

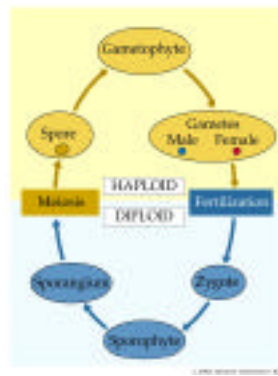
Chapter 9

Chromosomes, the Cell Cycle, and Cell Division

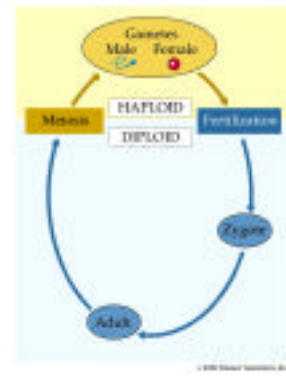
Haploid life cycle



Alternation of generations



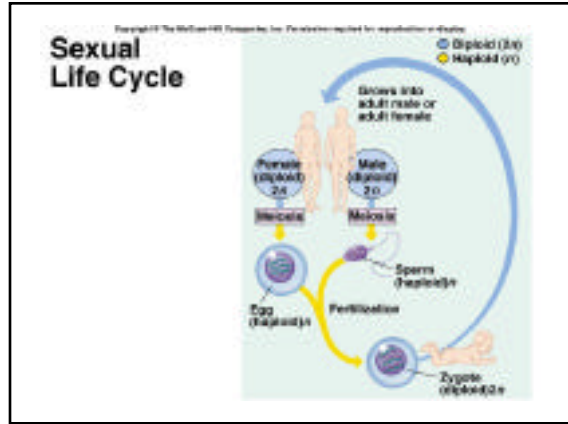
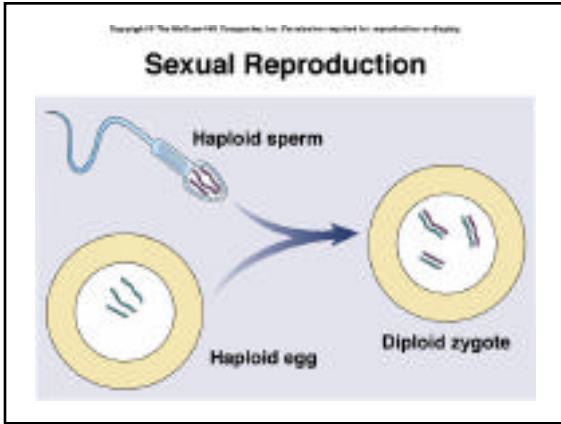
Diplontic life cycle



Meiosis

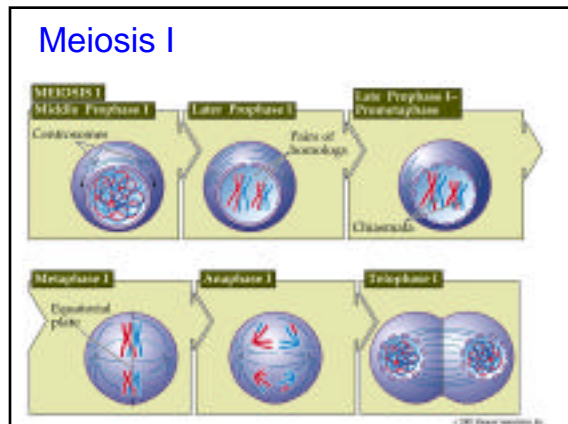
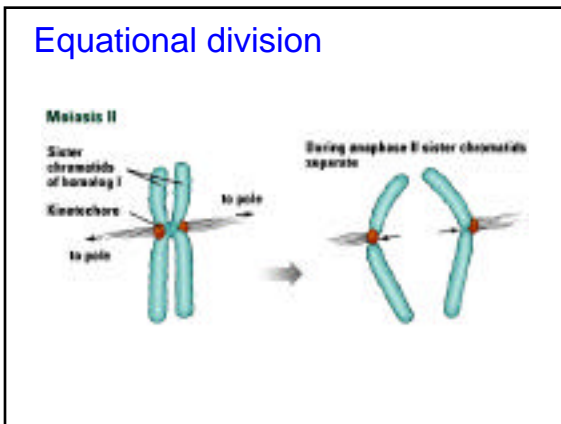
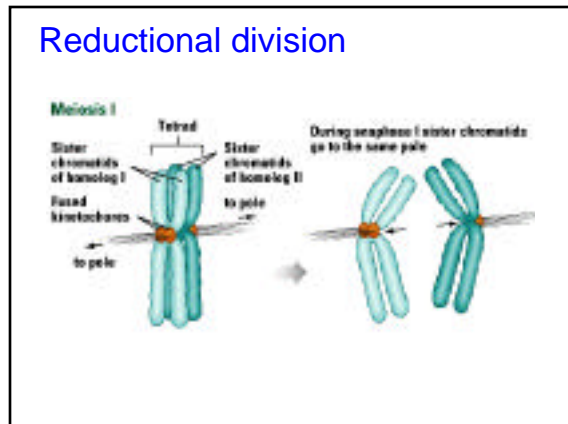
Crossing red and white snapdragons produces pink ones



