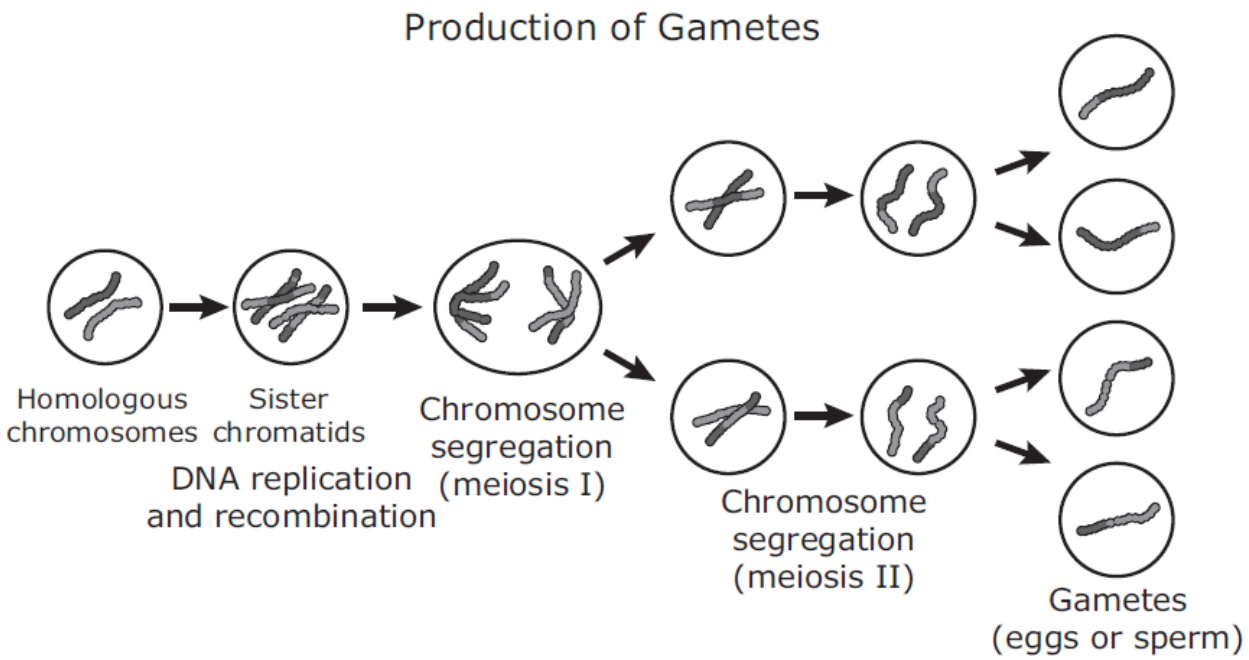
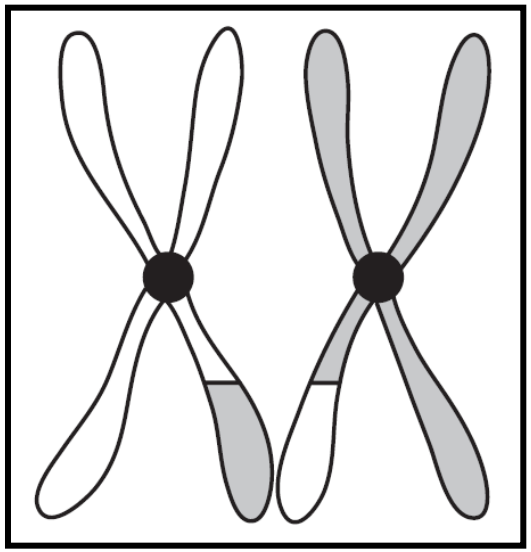
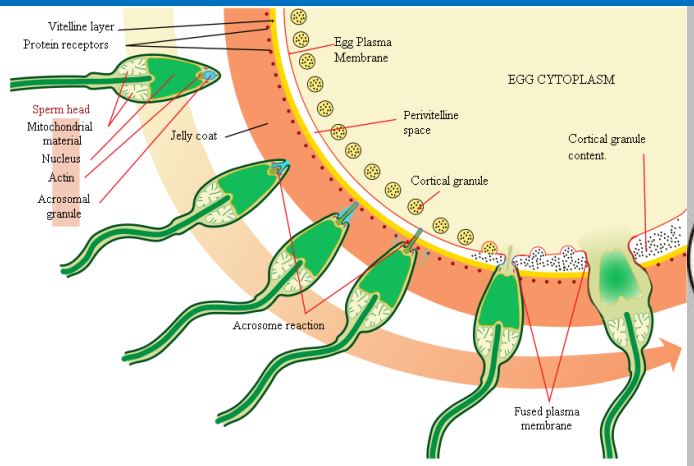
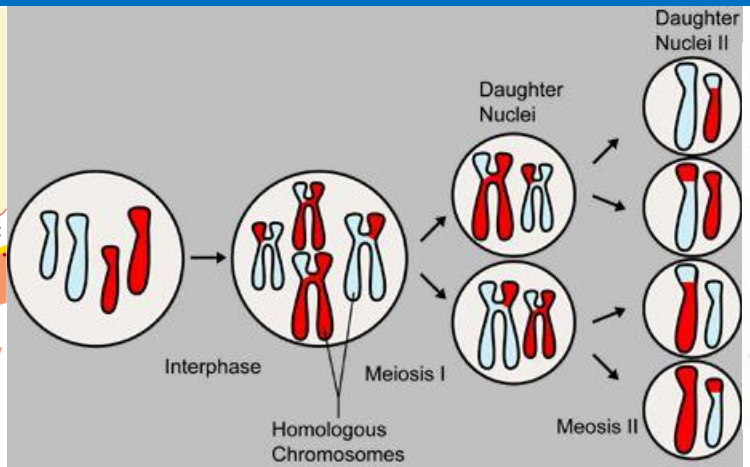




