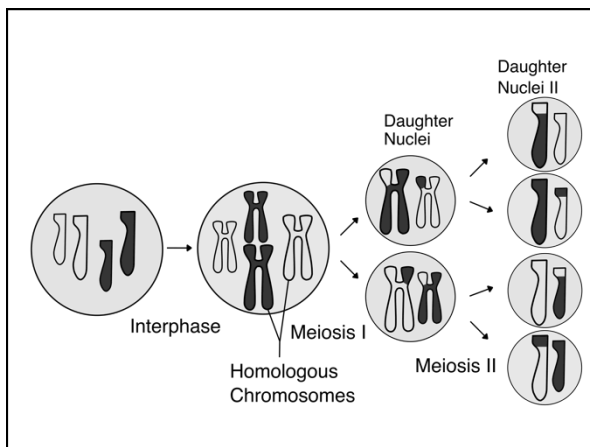


Meiosis

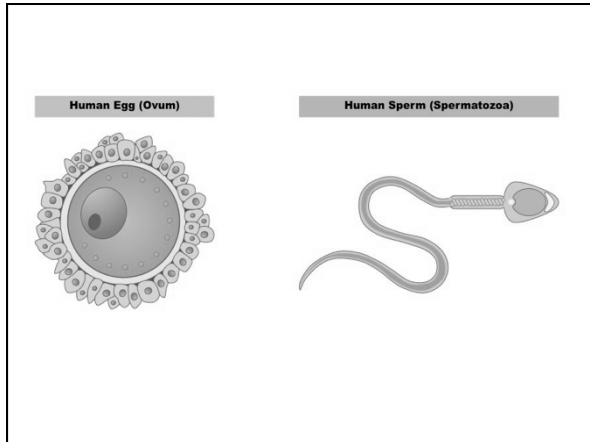
Meiosis

- A type of cell division that results in four daughter cells each with half of the chromosomes of the parent cell. In addition to only half of the chromosomes, each cell formed by meiosis is genetically different.



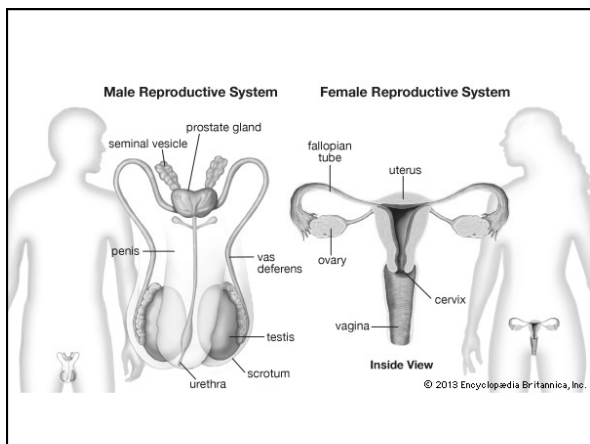
Gametes

- Cells formed by meiosis are called gametes. In humans, the male gametes are called sperm and the female gametes are called eggs.



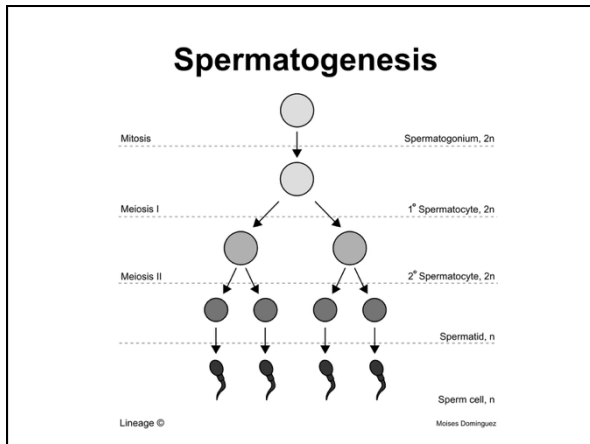
Gonads

- The male gonads are the testes and that is where the sperm are produced.
- The female gonads are the ovaries and that is where the eggs are formed.

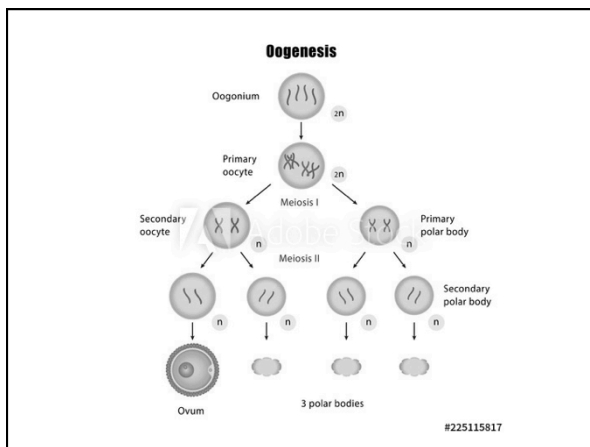


Spermatogenesis

- Formation of sperm in the testes.
- Each male spermatogonium (diploid) will produce 4 genetically different viable sperm (haploid).
- Each cell will have a tail.
- Males produce 60,000 sperm a minute.

