

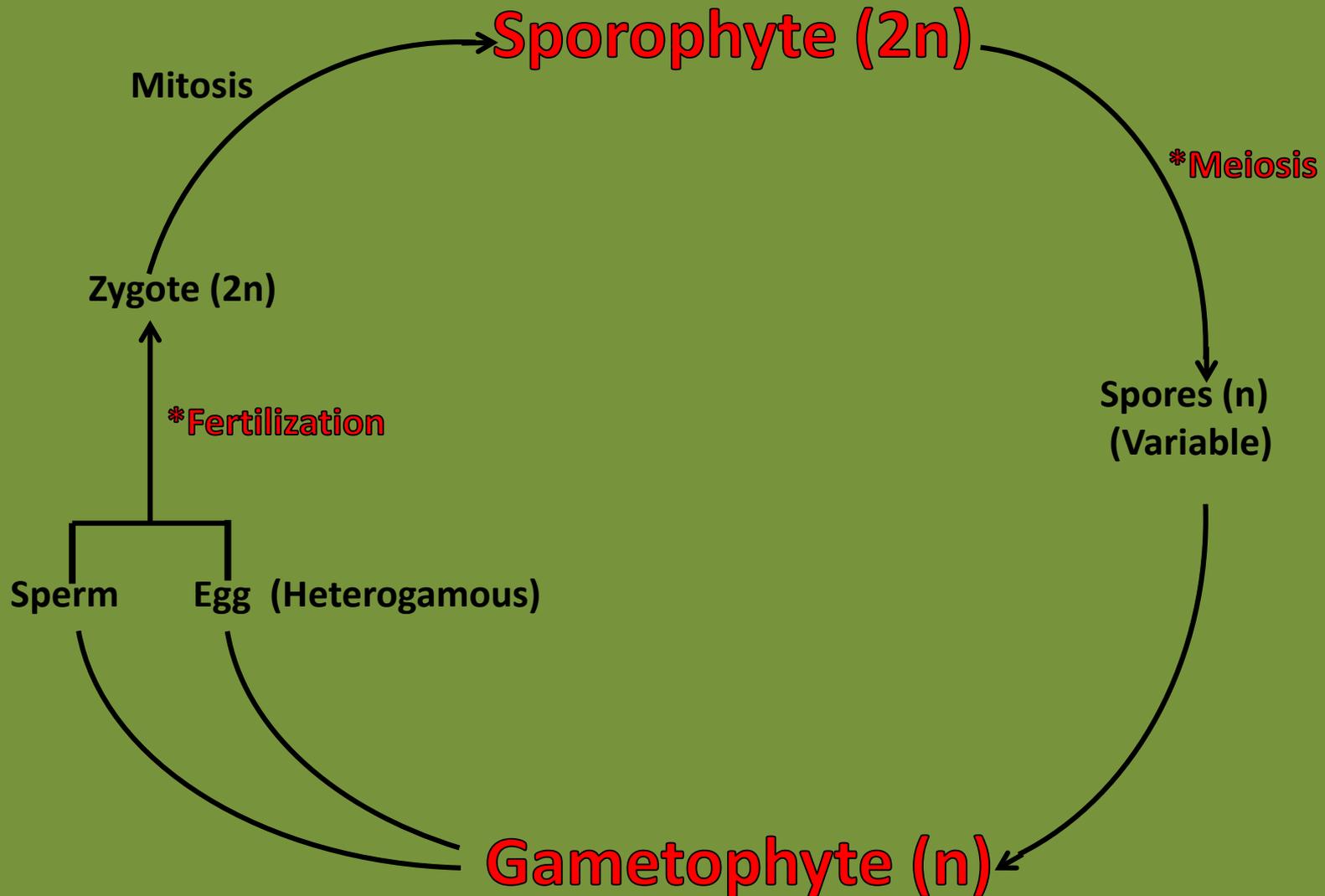
Mosses and Ferns

"Plants on an Alien Planet"



Exercise 1: Plant Life Cycle

-Details of "Alternation of Generation"-



What “Alternation of Generations” Means

- To appreciate this life cycle you must first focus in on the fact that plants were given rise to by a **green algal ancestor** which had, appropriately enough in an aquatic environment, ... a sperm with a tail on it.
- Terrestrial animals also came from an aquatic environment, by means of a fish with lobed fins and lungs, that also had a sperm with a tail on it. But because animals could move, they got together intimately for the deposition of that sperm close enough to the egg for successful fertilization, and to prevent it from drying out. However, because plants cannot move, they could not use that method!