Meiosis





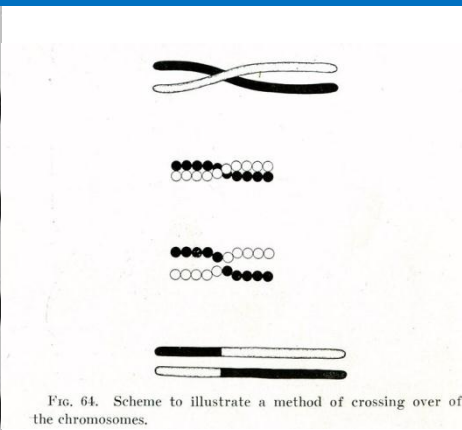
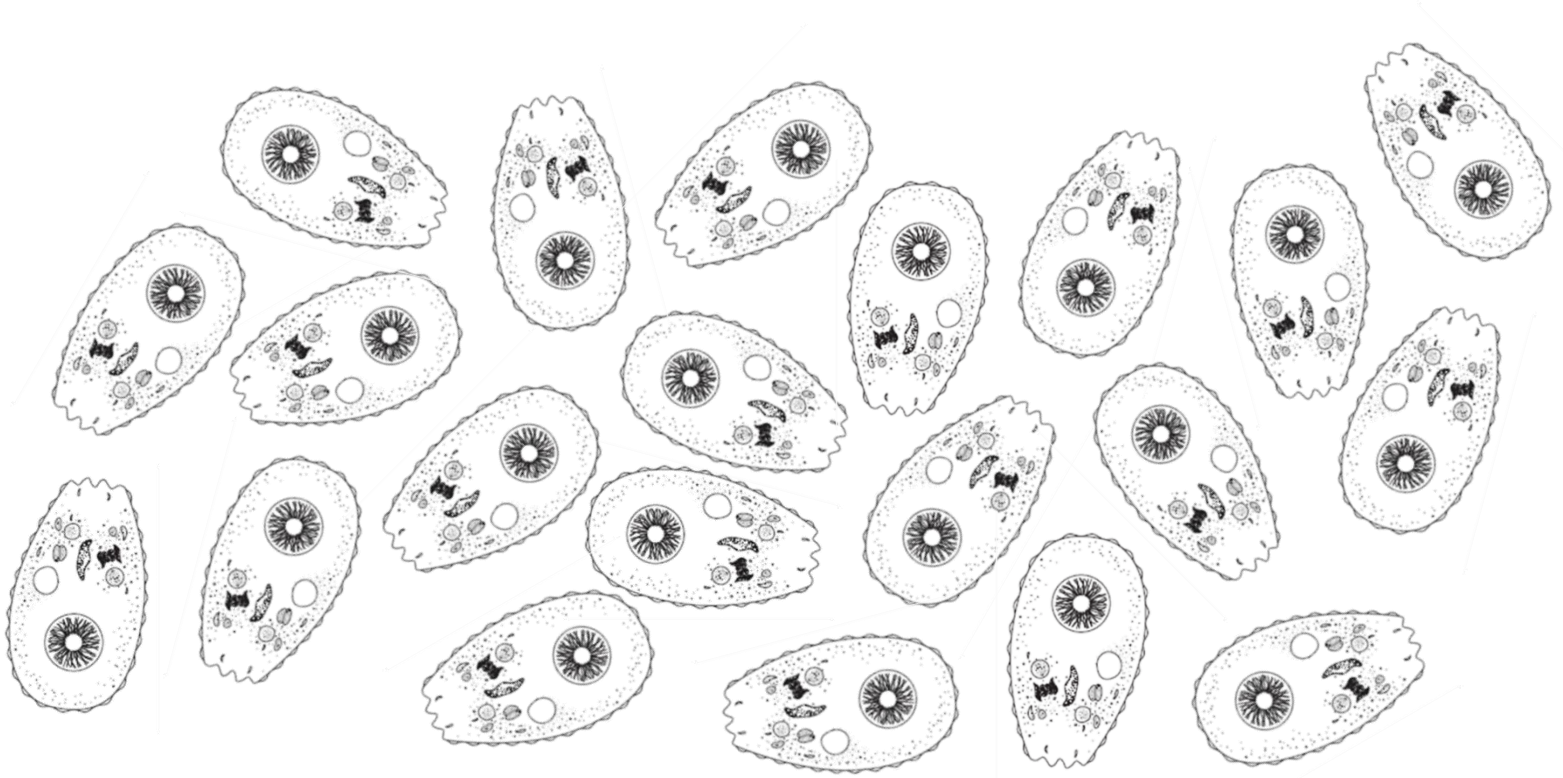


Fig. 64. Scheme to illustrate a method of crossing over of the chromosomes.

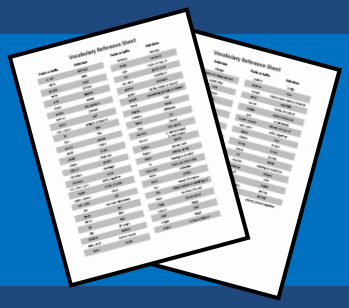
All living things can reproduce themselves.



