

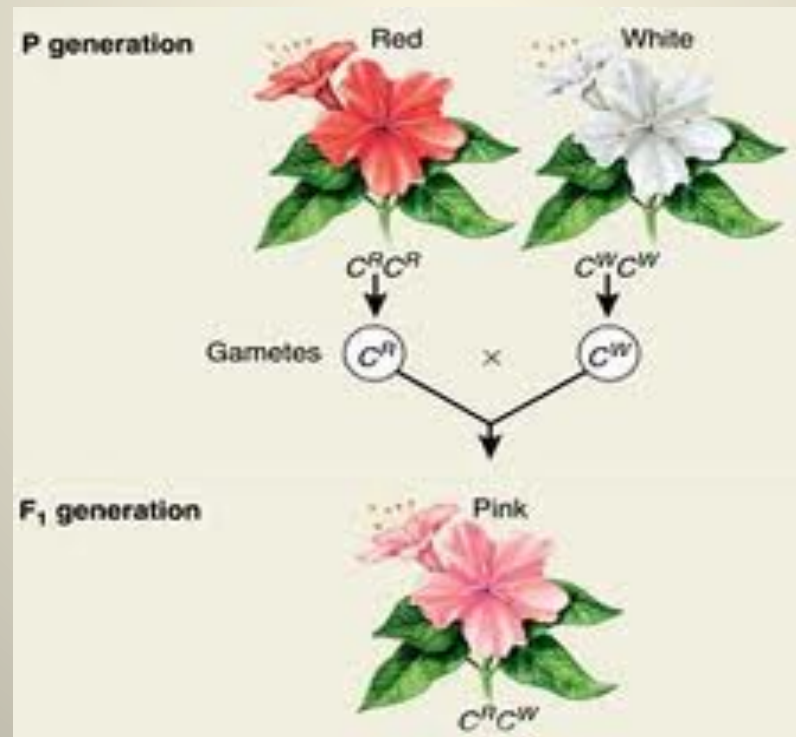
Ch 11-3, 11-4 & 11-5:
-Beyond Simple Dominance
-Meiosis
-Gene Linkage

Essential Questions:

- What are some inheritance patterns different from simple dominance?
- What happens during the process of *meiosis*?
- What are the differences between *meiosis* & *mitosis*?
- What are *gene maps* and *gene linkage*?

■ Beyond Dominant and Recessive Alleles

- Incomplete Dominance
 - neither allele is dominant
 - ex: white x red flowers = pink flowers



- Codominance
 - both alleles contribute
 - ex: white bull x black cow = black & white spotted cow



– Multiple Alleles

- more than 2 alleles possible for a trait's gene
- ex: coat color in rabbits

Possible genotypes	CC, Cc^{ch}, Cc^h, Cc	$c^{ch}c^{ch}$	$c^{ch}c, c^hc$	c^hc, c^hc	cc
Phenotype	Dark gray	Chinchilla	Light gray	Himalayan	Albino



The image shows five photographs of rabbits arranged horizontally, corresponding to the phenotypes listed in the table above. From left to right: a dark gray rabbit, a chinchilla rabbit (lighter gray with darker spots), a light gray rabbit, a Himalayan rabbit (white with dark points on its ears, face, and feet), and an albino rabbit (completely white).

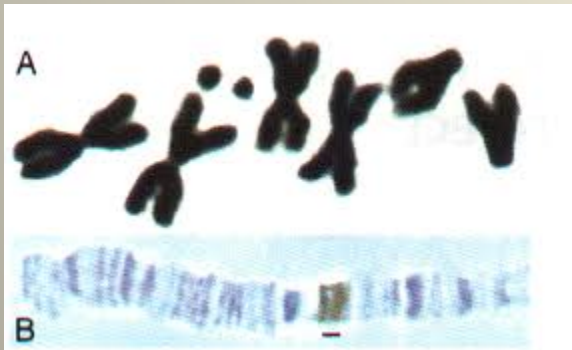
LIFE: THE SCIENCE OF BIOLOGY, Seventh Edition, Figure 31.16: Inheritance of Coat Color in Rabbits
© 2004 Sinauer Associates, Inc. and W. H. Freeman & Co.

