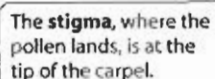


Genetics: Mendel and Beyond

Anatomy of a pea flower (shown in long section)

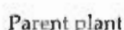


Anthers at the tip of the stamen are the sites of pollen production.

Stamens are the male sex organs.

The **ovary** is the female sex organ.

Parent plant

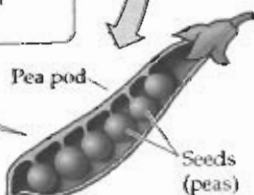


Poller

- 1** Using a brush, pollen is transferred from anthers of a purple flower to the stigma of a white flower whose anthers have been snipped off.

- 2** This cross-pollination produces seeds that are allowed to grow into new plants.














- 3** Analysis of physical characteristics (see Table 10.1) of the offspring over 2 generations shows evidence of hereditary transmission from both parents.



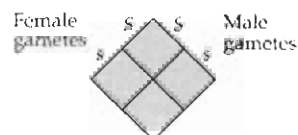
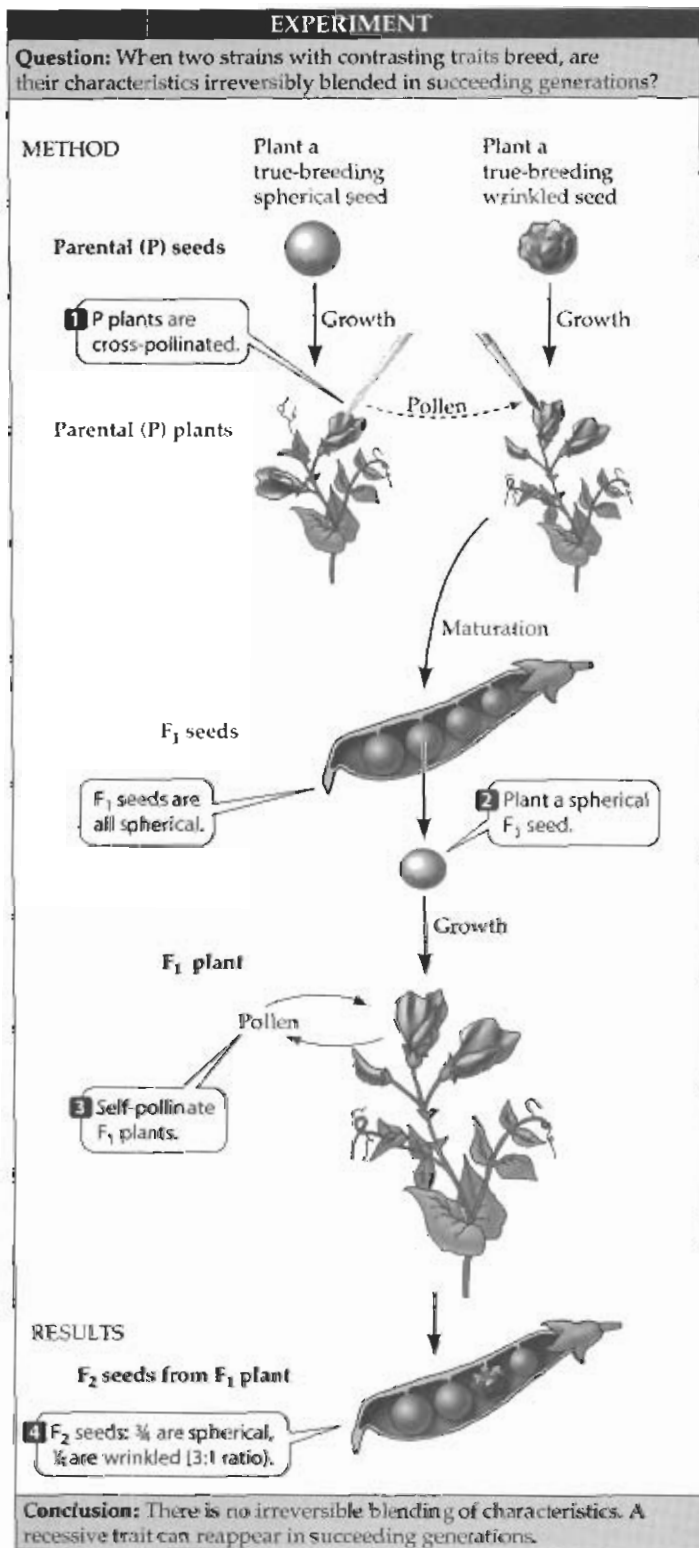
Pea pod.