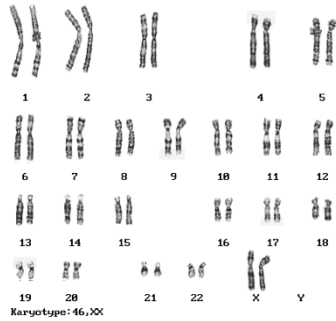


- ### Oogenesis
- Formation of eggs in the ovaries
 - Each diploid oogonium will produce 1 haploid egg and 3 polar bodies. The egg has all of the organelles needed for the formation of the zygote.
 - 1 egg matures each menstrual cycle (28 days)



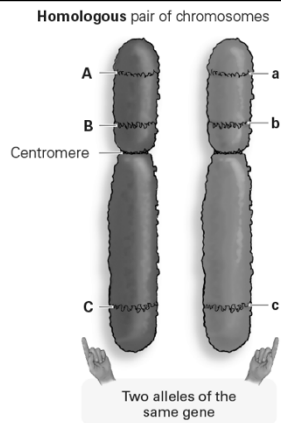
- ### It's All About The Chromosome Number
- A normal human cell contains 46 chromosomes. Each human gets 23 chromosomes from their mother and 23 from their father.
 - The n number (haploid) of chromosomes is 23, but since you have a copy from each parent, you are said to have a 2n number (diploid) of chromosomes. That is 46 in humans.

Looking Into The Chromosomes-Karyotype

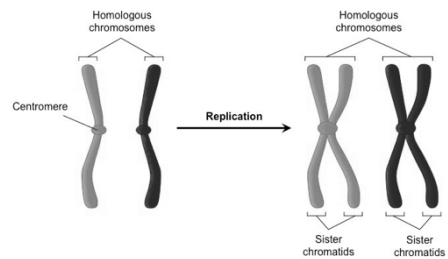


Homologous Chromosomes

- Each pair of chromosomes are said to be homologous. That means they are the same chromosome number where all of the genes are located in the same area of the chromosome. They are NOT identical.



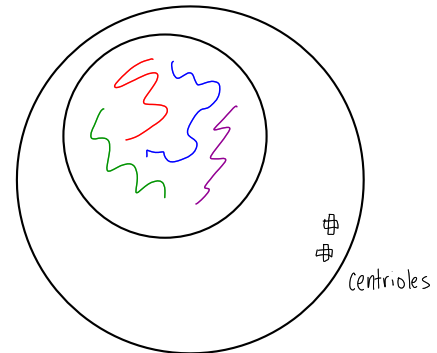
When Homologous Chromosomes Replicate- NOW Sister Chromatids



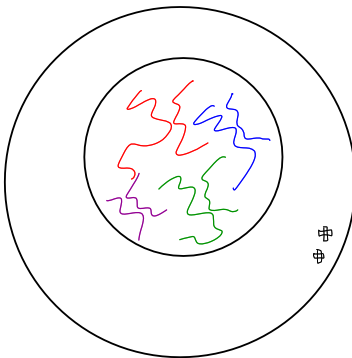
Slight Confusion

- In meiosis the chromosomes replicate one time but split twice.
- The replicated chromosomes (sister chromatids) will interact and that is what helps lead to genetic diversity.

Four Single Stranded Chromosomes



Replication-Four Double Stranded Chromosomes

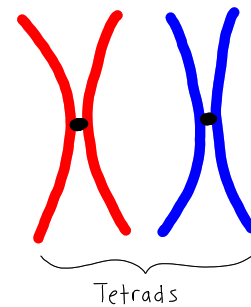
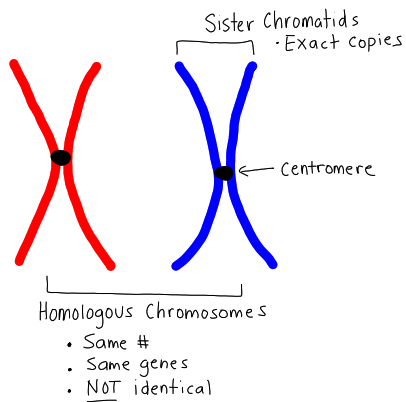
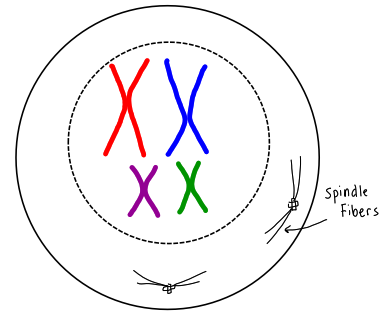