- So plants retain an adult generation that is simple and above all, **small** -the (n) Gametophyte- that allows the sperm the possibility of successfully swimming a short distance to the egg, in order to increase the chances of fertilization; and at the same time, retain an adult that has **enough genes** (the 2n Sporophyte) to enable it to adapt successfully -producing more complex structure- to a rigorous and inhospitable environment,...the dry land.
- Plants have, in effect, segregated the two processes of sexual reproduction (meiosis and fertilization) into two disparate adults...the **sporophyte that undergoes the meiosis** part of sex to produce variable spores, and the **gametophyte on which fertilization takes place**, and provides the young sporophyte a source of energy.

Answer questions 1-5 on page 243

Exercise 2: Which Works Better on Land Haploid or Diploid?

- Genes and Mutations: Answer two questions page 244.
- Limitations of the Haploid: Answer questions 1-5 on page 245.
- Advantages of the Diploid: Answer questions 1-5 on page 246.

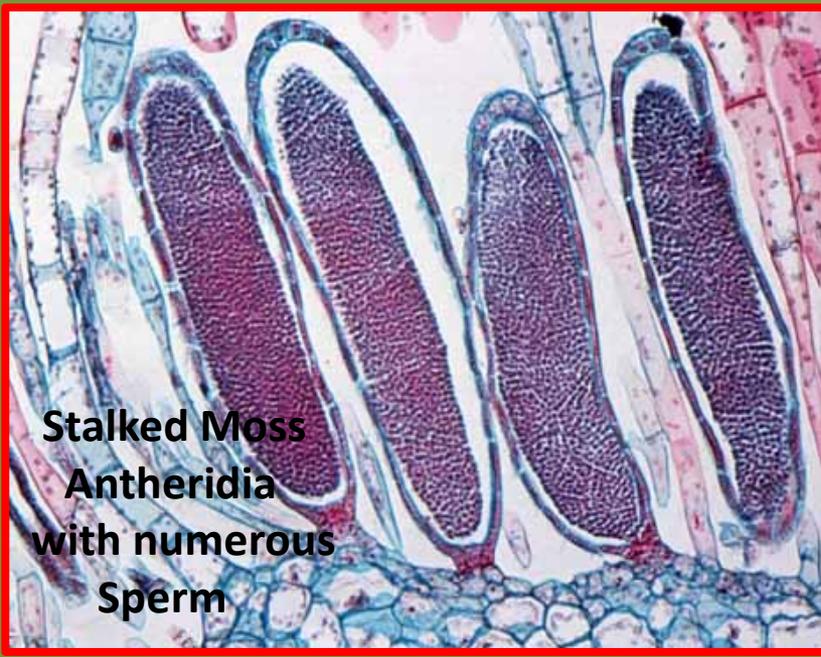
Exercise 3: The Moss Plant



Moss Gametophytes
with stalked
Sporophytes

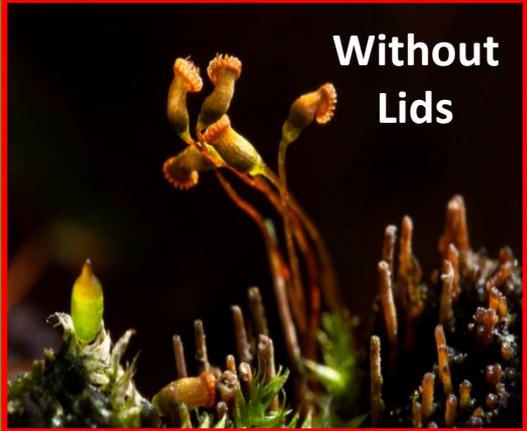
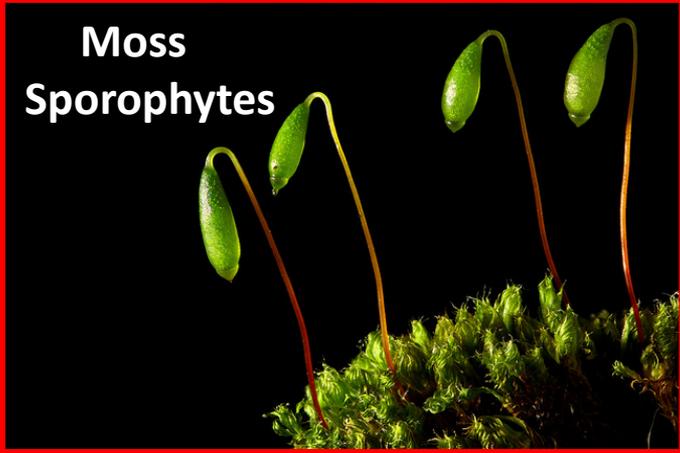
Answer questions
1-6 on page 247

- **Moss Sex Organs:** All plants possess gametes that look different from one-another. Because of this, they are referred to as **heterogamous** (= the other gamete), with the one big cell called an egg (ovum), and the numerous smaller cells called sperm. They are also “housed” in different chambers.



