Meiosis

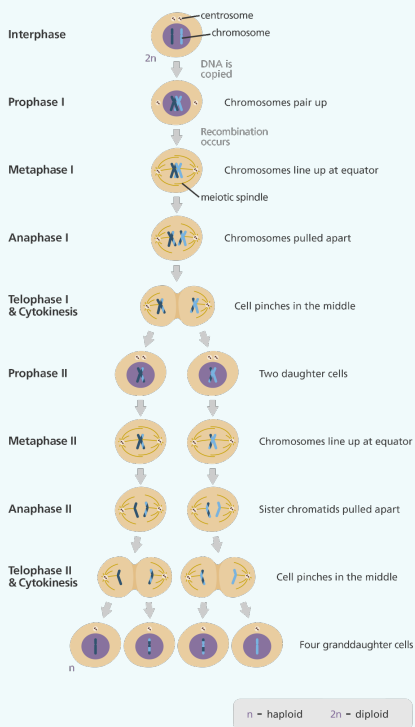|	
Interphase	centrosome / chromosome
	2n — DNA is copied
Prophase I	Chromosomes pair up
	Recombination occurs
Metaphase I	Chromosomes line up at equator
	meiotic spindle
Anaphase I	Chromosomes pulled apart
Telophase I & Cytokinesis	Cell pinches in the middle
Prophase II	Two daughter cells
Metaphase II	Chromosomes line up at equator
Anaphase II	Sister chromatids pulled apart
Telophase II & Cytokinesis	Cell pinches in the middle
	Four granddaughter cells

n – haploid   2n – diploid

Genetic Diversity

Meiosis I:
-Separation of the homologous chromosomes allows each gamete to receive haploid (1n) set of chromosomes (both maternal and paternal chromosomes)
-Homologous chromatids exchange genetic material via "crossing over" (recombination)
a. Increases genetic diversity among the resultant gametes
Increase Variation:
-Sexual reproduction
a. Crossing over, random assortment of chromosomes during meiosis, and subsequent fertilization of gametes

Non-Mendelian Genetics

Phenotypic ratios differ from predicted ratios

Linked genes	Genes on the same chromosome
Recombination frequency	(# of recombinants/total # in population) x 100 = () LMU
Multiple alleles	More than 2 alleles present in a population (I^A, I^B, i)
Incomplete dominance	Traits "blended"; neither dominant
Co-dominance	Both traits displayed (spots, strippes etc.)
Sex-Linked	X or Y linked traits
Barr Body	Inactivated X chromosome in each female mammal's somatic cell
Non-nuclear	Chloroplasts and mitochondria are randomly assorted to gametes and daughter cells (both maternally inherited in plants and animals)

Di-Hybrid Cross

	AB	Ab	aB	ab
AB	AABB	AABb	AaBB	AaBb
Ab	AABb	AAbb	AaBb	Aabb
aB	AaBB	AaBb	aaBB	aaBb
ab	AaBb	Aabb	aaBb	aabb

Laws of Mendelian Genetics

Law of Dominance: when inherited heterozygous, the allele expressed is dominant and the allele not expressed in recessive

Law of Segregation: (1) The two alleles for each trait segregate, during the formation of gametes (2) During formation of new zygotes, the alleles will combine at random with other alleles

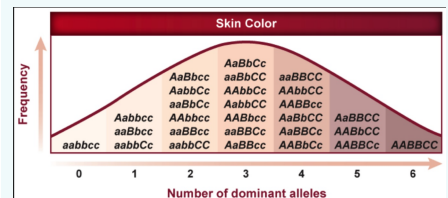Law of Independent Assortment: different genes and their alleles are inherited independently

Types of Crosses

Monohybrid	Ll x Ll; phenotype ratio=3:1; genotype ratio=1:2:1
Dihybrid	LlPp x LlPp; 4 types of gametes; phenotype ratio =-9:3:3:1
Test Cross	T_x tt to determine unknown genotype

Polygenetic Traits

Blending of multiple genes, identified by bell curve distribution