There are two main methods of reproduction: *sexual* and *asexual* reproduction

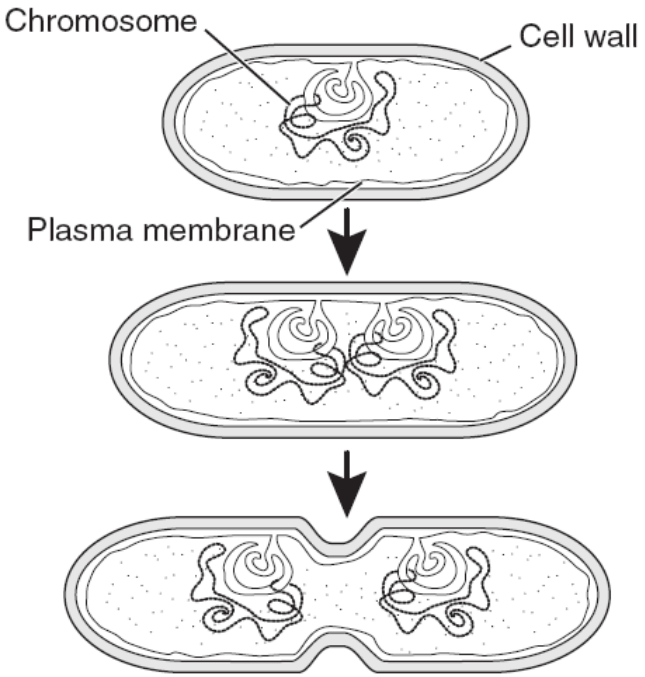
Reproduction

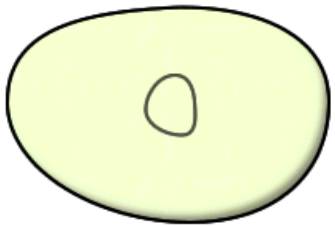
Asexual reproduction occurs <u>when a single organism produces offspring on its own</u>.



The prefix ***a-*** means <u>without</u>.

This produces offspring that are <u>***genetically identical***</u> to their parents.