^aSeeds (peas)

10.1 Mendel's Results from Monohybrid Crosses

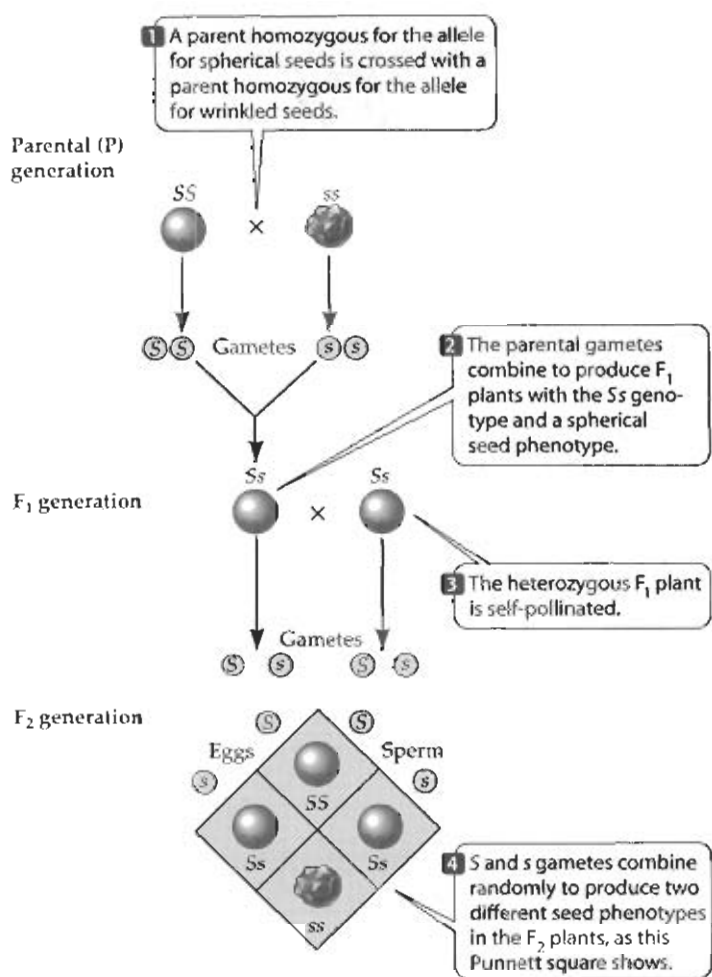
PARENTAL GENERATION PHENOTYPES			F ₂ GENERATION PHENOTYPES				
	DOMINANT	RECESSIVE		DOMINANT	RECESSIVE	TOTAL	RATIO
	Spherical seeds	× Wrinkled seeds		5,474	1,850	7,324	2.96:1
	Yellow seeds	× Green seeds		6,022	2,001	8,023	3.01:1
	Purple flowers	× White flowers		705	224	929	3.15:1
	Inflated pods	× Constricted pods		882	299	1,181	2.95:1
	Green pods	× Yellow pods		428	152	580	2.82:1
	Axial flowers	× Terminal flowers		651	207	858	3.14:1
	Tall stems (1 m)	× Dwarf stems (0.3 m)		787	277	1,064	2.84:1

(Page 190)

