

Meiosis

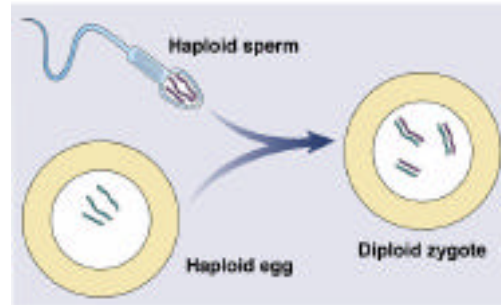
Definitions

- ✓ Transmission genetics
 - How is variation passed from one generation to the next
- ✓ Molecular genetics
 - How DNA and the cell carry these instructions
- ✓ Phenotype
 - Physical and behavior characteristics
- ✓ Genotype
 - Collection of genes (genome)
- ✓ Gene
 - A region of DNA that codes for a protein

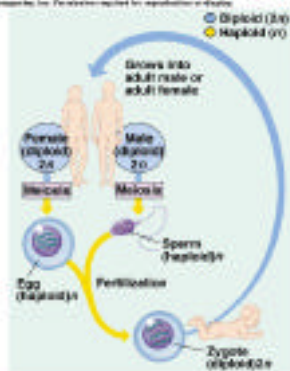
Crossing red and white snapdragons produces pink ones



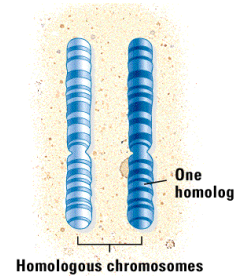
Sexual Reproduction



Sexual Life Cycle



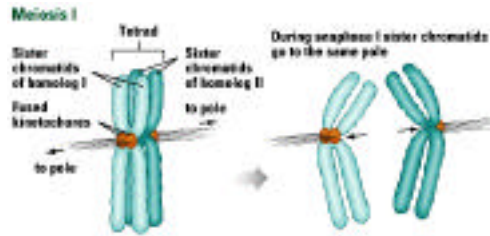
Chromosomes are paired



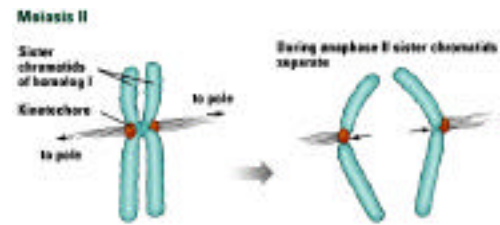
Meiosis is a two-part process

- ✓ Meiosis I
 - Reductonal division
- ✓ Meiosis II
 - Equational division

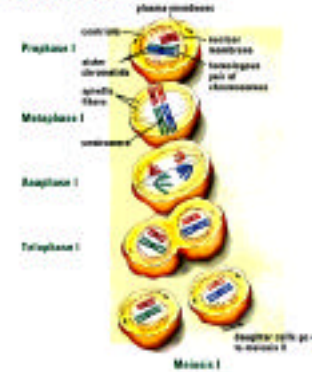
Reductonal division



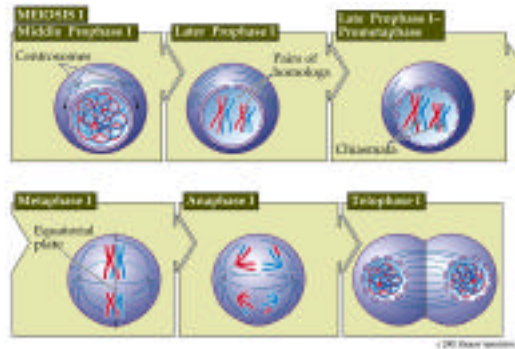
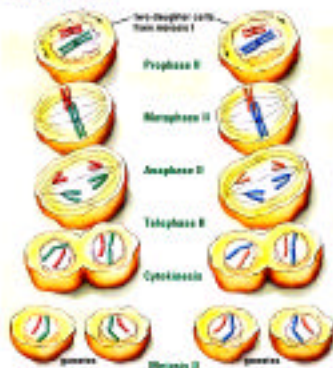
Equational division

