

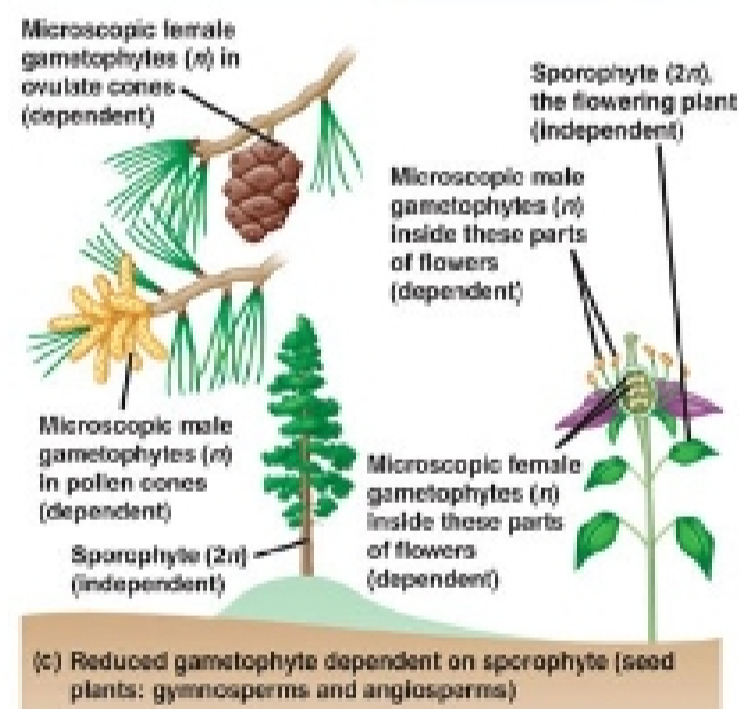
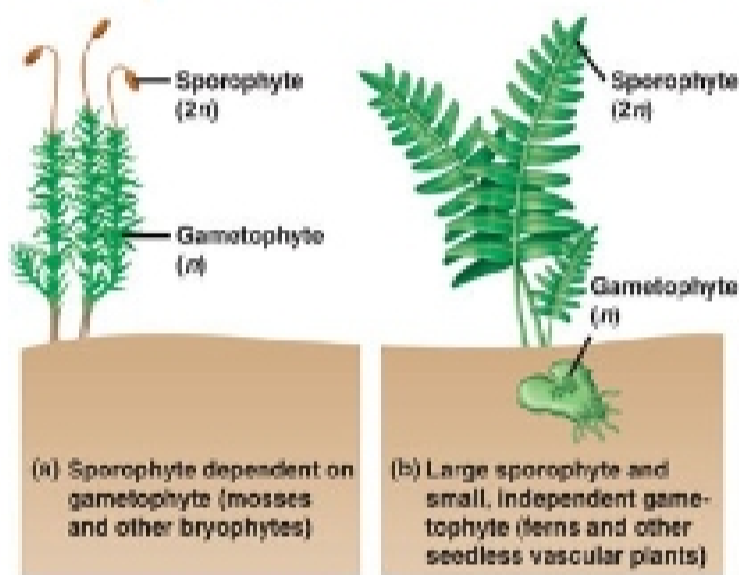
Chapter 30: Plant Diversity 2: The Evolution of Seed Plants

Concept 30.1: Seeds and pollen grains are key adaptations for life on land

- characteristic common to all seed plants
 - seeds
 - reduced and dependent gametophytes
 - heterospory-produce 2 types of spores, megaspores-female, microspores-male
 - ovules-structures that house the female gametophytes
 - pollen-structures that house male gametophytes and gets dispersed

