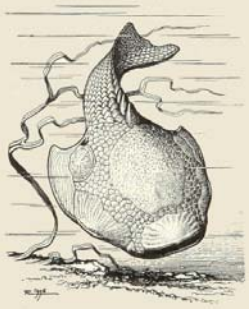
Silurian and Devonian periods



Silurian and Devonian

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Devonian, second largest extinction.

Paleozoic periods

- Paleozoic era
  - Cambrian 550-488 Ma
  - Ordovician 488-443 Ma
  - Silurian 443-416 Ma
  - Devonian 416-359 Ma
  - Carboniferous 359-299 Ma
  - Permian 299-245 Ma

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Ordovician survivors

- Cnidaria – corals
- Molluscs
  - Shelled cephalopods
  - Bivalves
  - Gastropods
- Worms
- Echinoderms
- Bryozoa
- Arthropods
  - Trilobites (some)
  - Marine forms (Crustacea)

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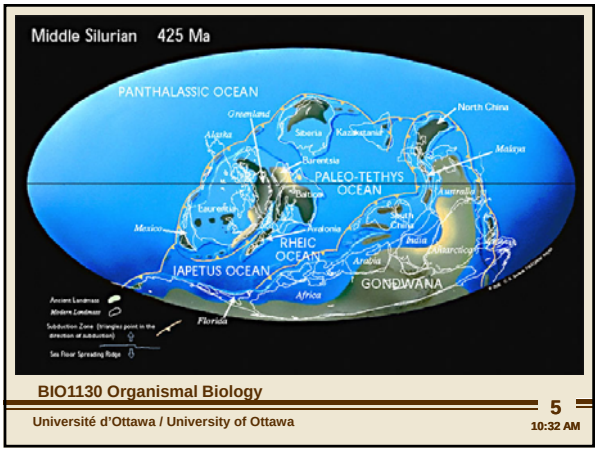
most trilobites disappear.

They are the ancestors of todays organisms

Silurian and Devonian periods

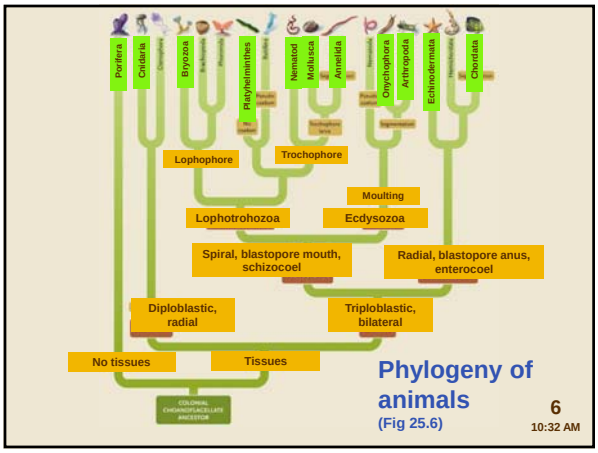
need plants to diversify first in order for the rest of the organisms to go

onto land, needs food source.

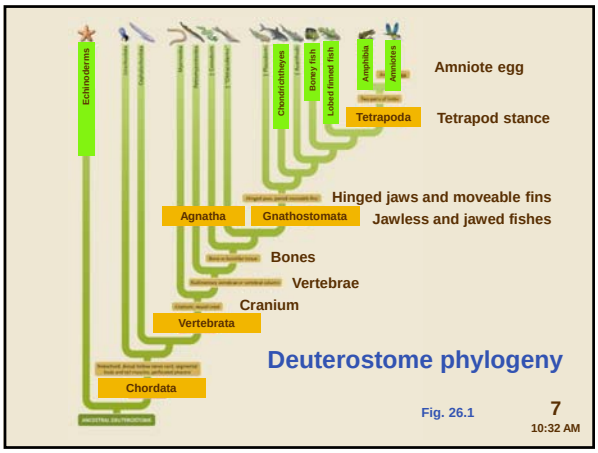


they are going to form supercontinent pangea.

the oceans are ideal incubators for fish.