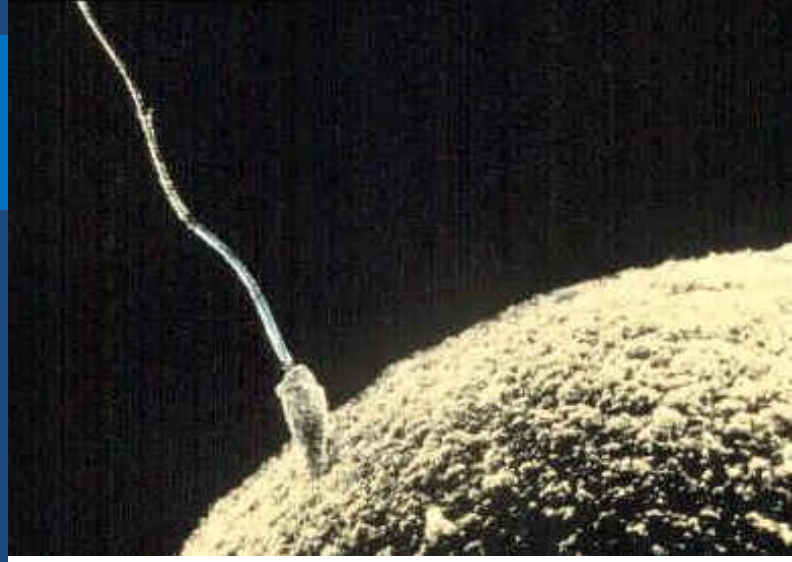


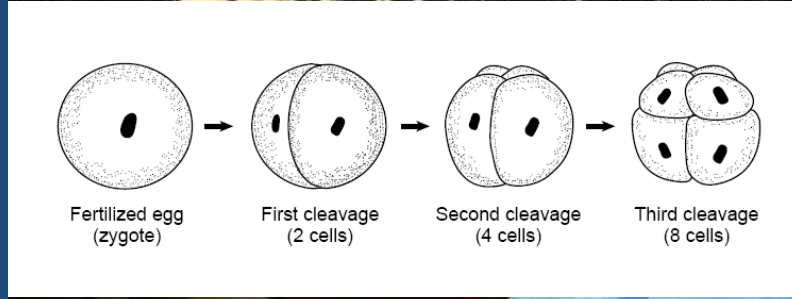


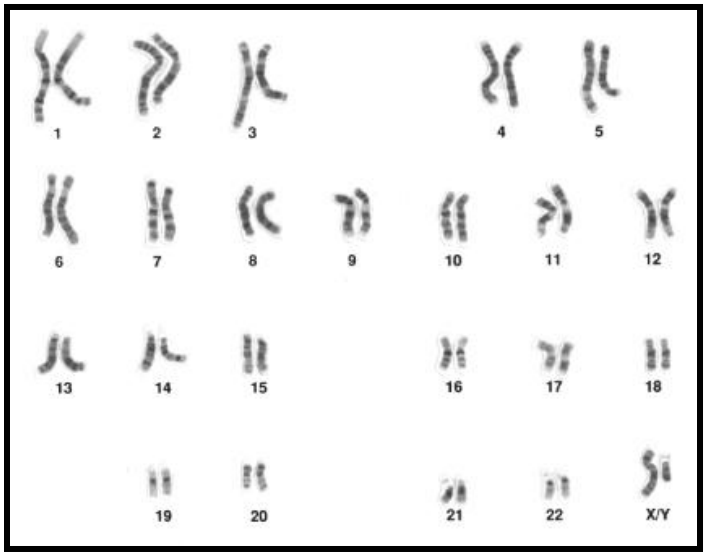
Reproduction

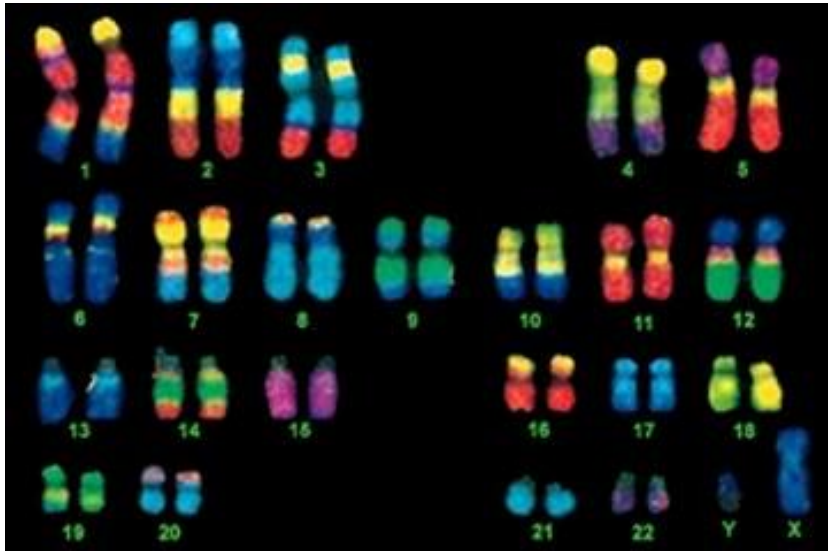
Sexual reproduction occurs when two organisms *share genetic material* to create offspring.

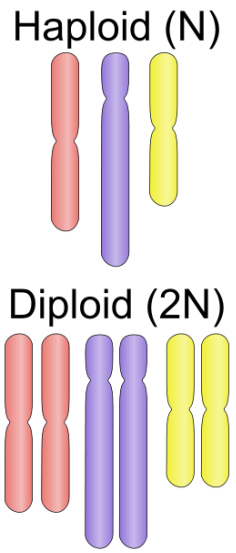
This creates offspring that are *different* from both parents and *genetically unique*.





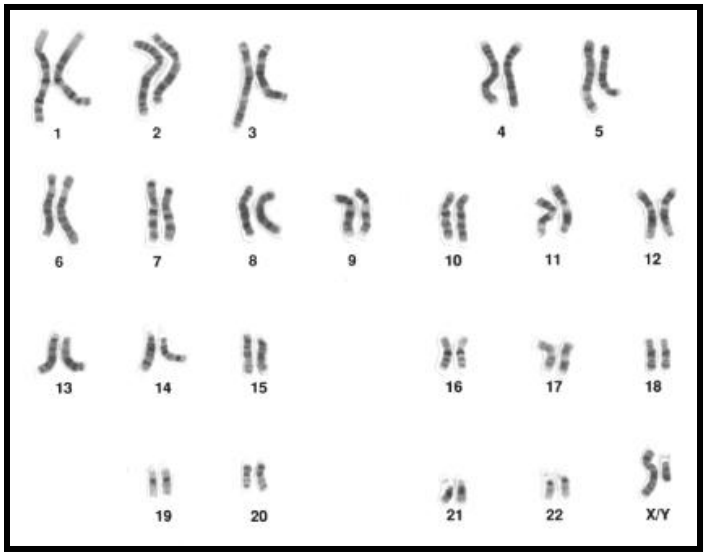




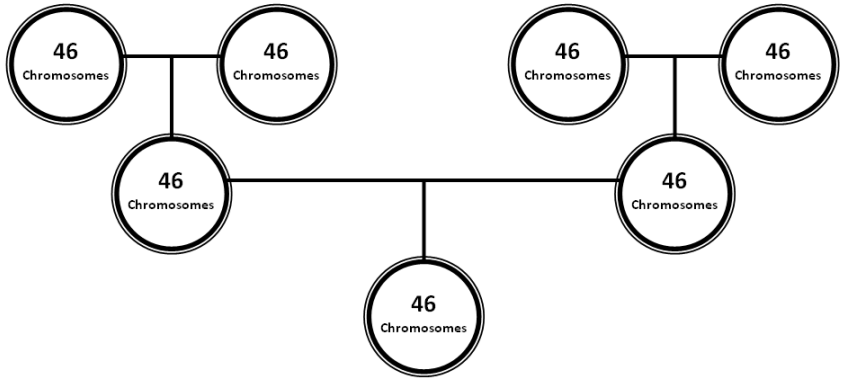


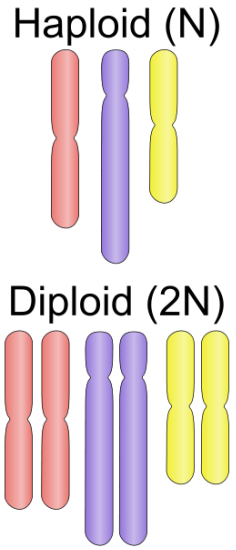
Inside eukaryotic cells, chromosomes are found in ***homologous pairs***. This means that there are two of each chromosome.

Cells with <u>two of each chromosome</u> are called **diploid** cells.



