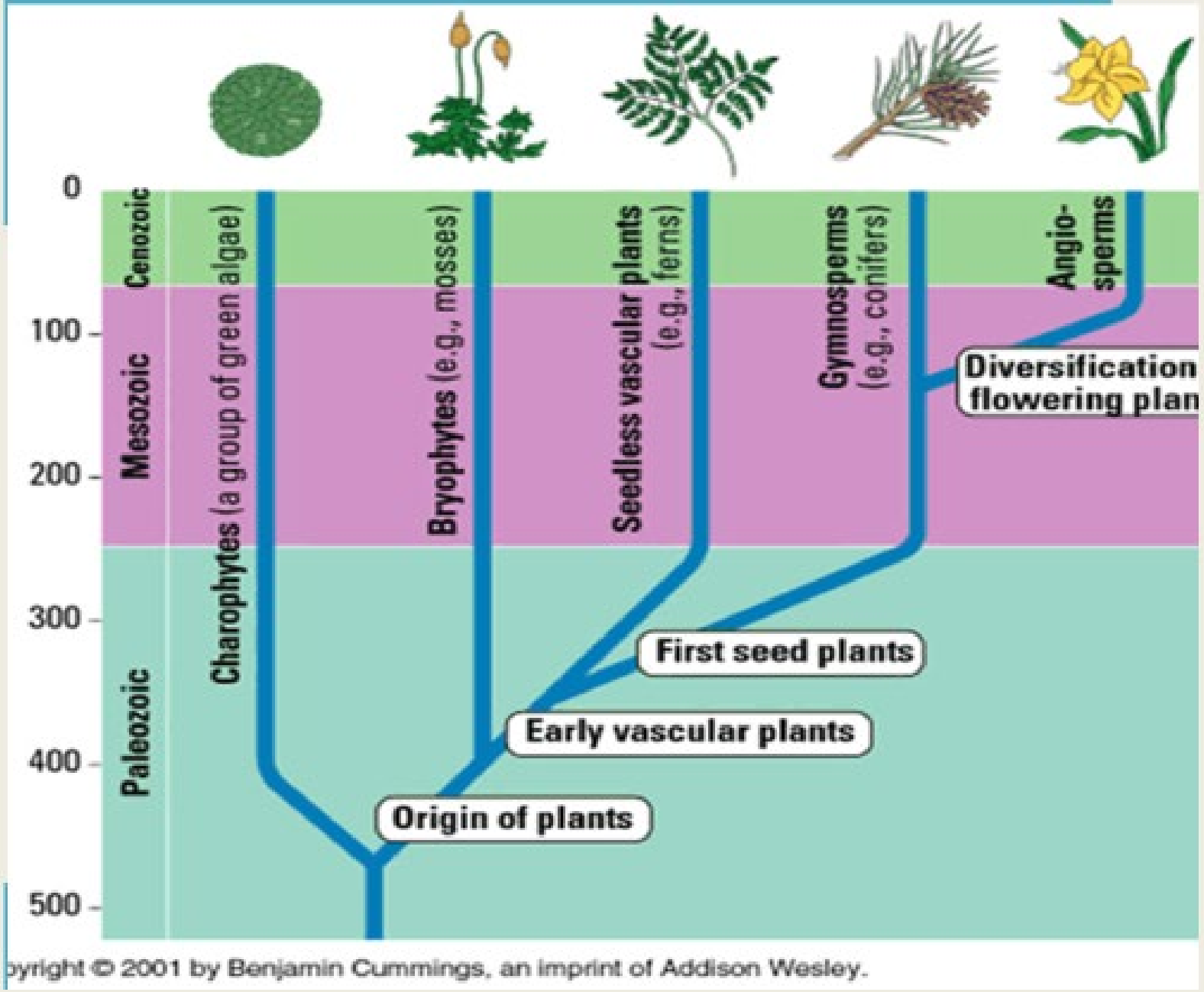
WHERE DID PLANTS COME FROM?

Cyanobacteria: Bacteria that contained blue/green algae (2.7 billion years ago)

Protoplants came up on to land and formed symbiotic relationship with fungi (470 m.y.a) because they could offer digest forms of rock and minerals; the algae provided glucose (sugar).