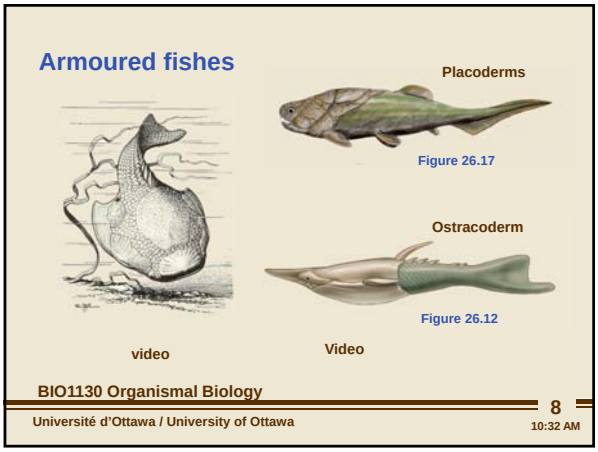


Silurian and Devonian periods



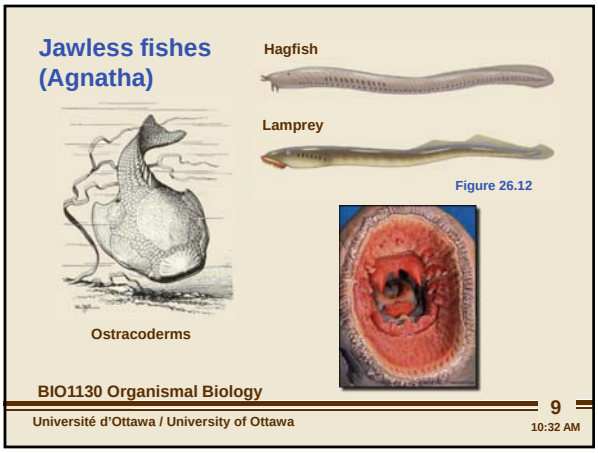
chordates: characterized by having tails.

vertebrae: casing shell to protect the brain.



small, have vertebrae, they are covered with big bony plates to protect them from predators.

Ostracoderm: lack a jaw, swim around with mouths open, gathering water, water is poured outside with side cavities and the food stays inside.



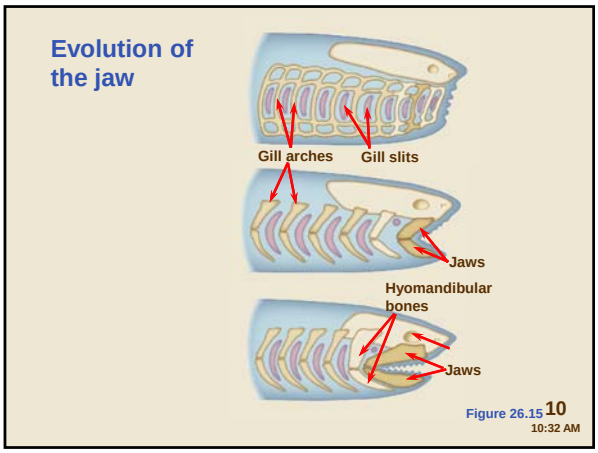
lamprey spends most of its time as predator, it is a parasite

example of Agnathen here today but modified.

its life cycle is eggs in fresh water. swim from ocean to rivers then into river beds to lay eggs, male fertilize egg, parents die. Eggs turn into larvae, hatch and grow for a couple of years then move out to the ocean and follow the same cycle.

same thing as Salmon.

were introduced to great lakes, no competition so they reproduced and food source was fish. now control systems to reduce lamprey so fish could recover

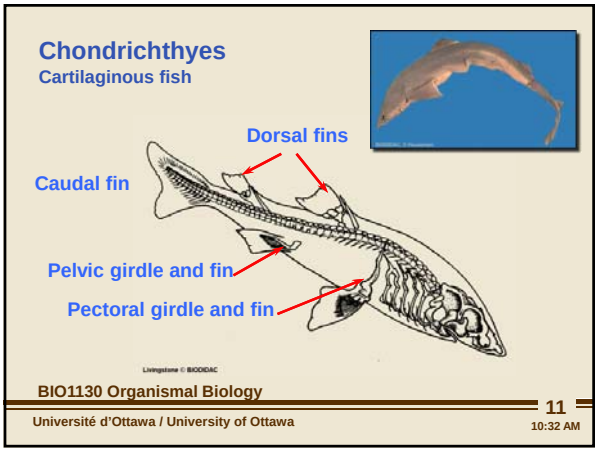


rare genome duplication in chordate lineage, caused experiments in different chordate forms. Dont know how this duplication happened.

