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## I. Overview

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**A. Organisms must inherit a single copy of every gene from each parent**

1. ∴ each individual organism inherits two complete sets of genes

**B. When an organism produces reproductive cells (eggs and sperm) its two sets of genes must be separated from each other.**

1. this separation is called meiosis
  - a. exclusively eukaryotic, ∴ NOT a process for ?
  - b. required by sexual, but not asexual, reproduction

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## II. Chromosome Number

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**A. Eukaryotic sexual reproduction results in organisms with two sets of chromosomes**

1. one each from the male and female parent
2. the two sets are said to be homologous
  - a. chromosomes in one set have a version of themselves in the other set

**B. A cell with both sets of homologous chromosomes is said to be diploid (2N)**

**C. A cell with one set of chromosomes is said to be haploid (N)**

1. gametes (ex: egg and sperm or ovule and pollen)

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### III. Phases of Meiosis

- A. Diploid cells destined to become gametes (germ cells) go through two rounds of cell division
- B. Before the first round of cell division - DNA replication occurs - recall the S phase of the cell cycle
- C. Meiosis I
  1. not like mitosis where the newly synthesized chromosomes line up to be separated into two new cells
  2. here the newly synthesized chromosomes pair up with their homologes forming a tetrad
  3. the tetrads may exchange portions of their chromatids: called crossing-over




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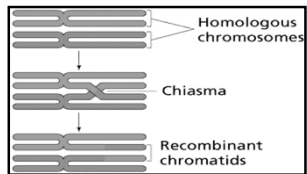
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4. crossing over results in the exchange of genes between homologous chromosomes and produces new combinations of genes



- 5. after crossing-over occurs, homologous chromosomes separate and two new diploid cells are formed - recall cytokinesis
- 6. these two new diploid cells have unique sets of genes




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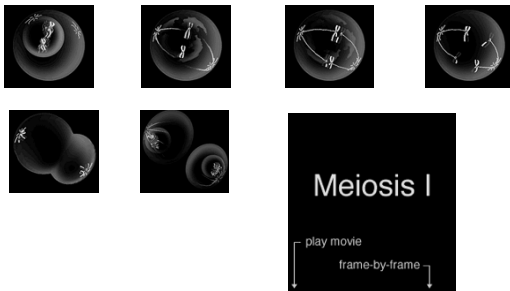
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### Images of Meiosis I

note the similarities and differences to mitosis




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**D. Meiosis II**

- 1. performed by the two new cells produced in meiosis I
- 2. DNA does not replicate
- 3. prophase through cytokinesis occurs producing four haploid cells - two from each of the cells produced in meiosis I




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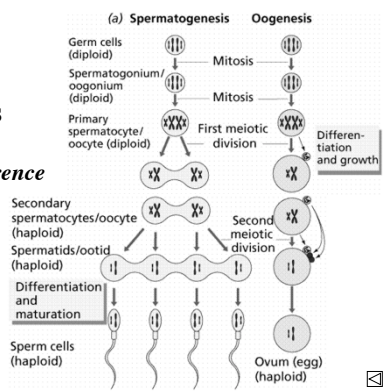
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**Males  
vs.  
Females**

*there is a difference*

For animals, meiosis in males produces 4 sperm from every germ cell vs. one egg for females




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**Do You Get It?**  
**The End**

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