

# HOW DID PLANTS MAKE IT TO LAND?

OCTOBER 22, 2013

CATALYST: WRITE DOWN ONE QUESTION  
FROM THE TEST CORRECTIONS YOU  
NEED HELP WITH OR WERE CONFUSED  
ABOUT.

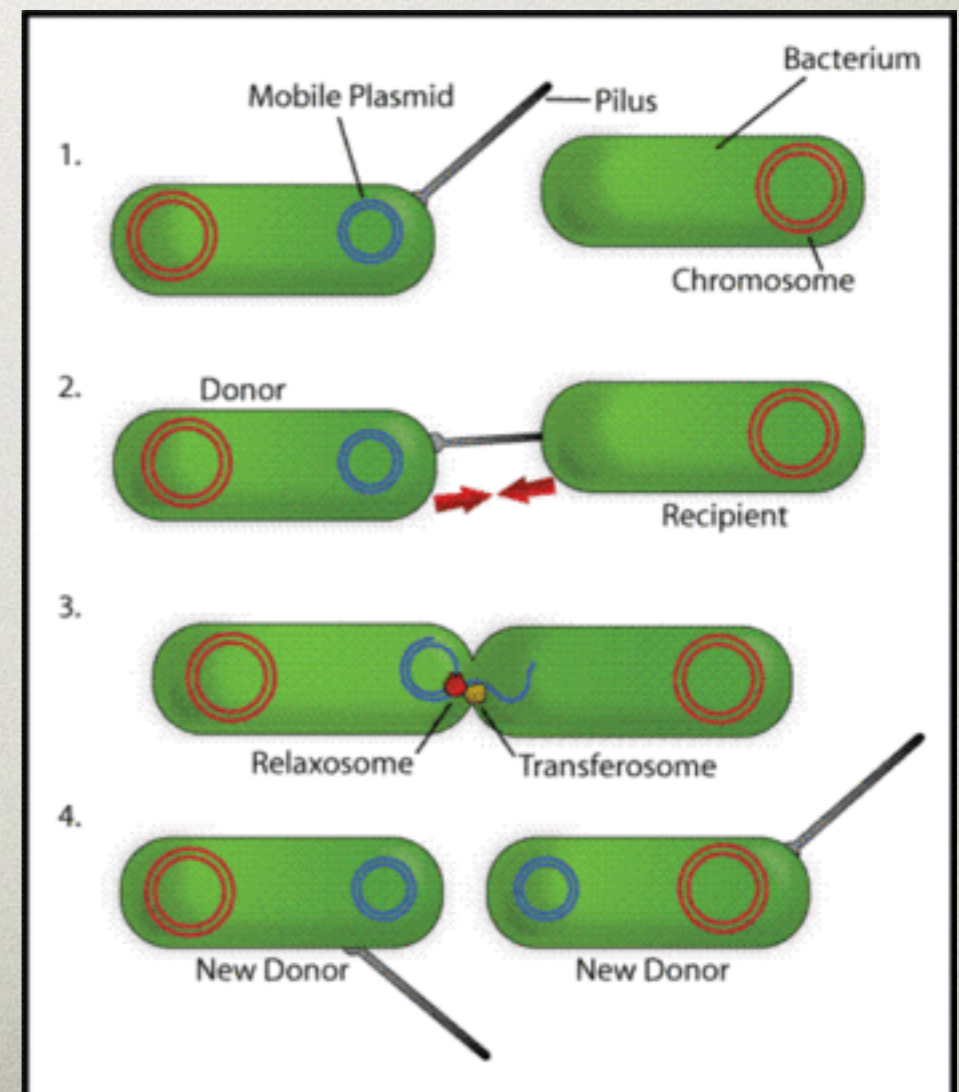
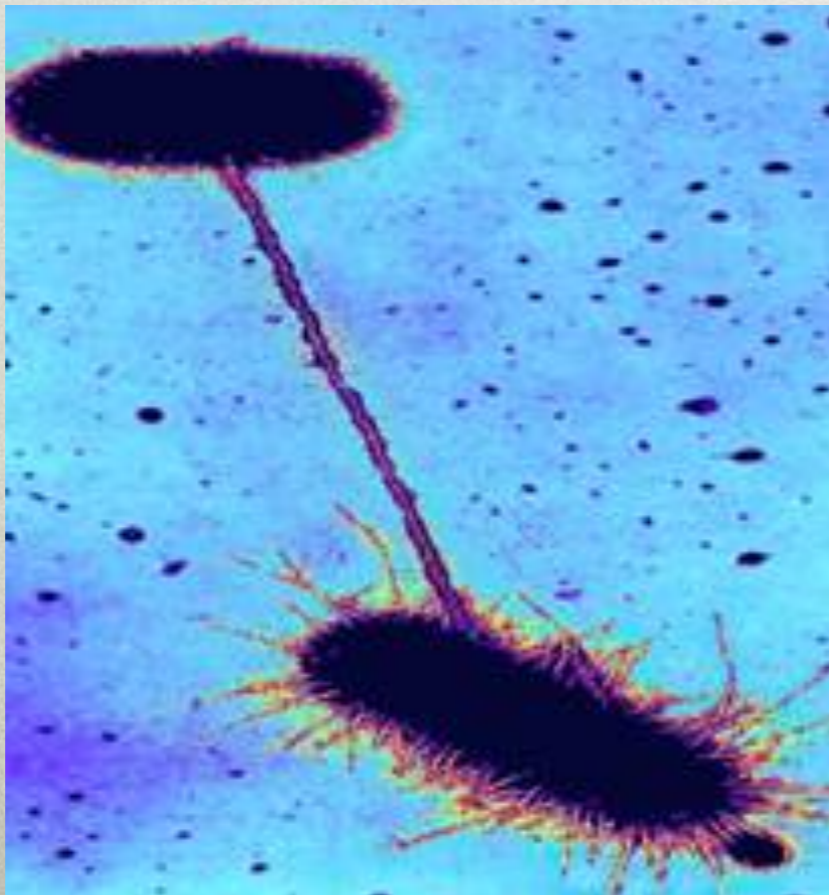
# AGENDA

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- Sex and Multicellularity
- Terrestrial Plants
- Fungi
- Questions
- Vocabulary practice