Cartilaginous structures that hold gills open develops inner layer of muscle.

contractions pump water into mouth, dont have to swim around to aerate gills. gill arch behind jaws turn into Hymoandibular bones (cartilage). efficient mechanism of feeding, eats fish, close jaws so its trapped.

Known as the Gnathostones.



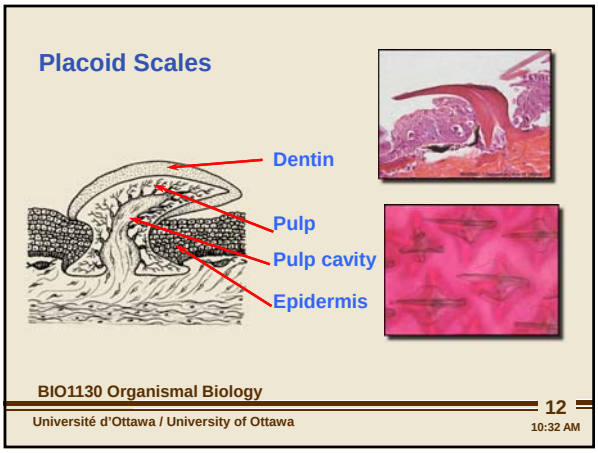
undulating tail to swim

paired fins- pelvic fins and pectoral fins - have bones that move with the body.

with dorsal fin, positioned at ideal angles to stabilize and swim straight.

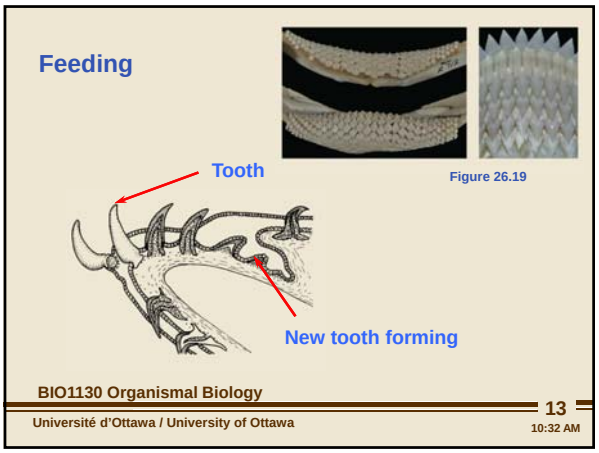
without them they entire body would waggle.

lost pumping mechanism



no more armoured gills. Use scales so they could have smooth flow.

reduce frictional drag. creates microturbulance behind scales, buffers water to reduce drag.Produced by epidermis.



teeth are highly modified scales. just bigger.

teeth lock prey in place and then they spin, torque causes limbs to be ripped off prey. during this process the teeth are ripped off and can constantly replace them.

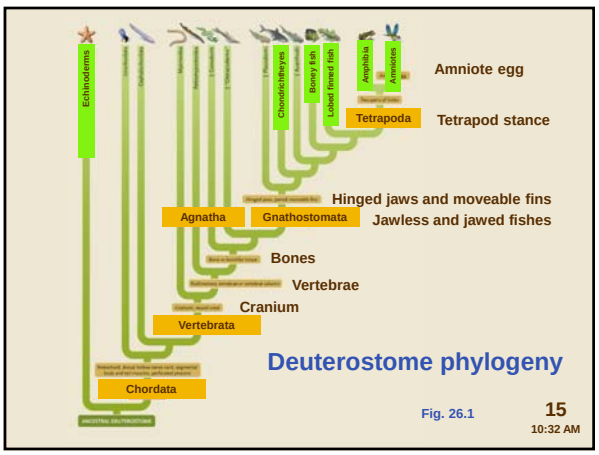
Produce oil to counter density of tissue so they dont sink and float.