90% of plants have fungal associations via mycorrhizae with plants

EVOLUTION, STRUCTURE AND COMPLEXITY



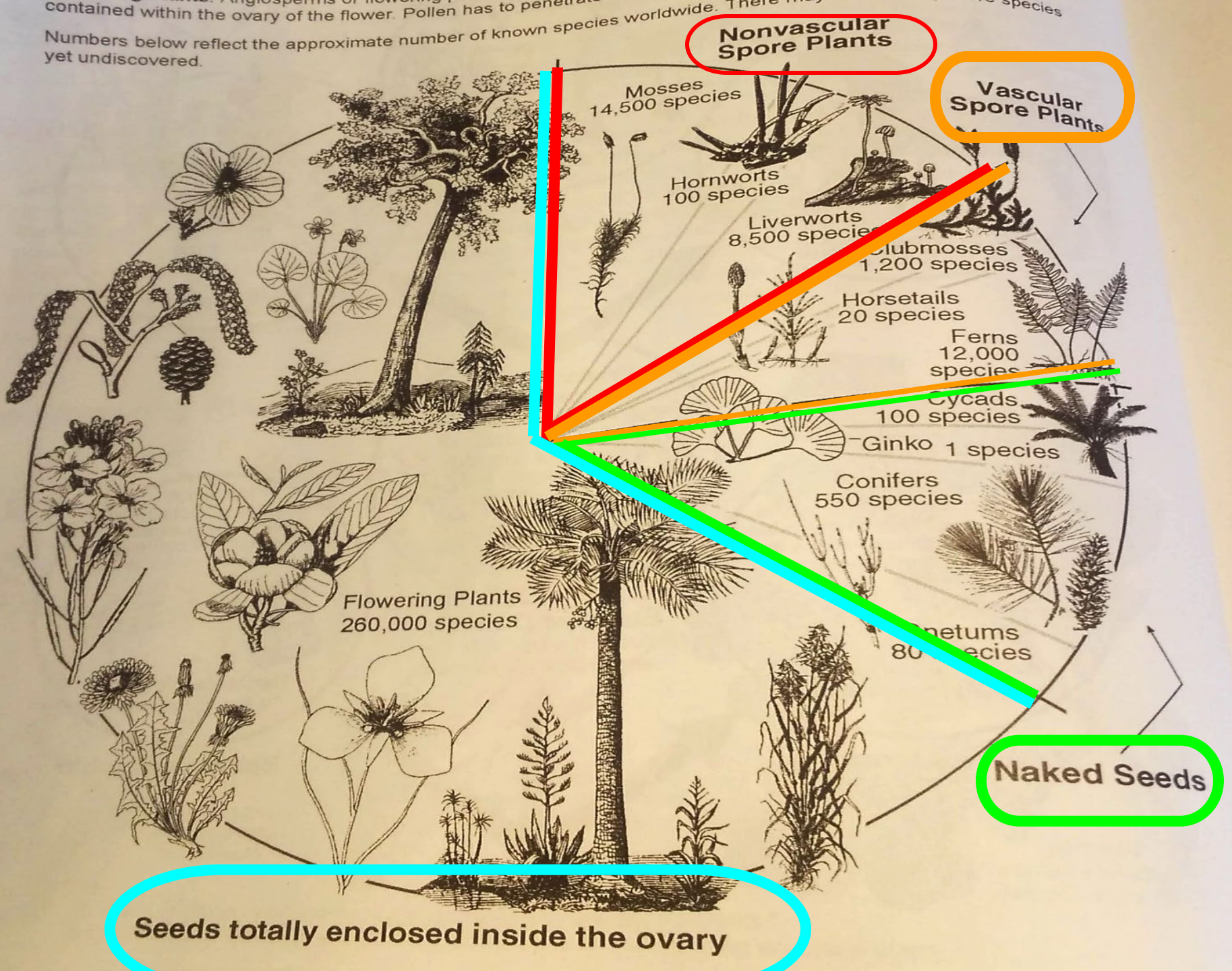
EVOLUTION, STRUCTURE AND COMPLEXITY (Elpel)

Botany in a Day Tutorial

Era	Period	Mil Years	Evolutionary Event
Cenozoic	Quarternary	0-1.65	Modern humans.
	Tert./Neogene	1.65-23	Human ancestors, horses, dogs, asters, pinks.
	Tert./Paleogene	23-65	Primates, deer, grasses, lilies, roses, peas, grapes.
Mesozoic	Cretaceous	65-143	Flowering plants spread. Broad-leaf trees, palms.
	Jurassic	143-213	First flowering plants. First birds.
	Triassic	213-248	First dinosaurs and mammals.
Paleozoic	Permian	248-290	Modern insects like dragonflies and beetles appear
	Pennsylvanian	290-323	Coal age— First cycads, ginkos, primitive conifers.
	Mississippian	323-362	Coal age— First winged insects. Reptiles.
	Devonian	362-408	Ferns, horsetails, club mosses. First amphibians.
	Silurian	408-440	Vascular plants, first millipedes. Fish with jaws.
	Ordovician	440-510	First fish. Plant/fungus symbiosis begins on land.
	Cambrian	510-570	Marine life: invertebrates, shells, predators.
Neo-Proterozoic		570-900	First multi-celled life, and first oceanic herbivores.
Meso-Proterozoic		900-1,600	Atmosphere oxygenated. First bisexual reproduction.
Paleo-Proterozoic		1,600-2,500	First Eukaryotic cells with nucleus and organelles.
Archean Eon		2,500-3,800	First simple bacteria & blue-green algae cells.
Hadean Eon		3,800-4,500	Earth's Crust and Oceans Form. No Life.

contained within the ovary of the flower. Pollen has to penetrate

Numbers below reflect the approximate number of known species worldwide. There may
yet undiscovered.



