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# Botany (Quickstudy: Academic)

**WORLD'S #1 ACADEMIC OUTLINE**

## BOTANY

• Study of the Plant Kingdom... Our Essential Partners in Life •

### INTRODUCTION

**What is so special about plants?**

- They are photosynthetic, using the ultimate energy source, the sun, to make their own food. For this reason, they are called **autotrophs**. Plants gather most nutrients and are thus essential to life on Earth.

**Have you thanked a plant today?**

### ALTERNATION OF GENERATIONS

A unique evolutionary strategy for eukaryotes where a single plant organism has two phases to its life history.

- Diplophase** – Diploid, multicelled individual produces gametes via meiosis. Dominant form in lower plants.
- Sporophyte** – Diploid, multicelled individual from gamete fusion (zygote), produces haploid spores via meiosis for dispersal, grows gametophyte via mitosis to produce gametophyte. Dominant form in higher plants.
- Heterozygote A/G** – Gametophyte and sporophyte individuals are morphologically indistinguishable.

### GAMETE EVOLUTION

Plants have developed different strategies for gamete production and fusion.

- Isogamy** – Gametes are equally motile and of similar size.
- Anisogamy** – One gamete is large and less motile, with nutrient reserves, while the other is smaller and more motile, with few nutrient reserves.
- Oogamy** – One gamete is non-motile and large, with large nutrient reserves (egg), while the other is smaller and motile (sperm) and swims inside the larger gamete.

### PLANT CLASSIFICATION

**SEEDS VASCULAR**

- Angiosperms
- Gymnosperms

**SEEDLESS VASCULAR**

- Ferns
- Horsetails
- Wink Ferns

**NONVASCULAR**

- Mosses
- Liverworts
- Harlequins

### NONVASCULAR PLANTS

**In Plants on Land**

- Lack vascular tissues
- Gametophyte is dominant, sporophyte substantially dependent on gametophyte
- Small, live in moist environments, gametes released into water
- Classes:
  - Division Bryophytes (Liverworts)**
  - Division Charophytes (Harlequins)**
  - Division Thallophytes (Algae)**

### PLANT EVOLUTION

Plant evolution: Land colonization occurred about 400 mya. Many traits aquatic, green algae ancestor.

**New problems on land:** Plants must adapt to living in the air, a non-aquatic, dry medium. This presents some problems:

- Obtaining water and preventing water loss
- Transporting water and nutrients
- Gas exchange (requires stomata)
- Dormancy
- Reproduction when gametes remaining in water is limited
- Temperature that of air is more rapid than in water

**Plant adaptations/evolution:**

- Chlorophyll A & B, to capture sunlight – similar to green algae chlorophyll
- Starch storage, for prolonged inactive periods during seasonal variations
- Gametes protected and kept moist inside plant tissues
- Stomata (leaf openings) to regulate gas exchange
  - Wax cuticle to prevent excess water loss
  - Root systems to pull in water and nutrients from soil
  - Conduction tissues to transport water, nutrients and food
- Support tissues to battle gravity for vertical growth
- All of these adaptations have greatly enhanced the success of plants on land today



## Synopsis

This 6-page multi-colored guide is created for both high school and college level students studying the fundamental structure of botany.

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## Customer Reviews

Works for helping me organize my material more effectively... great resource to have on hand... would recommend to others who are learning about plants

Very detailed summary of botanical structures.

Clear, concise information.

good for quick reference.

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