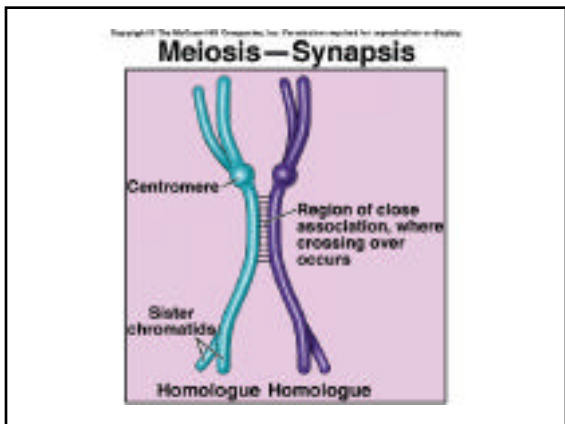
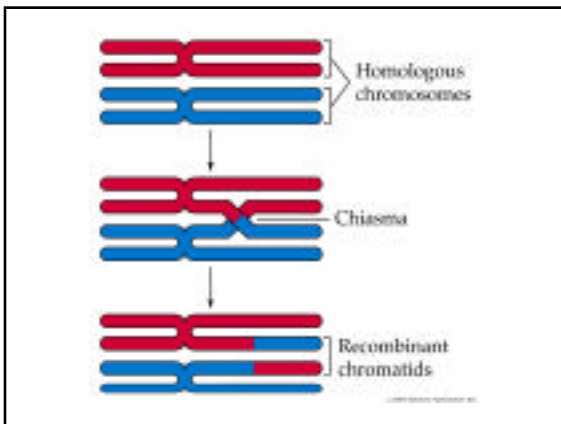
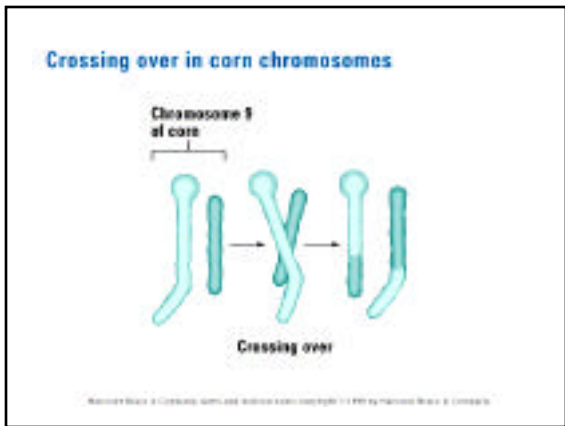
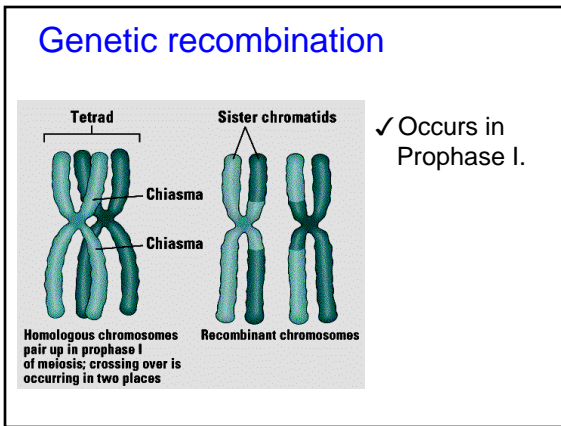
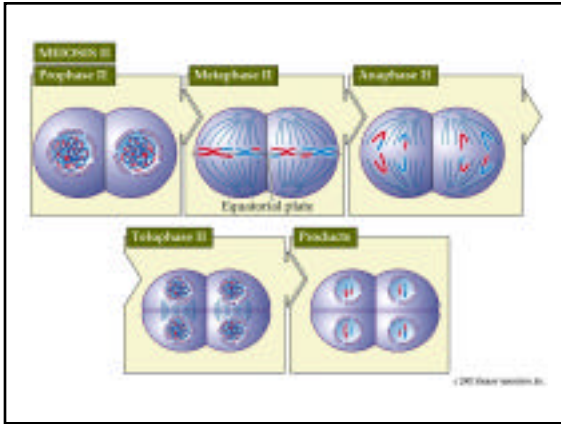