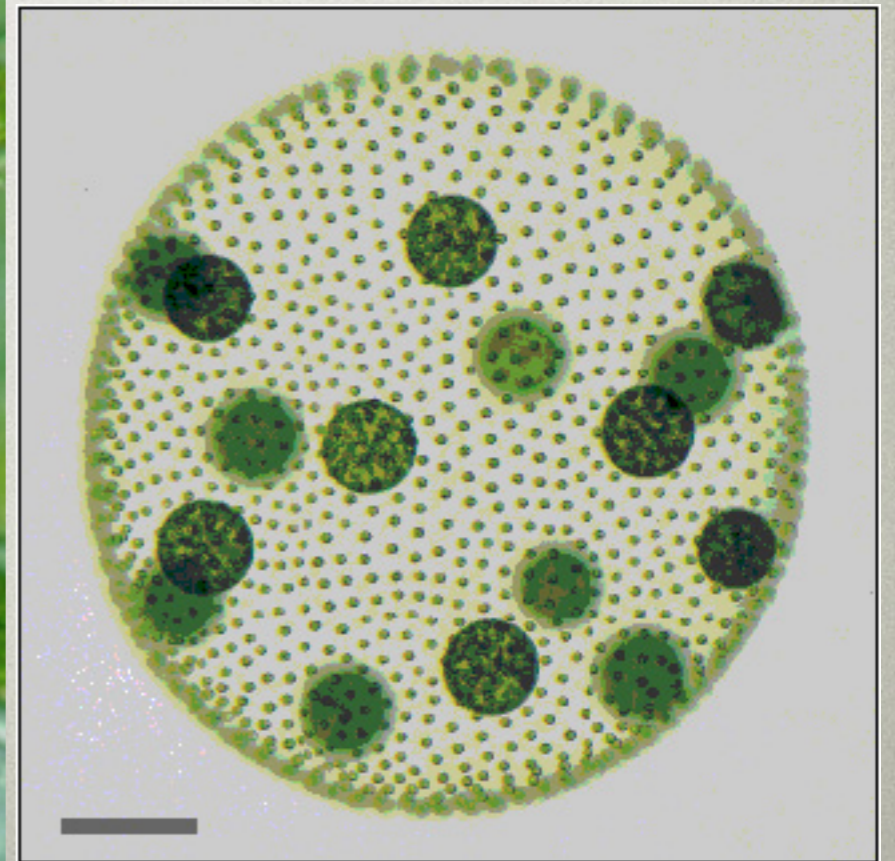
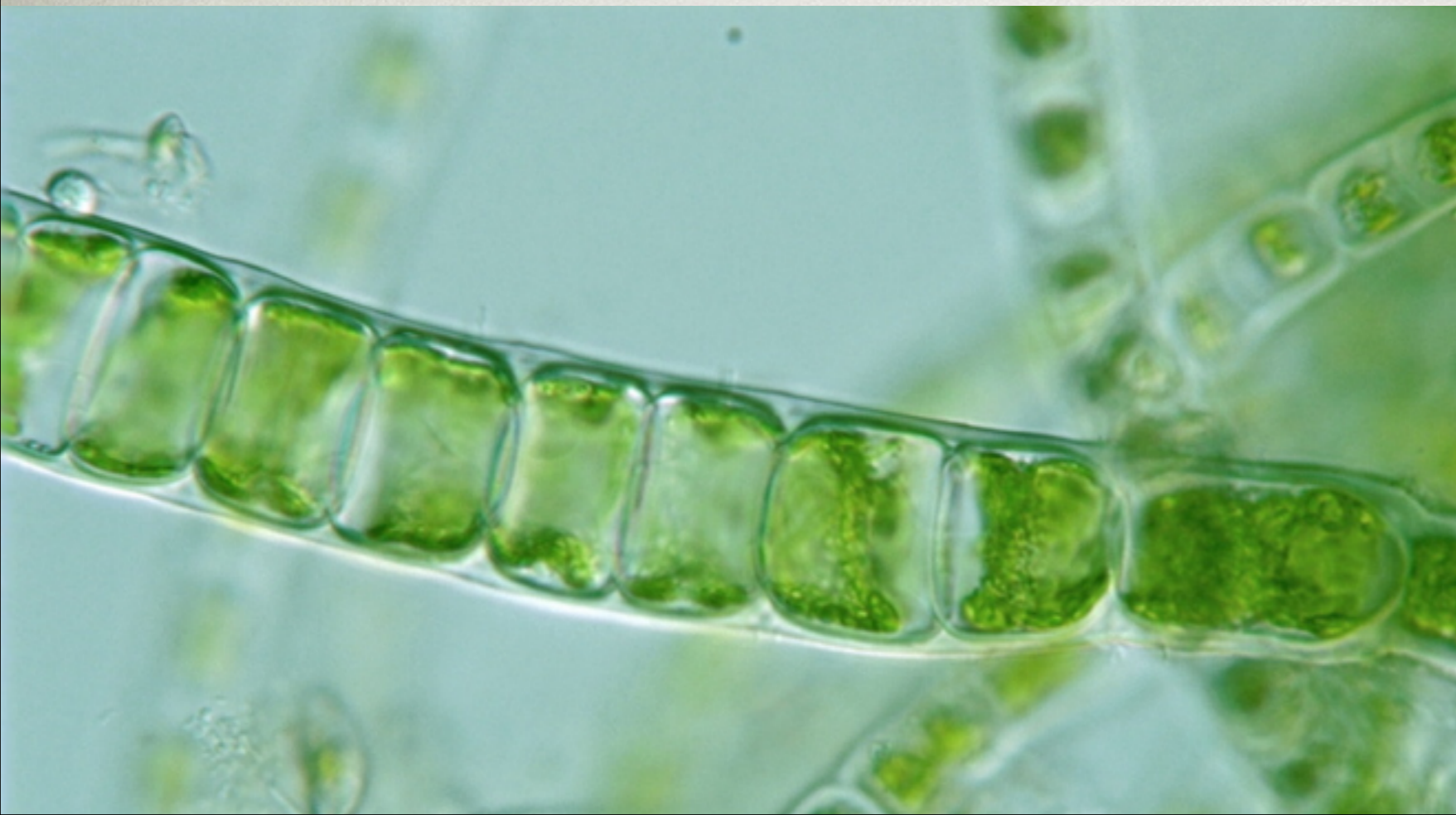
# EUKARYOTES

- Development of sexual reproduction important
- Increases genetic diversity, can increase fitness quickly



# EUKARYOTES

- The next major step of evolution was the organization of multicellular organisms
- Began with simple organisms, like algae



# TRANSITION TO LAND

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1. Algae inhabited areas near land, had occasional drying
2. Selection favors plants that can survive out of water
3. Became terrestrial

# PROS AND CONS OF TERRESTRIAL LIFE

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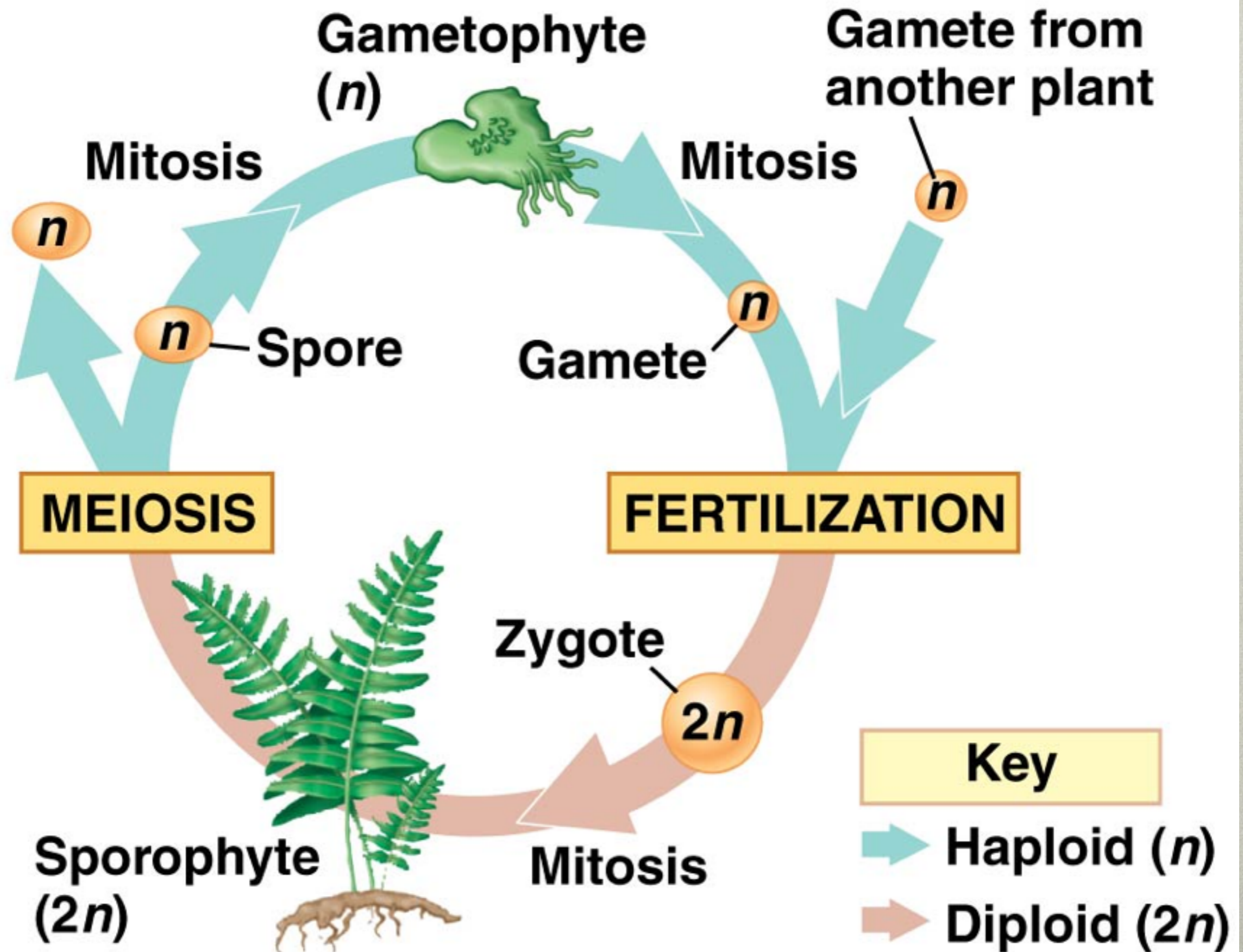
- Pro: more access to sunlight, more CO<sub>2</sub> than water, rich soil
- Con: scarcity of water, lack of support against gravity