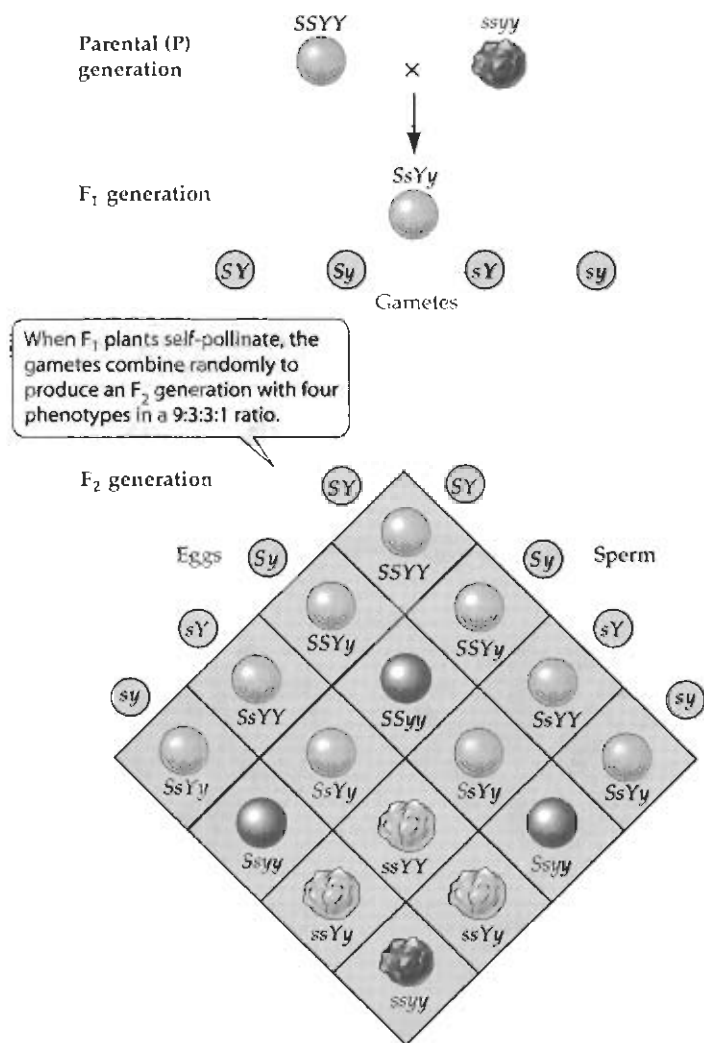


In-Text Art (Page 192)

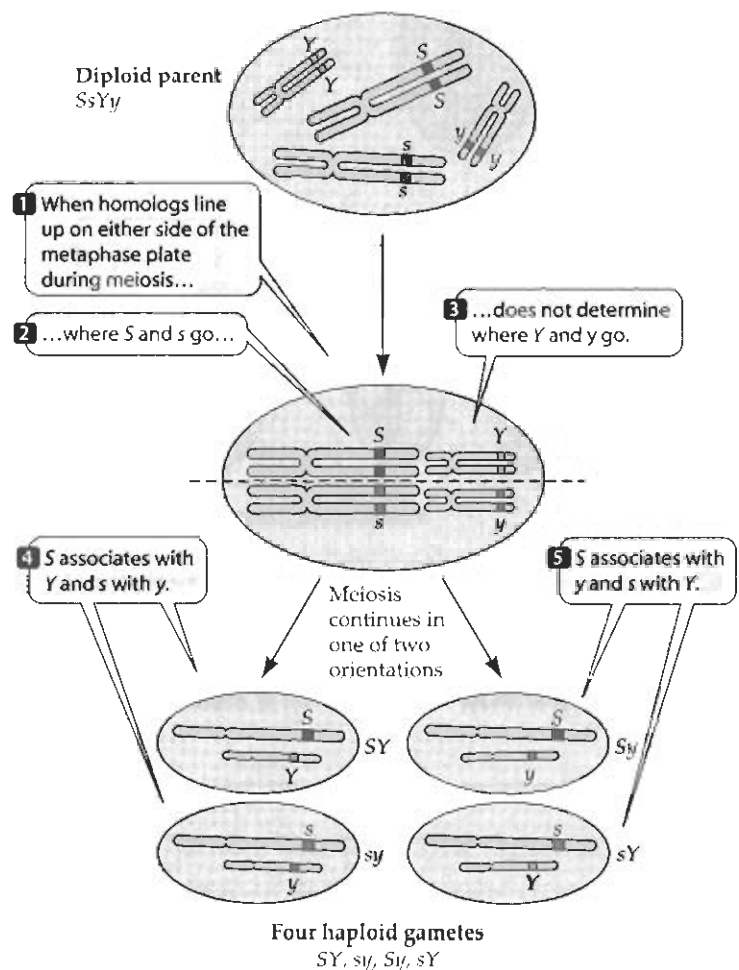
10.3 Mendel's Experiment 1 (Page 191)