ALGAE
(Thallophyta)

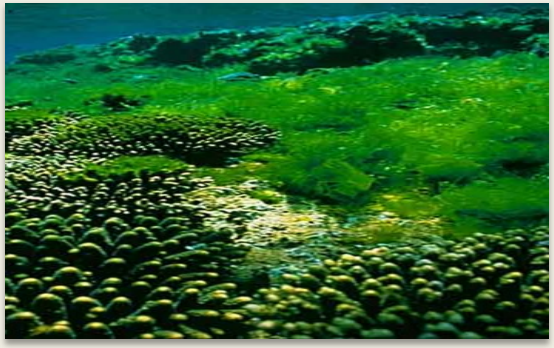
MOSSES, LIVERWORTS, HORNWORTS
(Bryophyta)

FERNS
(Pterophyta)

GYMNOSPERMS (CONIFERS)

ANGIOSPERMSS-
Flowering Plants

ALGAE

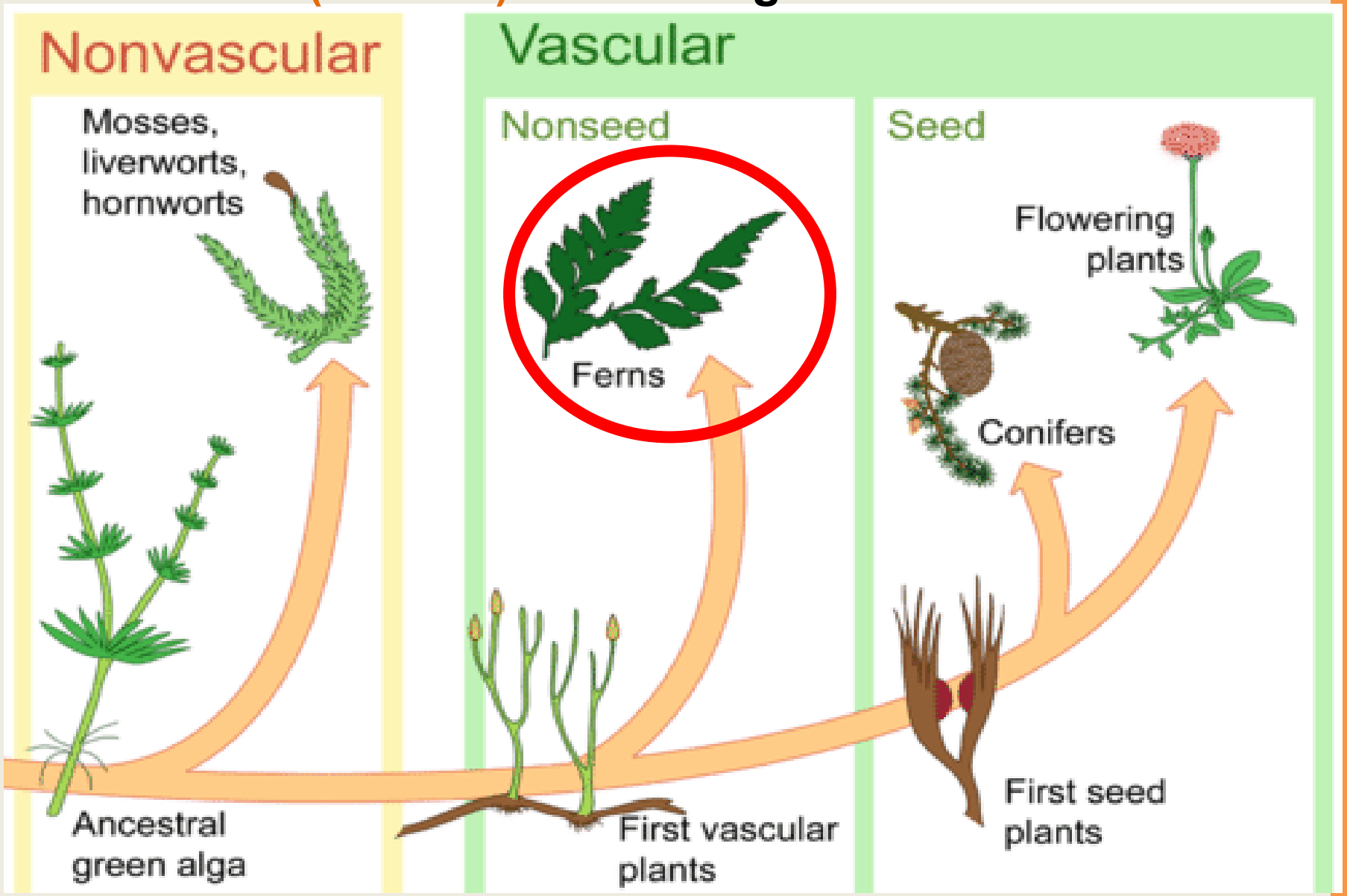


- NON VASCULAR: Lack true roots or stems and structures for transporting water
- ANCESTORS OF ALL PLANTS!
- STRUCTURALLY SIMPLE
- NEEDS TO BE AROUND OR IN H20 for REPRODUCTIVE CYCLES
- EXAMPLES: SEAWEED,BLUE GREEN SLIME

Mosses, Liverworts & Hornworts

- NON VASCULAR
- REPRODUCE THROUGH SPORES- GEMMAE CUP….SO COOL!!
- HAVE A BIT MORE STRUCTURE THAN ALGAE>>>>>>>>LESS DEPENDANT ON H20
- CHLOROPHYLL HANGS OUT WHEN ITS DRY
- Lots here in the rainforest!

First Vascular Plants: Means they have water (Xylem) and nutrient (Phloem) conducting tissues!



FERNS AND ALLIES
(CLUBMOSSES,HORSETAILS)

Vascular systems!

Allows more specialization of structure so we get…….

ROOTS!

BARK!!

