

Plant Life Cycles Handout: The Alternation of Generations

Plants alternate between two distinct phases throughout their life cycle: the diploid sporophyte and the haploid gametophyte.

The sporophyte produces sporangia, which undergo **meiosis** to produce **spores** (which are haploid) – remember that this is very different from animals!. These spores germinate and become the gametophyte. The gametophyte produces gametangia (gamete-producing structures) that undergo **mitosis** to produce **gametes**: *antheridia* produce sperm, and *archegonia* produce eggs.

When the sperm and egg meet, fertilization occurs, and a zygote (diploid) is formed. This grows into the mature sporophyte, completing the life cycle.

Definitions:

Haploid: Possessing only a half complement (1 set) of chromosomes.

Diploid: Possessing a full complement of 2 sets of chromosomes.

Sporophyte: Diploid ($2n$), spore-producing phase

Gametophyte: Haploid ($1n$), gamete-producing phase

Sporangium: Spore-producing structure contained on the sporophyte.

Gametangium: Gamete-producing structure contained on the gametophyte.

Antheridium: Gametangium that produces sperm.

Archegonium: Gametangium that produces eggs.

Sporogenesis: Production of spores.

Gametogenesis: Production of gametes.

Meiotic sporogenesis: Production of spores via meiosis.

Mitotic gametogenesis: Production of gametes via mitosis.

Syngamy: Fusion of two gametes. In primitive life-cycles, gametes may not be divided into sperm and egg, but simply gamete 1 and gamete 2.

Fertilization: Fusion of sperm and egg.

Zygote: Diploid cell resulting from the fusion of egg and sperm. Grows into mature sporophyte.

Zoospore: Motile spores found in some algal lineages (as well as oomycetes and some other groups).