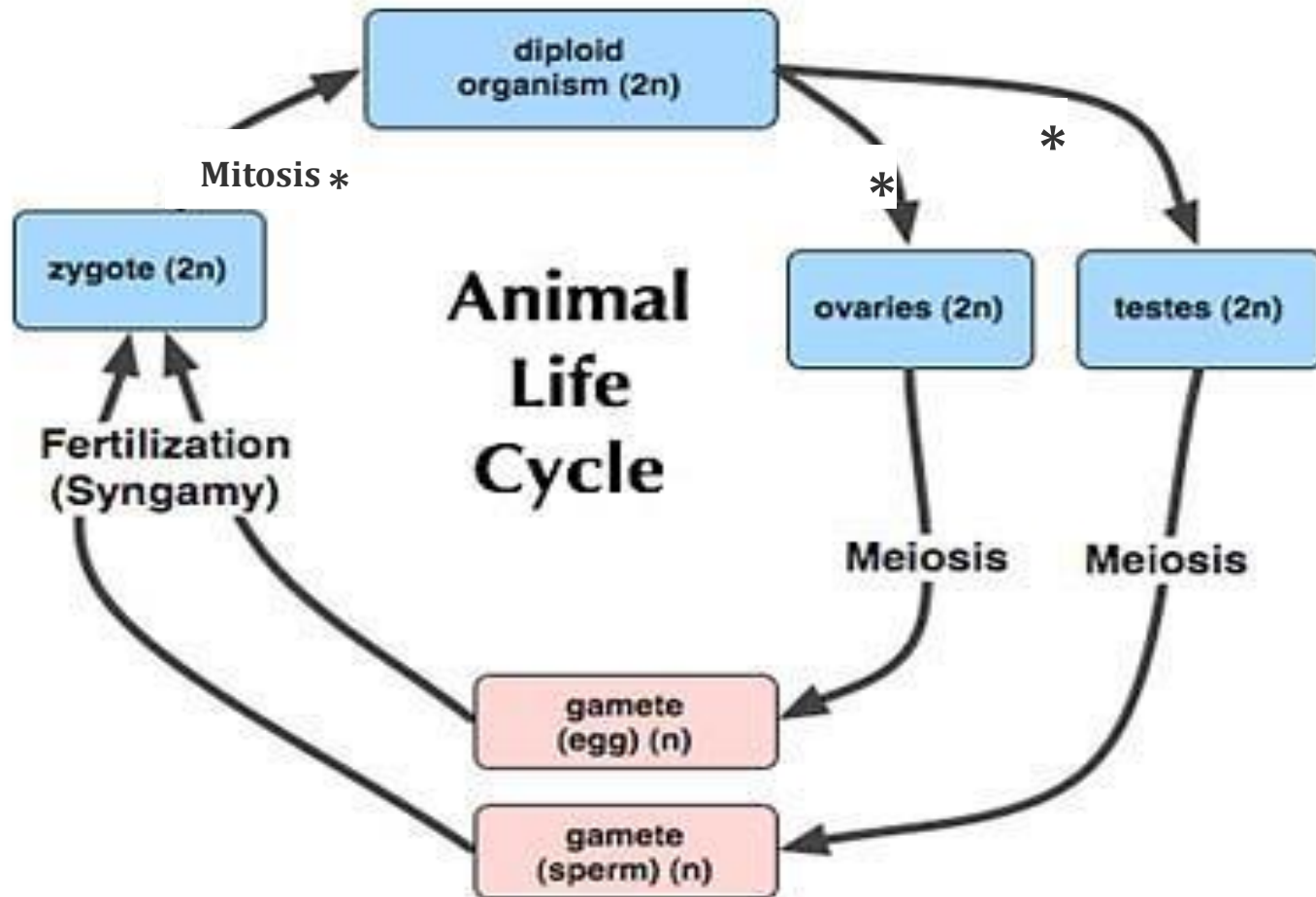


Meiosis & Sexual Reproduction Life Cycle



Genetic Variation in Diploid Organisms

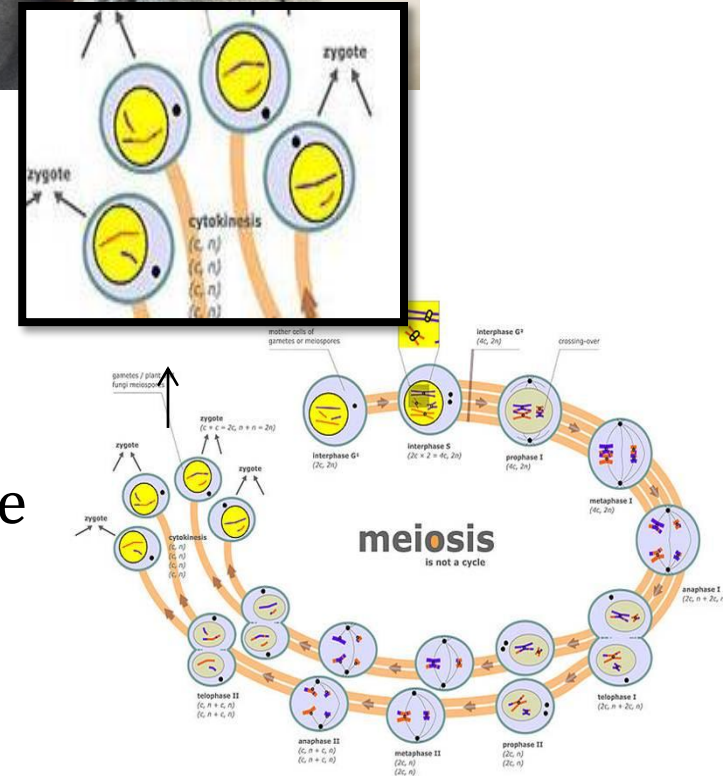


Fusion of sperm and egg results in unique offspring...

...but not only because the young are a product of two individuals with different genetic makeup.

Meiosis also “shuffles” the genes so that the an individual’s gametes are genetically different from one another.

How is this shuffling accomplished?