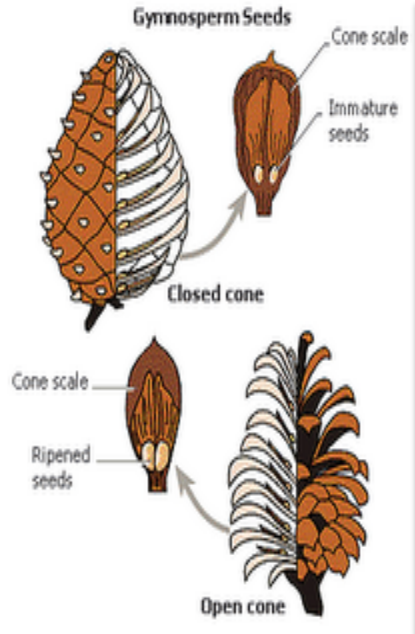
LEAVES!!!

BRANCHES!!!!

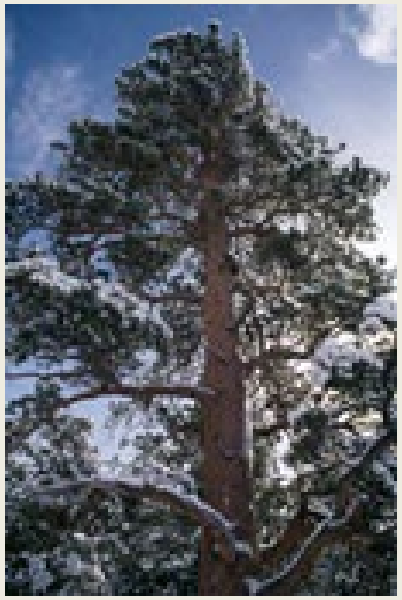
Allows plants to stand upright & utilize sunlight

- **STILL USE SPORES FOR REPRODUCTION**
- **STILL DEPENDENT ON H2O FOR SPORES TO GERMINATE**

GYMNOSPERMS-CONIFERS

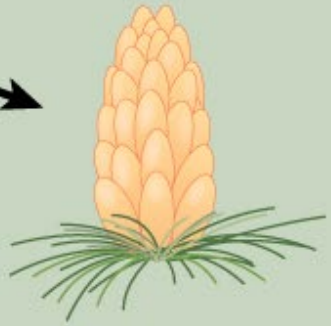


- VASCULAR
- NAKED = “GYMNO” +
  SEED= “SPERM”
- CONES WITH SEEDS!
- WIND POLLINATED (brrrr….naked!)
- CONIFERS!



Sporophyte (2*n*)
(mature tree)

Female cones grow in the upper branches where they may be fertilized by pollen blown on the wind from the male cones.

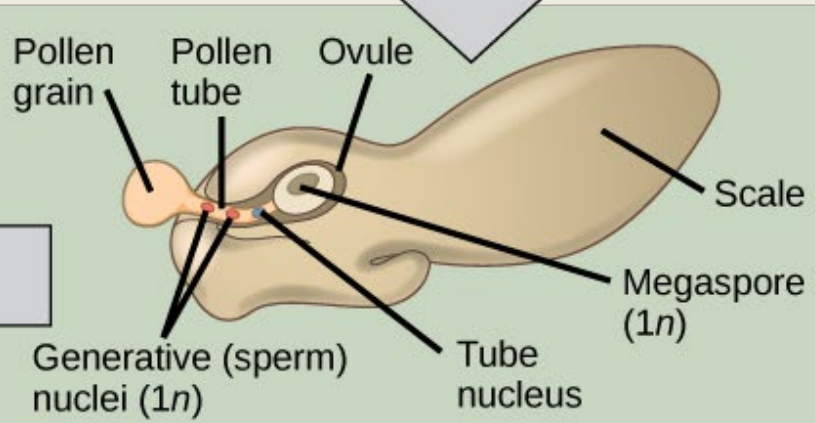


Male cones grow in the lower branches.