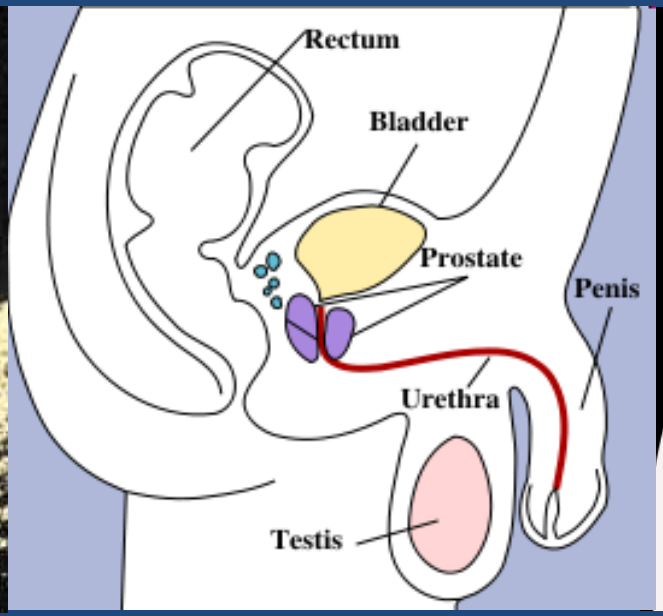
Typical Human Family Tree

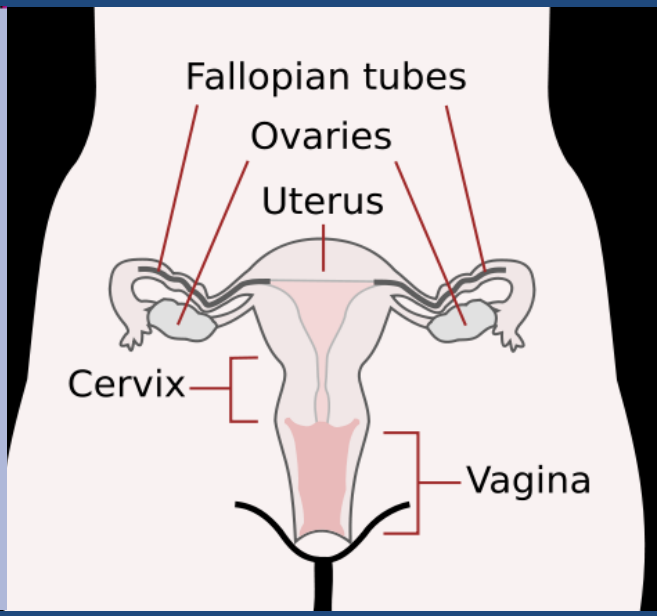




During sexual reproduction, organisms must share their chromosomes *without* adding or subtracting from the total number.

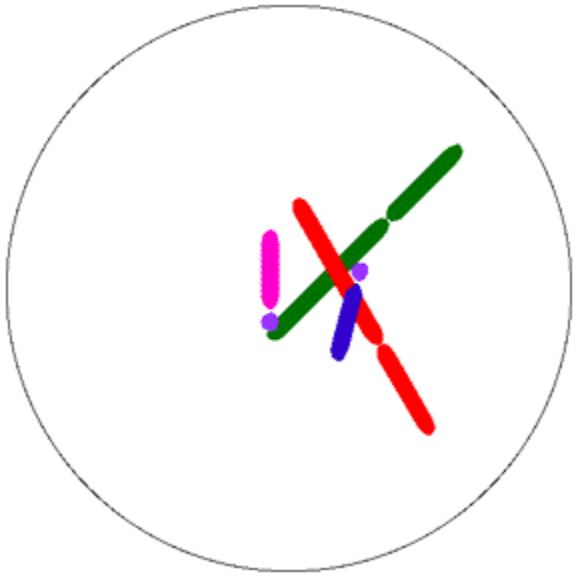
This means that they must create special haploid cells with only one of each chromosome for sexual reproduction.

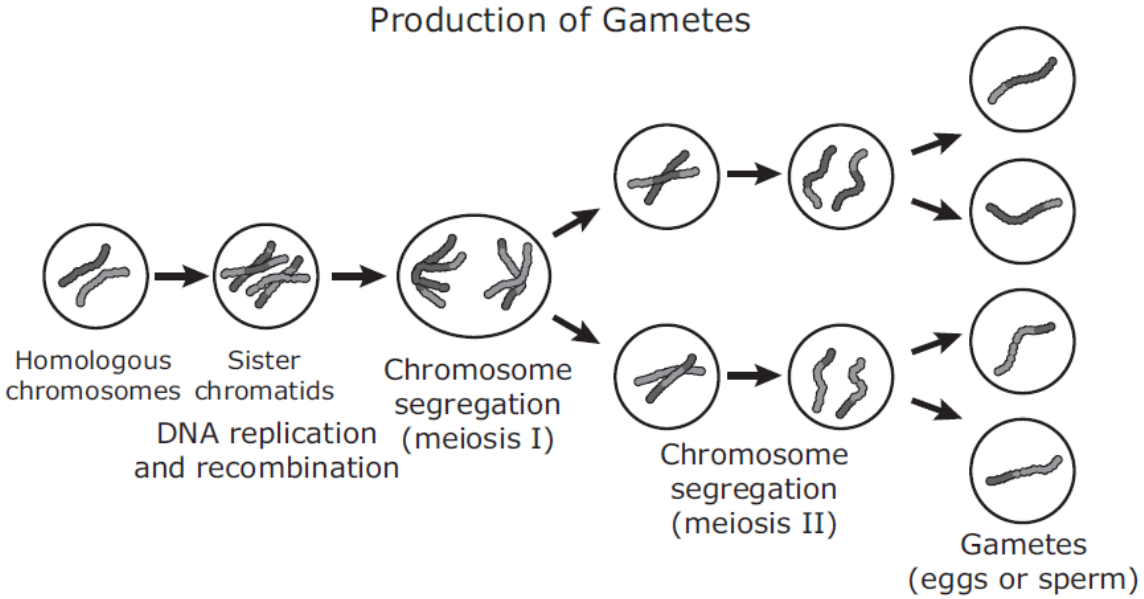




These special haploid cells are known as gamete cells, and they are only made in the reproductive organs.

