Meiosis (reduction division)

Cell division that produces haploid (n) daughter cells from a diploid (2n) cell

- Gametes (egg and sperm cells) are made by meiosis
- Meiosis requires **two** consecutive divisions, called meiosis 1 and meiosis 2:

In meiosis 1, each daughter cell receives only one of each pair of duplicated chromosomes in the diploid mother cell

- The daughter cells produced by meiosis 1 are haploid (n) with duplicated chromosomes
- Note that duplicated sister chromatids do **not** separate in meiosis 1

In meiosis 2, each daughter cell receives only one chromatid of each pair of sister chromatids from each duplicated chromosome of the meiosis 1 cell

- The daughter cells produced by meiosis 2 are haploid (n) with unduplicated chromosomes
- Note that duplicated sister chromatids **do** separate in meiosis 2

Meiosis makes 4 sperm cells or one egg cell from one diploid cell

To ensure variety in our offspring, each gamete receives a unique mixture of your maternal and paternal genes

There are two ways that the maternal and paternal genes are mixed:

1) Independent assort of chromosomes

2) Crossing over

(Both occur in meiosis I)

Independent assortment of chromosomes

The separation of each homologous pair of chromosomes in meiosis I is random and independent of the separation of all other homologous pairs.

Crossing over (Synapsis)

Exchange of DNA segments between homologous chromosomes in meiosis I

- Occurs before the homologous chromosomes are separated in meiosis I
- Allows mixing of maternal and paternal genes on the same chromosome

Together, these processes allow each gamete to receive a nearly independent assortment of maternal and paternal genes

- Independent assortment = Each gene a gamete receives has a random 50% chance of being maternal or paternal.
- Receiving a maternal or paternal version of one gene does not cause any other gene to be maternal or paternal.