**MEIOSIS**

* Sexual reproduction, through the **\_\_\_\_\_\_\_\_\_\_\_\_** of DNA, produces genetic **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* This variation offspring produces individuals that may have **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** over one another.
* Sexual reproduction requires **\_\_\_\_\_\_\_\_\_\_\_** parents.
* A close up of a device

  Description automatically generatedEach parent passes on **\_\_\_\_\_\_\_\_\_\_** its genes to its offspring.
* Must have male and female: male to produce **\_\_\_\_\_\_\_\_** and female to produce **\_\_\_\_\_\_\_\_**
* If an organism is the result of sexual reproduction, it will have **\_\_\_\_** sets of chromosomes.
  + One set comes from the mother and one set comes from the father.
  + These two sets are called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** chromosomes.
* Homologous chromosomes carry the same genes, but they may have different **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of that gene.
* Normal body cells have a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** chromosome number
* Diploid means there are **\_\_\_\_\_\_\_\_\_** of each kind of chromosome in each cell
* They occur in **\_\_\_\_\_\_\_\_\_\_\_**
* “*n*” is the number of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** chromosomes an organism has, so diploid is represented as **\_\_\_\_\_\_**
* Humans are 2*n* (aka diploid) because we have 2 of each kind of chromosome.
* Sex determining chromosomes in humans are the **23rd** pair:
  + XX = biologically born **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (X from mother, X from father)
  + XY = biologically born **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (X from mother, Y from father)

Diagram

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* In humans, the male and female each contribute \_\_\_\_\_\_\_ chromosomes.
* When fertilization takes place:
* egg (23) + sperm (23) 🡪 zygote (46)
* The zygote goes on to develop into an embryo, and on into a complete individual. When the time comes, the cycle repeats.

Gametes are said to be **\_\_\_\_\_\_\_\_\_\_\_\_** (or ***n***) because they contain only **\_\_\_\_\_\_** of each kind of chromosome.

Big idea: The cells which produce eggs and the cells which produce sperm are diploid (or 2*n*)…

***So how do the egg and sperm cells get to be haploid (or n)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

Meiosis is a process of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** in which the number of chromosomes per cell is cut in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** through the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of homologous chromosomes.

* Occurs in the **\_\_\_\_\_\_\_\_\_** cells only: the egg and sperm.
* Purpose is to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** the chromosome number of the egg and sperm by **\_\_\_\_\_\_\_\_\_\_\_\_**.
* Like mitosis, meiosis is **preceded** by the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of chromosomes.
* Unlike mitosis, this replication is then **followed** by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: meiosis I and meiosis II.

Diagram

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| --- | --- |
| **Interphase** | The ­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ replicate. It is similar to chromosome replication of mitosis. Two identical sister \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are held together by a centromere. |
| **MEIOSIS I**  **Prophase I** | Chromosomes shorten and thicken. Each chromosome pairs with its corresponding \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ chromosome to form a \_\_\_\_\_\_\_\_\_\_\_\_\_\_.   * During Prophase I, each pair of chromatids lines up next to its **homologue** * This pairing of homologous chromosomes produces **tetrads**. * A tetrad consists of **\_\_\_\_\_\_** chromatids * Crossing over is the exchange of **genetic information (\_\_\_\_\_\_\_\_\_\_\_)** between segments of **homologous** chromosomes during meiosis. |
| **Metaphase I** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ line up at the center of the cell. |
| **Anaphase I** | The tetrads break apart and the pairs move to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sides of the cell. Sister chromatids remain attached at their centromeres. |
| **Telophase I** | The cell separates into \_\_\_\_\_\_\_\_\_ cells  ***Meiosis I results in \_\_\_\_\_\_ haploid (1n) daughter cells, each with \_\_\_\_\_\_\_\_ the number of chromosomes as the original cell.*** |

|  |  |
| --- | --- |
| **MEIOSIS II**  **Prophase II** | The pairs of **\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** start toward the center. |
| **Metaphase II** | Pairs of sister chromatids line up at the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Anaphase II** | The pairs of sister chromatids separate and move to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** sides of the cell. |
| **Telophase II** | | Results in **\_\_\_\_\_\_** new cells that are **\_\_\_\_\_\_\_\_\_\_\_\_** (1n) and all **\_\_\_\_\_\_\_\_\_\_\_\_** from each other. |

**The Importance of Meiosis**

1 (2n) cell ------->

The offspring will receive a \_\_\_\_\_\_\_\_\_\_\_\_ combination of genetic information.   
This leads to variation (called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**) in the offspring.

**Mitosis vs Meiosis**