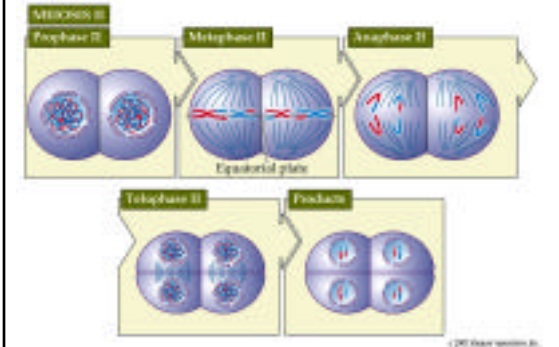


Meiosis is a two-part process

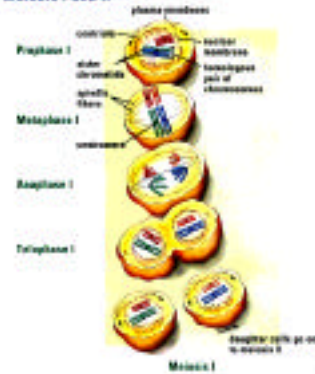
- ✓ Meiosis I
 - Reductional division
- ✓ Meiosis II
 - Equational division



Meiosis II



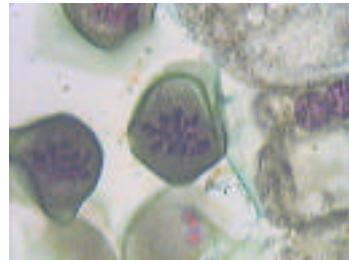
Meiosis I and II



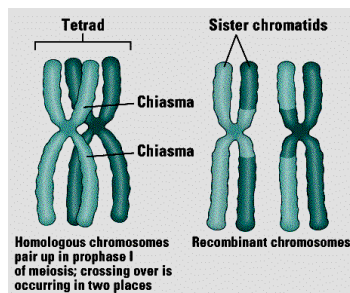
Meiosis I and II



Prophase I

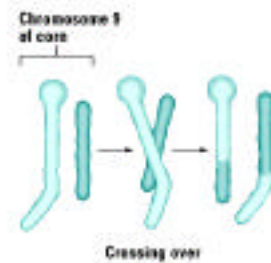


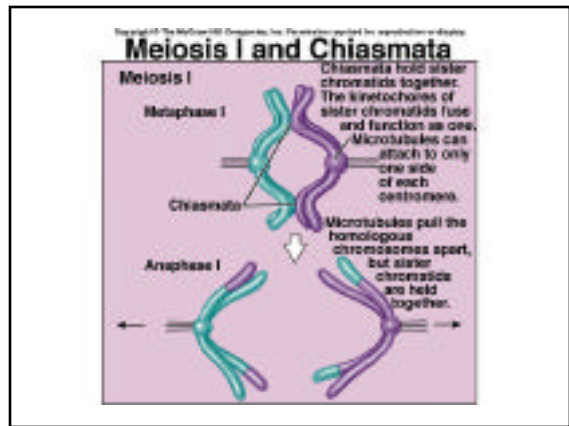
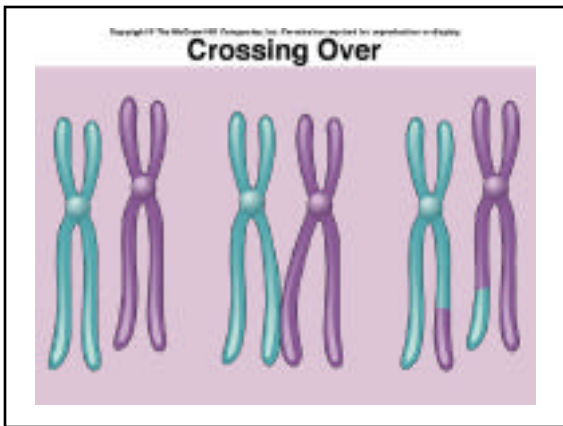
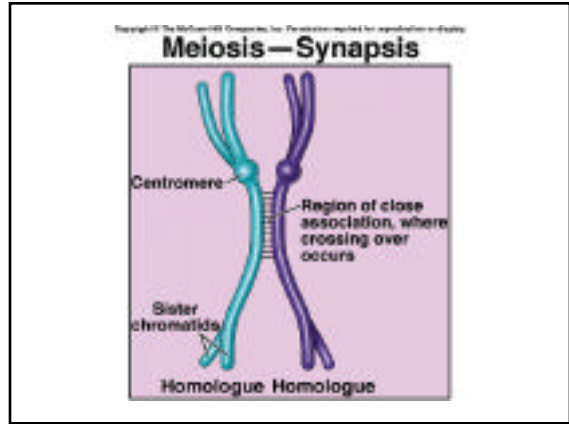