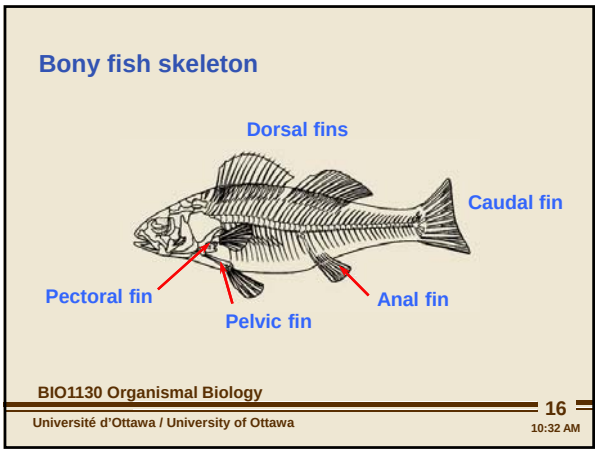
protective case for young shark

no larval sharks.

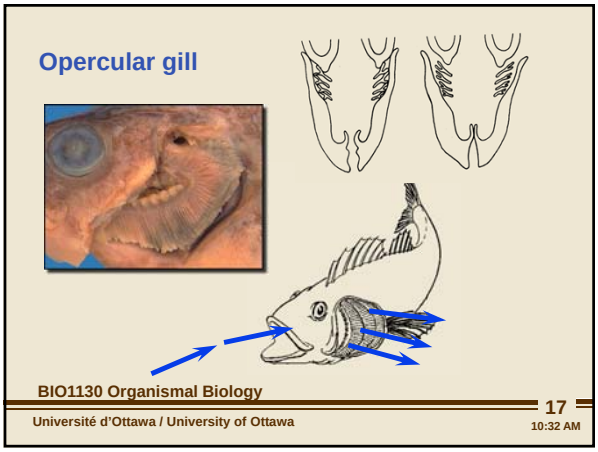
miniature shark hatches from mermaids purse.

In females they only reproduce 20 offspring in its life cycle.

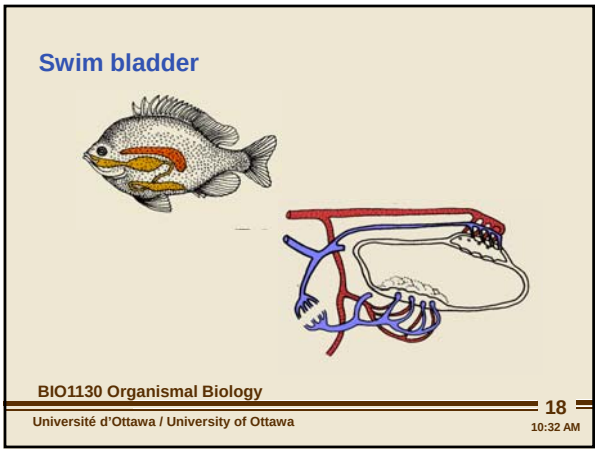




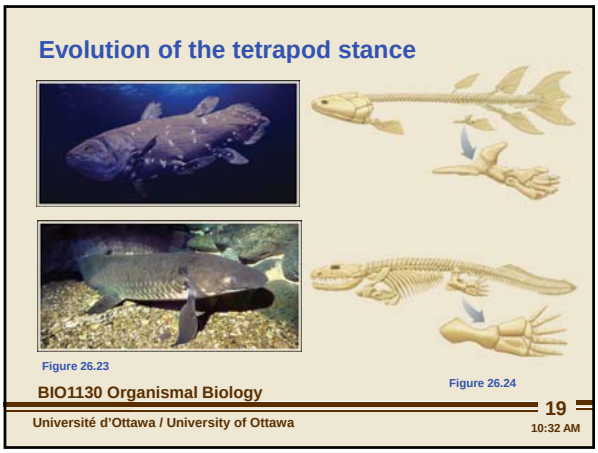
sharks are not agile so they cant move well. Bony fish have perfected this. pectoral fins used for maneuvering.



develop operculum, pours water out of the mouth. Flap of tissue that can open and close. Operculum closes and pumps water out of the moth.

