

### What Is Meiosis?

Meiosis is the formation of gametes; the sex cells used in sexual reproduction (egg and sperm cells).

Usually, during interphase, body cells are diploid cells; they contain a full set of chromosomes ( $2n$ ). Gametes are haploid ( $n$ ). Each parent's gametes contain half the genetic material needed, so when a gamete from each parent fuse together, the offspring has a full set of genetic material ( $2n$ ); half from each parent.

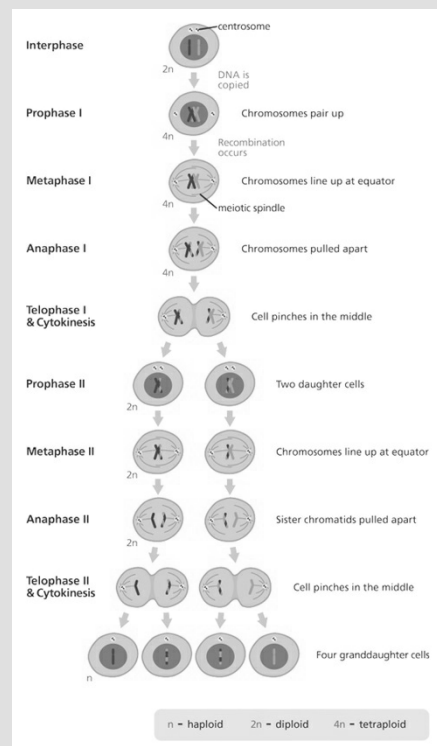
### The Stages of Meiosis

1) Interphase	DNA within the cell is duplicated.	$2n$ → $4n$
2) Prophase I	Chromosomes form homologous pairs (tetrads), and crossing over occurs, where certain genes from each chromosome physically interact and swap over.	$4n$
3) Metaphase I	Tetrads line up at the equator of the cell.	$4n$
4) Anaphase I	Spindle fibers pull 1 chromosome from each tetrad to opposite poles of the cell.	$4n$
5) Telophase I	A cleavage furrow forms, which pinches the cell in the middle.	$4n$
6) Cytokinesis	The cell divides into 2 daughter cells.	$4n$ → $2n$
7) Prophase II	The reformed nuclear envelope breaks down.	$2n$
8) Metaphase II	Chromosomes line up at the cell's equator.	$2n$
9) Anaphase II	Each chromosome's sister chromatids are pulled to opposite poles of the cell by spindle fibers.	$2n$
10) Telophase II	A cleavage furrow forms.	$2n$
11) Cytokinesis	Each daughter cell divides into 2 cells, forming a total of 4 haploid cells for the whole process.	$2n$ → $n$

### What Causes Genetic Variation?

- Independent assortment, which occurs when chromosomes randomly line up at the equator.
- Crossing over, during prophase I, where genetic material is swapped by chromatids.
- Random fertilisation. During sexual reproduction, only one sperm will fertilise one egg, meaning it is random chance which combination of genetic information will be present in the parents' gametes.

### Meiosis Diagram



### How Are Mitosis and Meiosis Different?

Differences:	Mitosis	Meiosis
Number of cell divisions	1	2
Number of daughter cells	2	4
Genetic composition of daughter cells	$2n$	$n$
Role in animals	Tissue growth, asexual reproduction	Formation of gametes (for sexual reproduction)