# TERRESTRIAL PLANT ADAPTATIONS

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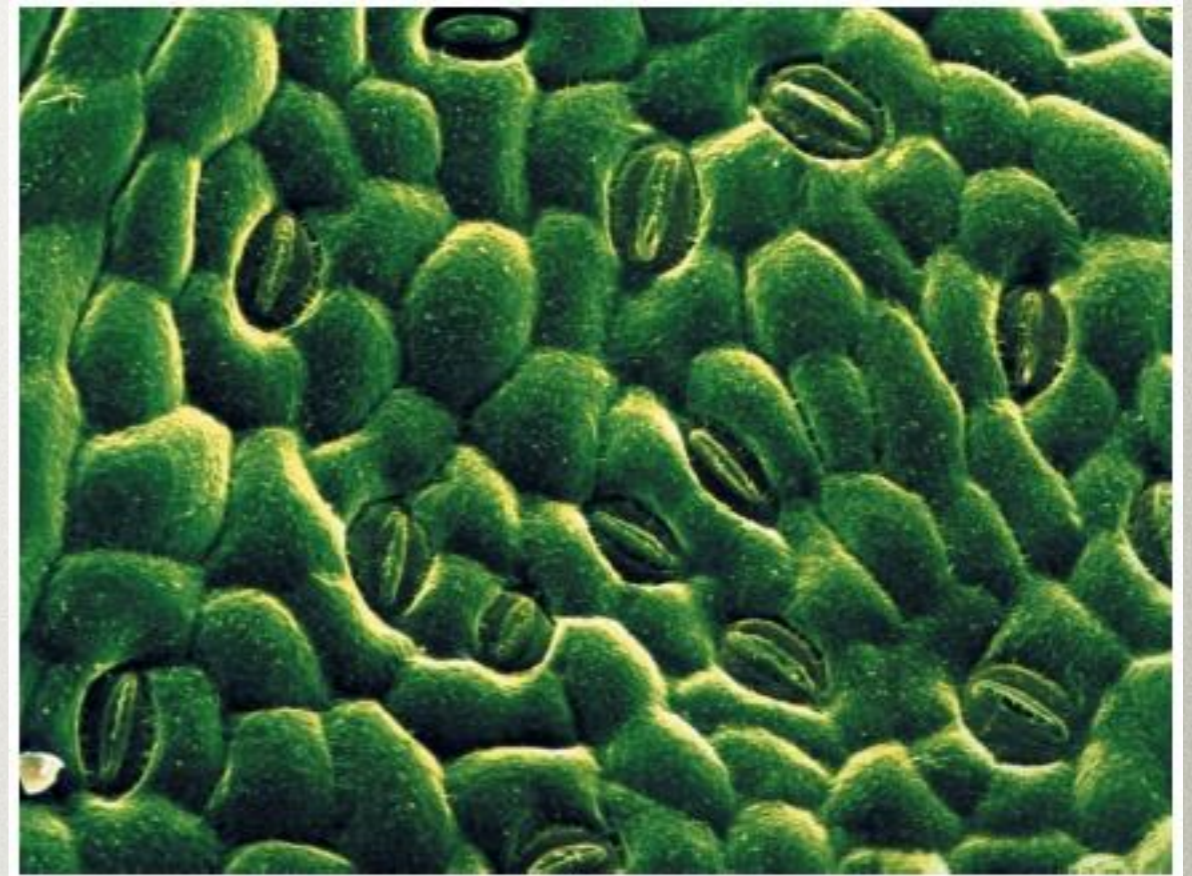
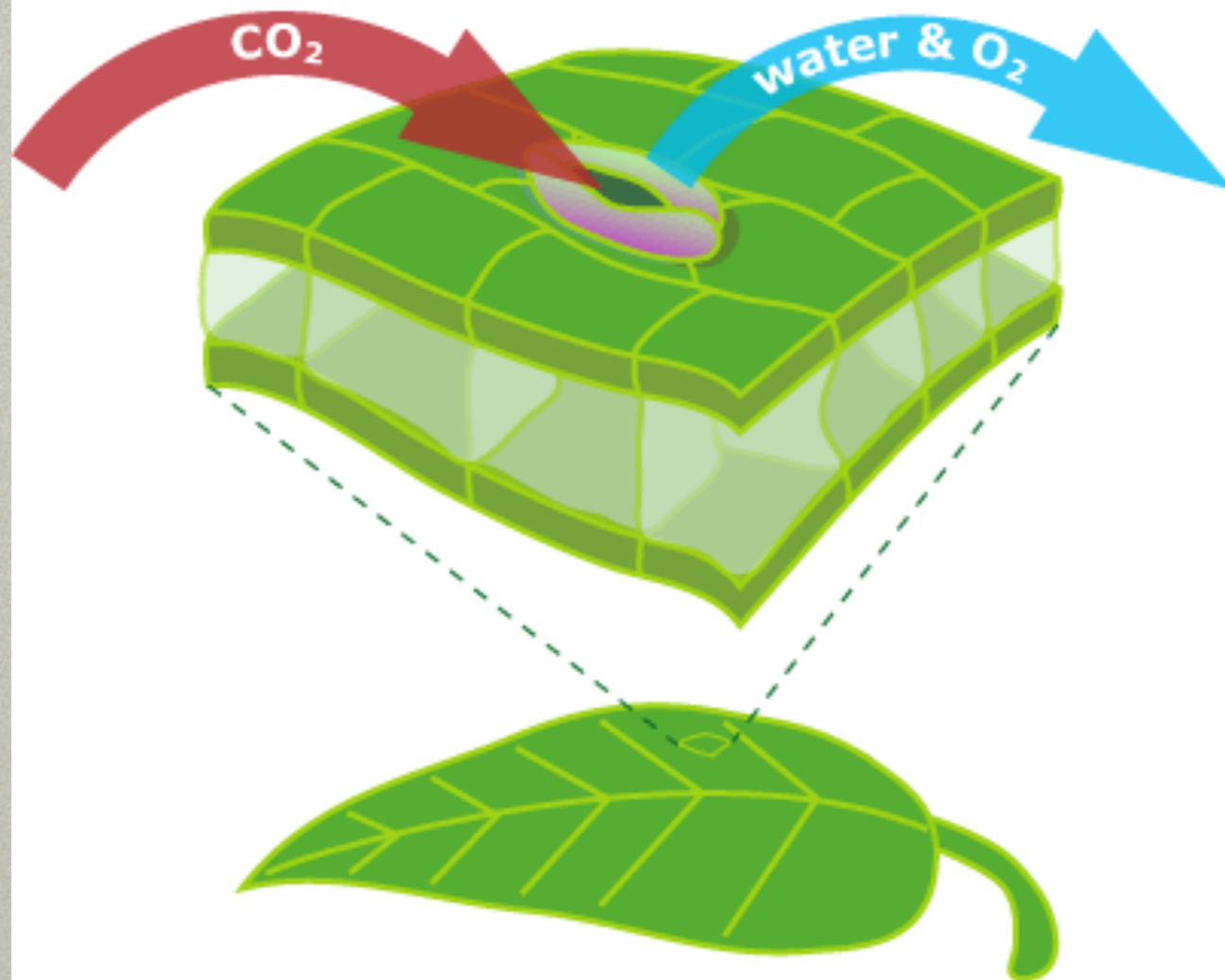
1. Alternation of generations
  - 1.1. Gametophytes - sex cell producing
  - 1.2. Sporophytes - spore producing
2. Cuticle - waxy covering
3. Stomata - pores that allow gas exchange