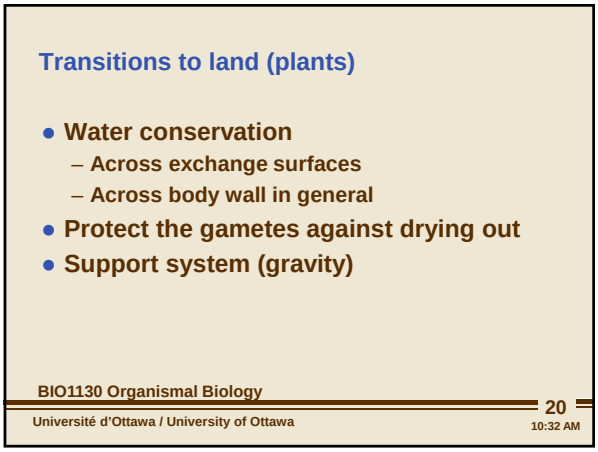


filled with gas. connected to the circulatory system with capillaries. amount of air used to balance hovering, so they dont rise or sink and can stay in the same place.

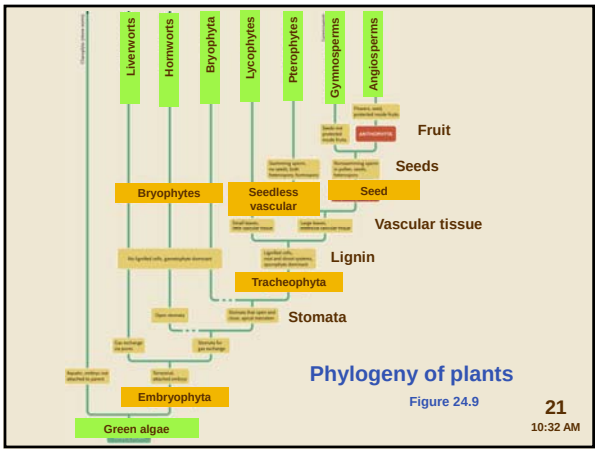


fins are supported internally by thick bones. lobe finned fish. used to burrow into sediments. They have lungs. pocket of infolded tissue connected to the nostrils. Can stick their head of the water to breath air into thier lungs. can also use gills to take oxygen from water. lack of water in devonian period so they can gulp air can move on land to find better pond.

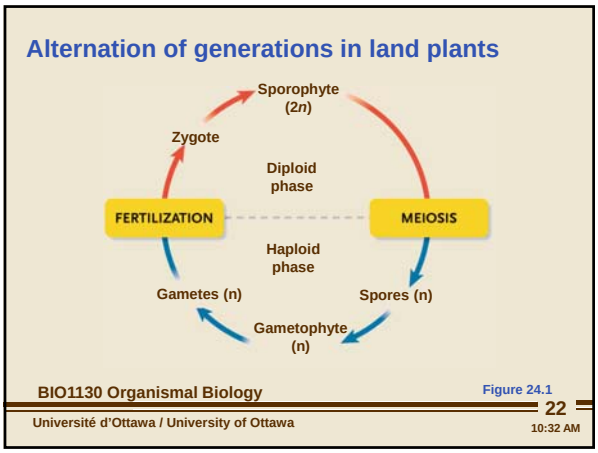
Exam Question: Look for parallels between animals and plants in solving issues of moving up onto land.



gas exchange surfaces can cause water loss. sperm locomotion- non-aquatic environment, keep them from drying out. No support from water- much have internal support system to hold organism up against gravity. vascular system develops to connect roots with gas exchange sites.



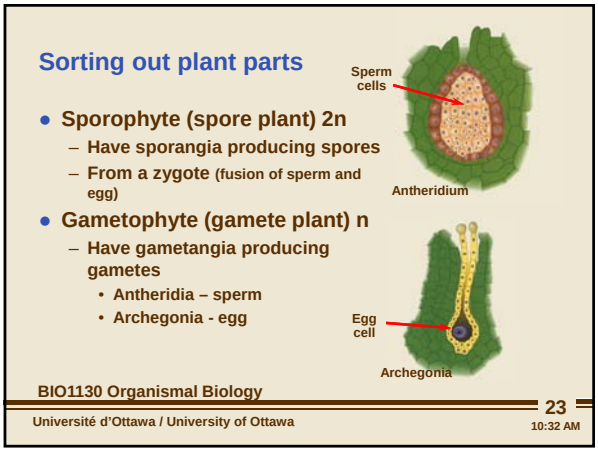
lignin- secondary cell wall- becomes vascular tissue later on which connects the gas exchange to the nutrient system. need gas exchange site that wont lose water. support system to conteract gravity. way to get sperm to egg.