– Polygenic Traits

- many genes control trait
- ex: skin color in humans – 4 + genes likely control it



- Meiosis
 - Chromosome number
 - **Homologous** means corresponding to other parent's genes
 - **Ex: fruit fly: 8 chromosomes**
 - 4 from Mom, 4 from Dad
 - **Diploid** = “2 sets” (2N)
 - » **Fruit fly: $2N = 8$**
 - Gametes are **haploid** (“one set”)
 - » **Fruit fly: $N = 4$**

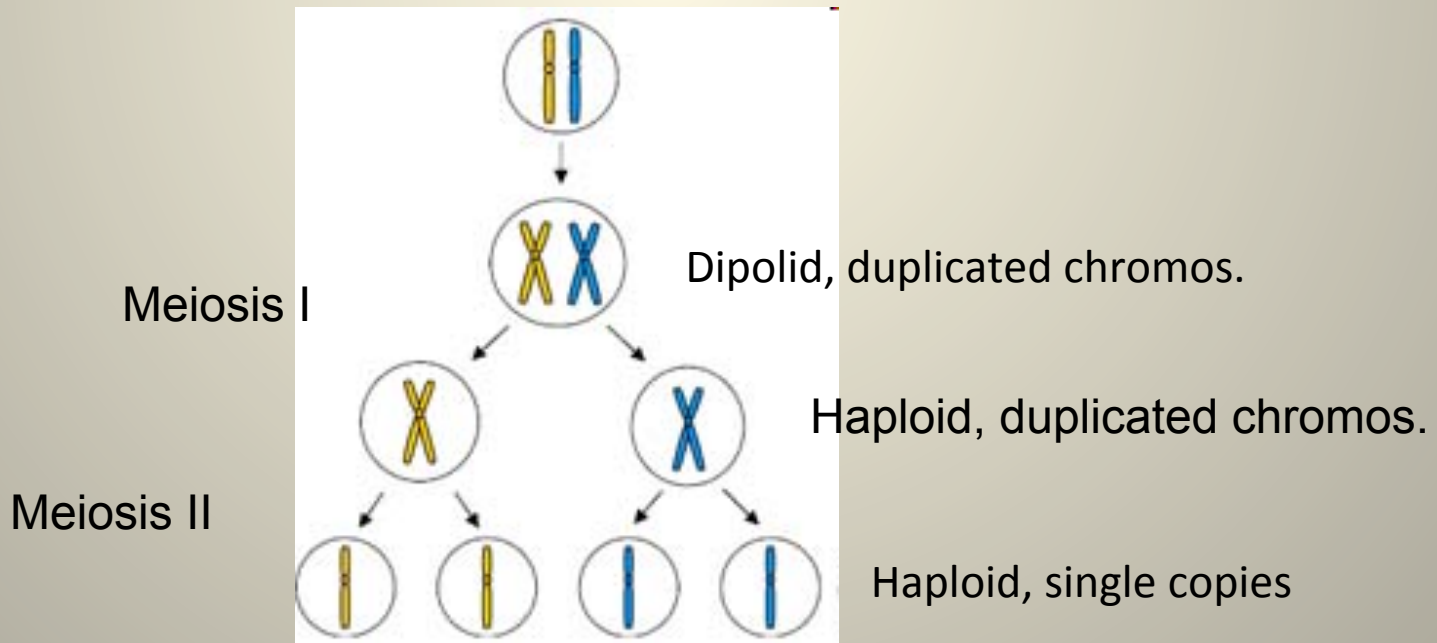


- Phases of meiosis

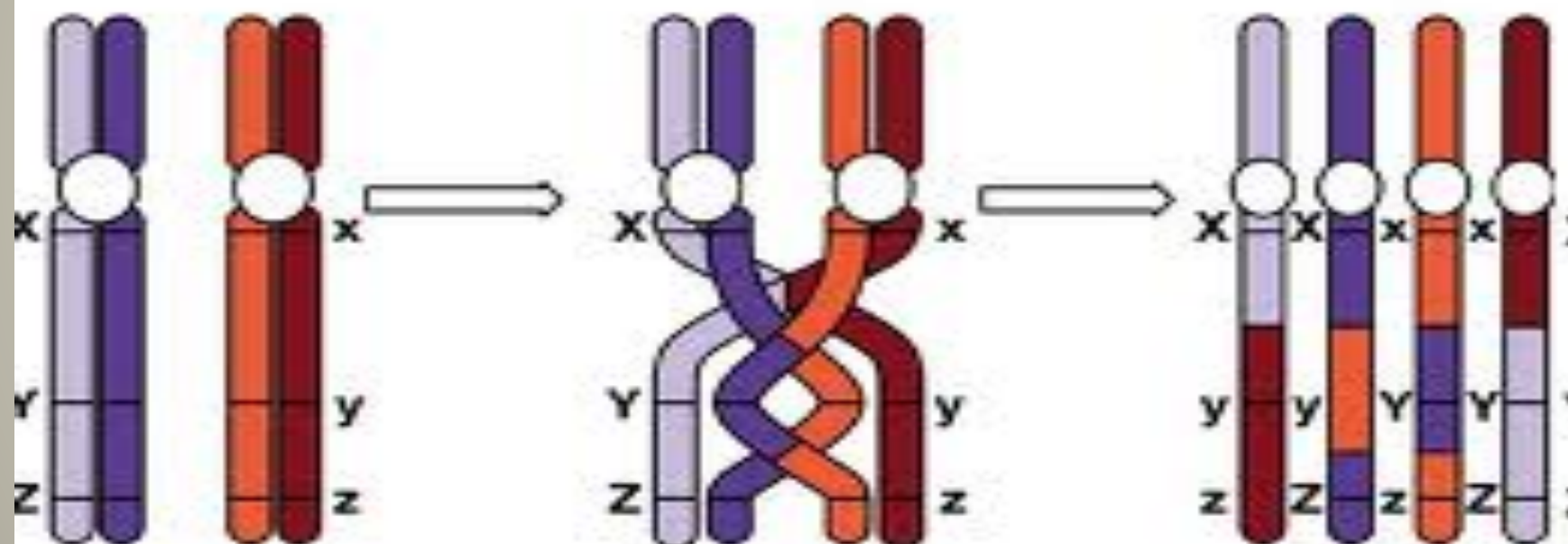
- Meiosis I - # of chromosomes per cell is cut in half by separating *homologous chromos.*