Genetic shuffling of Meiosis I

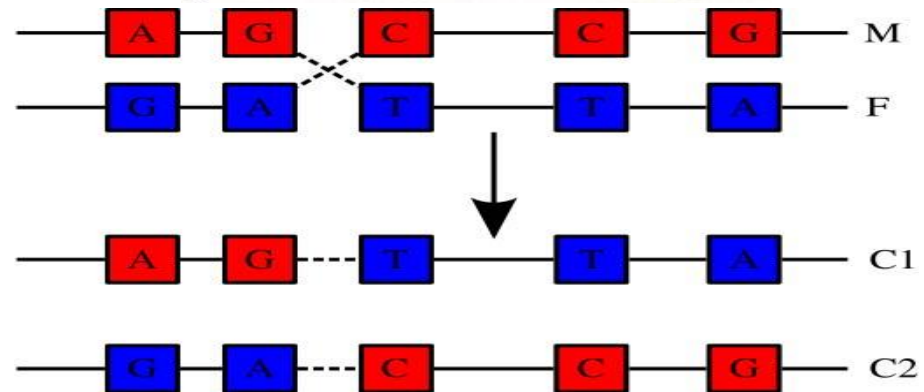
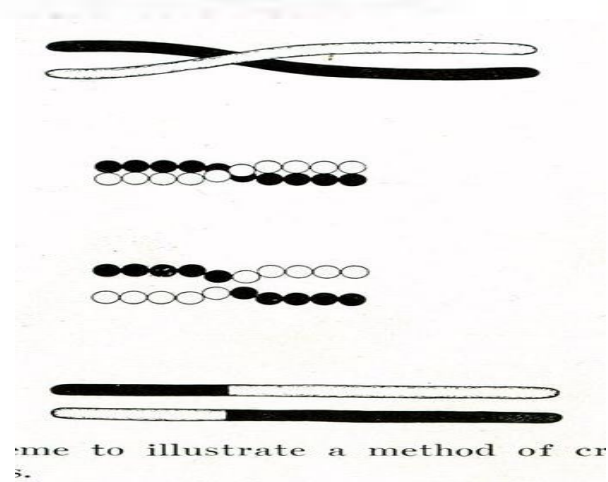
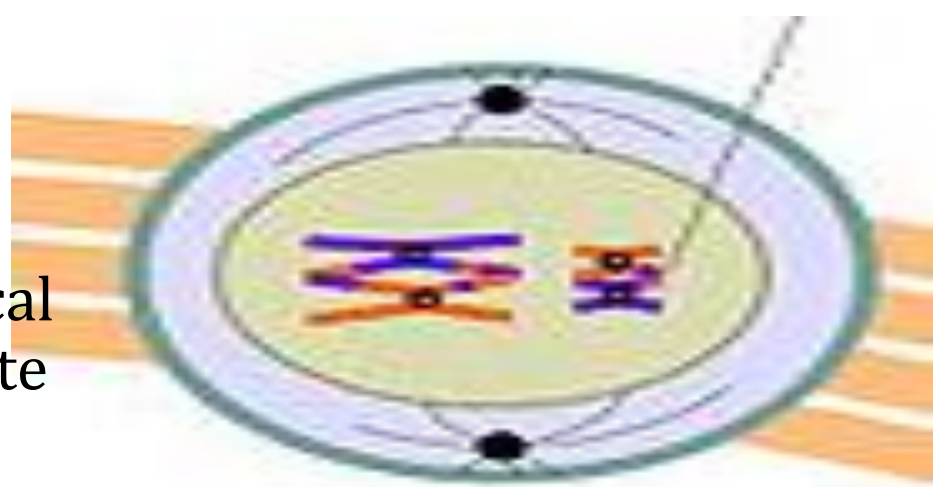
In addition to a new combination of chromosomes resulting