Gametophyte/Sporophyte relationships

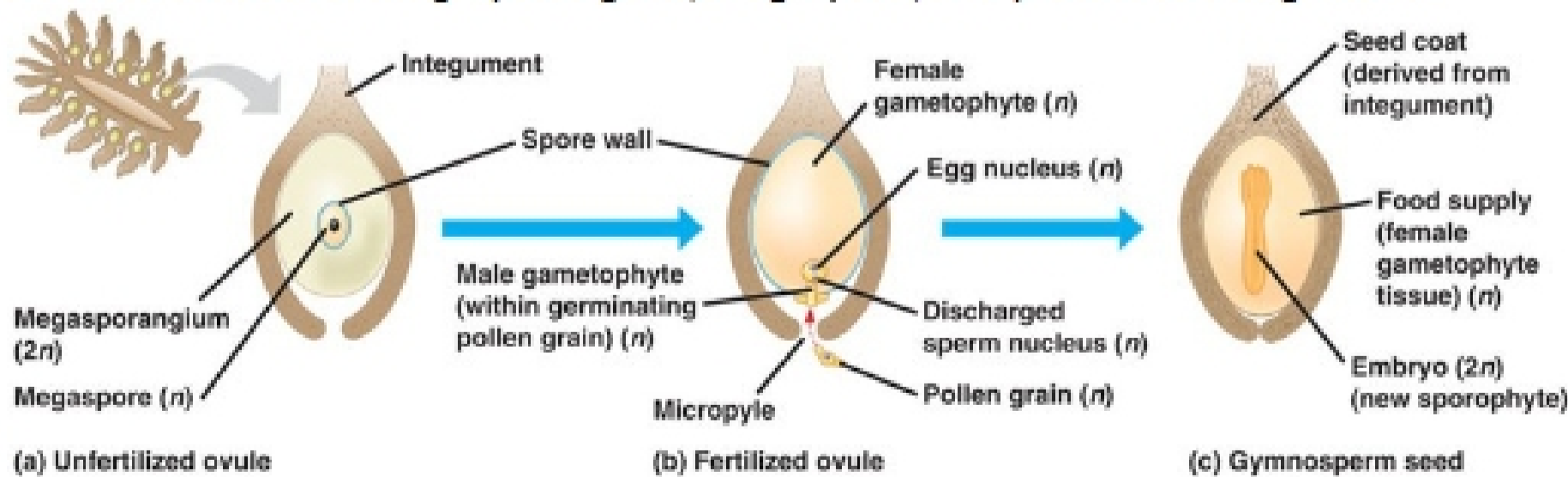
- gametophytes of seed plants develop within the walls of spores retained within tissues of the parent sporophyte
- no longer dependent on water for fertilization



- non vascular and seedless non vascular- rely on water at some point so the sperm can swim out and fertilize the eggs

Ovules and Production of Eggs

- an ovule consists of megasporangium, megaspore, and protective integuments



- (a) Unfertilized ovule

(b) Fertilized ovule

(c) Gymnosperm seed

- megaspore develops into the female gametophyte

Pollen and Production of sperm

- microspores develop into pollen grains
 - contains male gametophyte
- pollen can be dispersed by air or animals, eliminates the need for water in fertilization
- don't need water because pollen grains can be dispersed by the winds or by animals

If a pollen grain germinates....

- it gives rise to a pollen tube that discharges sperm into the female gametophyte within the ovule
- figure 30.3b (in above picture)

A seed

- once fertilization takes place, the whole ovule becomes the seed
- includes sporophyte embryo, food supply, protective coat
- food source gets transferred to the embryo which is the new sporophyte stage
- figure 30.3c(in above picture)

Which does not apply to gymnosperms or angiosperms?

- single spore type
- seed bearing vascular plants will have vascular tissue, the dominant stage is the sporophyte stage with is diploid and they do have cuticles with stomata, they also have heterospory so they produce 2 types of spores

In seed bearing plants, microspores develop into ____?

- pollen grains
- seed happens after fertilization occurs and it produces a new embryo. the whole structure of the ovule becomes the seed