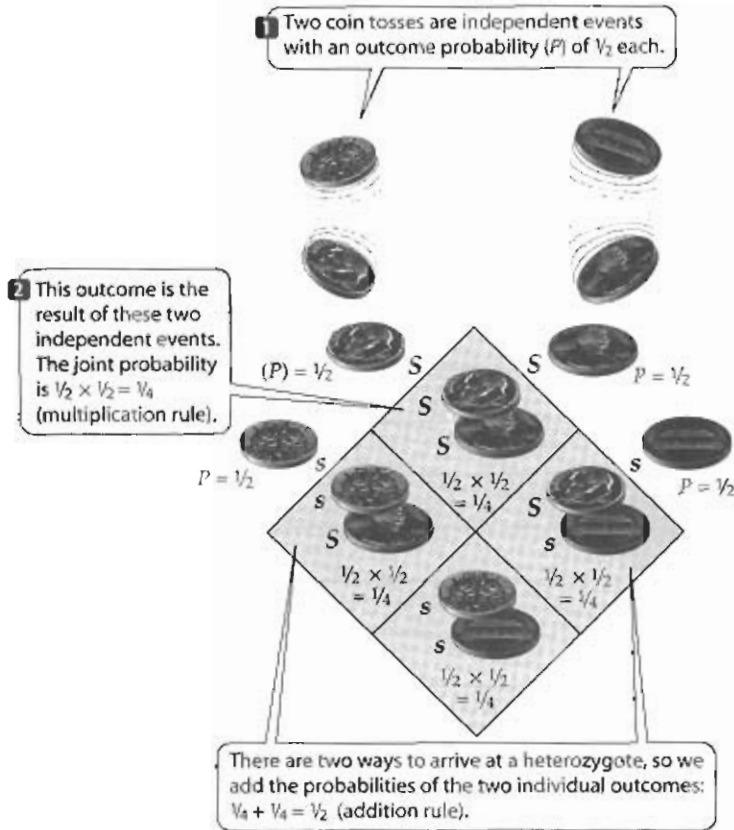
10.4 Mendel's Explanation of Experiment 1 (Page 192)



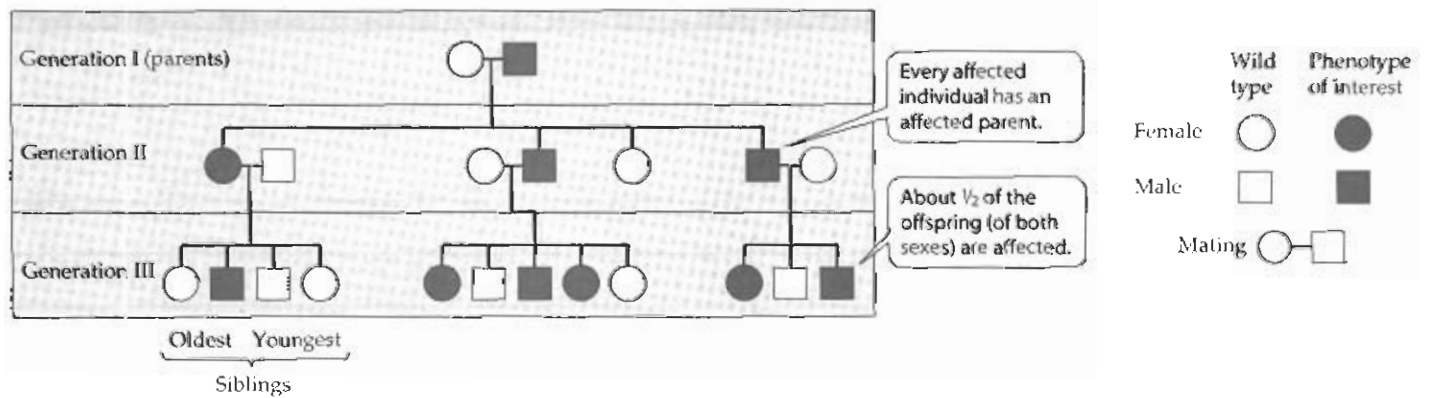
10.7 Independent Assortment (Page 194)