from **fertilization**, there are also events in Meiosis I that shuffle the genes.

1. **Crossing over** in Prophase I.

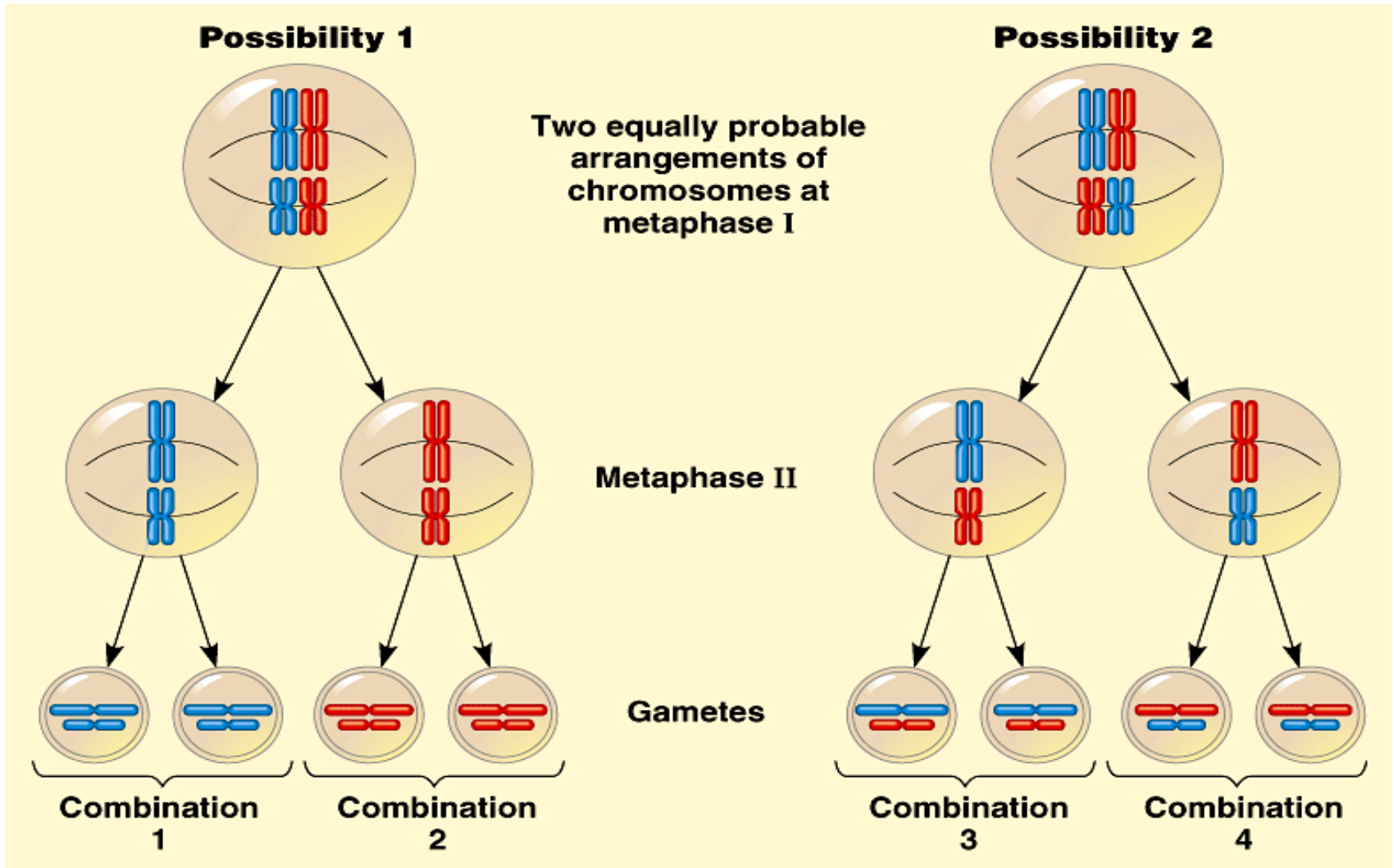
2. **Independent assortment** in Metaphase I.