# Alternation of generations



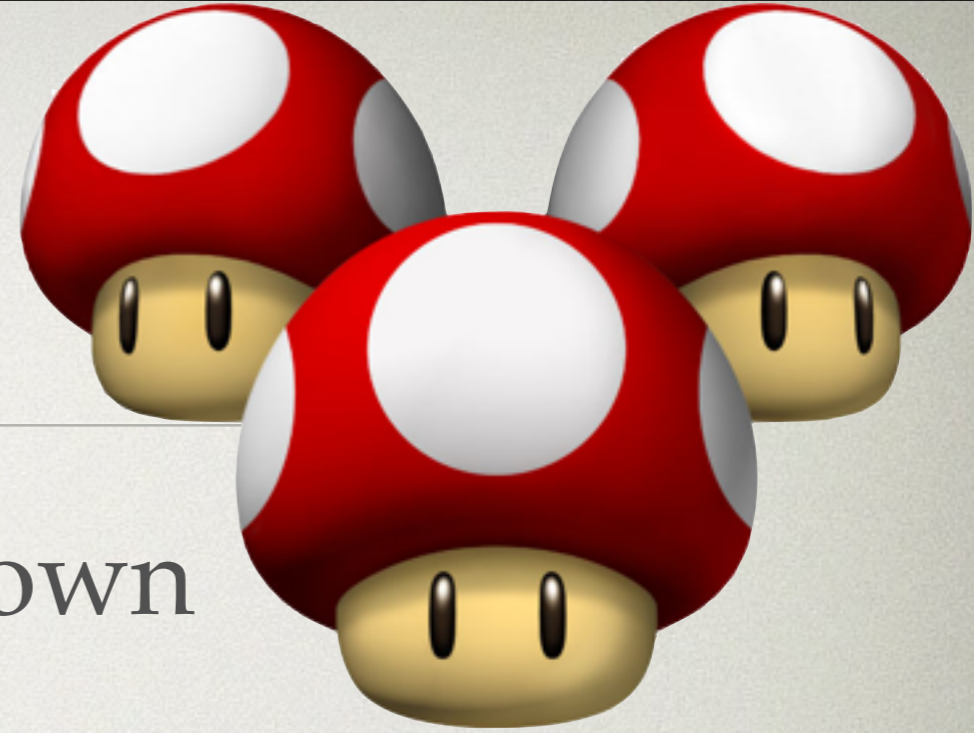


Carbon dioxide enters, while water and oxygen exit, through a leaf's stomata.



# FUNGI

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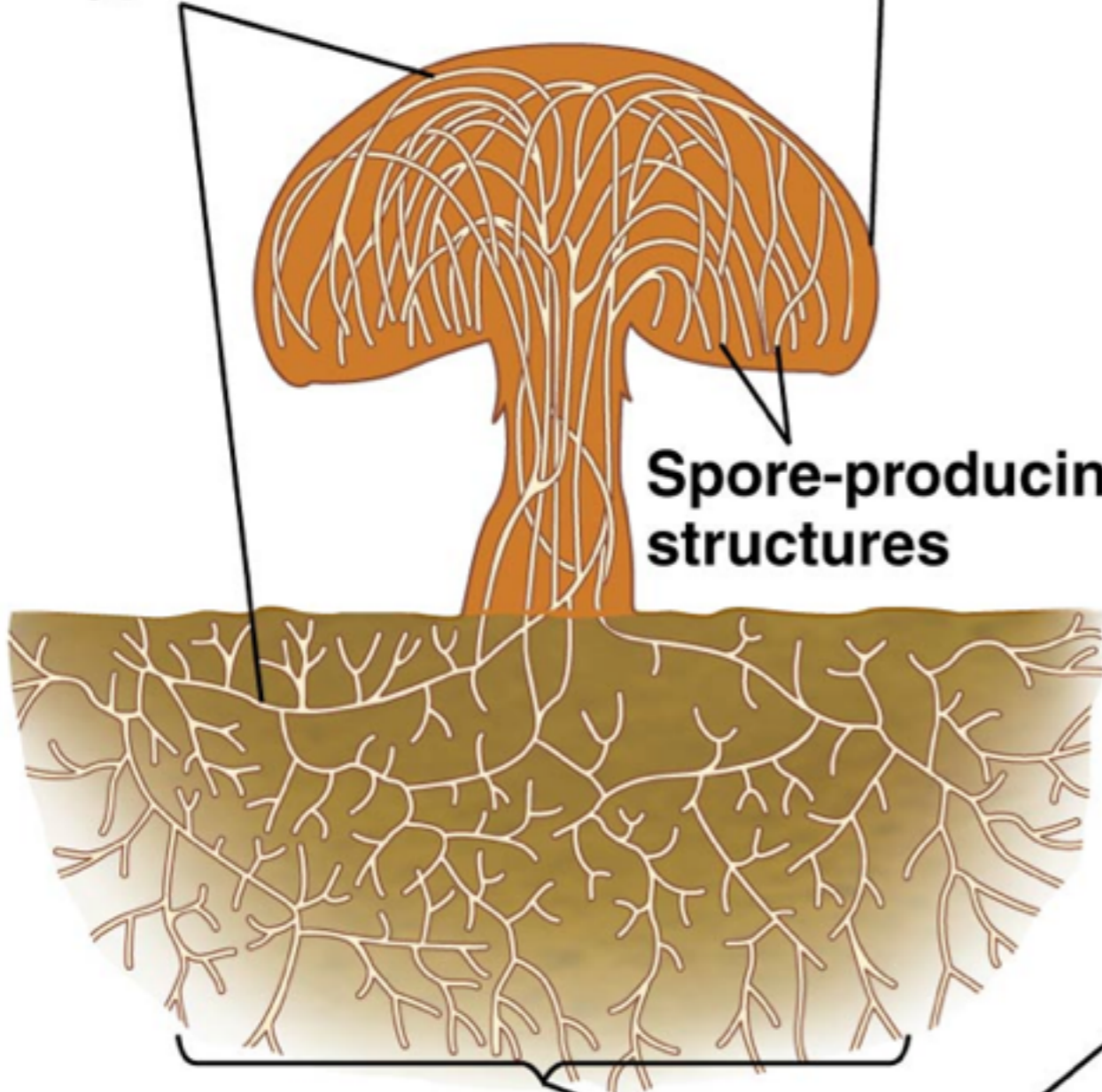


- Heterotroph - do not produce own energy
- Absorb nutrients from living and dead
- Cell walls have protein (chitin) to prevent bursting
- More closely related to animals than plants