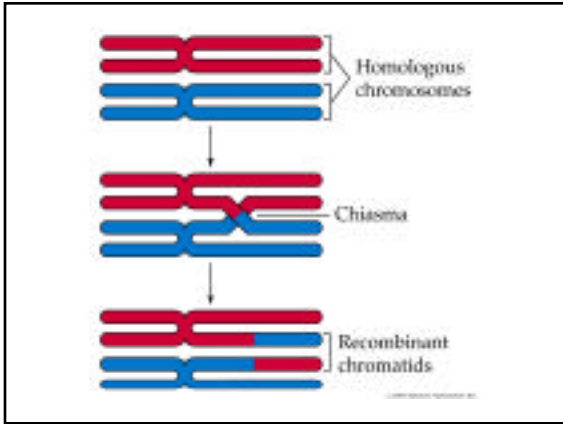
Genetic recombination



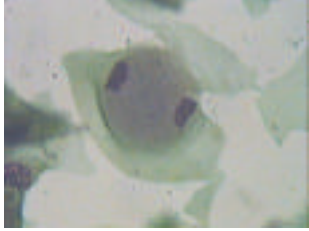
✓ Occurs in Prophase I.

Crossing over in corn chromosomes

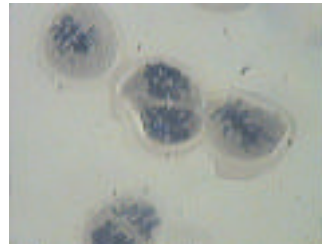




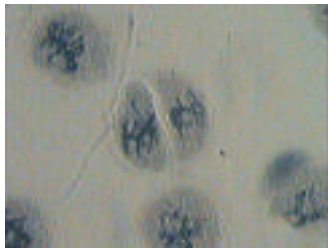
Telophase I



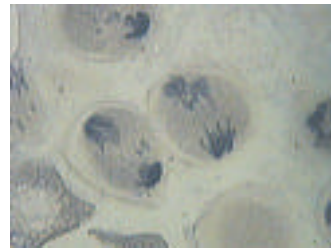
Prophase II



Metaphase II



Anaphase II

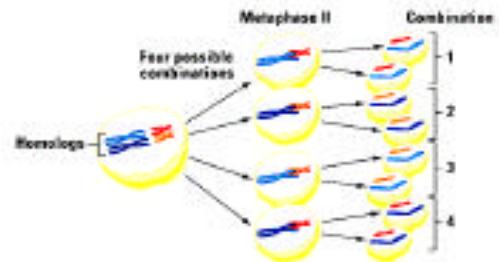


Telophase II



Human can form 2^{23} kinds of gametes = 8 million
A single couple could produce 64 trillion genetically unique offspring