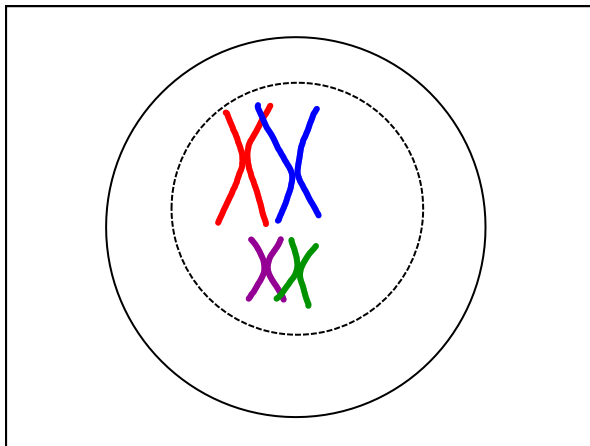
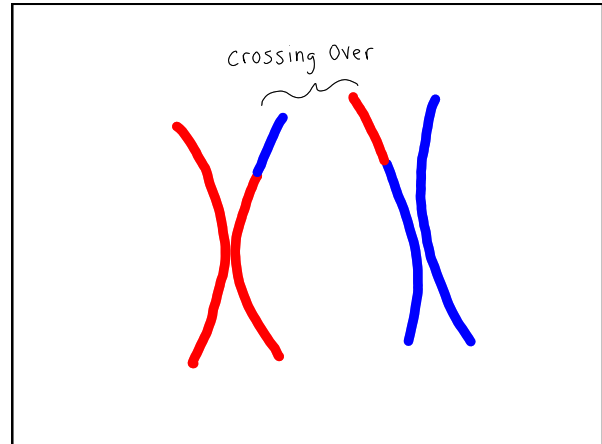
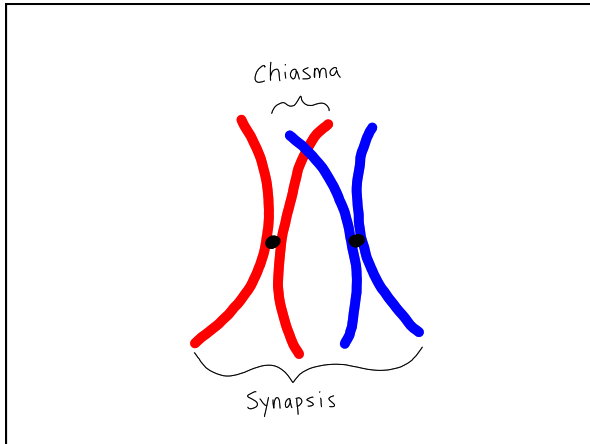
Meiosis I

- Prophase 1 **
- Metaphase 1
- Anaphase 1
- Telophase 1
- Cytokinesis

Prophase I

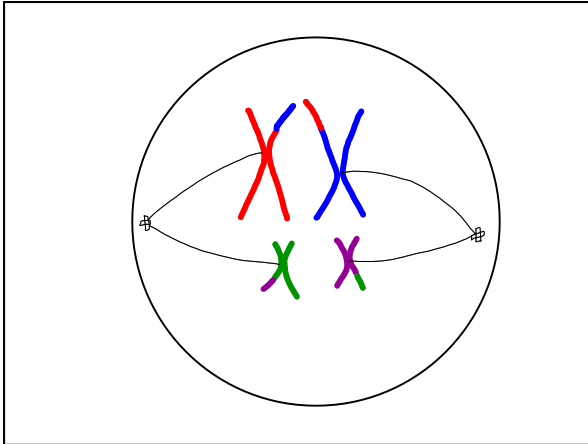
- Nuclear envelope disappears
- Nucleolus disappears
- Centrioles move towards the poles
- Spindle fibers form
- Condensed chromosomes interact. Homologous pairs (tetrads) swap DNA at the chiasma. Crossing over has occurred.