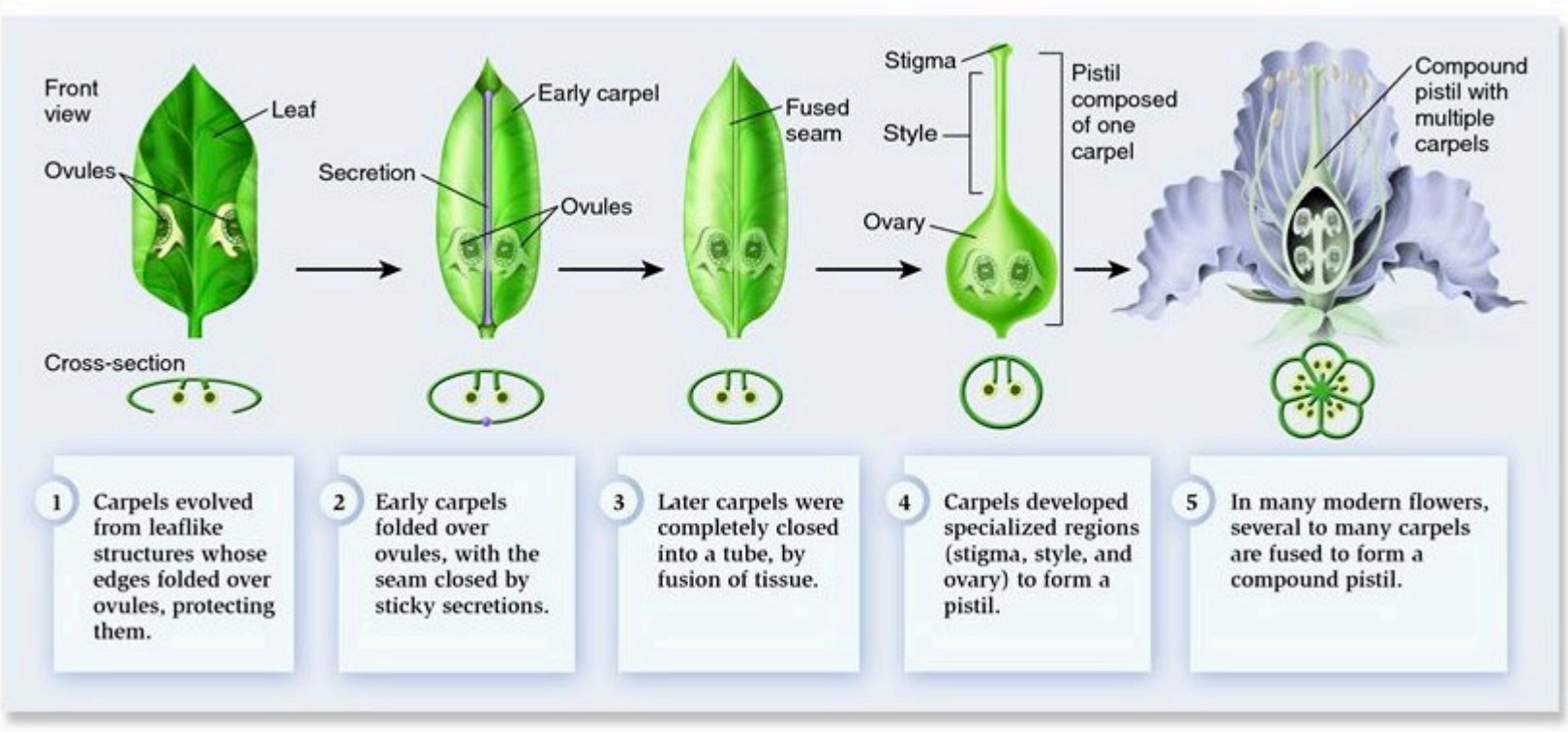
Female cone

Male cone

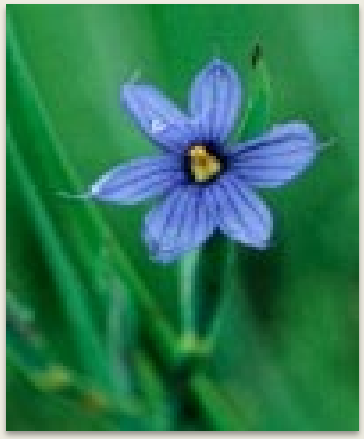
Seeds are dispersed and grow into mature trees.



A pollen tube forms, allowing the pollen to migrate toward the female gametophyte. Upon fertilization, a diploid zygote forms.


Front view
Leaf
Ovules
Cross-section
Secretion
Early carpel
Ovules
Fused seam
Stigma
Style
Ovary
Pistil composed of one carpel
Compound pistil with multiple carpels
1 Carpels evolved from leaflike structures whose edges folded over ovules, protecting them.
2 Early carpels folded over ovules, with the seam closed by sticky secretions.
3 Later carpels were completely closed into a tube, by fusion of tissue.
4 Carpels developed specialized regions (stigma, style, and ovary) to form a pistil.
5 In many modern flowers, several to many carpels are fused to form a compound pistil.

