

# Plant Life Cycles

A Meridian® Biology AP Study Guide by John Ho and Tim Qi

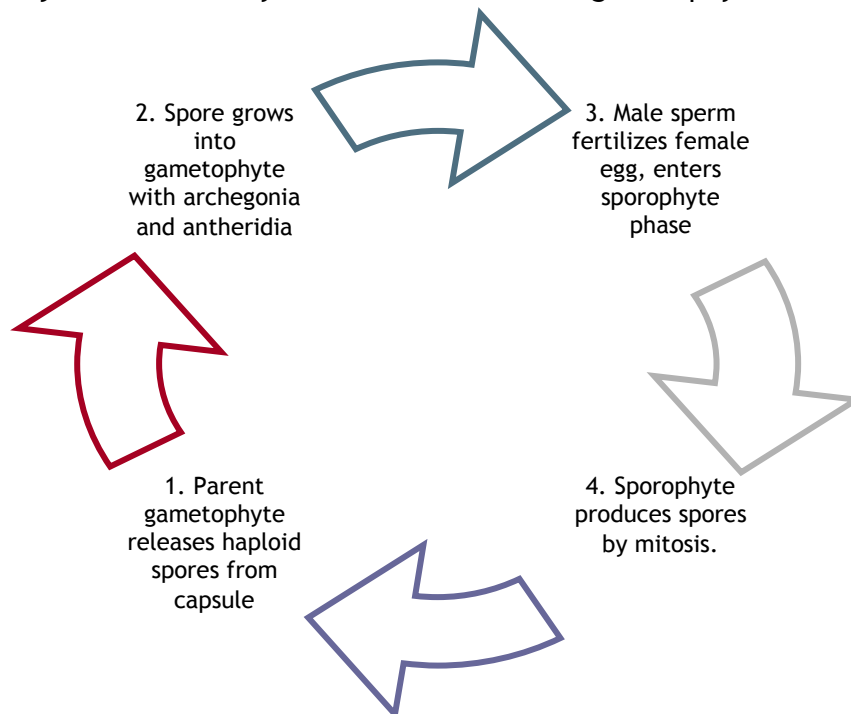
- ❖ **Alteration of Generations:** Plants exist in two multi-cellular forms; each gives rise to the other. It usually encompasses one complete life cycle.

Growth Types		
Form	Type	Description
Gametophyte	n	The haploid generation that fuses with another gametophyte (fertilization) to form a sporophyte.
Microspores		Male gametes such as plant pollen
Megaspores		Female gametes such as plant eggs or cones
Sporophyte	2n	The diploid spore-producing generation that undergoes meiosis to give rise to the gametophyte generation.

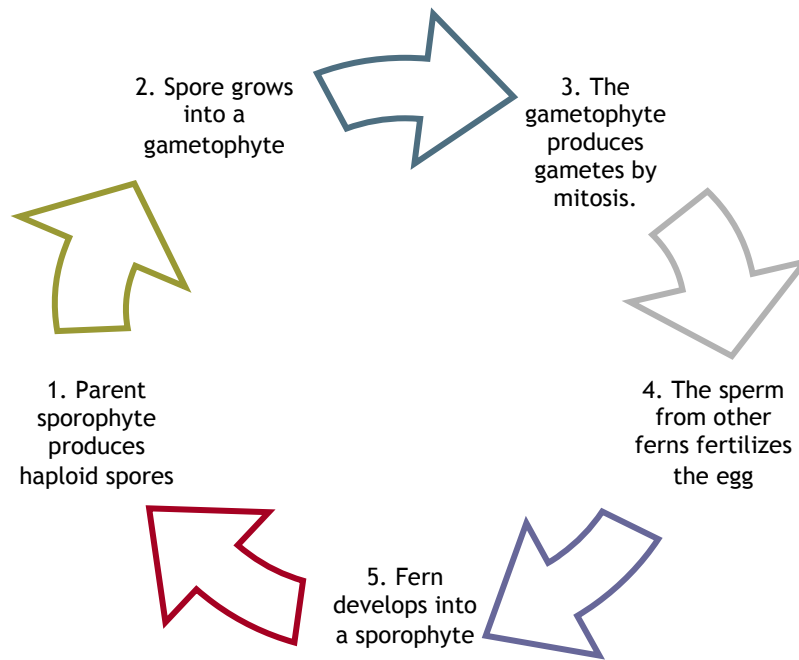
- **Zygote:** Diploid structure produced by gamete fertilization, begins the sporophyte generation.