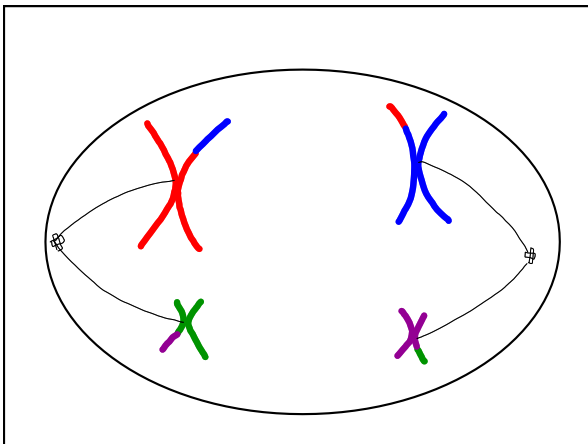
Metaphase I

- Homologous chromosomes line up NEXT TO EACH OTHER not in a straight line in the middle of the cell.
- Spindle fibers attach to the centromere so they can pull the homologous chromosomes apart.



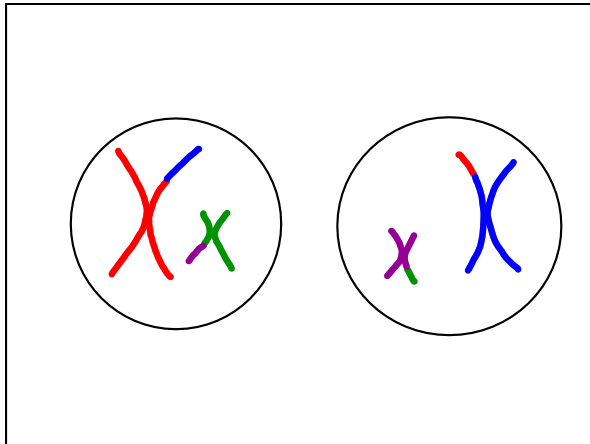
Anaphase I

- The homologous pairs are separated.



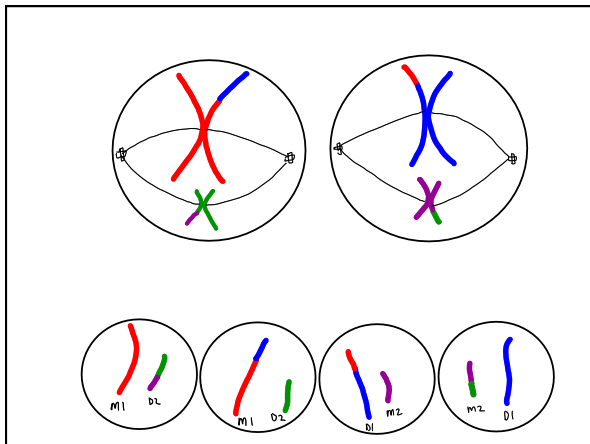
Telophase I/Cytokinesis I

- Each new cell that forms will have half of the chromosomes of the original cell BUT equal amount of DNA. That is weird, but remember the DNA was replicated then the cells split.
- Half of the chromosome number, but the chromosomes are considered double stranded.



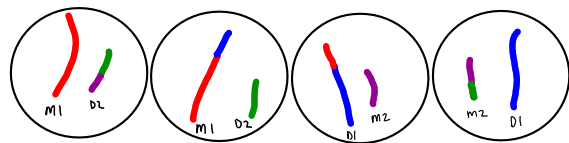
Meiosis II

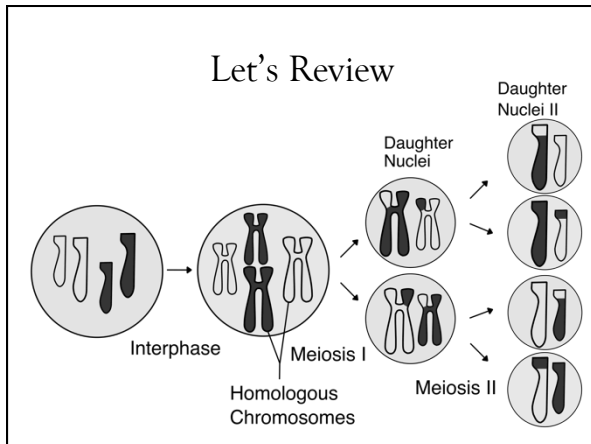
- Each double stranded chromosome will now line up down the middle of the cell and spindle fibers will attach.
- The sister chromatids will now be separated. Since there was not a second round of replication, these cell will have half of the original DNA and are called single stranded chromosomes.



Genetic Diversity

- Each of the cells will be slightly different than the one next to it.





Errors in Meiosis

- If the sister chromatids do not separate correctly in meiosis II, one cell will have extra chromosomes and one cell will not have enough.
- This is a problem when the gametes go through fertilization. The new organism will not have the correct number of chromosomes.
- This is called non-disjunction