Concept 30.2: Gymnosperms bear "naked" seeds, typically on cones

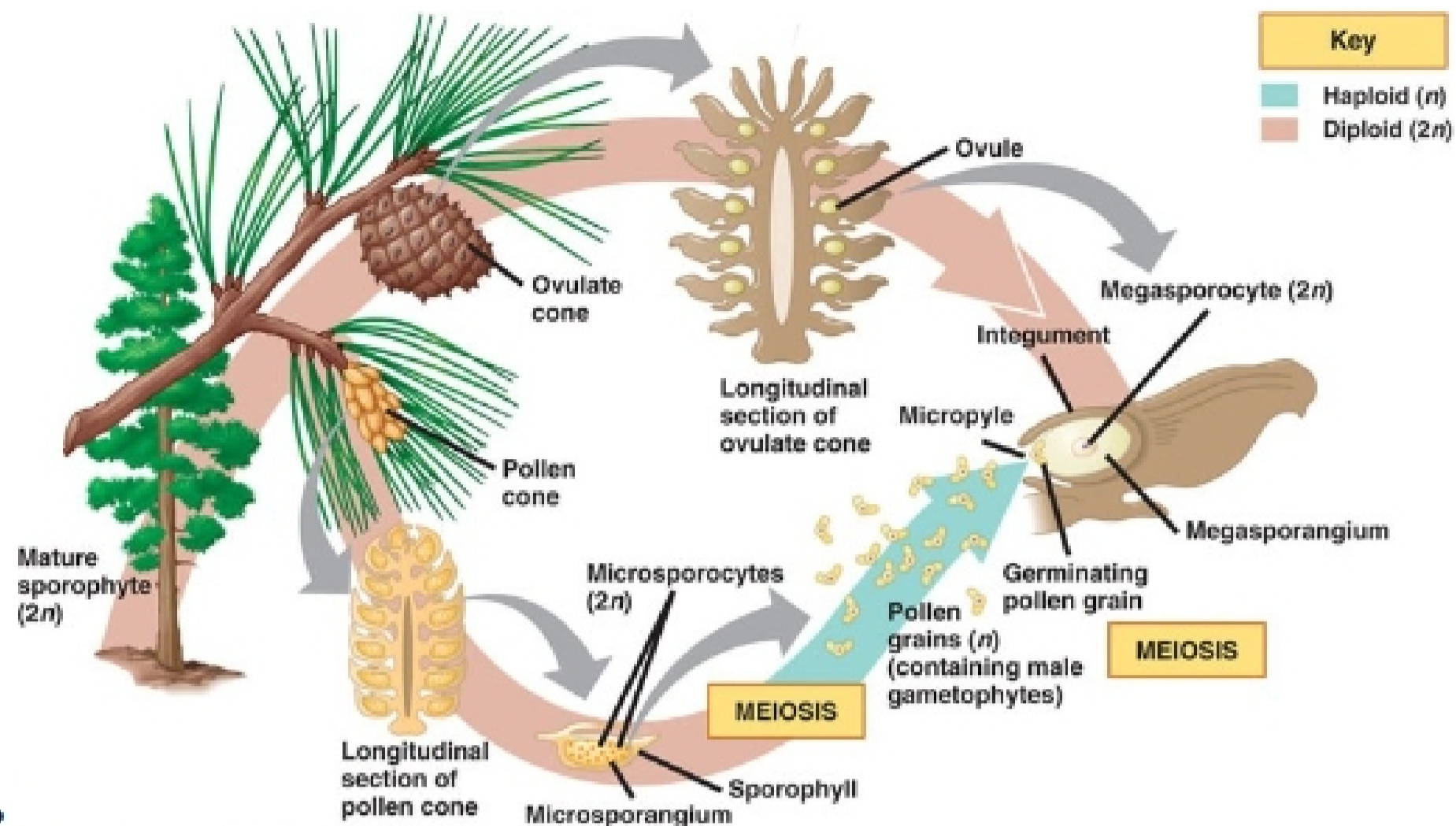
Gymnosperms Include...

- phylum cycadophyta
 - sago palms
- phylum ginkgophyta
 - only 1 species within this phylum
 - tolerant to adverse conditions (tolerate high levels of pollution)
- phylum gnetophyta
 - found in desert regions
 - reproductive stages, they produce cones
- phylum coniferophyta
 - includes: pines, firs, junipers, sequoias

A closer look at the lifecycle of the gymnosperm

- key features of the gymnosperm life cycle include:
 - dominance of the sporophyte generation
 - the role of pollen in transferring sperm to ovules
 - no water required because they are dispersed by the wind
 - the development of seeds from fertilized ovules

Pine Life Cycle



- alternation of generations
- sporophyte stage- pine tree is the mature sporophyte
- microsporangia have microsporocytes
- megasporangium has megasporocytes which undergoes meiosis to form 4 megaspores, 1 develops into the female gametophyte, the other 3 disintegrate
- in pines, the female gametophyte contains archegonia, each of which contain an egg
- in pines, a megaspore repeatedly grows and divides, giving rise to a female gametophyte. the female gametophyte is the site in which egg-bearing gametophytes develop
- in pines, an embryo is an immature sporophyte. the diploid embryo will develop into a seedling and then into a mature pine tree
- in pines, pollen grains get to the ovule via the micropyle
- the gametophyte tissue that surrounds the pine embryo functions as a haploid food reserve. the tissue is a source of nourishment for the embryo
- in the pine, diploid microsporangia form haploid microspores by meiosis

How many generations are represented in the seed of a gymnosperm

- three
- seed coat is derived from parent sporophyte, the food reserve is the gametophyte, and the embryo is the new sporophyte

Gymnosperms include _____?

- cycads, conifers, ginkgo biloba, and gnetophytes
- gymnosperms do not include flowering plants or plants with fruits

Concept 30.3: The reproductive adaptations of angiosperms include flowers and fruits

- angiosperms means covered seeds and the things that cover those seeds are fruits
- derived traits are the reproductive structures called flowers and fruits
- they are the most widespread and diverse of all plants
 - 250,000 species
 - 90% of all extant plant species, so they are the dominant plant today

Angiosperm Diversity

- some groups found within this clade include amborella trichopoda, water lilies, star anise, and southern magnolias