sporophyte is diploid, under go meisosis to produce spores then

Gametophyte which are haploid. spores settle on the ground and

become gametophyte, gametophyte produce gametes

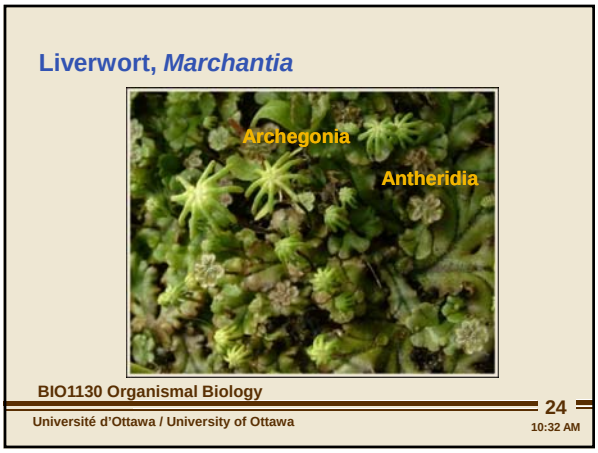


specialized cells that produce spores are called Sporangia.

Gametengia- produce gametes. comes into 2 types. one makes sperm

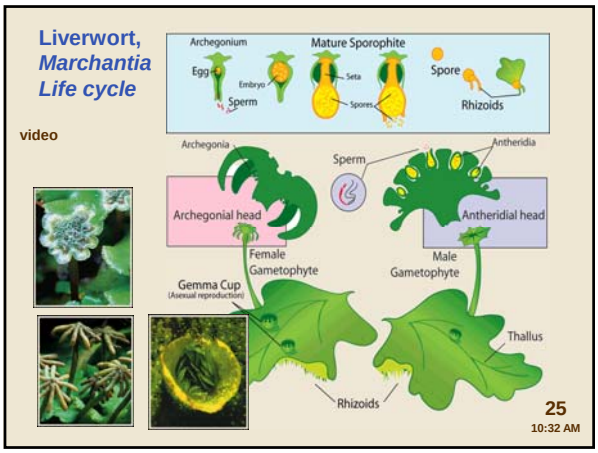
the other makes egg. one plant will make both structures. plants allow

self fertilize.



Algae- first land plants

Thallus: plant tissue- has no vescular tissue.



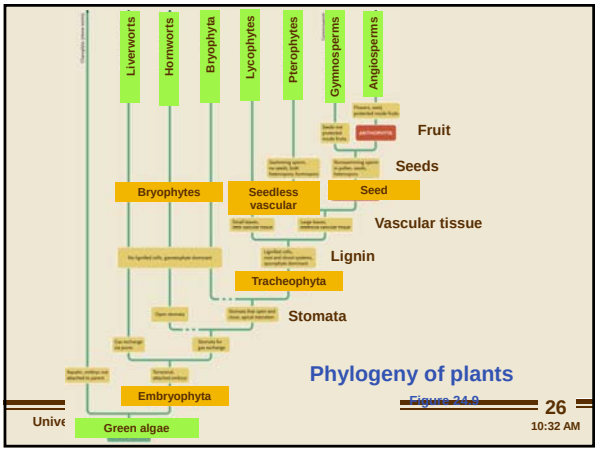
archegonia - head like umbrella

anthierdia: disc that faces up

splash fertilization: rain drops hit anthierdia and splash into the

archegonia. Fertilized egg hang on underside of antherdia wind carries

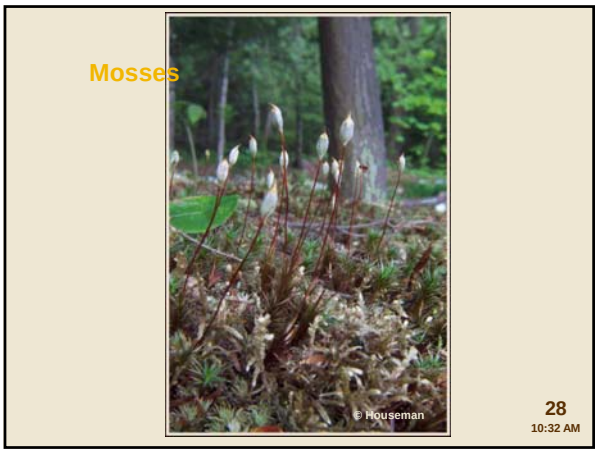
it away and turn into independent sporophyte.



gas exchange surface exposed to air, if air is dry, plat will dry out.

