**Sexual Life Cycles**

- Reproduction
  - Sex or no sex? Advantages and disadvantages
  - First eukaryotes were probably haploid and asexual. Sex gave rise to diploidy
  - Polyploidy
  - Many plants (like many animals) can reproduce asexually
  - Alternation of generations
  - Gametophyte and sporophyte and the switch in dominance with advancement to land
  - Drought-resistant spores, then seeds (complex multicellular structures in which reproductive structures are surrounded by sterile cells). Seeds have a special covering and stored food

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**Life Cycles**

- Life Cycles and diploidy
- Zygotic meiosis
- Gametic meiosis
- Sporic meiosis
- Isomorphic and heteromorphic alternation of generations

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**What is a sexual life cycle?**

- A sexual life cycle (or a sexual part of a life cycle) is one which includes **meiosis** (which halves ploidy or chromosome number) and **fertilization** (which doubles it)

- In contrast with asexual reproduction, which involves only mitosis

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**What is a sexual life cycle?**

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- The three main types of sexual life cycles, differing in the timing of meiosis and fertilization, relative to mitotic growth of multicellular bodies.
  - Zygotic meiosis: zygote divides = 4 haploid cells. Mitosis leads to more haploid cells or a haploid individual. Differentiation produces gametes.
  - Gametic meiosis: 2N individual produces 1N gametes. These fuse to form a 2N zygote. Mitosis = growth.
  - Sporic meiosis: sporophyte (2N) individual produces 1N spores via meiosis. Spores undergo mitosis = gametophytes (1N individuals). These produce gametes, which fuse to form 2N zygotes = sporophytes
A “heterokaryotic” stage may happen here in fungi. Note that the nuclei in a heterokaryotic cell are usually haploid nuclei. Thus, the code for the “dikaryotic” condition (one type of heterokaryotic condition) is n+n, rather than 2n. If a cell is not heterokaryotic, it is called mononucleate or monokaryotic.

Life cycle of a fern: note the dominant diploid (sporophyte) generation, and the reduced (but multicellular) gametophyte: heteromorphic alternation of generations.