Gamete cells are created through a process called meiosis.

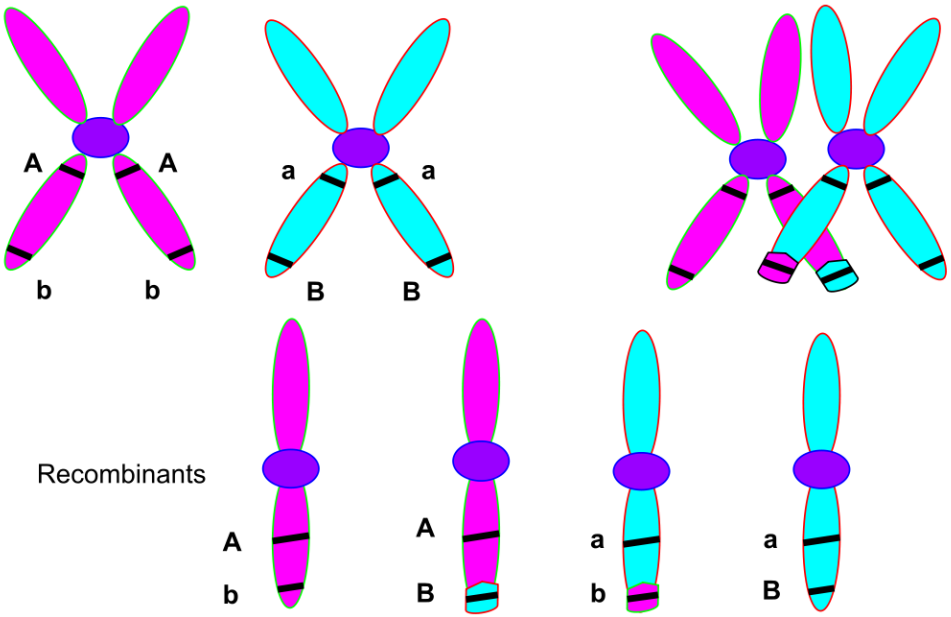


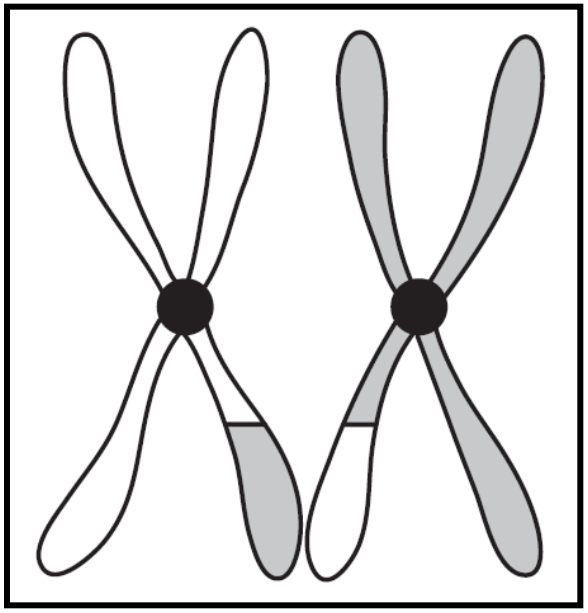


Meiosis creates cells with only one of each type of chromosome. The offspring get one set of chromosomes <u>from each parent</u>.

This creates offspring that are similar to both parents, but genetically unique.

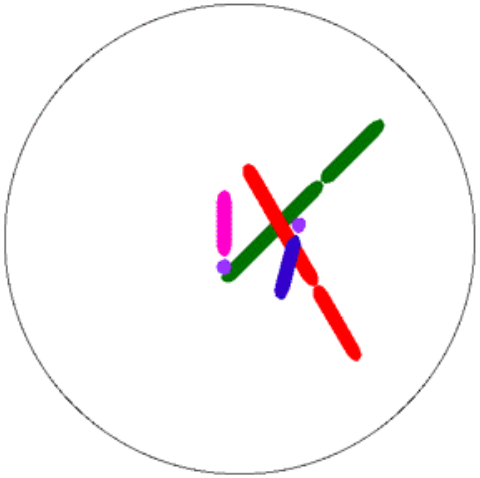
Increasing the genetic variations in a population is an important role of meiosis. Meiosis does not create new genes; however, it creates *new combinations of genes*.

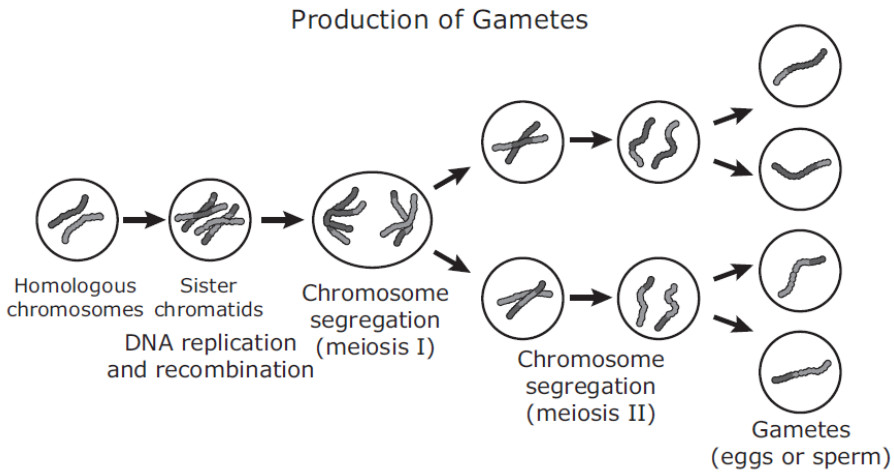




Genetic variations are increased even further through the process of crossing over. Homologous chromosomes recombine to create *new gene combinations*.