**Reproductive structure**

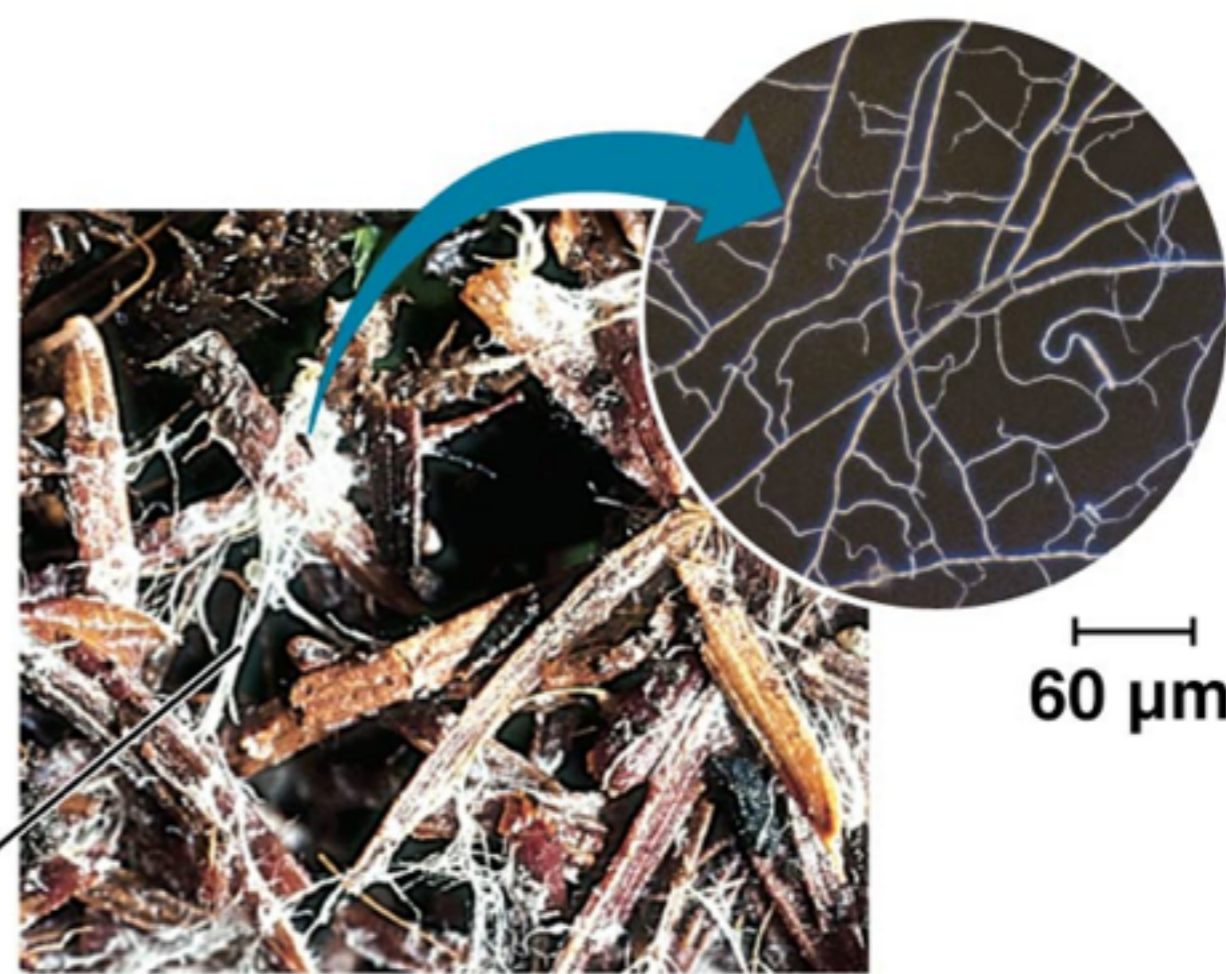


**Hyphae**

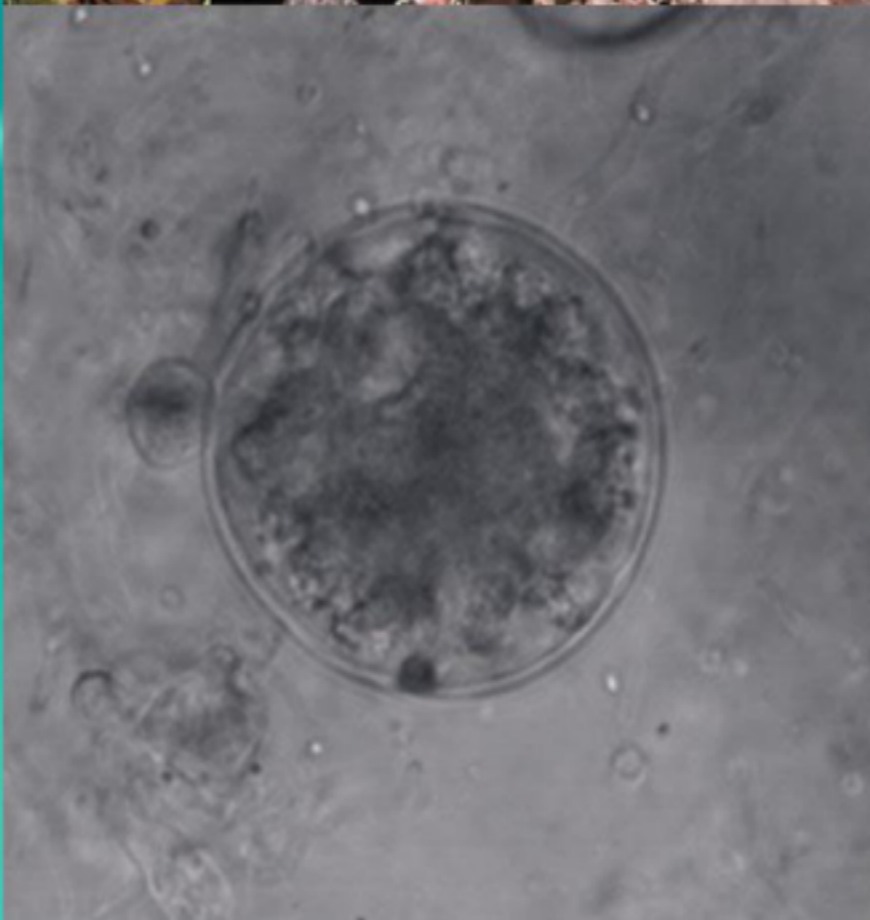
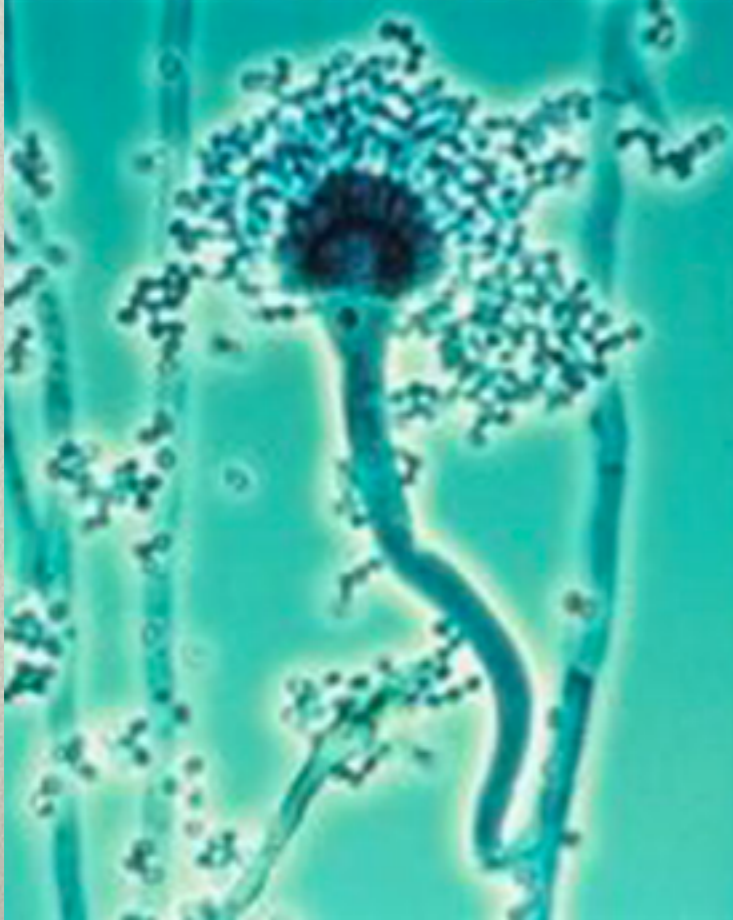


