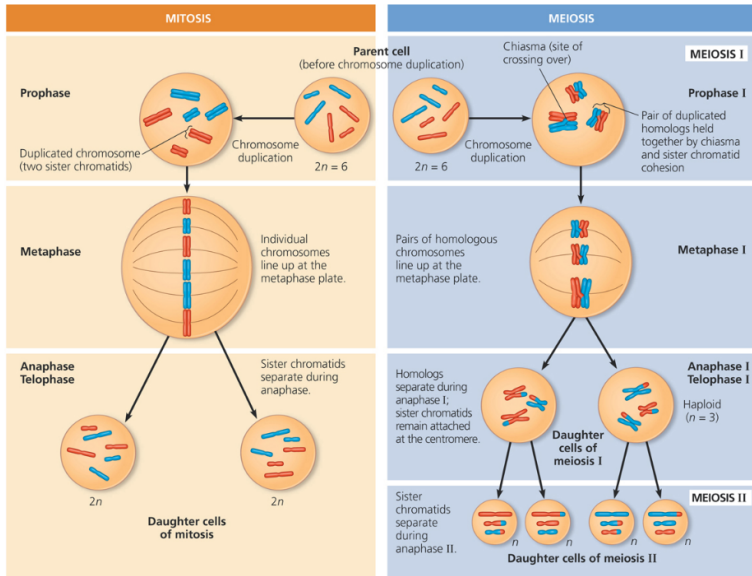


Mechanics of recombination

Recombination: 3 mechanisms for genetic variation

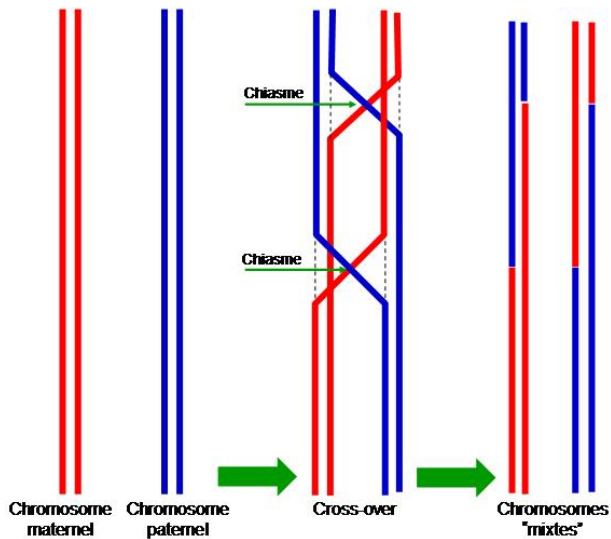
- ▶ Independent assortment
- ▶ Crossing over
- ▶ Random fertilisation

Meiosis



¹Image: Campbell N, et al. (2021). Biology: a global approach (12th edition global). Pearson Education Limited. Page 312 (Figure 13.10).

Crossover



Meiosis

- ▶ As in mitosis, preceded by chromosome replication
- ▶ Occurs in 2 sets of cell divisions (meiosis I and II)
- ▶ 2 cell divisions make 4 daughter cells
- ▶ Daughter cells have $1/2$ chromosomes ('haploid')

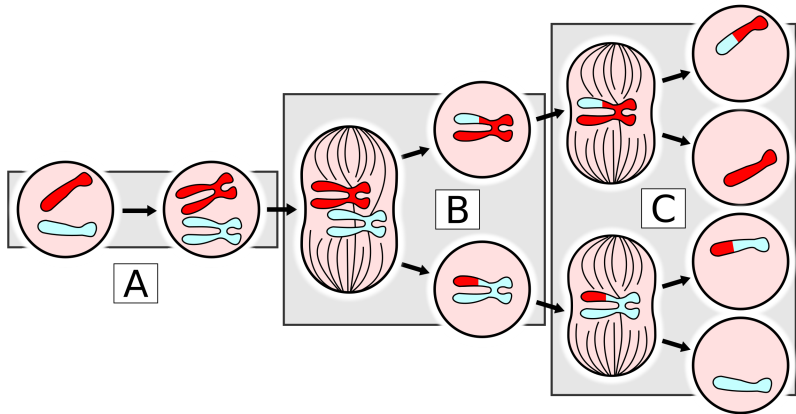
Meiosis: 3 unique events in Meiosis I

1. Synapsis (homologous chromosomes connecting) and chiasmata formation (connected chromosomes swap DNA)
2. At the metaphase plate, there are paired homologous chromosomes (tetrads) instead of individual replicated chromosomes
3. At anaphase I, tetrads separate

Meiosis as a source of variation

Chromosome behaviour during meiosis and fertilisation is responsible for most variation in a generation

Meiosis as a source of variation



(A) DNA replication, (B) Meiosis I, (C) Meiosis II

Meiosis as a source of variation

Crossing over contributes to genetic variation by combining DNA from 2 parents into a single chromosome with a shuffle.

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- ▶ Each zygote has a unique genetic identity