- Crossing over happens, so cells NOT genetically identical

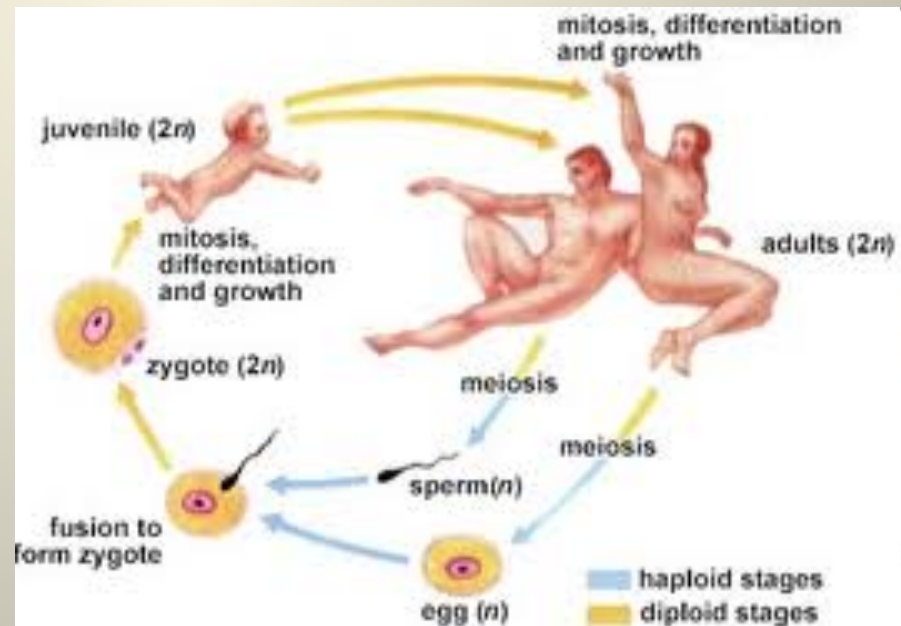
- Meiosis II – *sister chromatids* separate to form haploid gametes (single copies of chromos.)



Crossing over during meiosis



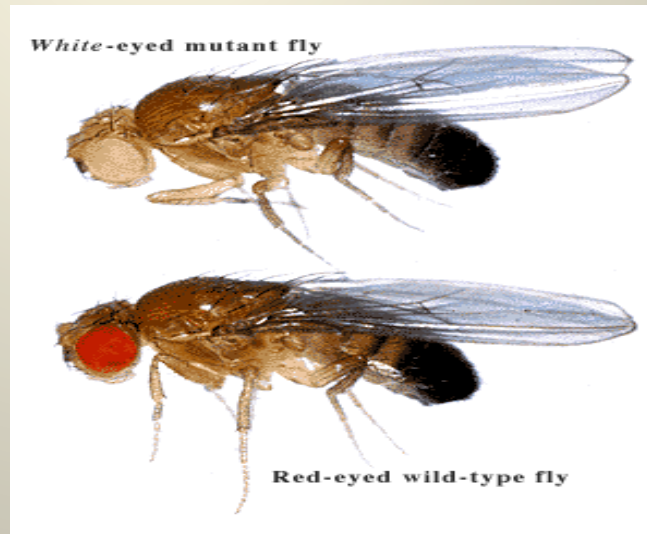
- Gamete formation: meiosis is the process that produces them
- Comparing Mitosis & Meiosis
 - Mitosis produces 2 genetically identical diploid cells
 - Meiosis produces 4 genetically different haploid cells



Linkage and Gene Maps

Gene linkage

- Mendel: genes assort independently in meiosis
- Morgan (1910):
 - chromos. are a group of linked genes
 - genes on same chromos. tend to be inherited together



– **Chromosomes** assort independently, NOT individual genes.

- Gene Maps

- Shows location of all genes on a chromos.

- Are genes on same chromos. always linked?

- No, crossing-over in meiosis can separate them

- Greater dist. between genes on chromos., more likely that they will separate.