**Spore-producing structures**

**Mycelium**



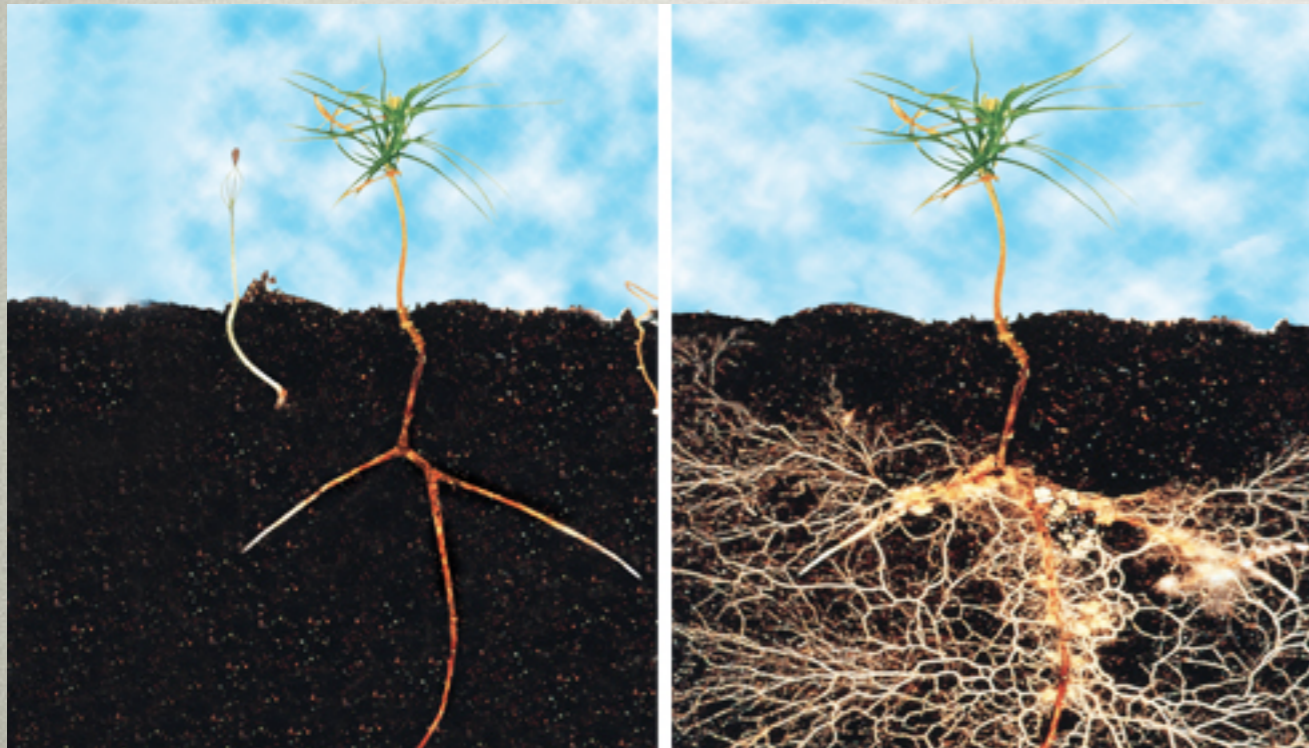
60  $\mu\text{m}$



# MYCORRHIZAE

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- Mutually beneficial fungi - plant root relationship
- Fungi improve ion delivery
- Plants provide food for fungi



# TERRESTRIAL PLANTS

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- Vascular - has xylem and phloem that transport water and nutrients (ex: trees, bushes, shrubs, flowers)
- Bryophytes - non - vascular plants (mosses)



# TERRESTRIAL PLANTS

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Bryophytes (mosses)



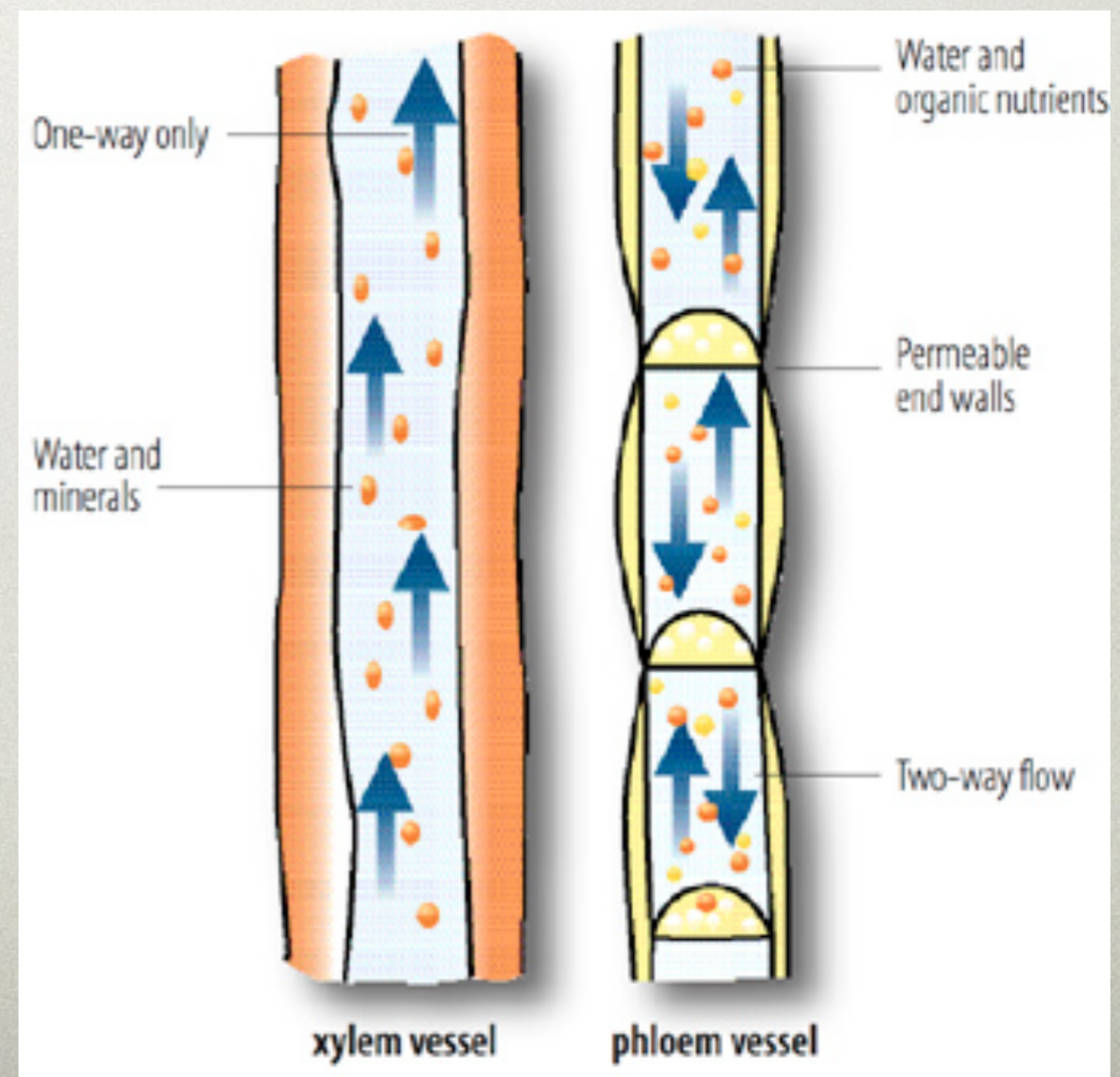
Seedless Vascular plants (ferns)



Seed bearing Vascular plants (trees,  
flowering plants)