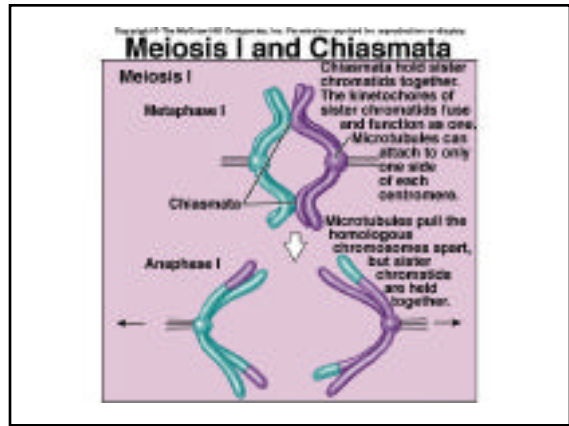
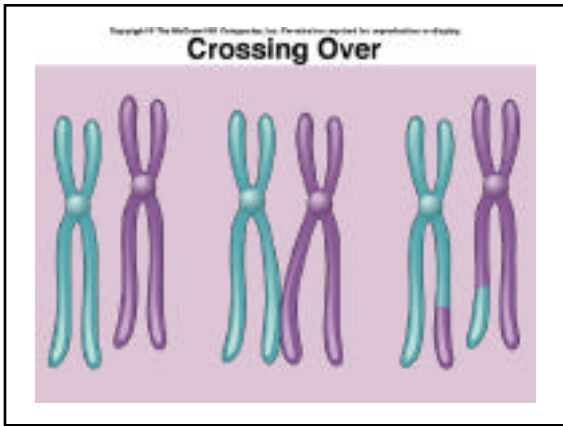
Meiosis I and II