Gamete Producing Organs		
Form	Type	Description
Archegonia	Female	Produces and contains female ovaries.
Antheridia	Male	Produces and contains male spermatids (pollen)

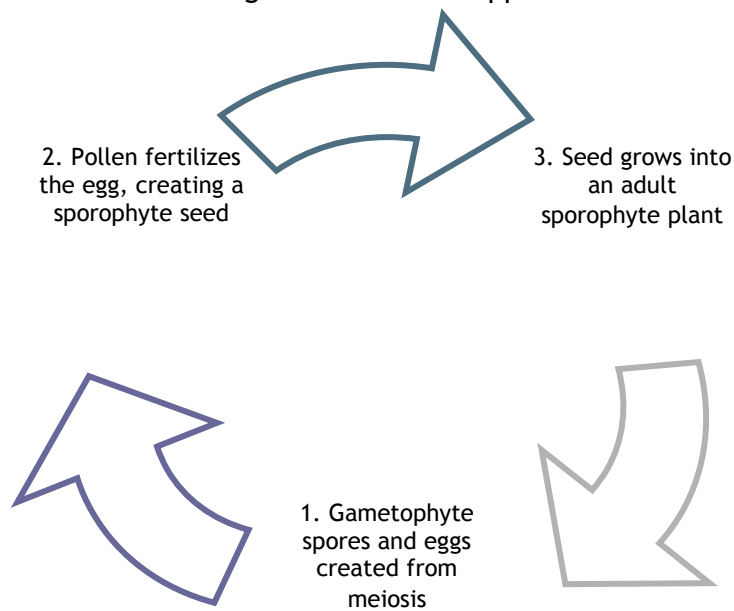
- ❖ **Bryophyte Cycle: Moss Life Cycle.** Dominant form the gametophyte.



- ❖ **Pterophyte Cycle: Fern Life Cycle.** Dominant form the sporophyte.



- ❖ **Seed Plant Cycle (Gymnosperms and Angiosperms):** Dominant form the sporophyte.
  - **Endosperm:** Outer coating of a seed that supplies the seed with nutrients.



- ❖ **Angiosperms:**
  - Life cycle similar to that of the gymnosperm
  - Monocots and Dicots (also “Eudicot”)

Moncots vs. Dicots		
Characteristic	Monocot	Dicot
1. Embryo	One cotyledon	Two cotyledons
2. Leaf Veins	Parallel	Net-like
3. Stems	Vascular tissue scattered	Arranged in a ring
4. Roots	Fibrous	Taproot
5. Pollen	One opening	Three Openings

6. Flowers	Petals multiples of three	Petals multiples of 4 or 5
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❖ **Plant Hormones**

Major Plant Hormones	
Hormone	Description
Auxin	Stimulates cell elongation and growth, functions in phototropism and gravitropism
Cytokinins	Affects root growth, stimulates cell division
Gibberellins	Promotes seed germination, stem and leaf growth, and root development.
Brassinosteroids	Inhibits root growth and leaf abscission (shedding)
Abscisic Acid	Promotes dormancy, closes stoma when under stress
Ethylene	Responds to stress, promotes fruit ripening

❖ **Plant Responses:**

- **Gravitropism:** Response to gravity. Utilizes the hormone *auxin* and structures such as *amyloplasts* (starch storing organelles) in the response. Stems grow away from gravity while roots grow towards gravity.
- **Thigmotropism:** Response to touch. Stimulates a variety of different actions, such as the snapping action of the Venus Fly Trap.
- **Photoperiodism:** Plant's response to the length of light exposed (actual response is to absence of light). Different wavelengths of light activate different isomers.

Effects of Light		
Type	Isomer	Description
Red	$P_r \rightarrow P_{fr}$	<ul style="list-style-type: none"> <li>✓ Short Day Plants: Inhibits flowering</li> <li>✓ Long-Day Plants: Promotes flowering</li> </ul> Stimulates germination in all plants
Far-red	$P_{fr} \rightarrow P_r$	Inhibits germination in all plants

- Plants are exposed to mostly *red* light during the day.

- **Sources of Environmental Stress:** 1) Drought, 2) Flooding, 3) Salt Stress, 4) Heat, and 5) Cold