Two pair of chromosomes can form four kinds of gametes

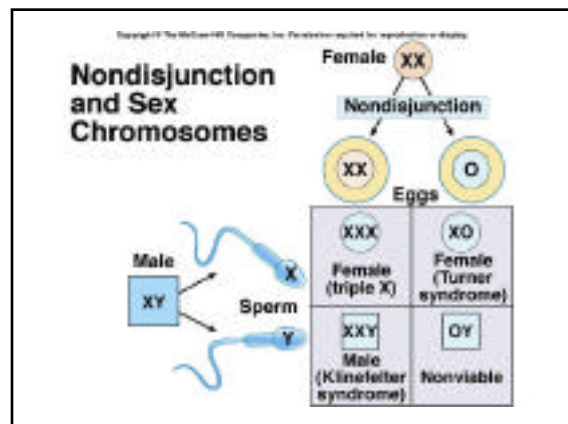
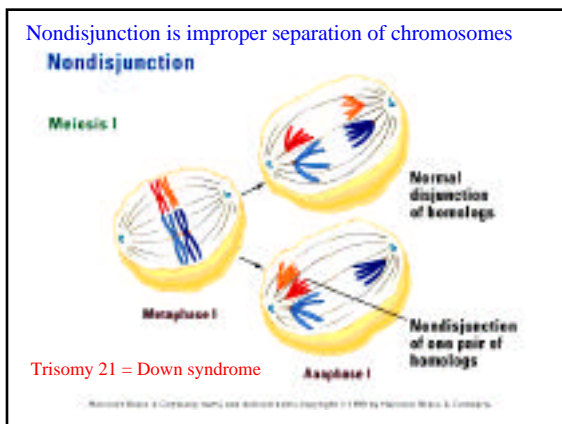
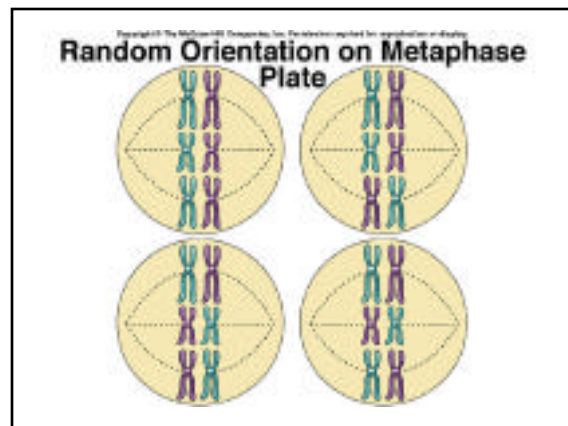
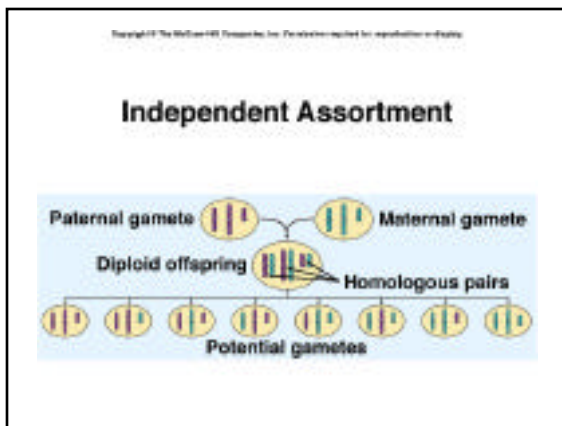