Meiosis I and II



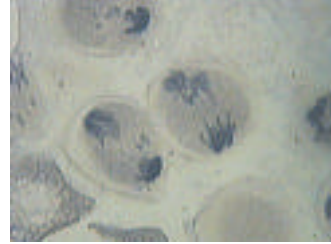




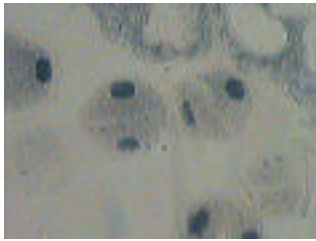
Metaphase II



Anaphase II

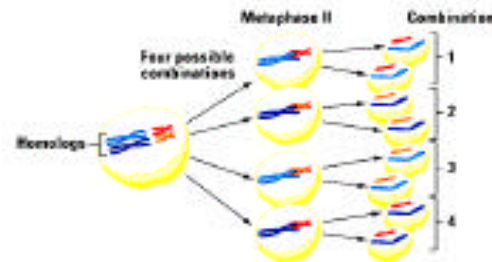


Telophase II



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

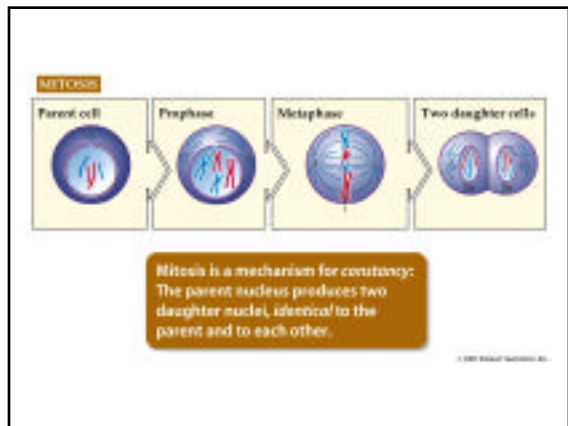
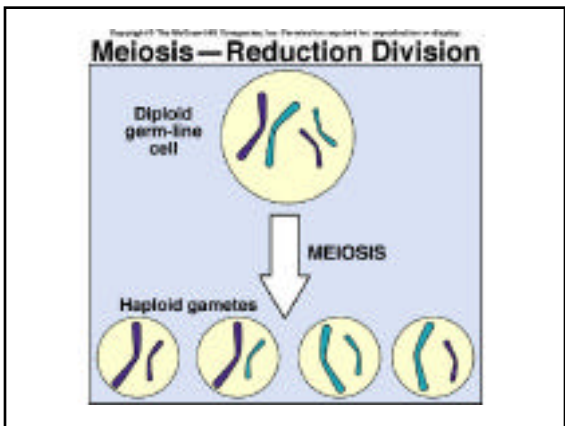
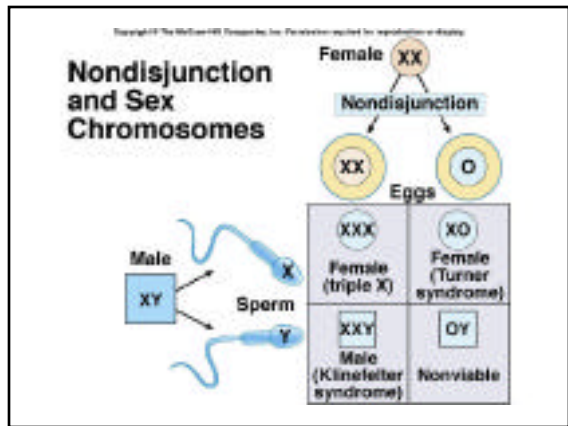
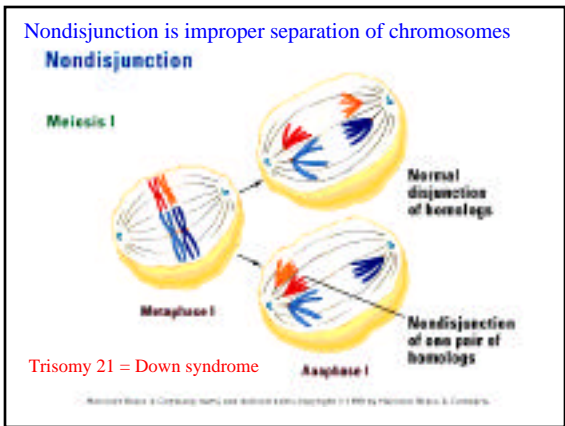
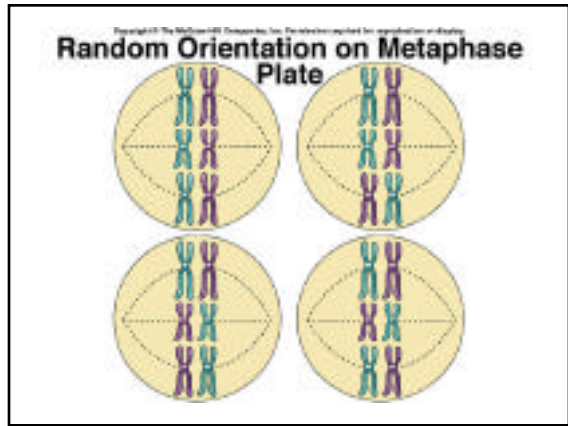
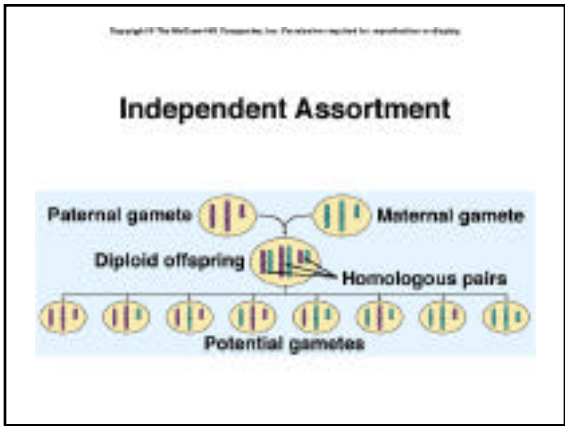