A single chromosome could have genes from both your grandmother and grandfather!





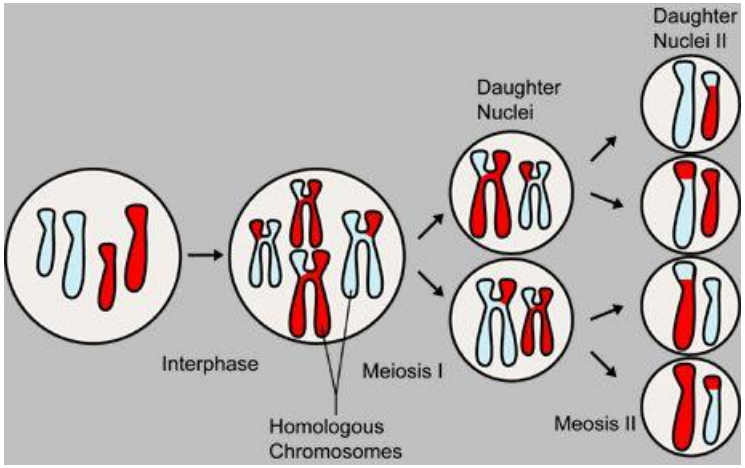
The Significance of Meiosis

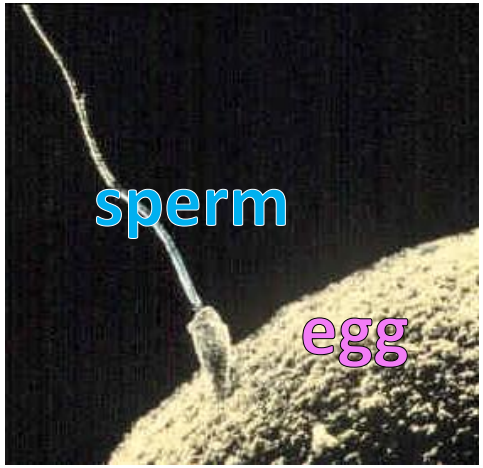
Meiosis helps create *genetically unique offspring*.

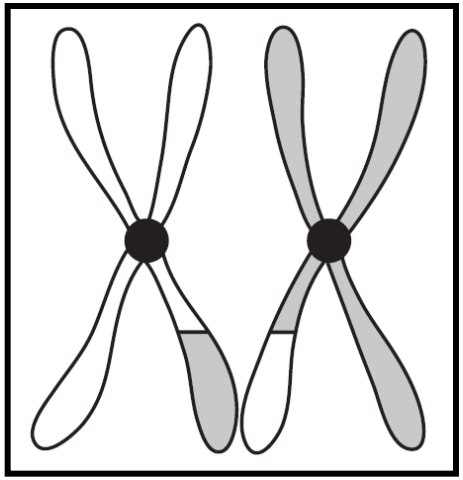
Meiosis *reduces* the number of chromosomes to create haploid *gamete cells*.

Meiosis increases *genetic variations* and creates *new combinations of genes*.