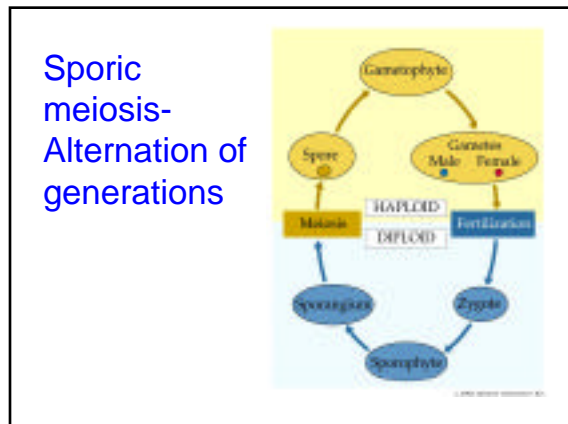
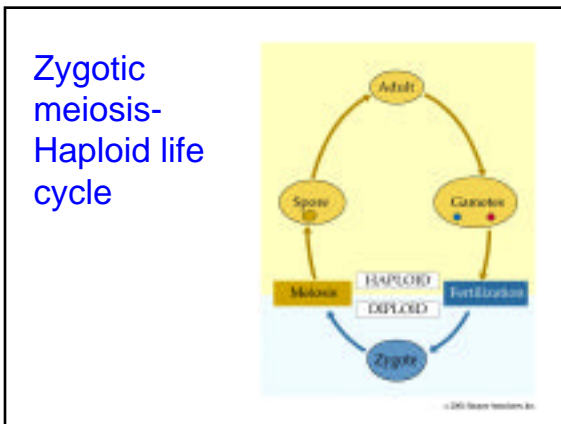
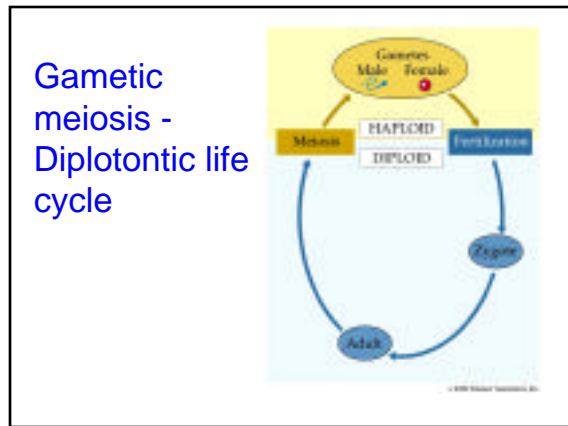
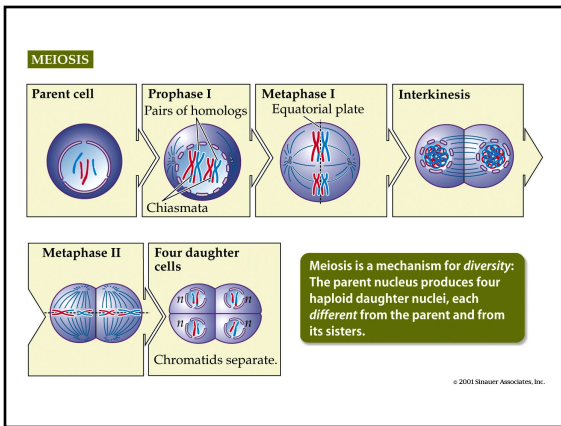
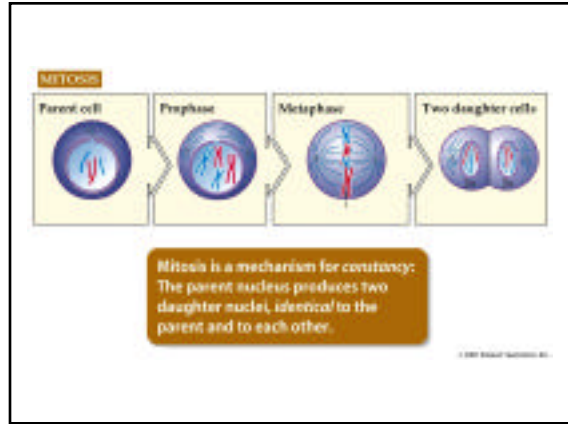
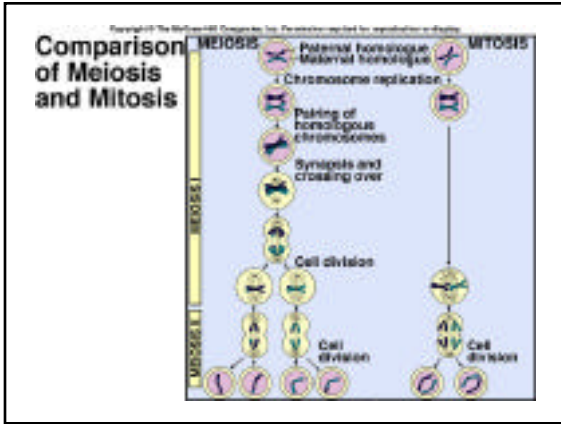
Law of Segregation