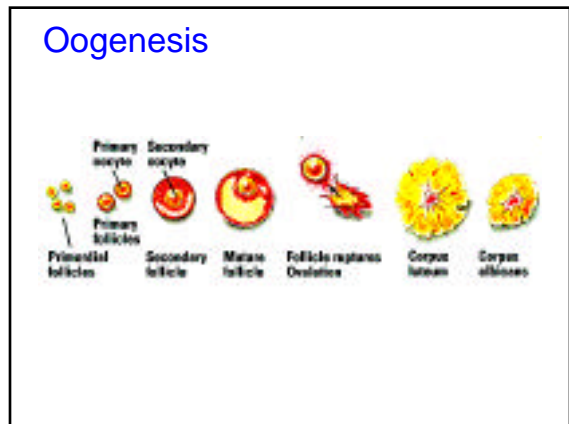
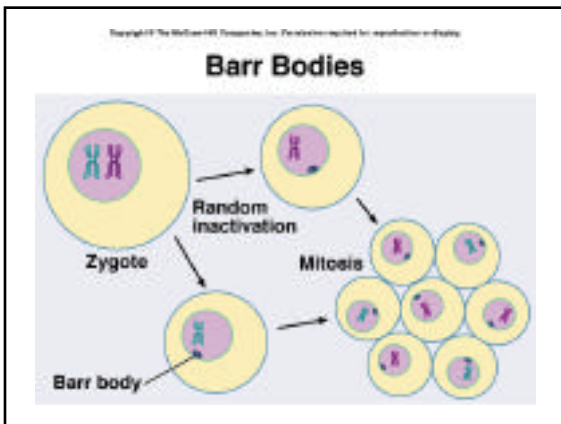
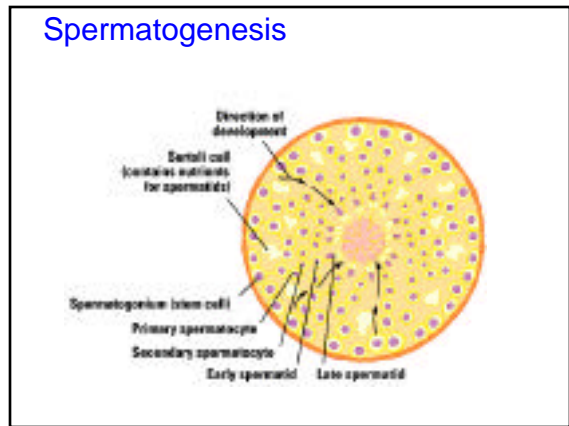
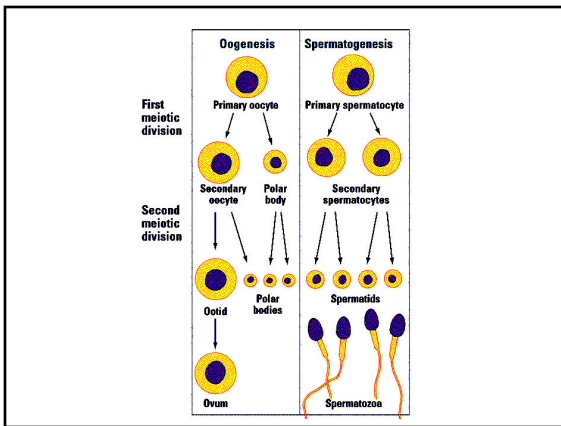
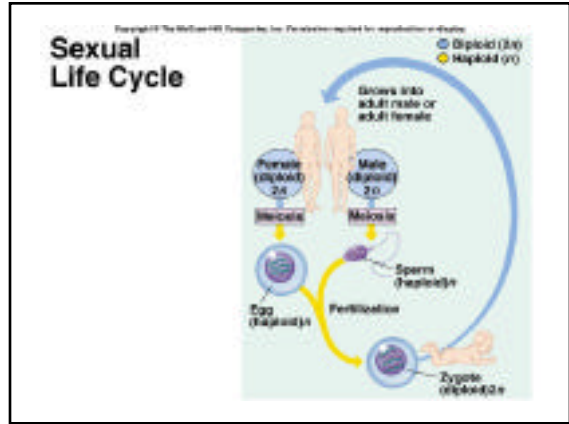
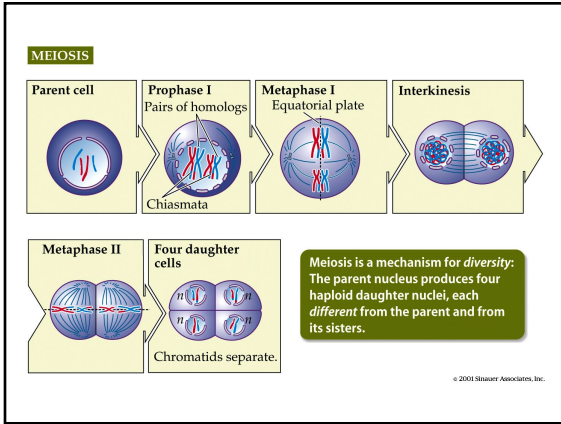
Law of Segregation

- ✓ 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.