# VASCULAR ADAPTATIONS

1. Xylem - carries water and minerals
2. Phloem - carries sugars, amino acids, other products
3. Leaves and roots





# THE SEED

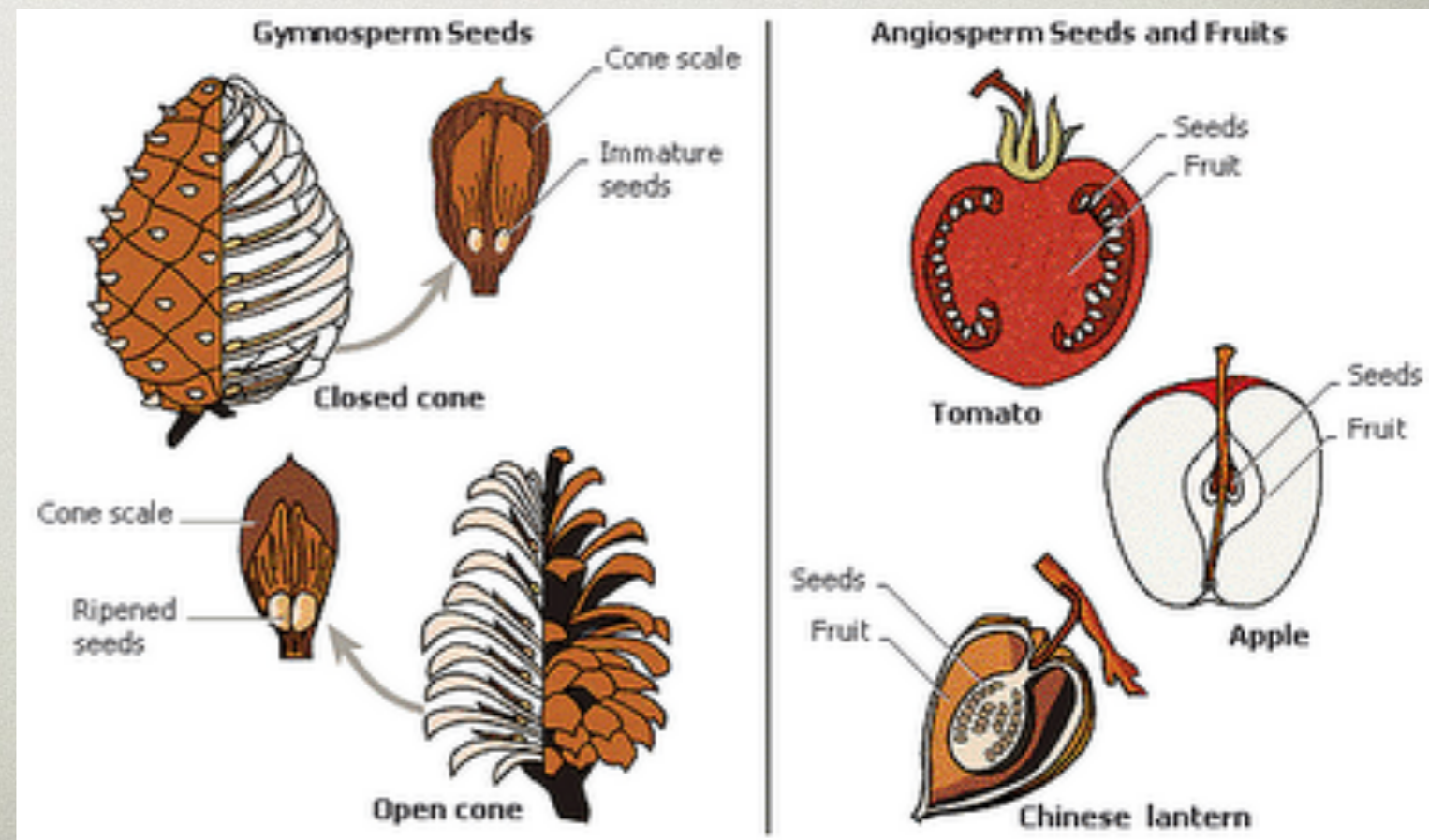
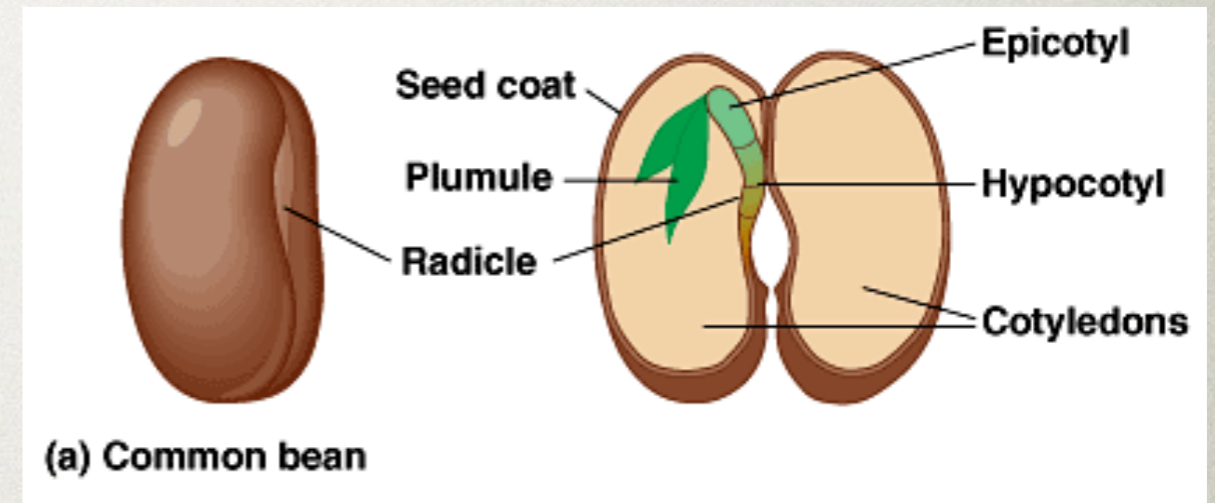
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- Seed - embryo and food supply with protective coat
- Gymnosperm - naked seeds, conifers
- Angiosperms - seeds in ovaries, flowers and deciduous



# THE SEED

- Protects embryo
- Can remain dormant and still reproduce
- Pollination - fertilization of egg



# FLOWERS & FRUIT

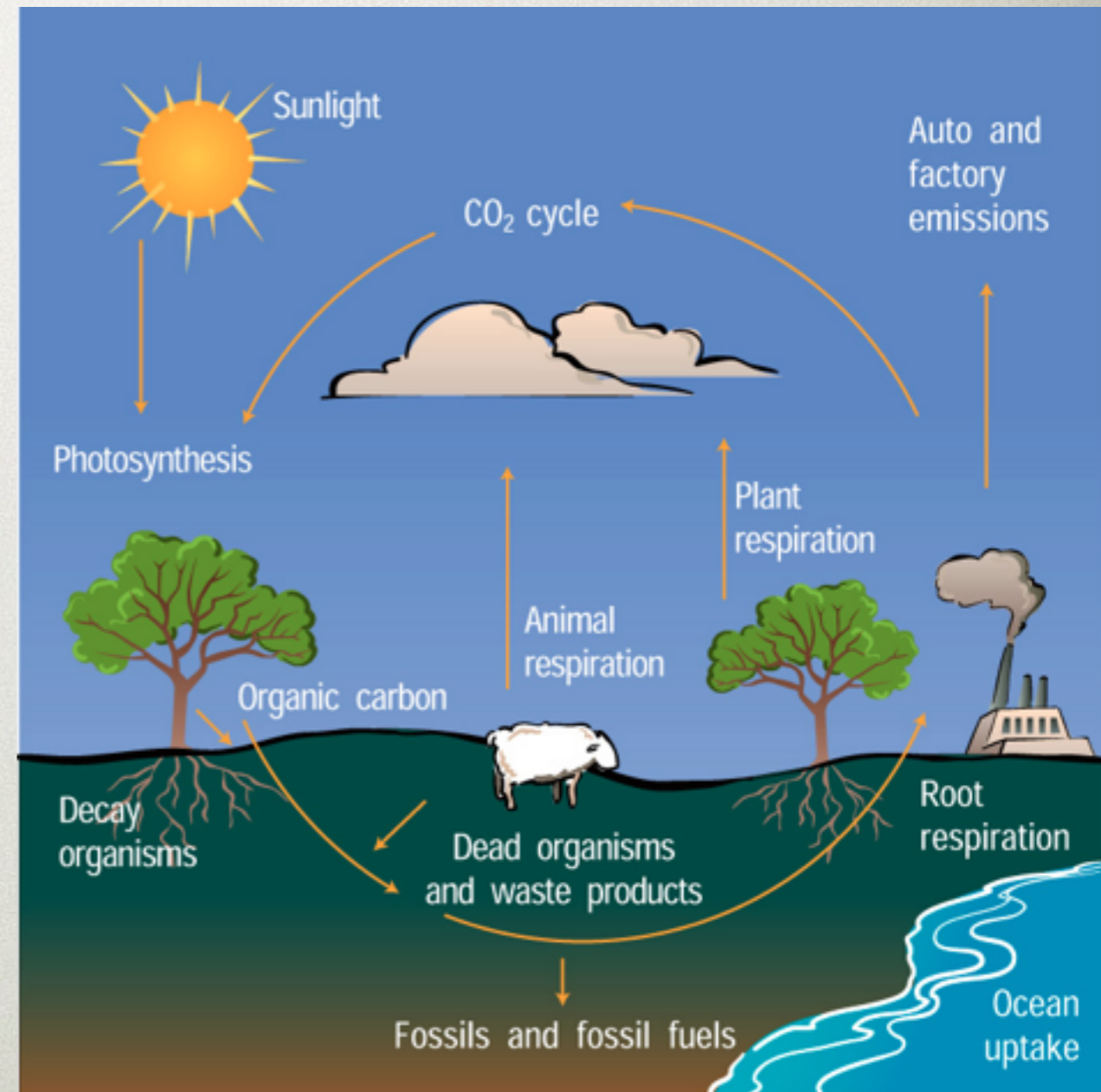
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- Plants and animals coevolve
- Fruit helps to spread seed
- Flowers help in pollination



