

Chapter 13 (Meiosis and Cell Life Cycles):

Heredity- the transformation of traits from one generation to the next

Genetics- scientific study of heredity and heredity variation

13.1:

Genes- hereditary units that are given from parents to offspring

Genes translated into features/traits

Gametes- reproductive cells

Male- sperm cells, female-eggs

Majority of DNA in a Eukaryote is packaged into chromosomes in the nucleus

Locus- a genes specific location along the length of a chromosome

Asexual Reproduction- a single individual is the sole parent and passes copies of all its genes to its offspring without the fusion of gametes

Offspring are clones

Clone- a group of genetically identical individuals

Sexual reproduction- two parents give rise to offspring that have unique combinations of genes inherited from the two parents

13.2:

Life cycle- the generation to generation sequence of stages in the reproductive history of an organism, from conception to production of its own offspring

Karotype- a display of condensed chromosomes arranged in pairs

Homologous chromosomes have the same length, centromere position, and staining pattern

Sex chromosomes- X and Y chromosomes (not homologous)

Autosomes- the other chromosomes

Diploid cells-Any cell with two chromosome sets, abbreviated  $2n$ .

For humans, diploid number is 46 ( $2n=46$ )

Haploid cells- single sets of chromosomes as found in gametes, abbreviated  $n$ .

For humans, haploid number is 23 ( $n=23$ )

The set of 23 consists of 22 autosomes plus a single sex chromosome

Fertilization- union of gametes culminating in fusion of their nuclei

Zygote- resulting fertilized egg

Diploid because it contains two haploid sets of chromosomes bearing genes representing the maternal and paternal family lines

Mitosis of the zygote and its descendent cells generates the somatic cells in the body

Gametes are the cells not produced by mitosis

Develop from specialized cells called germ cells in the gonads (ovaries in females and testes in males)

Three types of life cycles (alternation between meiosis and fertilization)

Humans

Gametes are only haploid cells

Meiosis occurs in germ cells during production of gametes. Gametes undergo no further cell division prior to fertilization

After fertilization, diploid zygote divides by mitosis to produce a multicellular organism that is diploid

Alternation of generations (plants and some algae)

Includes both diploid and haploid stages that are multicellular

Sporophyte-multicellular diploid stage

Spores- haploid cells that are products of meiosis in the sporophyte

The haploid spore does not fuse with another cell. It instead divides mitotically to generate a multicellular haploid stage called the gametophyte.

Cells of gametophyte give rise to gametes by mitosis. Fusion of two haploid gametes at fertilization results in a diploid zygote, which develops into the next sporophyte generation

Summary: Sporophyte generation produces a gametophyte as its offspring, and the gametophyte generation produces the next sporophyte generation.

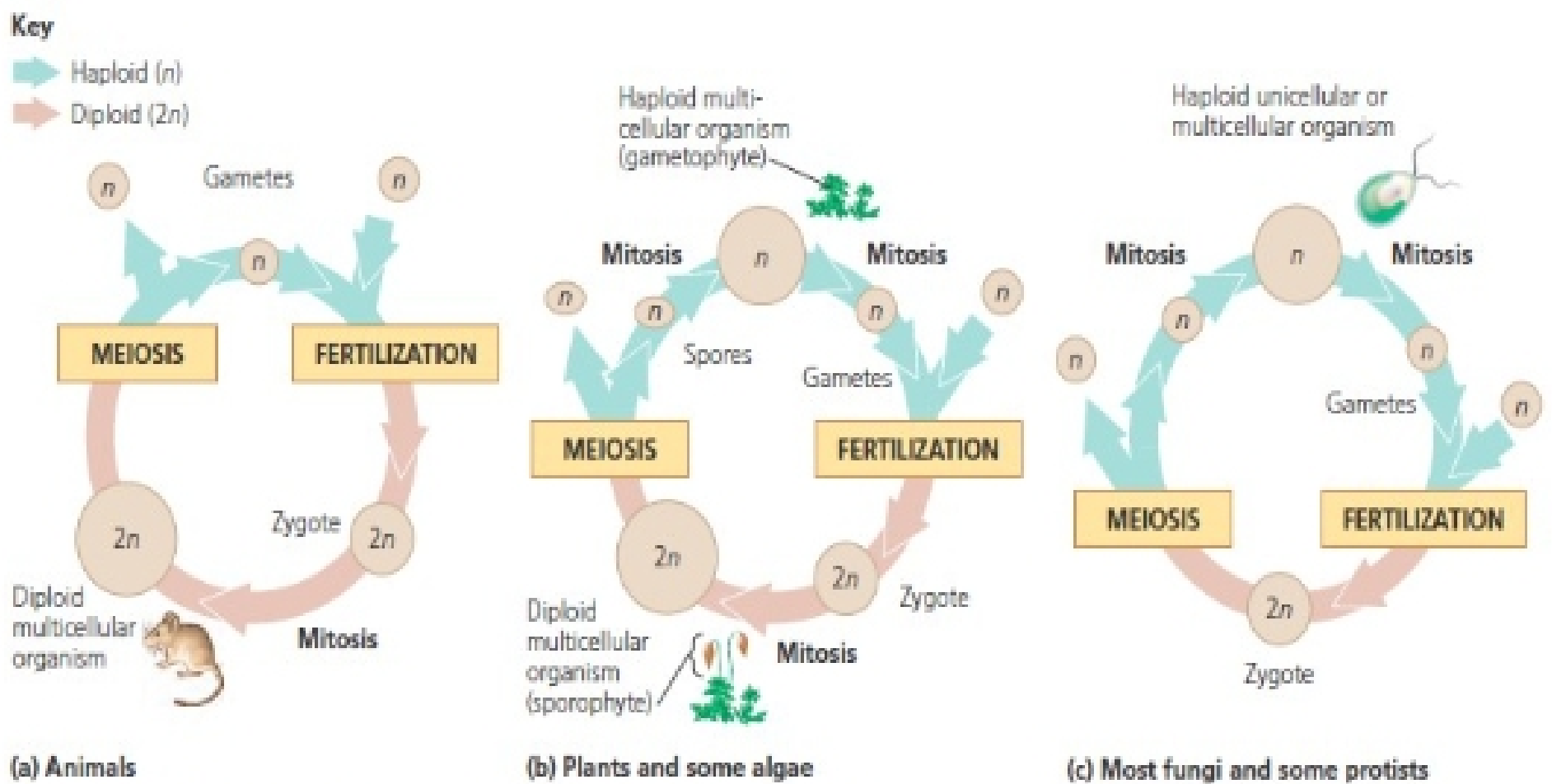
Life cycle of Fungi and Protists

After gametes fuse and form a diploid zygote, meiosis occurs without a multicellular offspring forming.

Meiosis does not produce gametes, but instead produces haploid cells

These haploid cells divide by mitosis and give rise to either unicellular descendants or a haploid multicellular organism.

The haploid organism carries out further mitosis to produce the cells that develop into gametes  
 Only diploid stage found in these species is the single celled zygote



**▲ Figure 13.6 Three types of sexual life cycles.** The common feature of all three cycles is the alternation of meiosis and fertilization, key events that contribute to genetic variation among offspring. The cycles differ in the timing of these two key events.

Either haploid or diploid cells can divide by mitosis depending on the cell cycle.

Only diploid cells can undergo meiosis because haploid cells have a single set of chromosomes that cannot be further reduced

13.3: Meiosis reduced the number of chromosomes sets from diploid to haploid

Meiosis is preceded by duplication of chromosomes

Single duplication followed by two consecutive cell divisions (meiosis I and meiosis II)