ANGIOSPERM-FLOWERING PLANTS



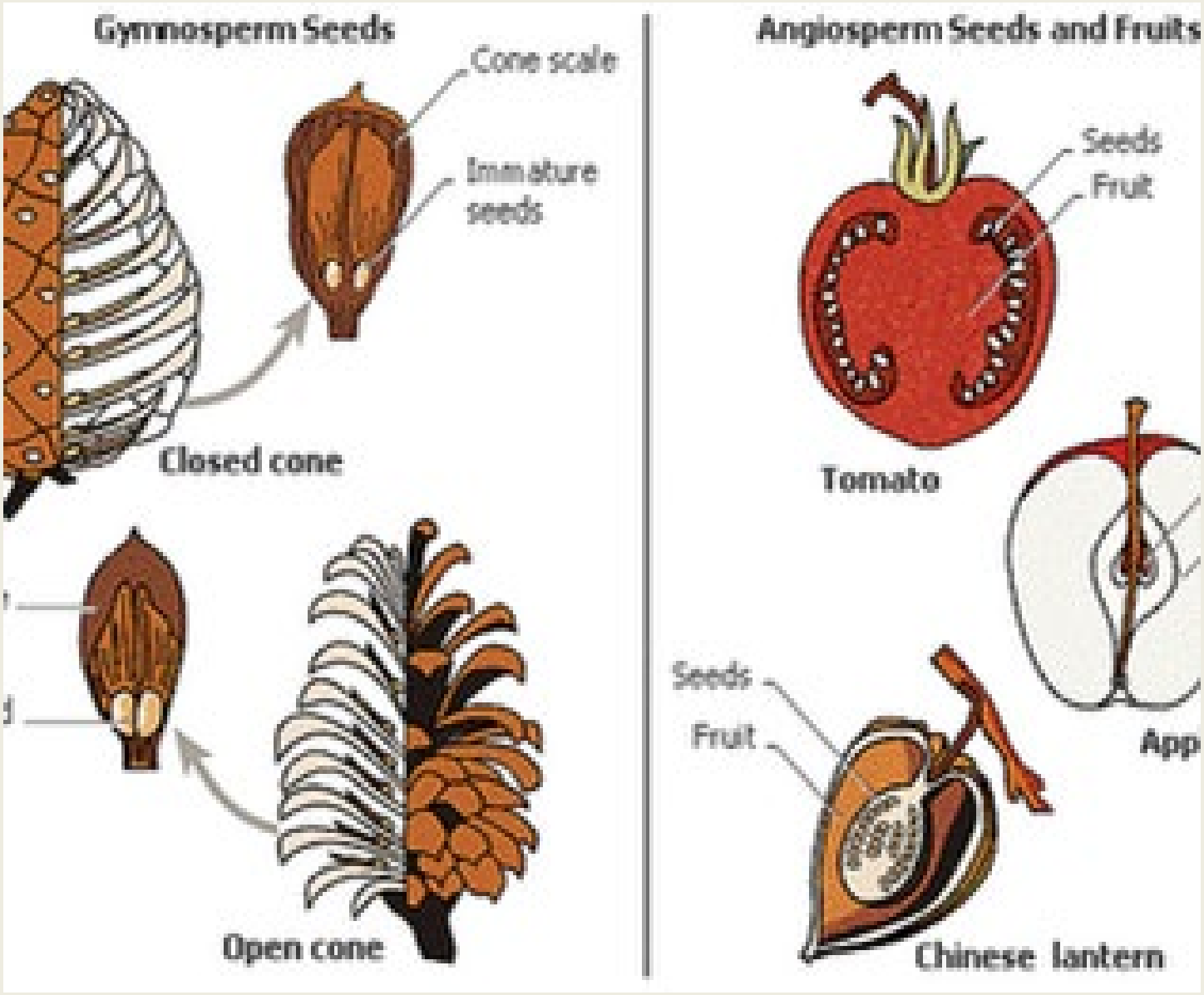
- VASCULAR
- "ANGIO"= COVERED
  "SPERM"=SEED
  (Ginko story)

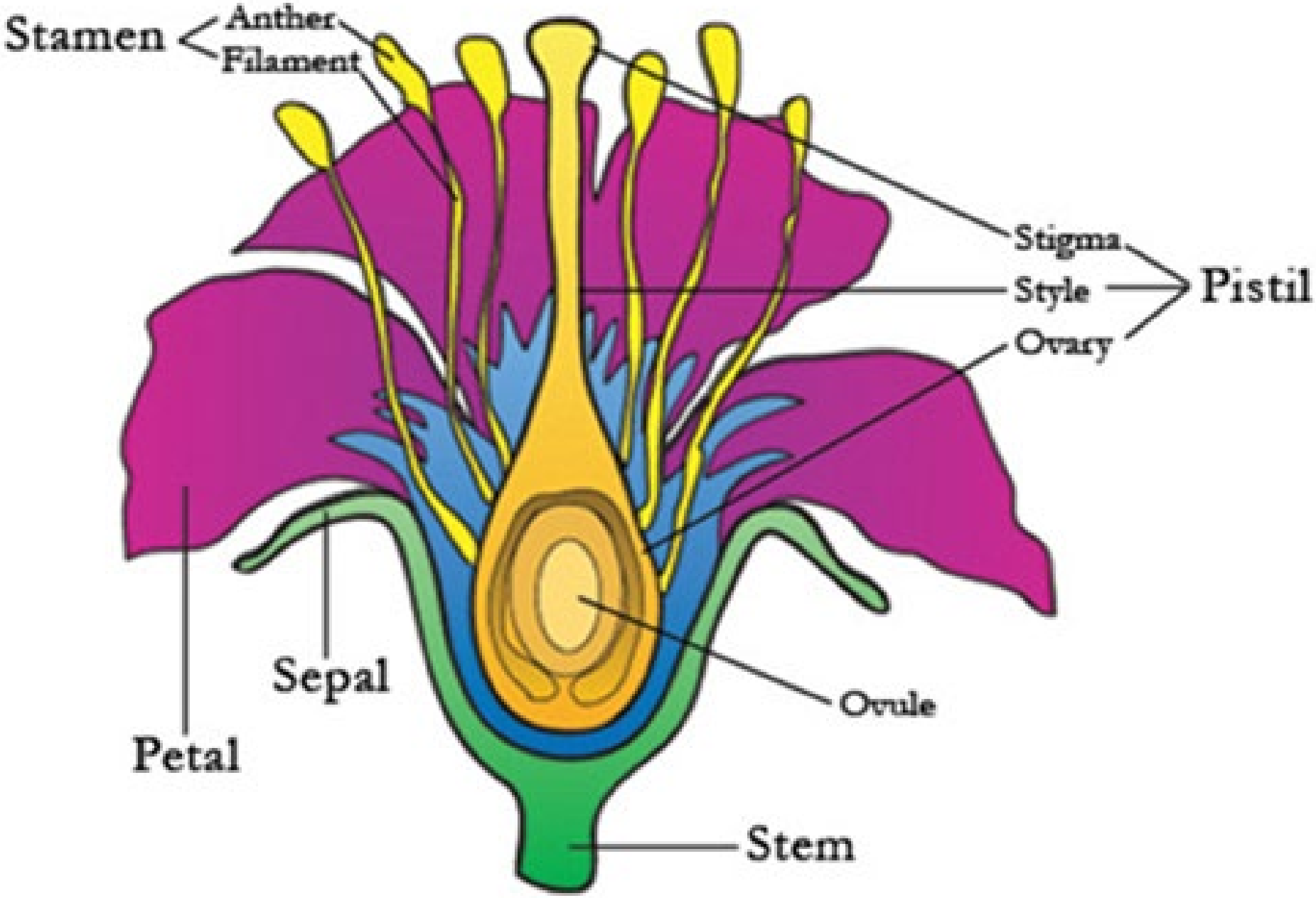
FLOWERS AND THEIR STRUCTURES!