Crossing Over

- Homologues break at identical locations, then rejoin opposite partners.
- This creates new combinations of the alleles on each chromosome.
- Occurs randomly several times on every chromosome.
- Results in mixing of the genes you inherited from your parents.

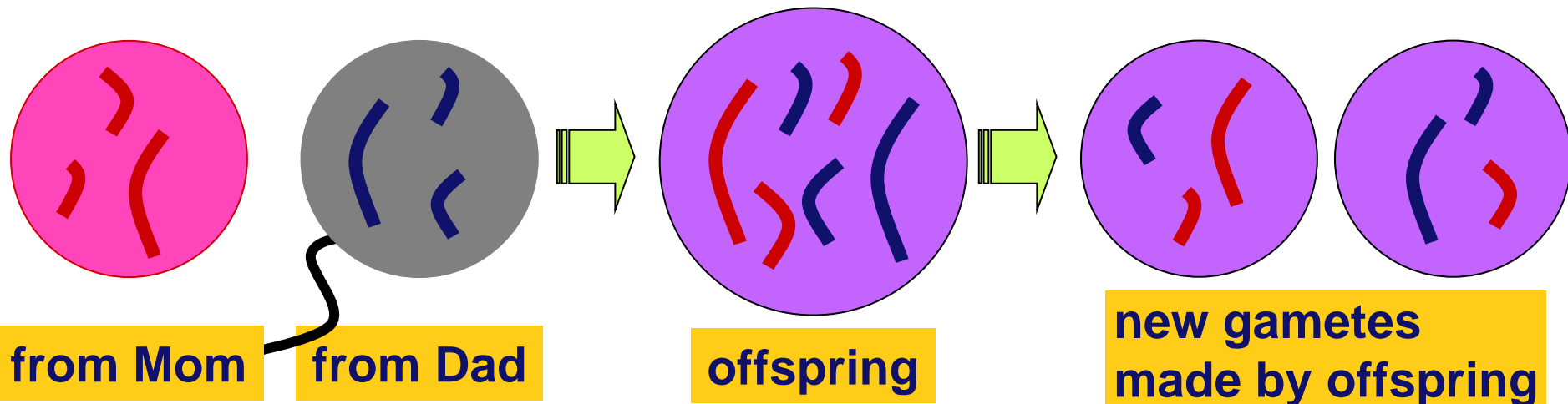


Independent Assortment



Variation from genetic recombination

- Independent assortment of chromosomes
 - meiosis introduces genetic variation
 - gametes of offspring do not have same combination of genes as gametes from parents
 - random assortment in humans produces 2^{23} (8,388,608) different combinations in gametes