Make drawings on page 248.

- **Funny Looking Stalk:** This is the sporophytic generation, which you can be assured of because it possesses spores.



Draw picture on page 249, and answer questions 1-2 on page 250.

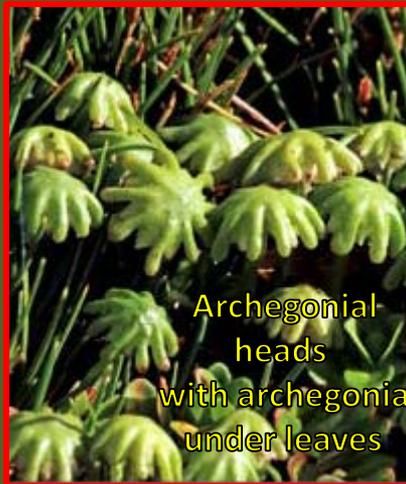
- **Moss Ancestor:** Its protonema (early stage of spore germination) looks like a filamentous alga. Draw pictures on pages 250 and 251.



Liverwort

(Marchantia polymorpha)

-Liverworts-



Liverwort is an Old English/Medieval name for liver-herb, named from the “Doctrine of Signatures,” whereby, people thought that the appearance of a an organism was a hint from God as to its special properties.

Hornwort
(Phaeoceras laevis)



-Hornwort Sporophytes-



Many hornworts develop internal **mucilage-filled cavities** when groups of cells break down. These cavities are invaded by **photosynthetic cyanobacteria**, especially species of *Nostoc*. Such colonies of bacteria growing inside the thallus give the hornwort a distinctive blue-green color.

Exercise 4: The Fern Plant

Maidenhair Fern
with Spores

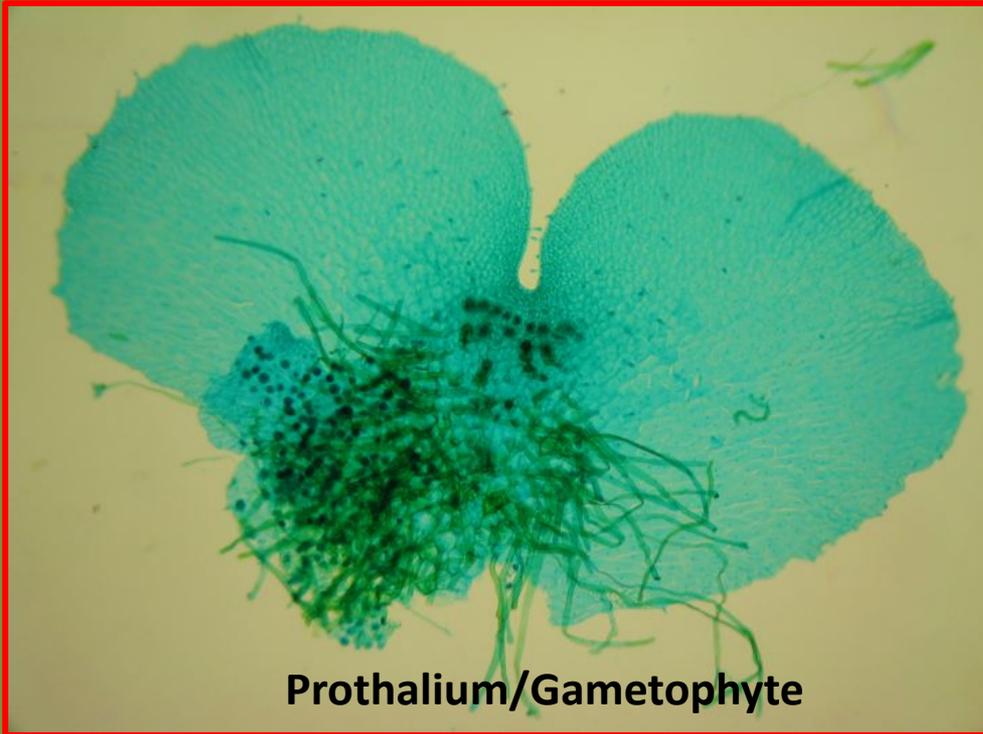


Without
spores



Answer questions 1-3 on page 251; make drawing on page 252;
and answer #5 on page 252.

- **Fern Sex Organs:** The “Prothallium” is a synonym for gametophyte. (pro = 1st or early; thalus = no roots, stems, or leaves.)



Make drawings on pages 253 and 254.