-Petals!

-Pollinators

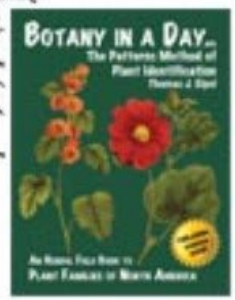
-Fruit


Gymnosperm Seeds
Cone scale
Immature seeds
Closed cone
Open cone
Angiosperm Seeds and Fruits
Seeds
Fruit
Tomato
Seeds
Fruit
Chinese lantern

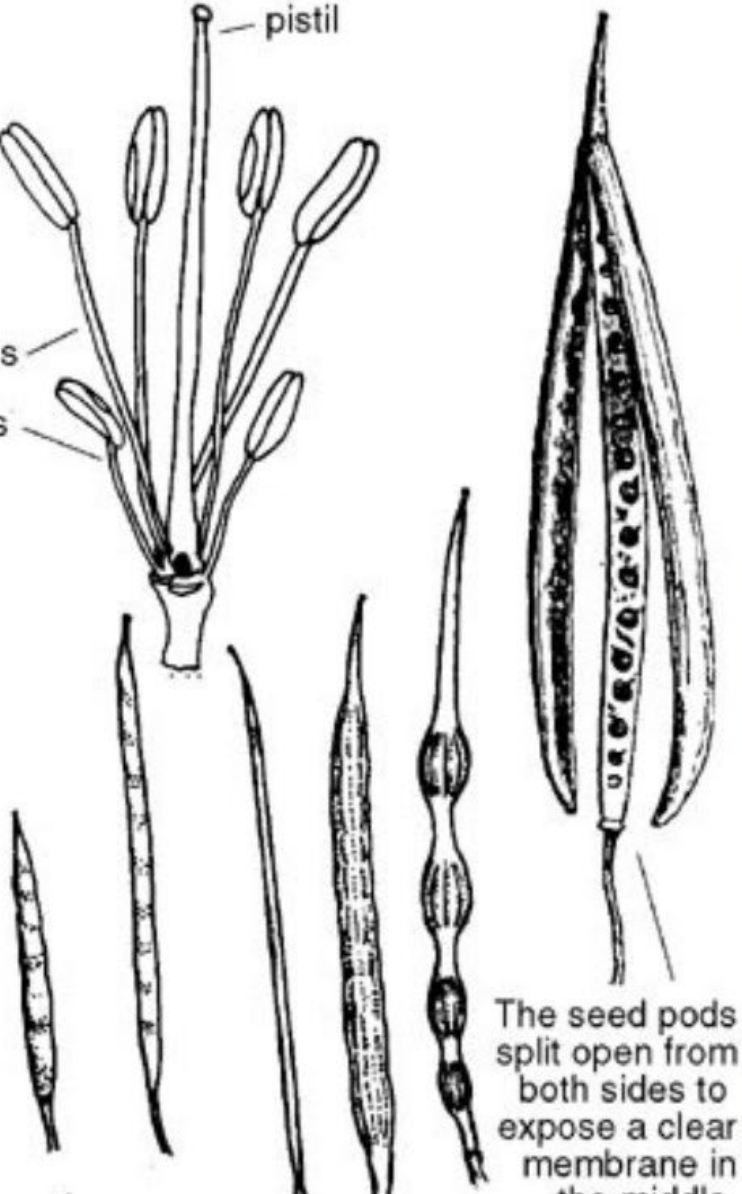

Stamen
Anther
Filament
Stigma
Style
Pistil
Ovary
Sepal
Ovule
Petal
Stem

Patterns of the Mustard Family

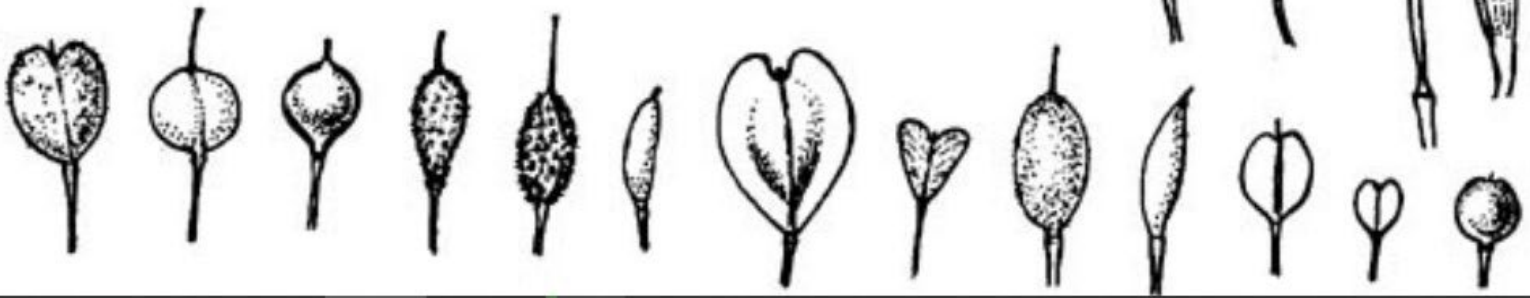
Wall Flower