Mitosis

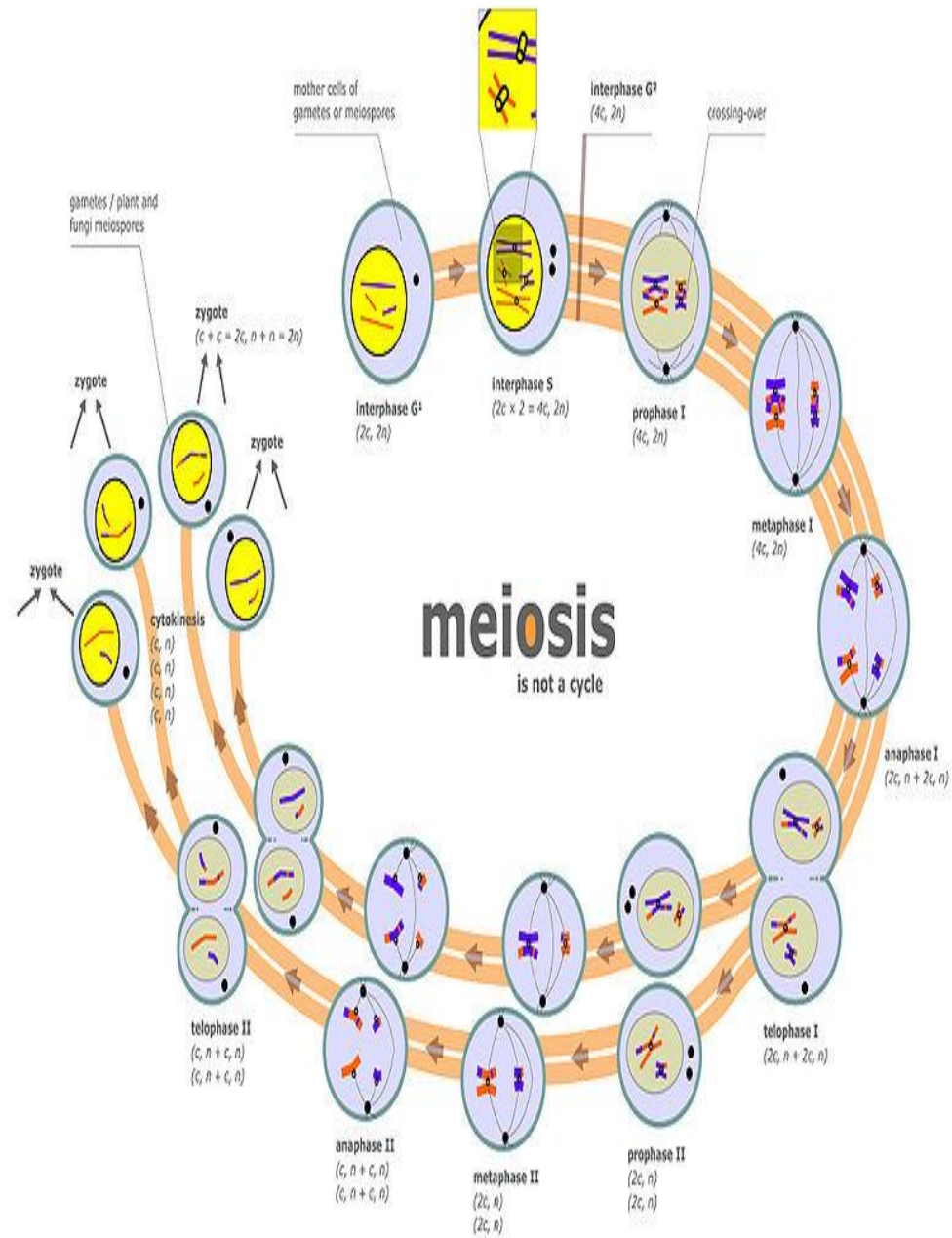
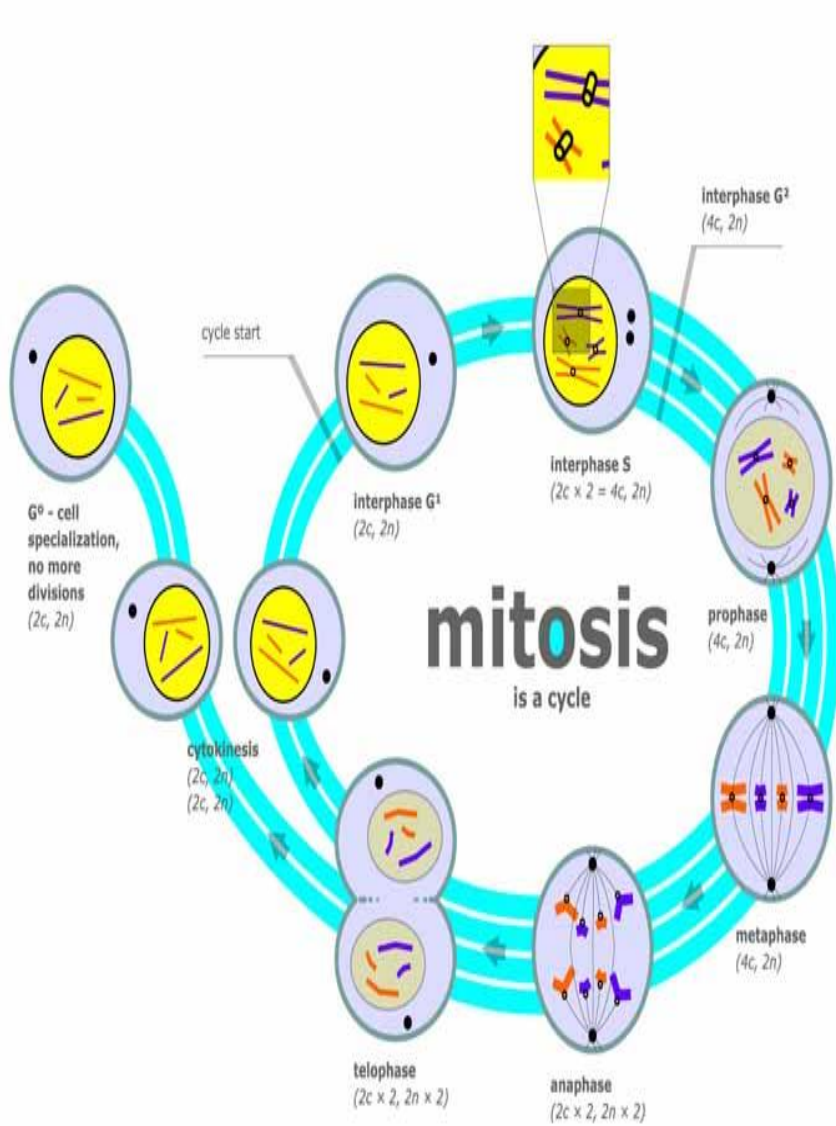
vs.

Meiosis

- $2n$
- Clone
- Same genetic information in parent cell and daughter cell.
- Give me another one just like the other one!