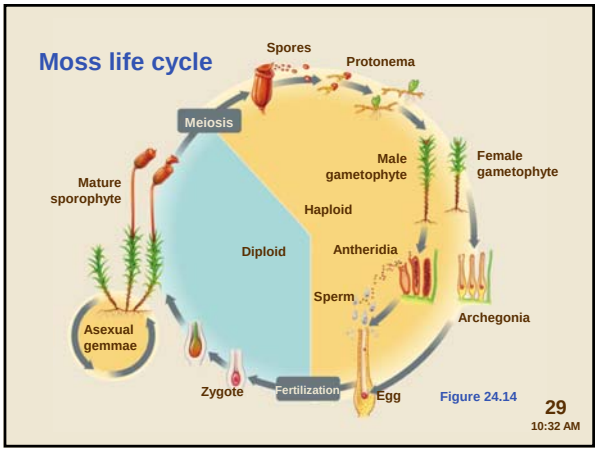
Stomata open and close to prevent drying out.

water- proof cuticle made of wax.



no vascular tissue, have stomata and cuticle.

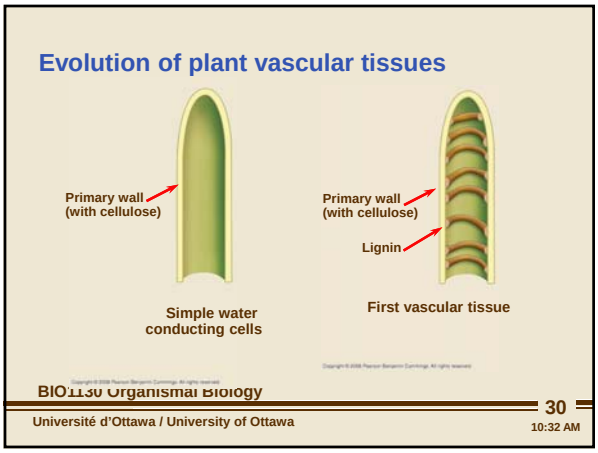
no root system to pick up water and nutrients, rely on water.



spores turn into plant like structure, archegonia or anthideria on top.

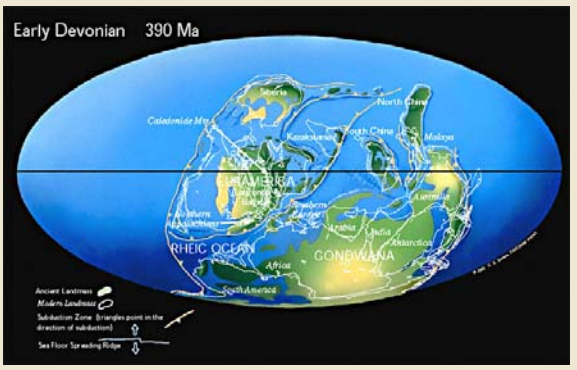
Only has one, will only be male or female, not both.

sporophyte and Gametophyte have joined together. Gametophyte supports the sporophyte on top.



lignin reinforces structure, can diffuse things between common cytoplasm.

when water is lost, doesnt lose structure



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Devonian aquatic environments

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Devonian terrestrial environment