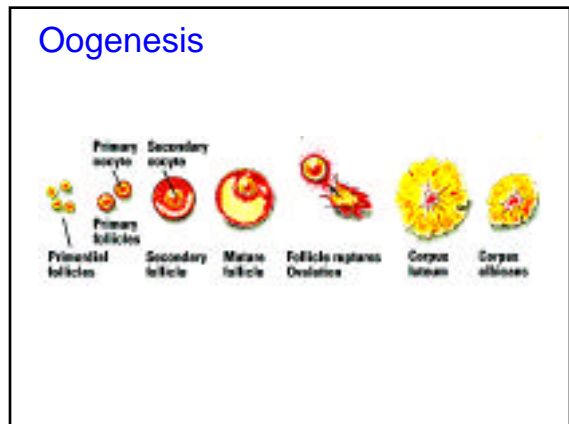
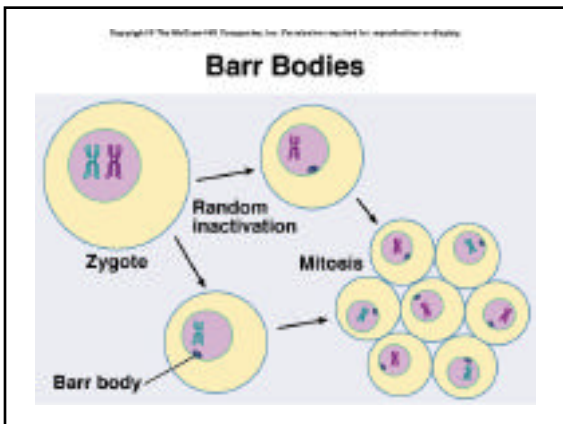
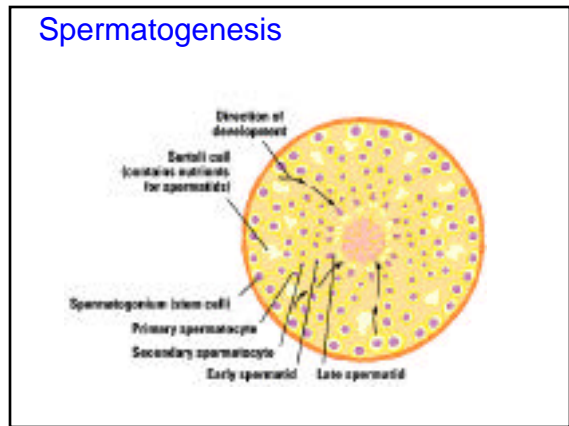
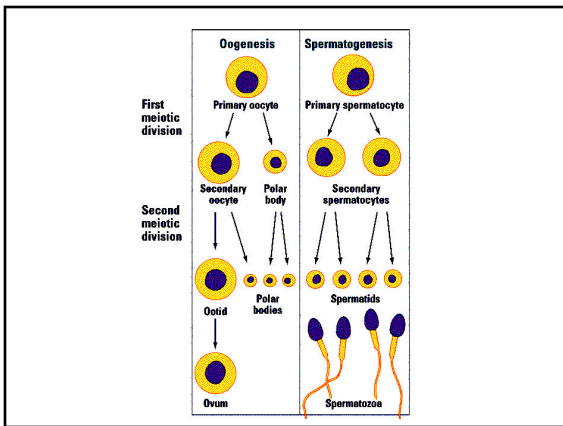
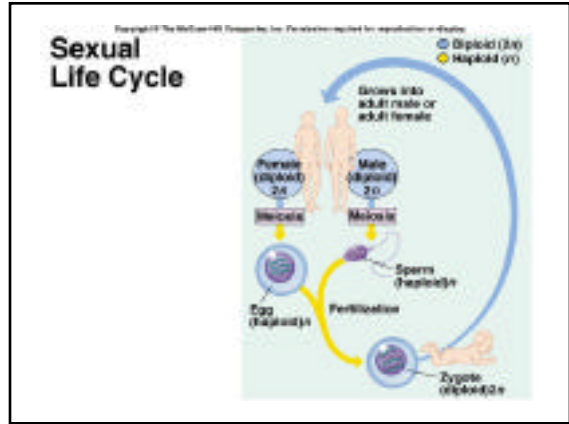
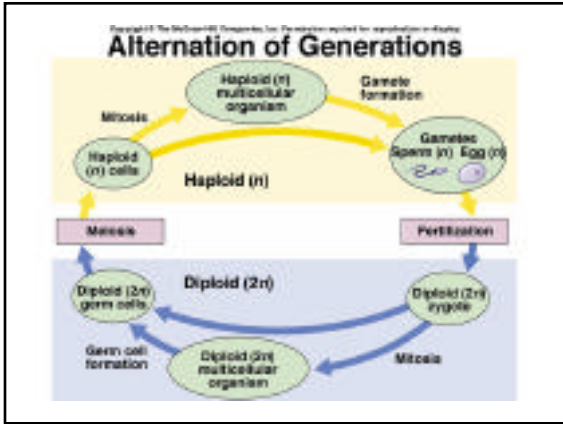
- ✓ Each organism has two genes (or alleles) for each trait expressed.
- ✓ These alleles segregate in the production of gametes.