# ENVIRONMENTAL EFFECTS

- Plants pass nutrients to other organisms
- Carbon cycling - remove CO<sub>2</sub> and pass Carbon to other organisms
- Influence climate



# QUESTIONS

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- Use your whiteboards to answer the following by writing the letter of the answer on your whiteboard.

The relationship between a gametophyte and a sporophyte in a liverwort is like the relationship between

- A. a brother and a sister.
- B. a grandparent and a grandchild.
- C. an uncle and a nephew.
- D. a parent and a child.
- E. two cousins.

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Many fungi produce antibiotics, for example, penicillin, that are effective at stopping bacterial growth. Which do you think is the evolutionary advantage to the fungus of secreting antibacterial chemicals?

- A. defense: preventing bacteria from infecting the fungus
- B. defense: preventing bacteria from killing fungal spores
- C. symbiosis: attracting helpful bacteria
- D. competition: destroying bacteria that compete for their food
- E. predation: eventually consuming the bacteria

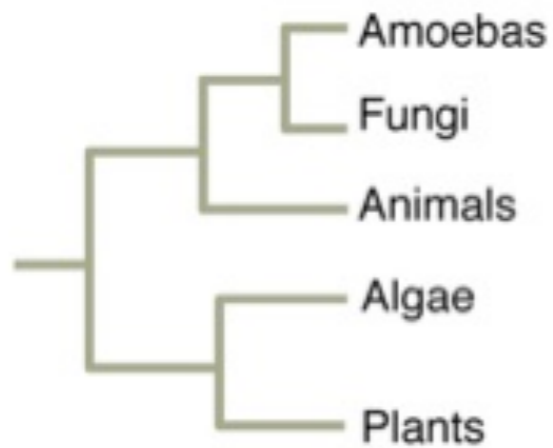


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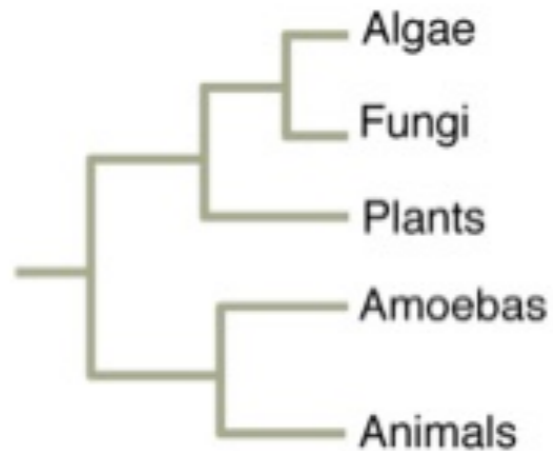
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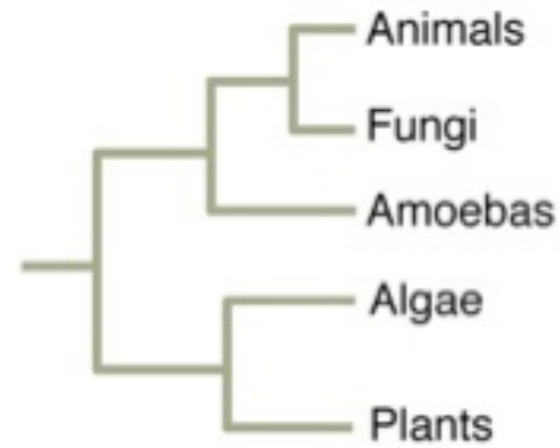
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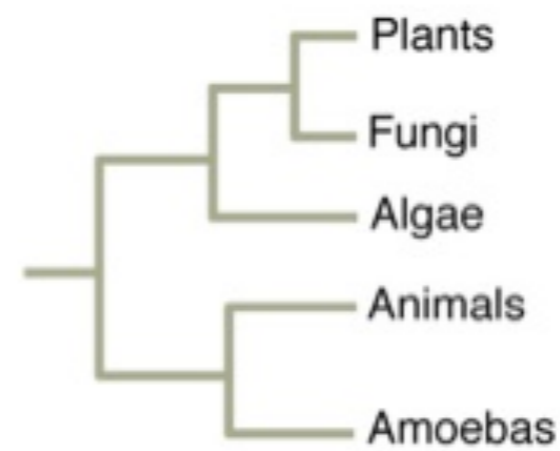
B.



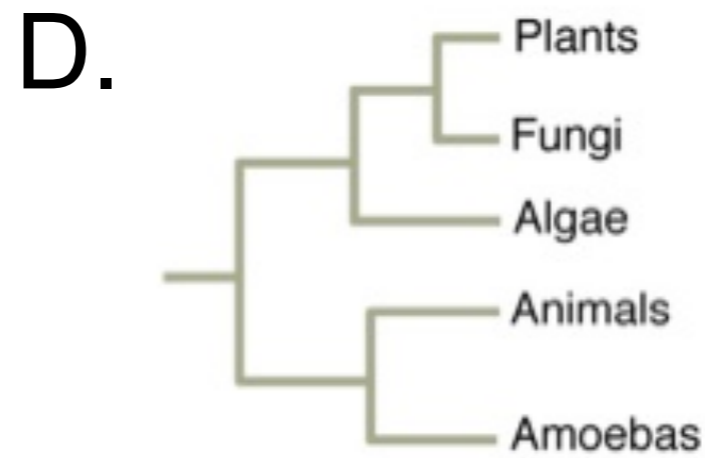
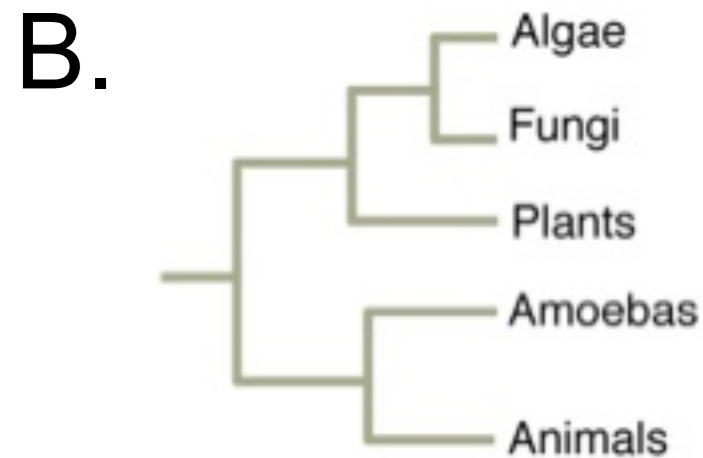
C.



D.



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You are presented with several single-celled organisms, including one thought to belong to the kingdom Fungi. What unique feature helps you identify the fungus?

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- C. presence of nuclei
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C. vascular systems

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Stomata are found in every group of sporophyte plants except the liverworts. According to the hypothesis that stomata evolved only once among the bryophytes, this is evidence that

- A. liverworts resemble the most primitive plants.
- B. liverworts don't need to exchange gases with the atmosphere.
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