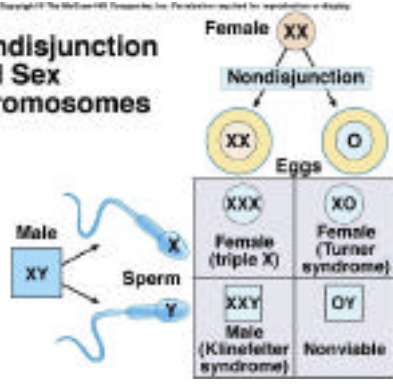
Fertilization/Syngamy

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

9.1 Numbers of Pairs of Chromosomes in Some Plant and Animal Species

COMMON NAME	SPECIES	NUMBER OF CHROMOSOME PAIRS
Mosquito	<i>Culex pipiens</i>	3
Housefly	<i>Musca domestica</i>	6
Toad	<i>Bufo americanus</i>	11
Rice	<i>Oryza sativa</i>	12
Frog	<i>Rana pipiens</i>	13
Alligator	<i>Alligator mississippiensis</i>	18
Rhesus monkey	<i>Macaca mulatta</i>	23
Wheat	<i>Triticum aestivum</i>	21
Human	<i>Homo sapiens</i>	23
Potato	<i>Solanum tuberosum</i>	24
Donkey	<i>Equus asinus</i>	31
Horse	<i>Equus caballus</i>	32
Dog	<i>Canis familiaris</i>	39
Carp	<i>Cyprinus carpio</i>	50

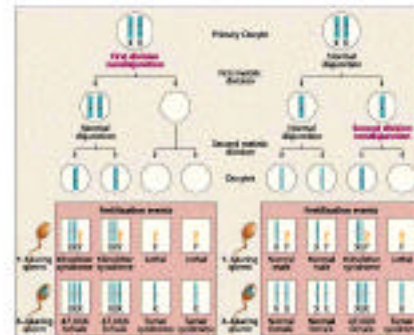
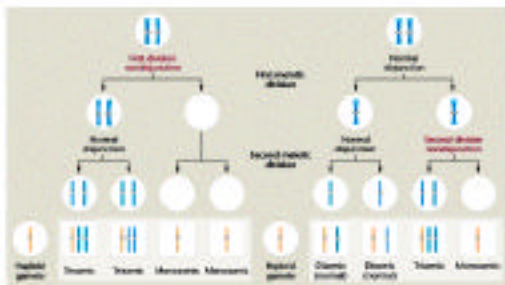
Nondisjunction and Sex Chromosomes



Non disjunction



Nondisjunction

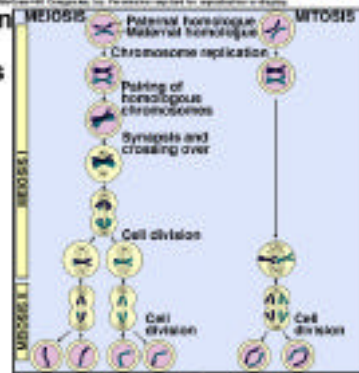


9.2 Two Different Ways for Cells to Die

	NECROSIS	APOPTOSIS
Stimuli	Low O ₂ , toxins, ATP depletion, damage	Specific, genetically programmed physiological signals
ATP required	No	Yes
Cellular pattern	Swelling, organelle disruption, tissue death	Chromatin condensation, membrane blebbing, single-cell death
DNA breakdown	Random fragments	Nucleosome-sized fragments
Plasma membrane	Burst	Blebbid
Fate of dead cells	Ingested by phagocytes	Ingested by neighboring cells
Reaction in tissue	Inflammation	

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Comparison of Meiosis and Mitosis



Stages of Meiosis



Gametic meiosis -
Diplontic life cycle



Zygotic meiosis-
Haploid life cycle



Sporic meiosis-
Alternation of generations