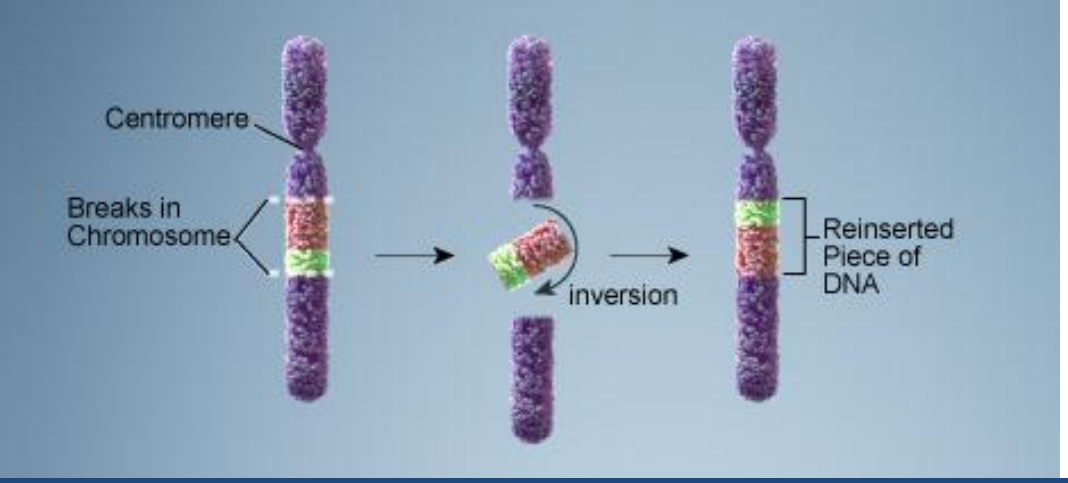
Mutations

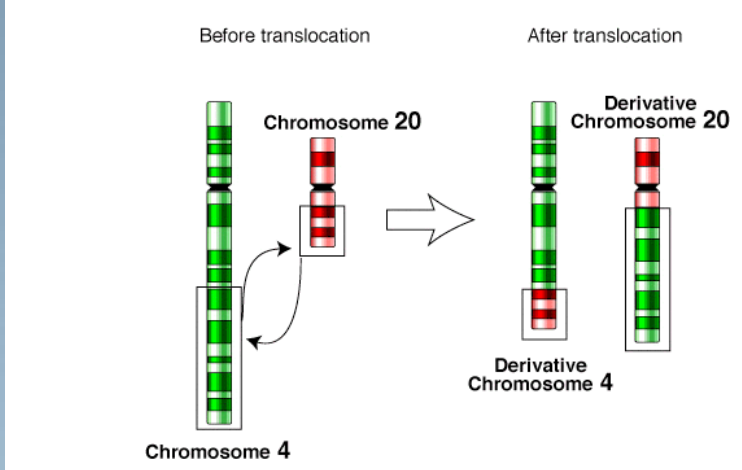




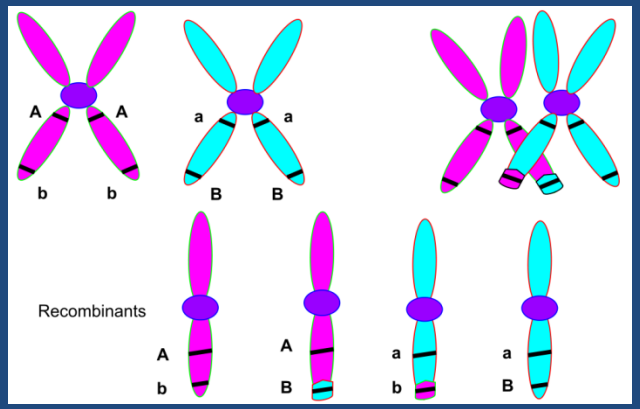


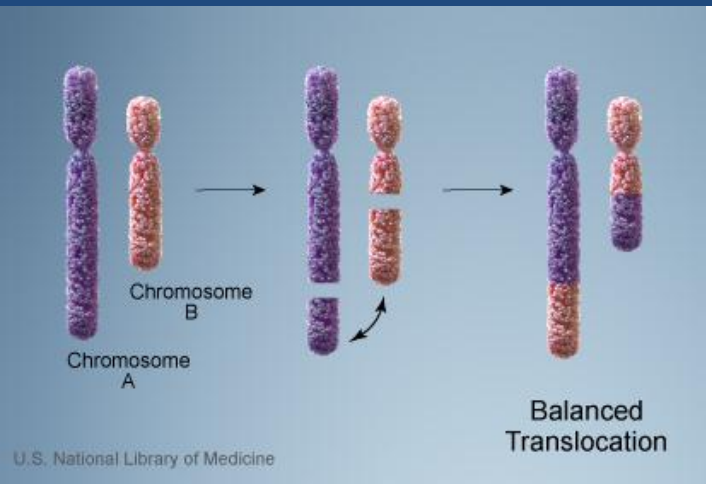
Only mutations that occur in gamete cells are passed on to the organisms offspring. Mutations to gamete cells usually occur during the process of meiosis.

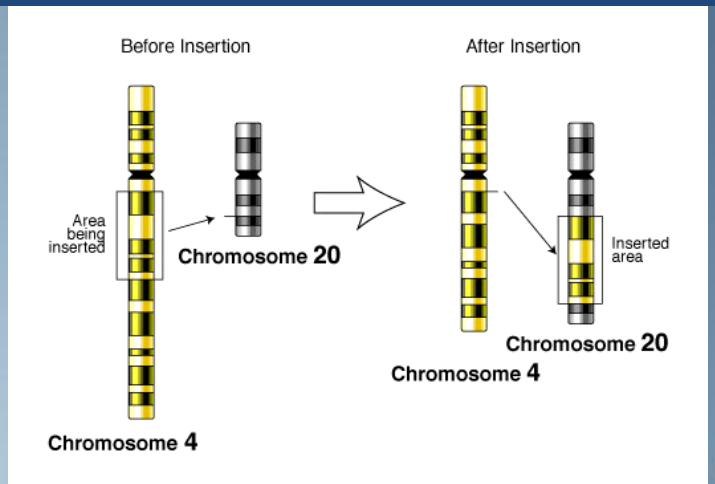


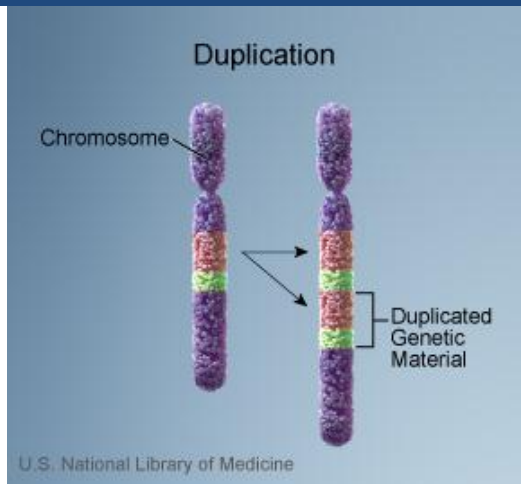


Chromosomal mutations are typically the result of mistakes that occur <u>when chromosomes cross-over</u>.









Nondisjunction occurs when chromosomes fail to separate properly during meiosis. This usually causes the offspring to have only **one chromosome** from a pair (**monosomy**) or to have **three homologous chromosome** (**trisomy**).

Monosomy

Trisomy