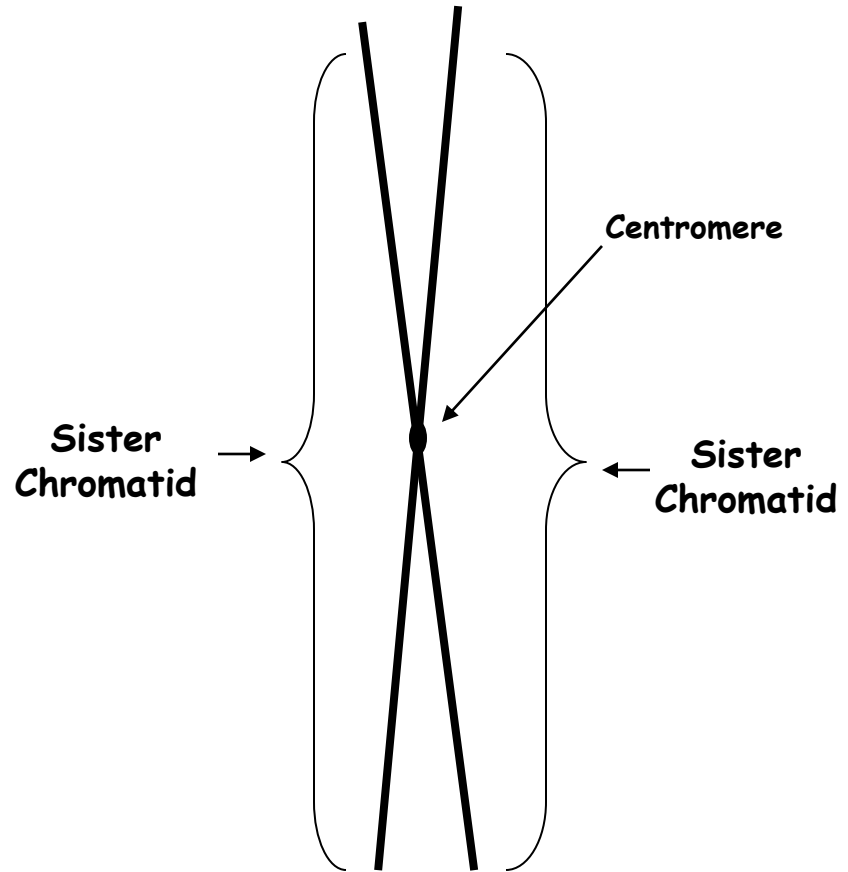
- $1n$
- Daughter cells different from parent cell and from each other.
- Daughter cells have $\frac{1}{2}$ the number of chromosomes as somatic cell.
- Shuffling the genes
(Mix it up!)



Drawing and Labeling Chromosomes

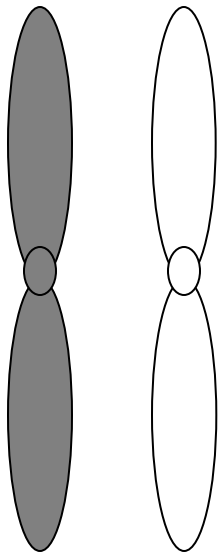


**Unreplicated
Uncondensed
Chromosome
(chromatin)**

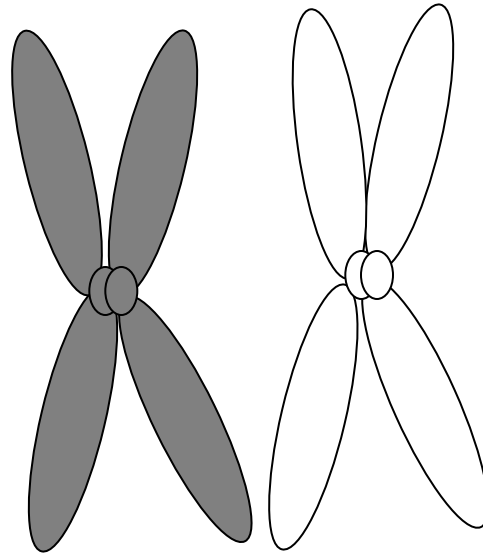


**Replicated
Uncondensed
Chromosome
(chromatin)**

Drawing & Labeling Homologous Chromosomes



Unreplicated,
Condensed,
Homologous
Chromosomes



Replicated,
Condensed,
Homologous
Chromosomes