Law of Independent Assortment

- ✓ Unlinked genes or alleles assort (separate) independently in meiosis.



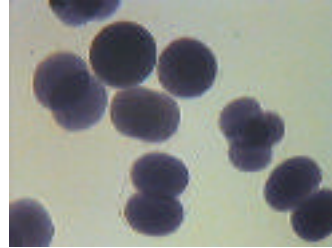




Fertilization/Syngamy

- ✓ Spermatozoa
 - Male gametes
- ✓ Oogonia
 - Female gametes
- ✓ Syngamy is the fusion of two gametes at fertilization.

Zygotes divide mitotically



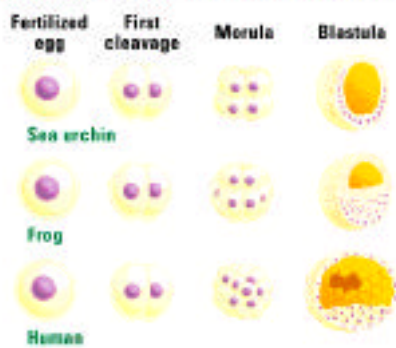
Blastula



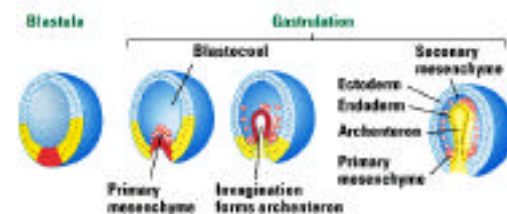
Gastrula



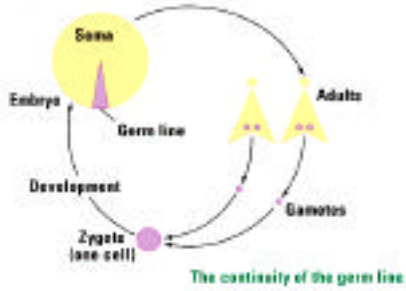
Common development in eumetazoan embryos



Development



Soma or body cells specialize to form skin, nerves, and muscle



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