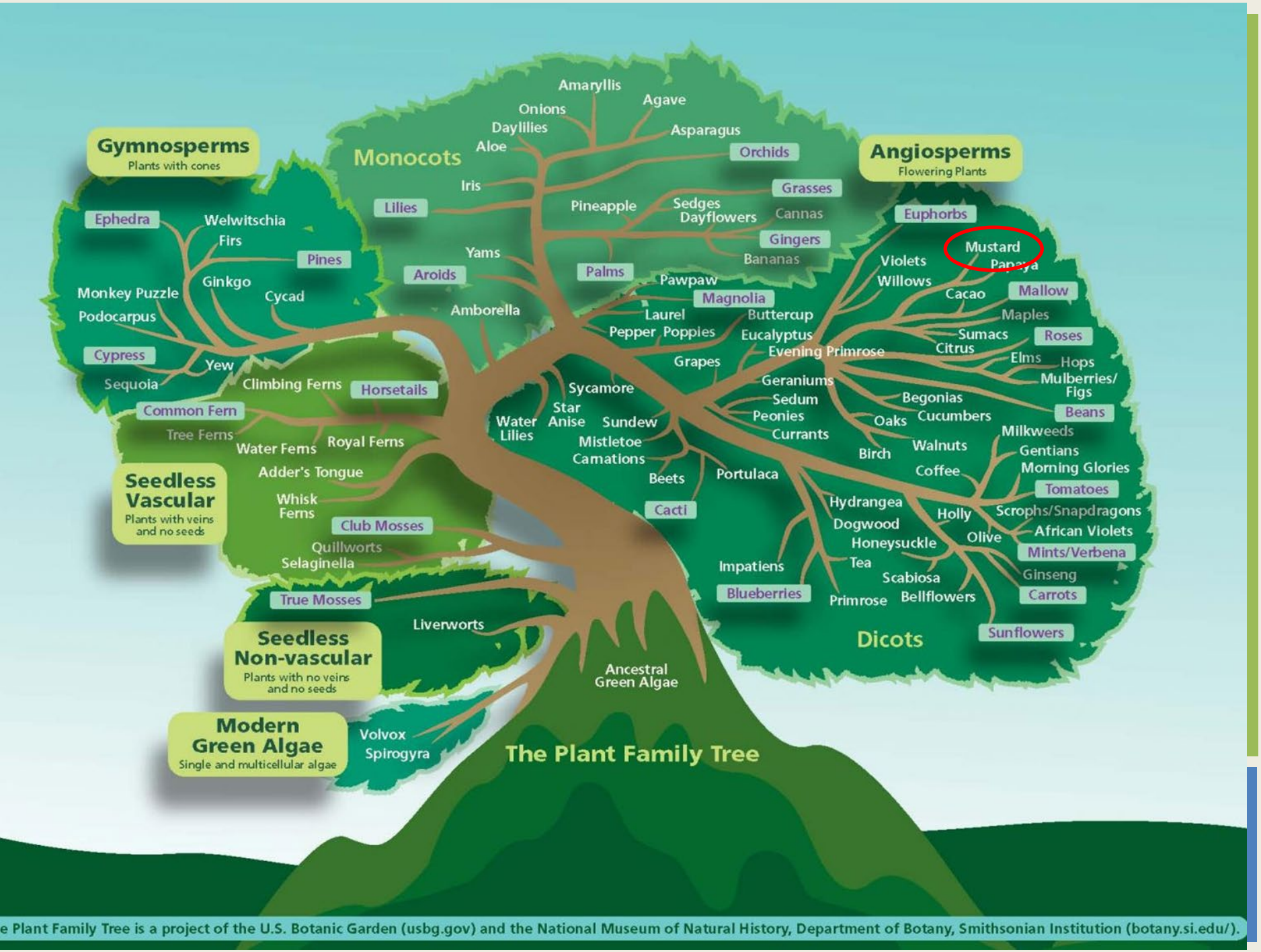


Mustard seed pods come in many shapes and sizes, but always occur on the plant in the same radial pattern around the stalk, a "raceme".



The seed pods split open from both sides to expose a clear membrane in the middle.





e Plant Family Tree is a project of the U.S. Botanic Garden (usbg.gov) and the National Museum of Natural History, Department of Botany, Smithsonian Institution (botany.si.edu/).