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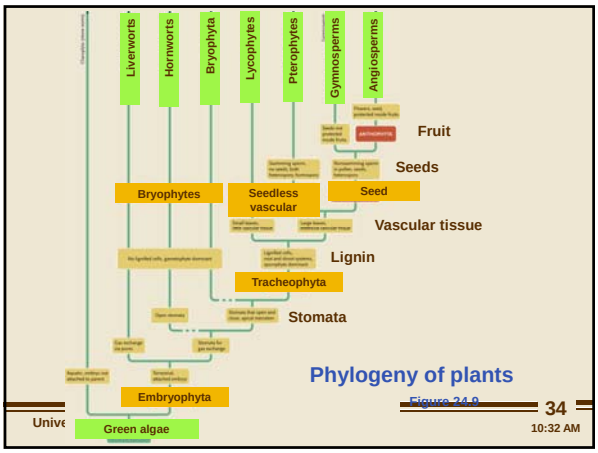
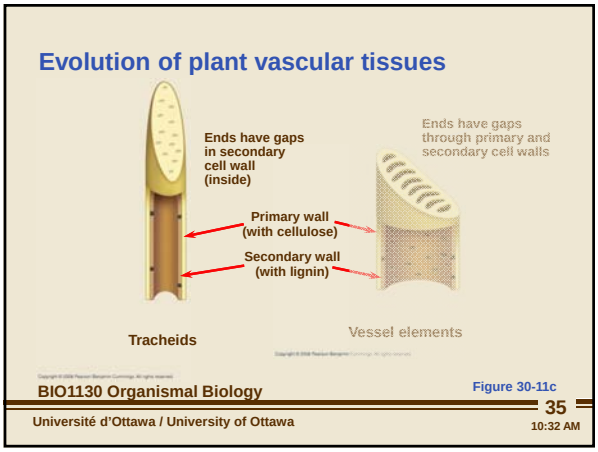
Silurian and Devonian periods



begining of vascular tissue.

plant requires minerals and

nutrients to grow.

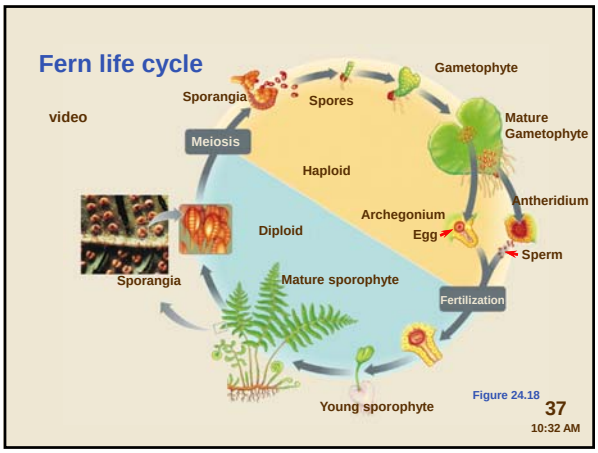


instead of lignin forming rings to support it they form another cell wall.

when they die, cell tissue become hallow tubes. become vascular

tissue. is a major innovation first used by ferns.

Silurian and Devonian periods



gametophyte and sporophyte start to become dependent.

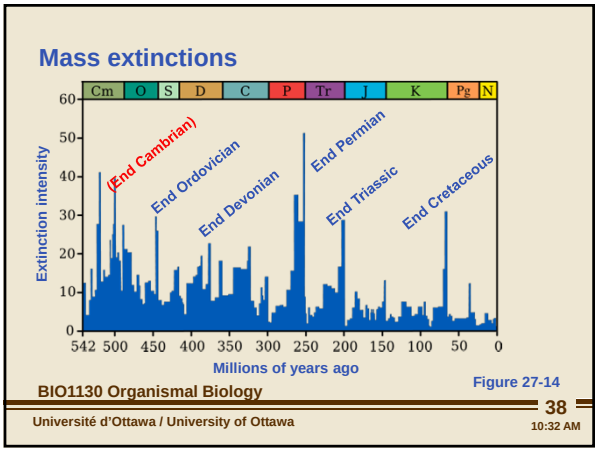
grow with mitotic divion of tissues. base of leave, see archogonia and

anthridia. anthridia make sperm, sperm will hit by drop of water etc...

see above.

still rely on water for sperm on anthridia to archogonia. life cycle

becomes tighter.



end of devonian is the second biggest mass extinction.

plants are sucking out the CO2, suckng out green house gases causes

it to be cooler. The plants die and decompose. start to have soil.

because of rotting plant, seas lose oxygen. organisms in water die.

what doesnt get affected is the plants. plants are capable of surviving

mass extinctions.