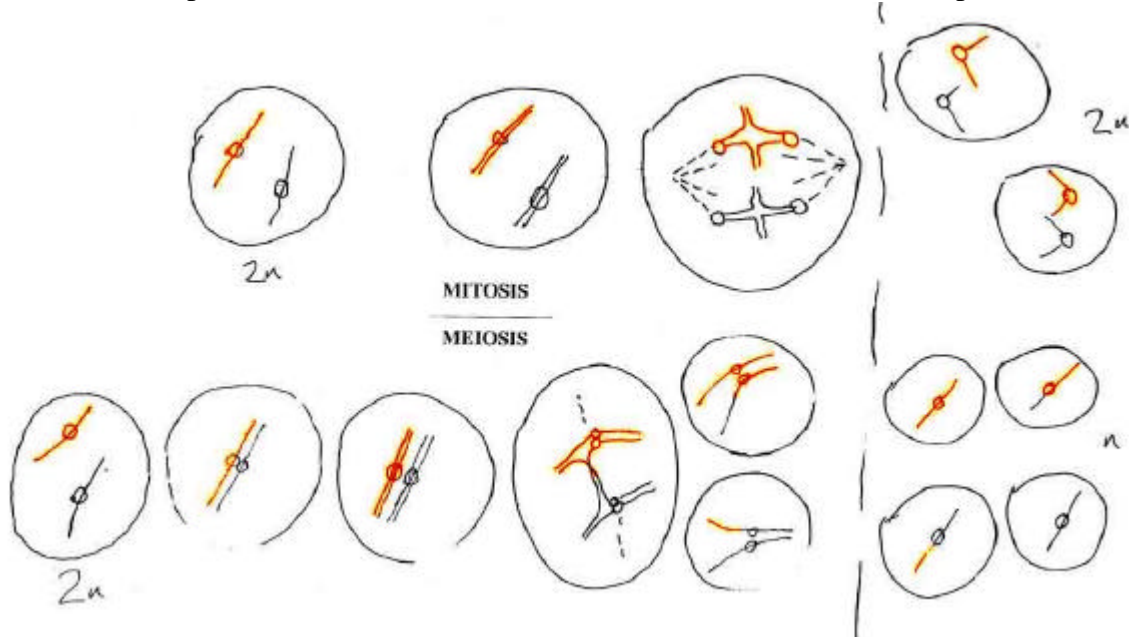


MITOSIS, MEIOSIS and the Alternation of Generations

All plants (and animals) have two sets of chromosomes – Thale cress has 5 pairs (thus each cell has 10 chromosomes), humans have 23 pairs (46 chromosomes), some equisetums have 108 (a total of 216 chromosomes in each nucleus). In humans the DNA in a single cell is some 2 meters long. Cells can divide in two ways:

Mitosis results in the production of 2 identical cells – this is the normal method of cell proliferation:



Meiosis results in the production of 4 cells (Spores OR Gametes), each with half the chromosomes, and in which the chromosomes also cross-over - the number and position of these cross-overs varies in every division, and results in shuffling of the genetic material (the red chromosome and black chromosome above each came from a separate parent). Gametes can now fuse to make zygotes, each of which will have exactly the same quantity of DNA as the parents (half from dad, half from mum), but most importantly, a brand new combination of that DNA – this is the most important function of sex, to shuffle genes and generate variation.

In green plants there is an **ALTERNATION OF GENERATIONS**. Unlike animals, in which the products of meiosis are gametes, green plants produce spores, which grow into a multicellular **GAMETOPHYTE** (Gamete-making-plant), this produces gametes (by mitosis) and these fuse to form a zygote that develops into a **SPOROPHYTE** (Spore-making-plant).