10.8 Meiosis Accounts for Independent Assortment of Alleles (Page 195)



10.9 Using Probability Calculations in Genetics (Page 196)

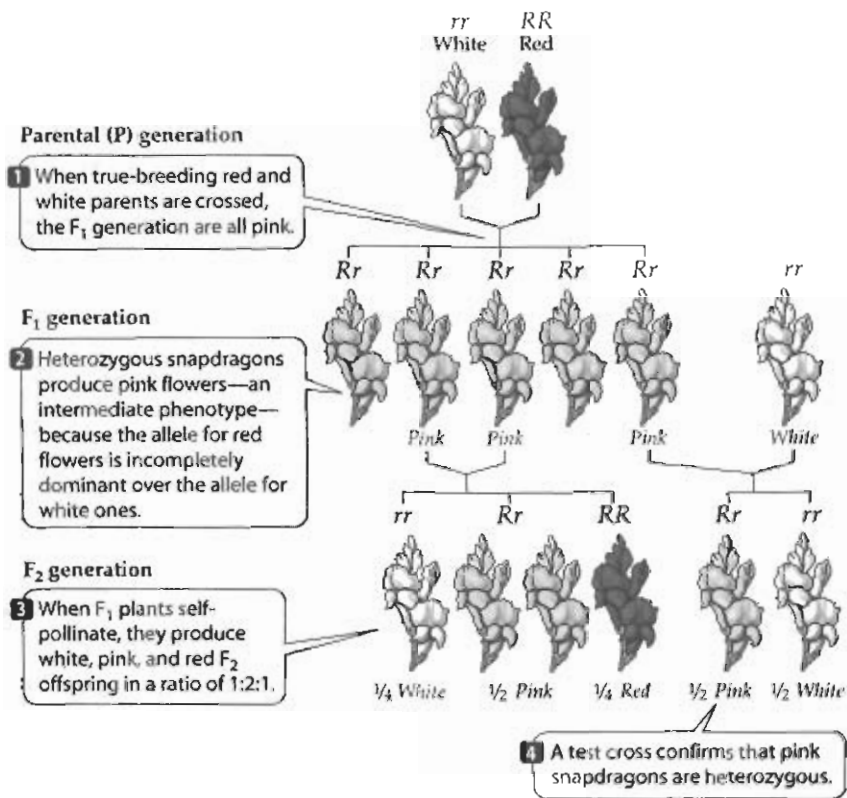


10.10 Pedigree Analysis and Dominant Inheritance (Page 197)



10.12 Inheritance of Coat Color in Rabbits (Page 198)

[The page contains faint horizontal lines, suggesting it was part of a lined notebook or document.]



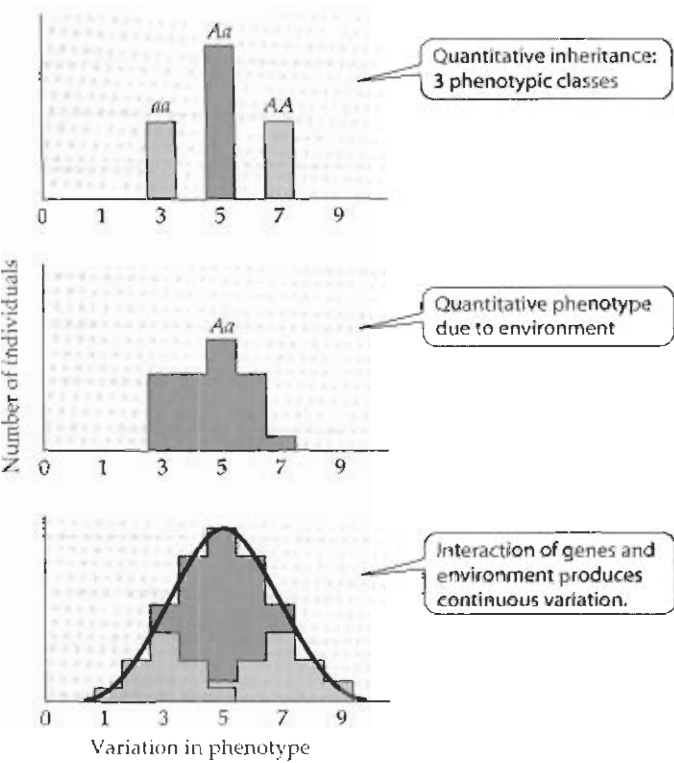
10.13 Incomplete Dominance Follows Mendel's Laws (Page 199)

Blood type of cells	Genotype	Antibodies made by body	Reaction to added antibodies	
			Anti-A	Anti-B
A	IAIA or IAi	Anti-B		
B	IBIB or IBi	Anti-A		
AB	IAIB	Neither anti-A nor anti-B		
O	ii	Both anti-A and anti-B		

Red blood cells that do not react with antibody remain evenly dispersed.

Red blood cells that react with antibody clump together (speckled appearance).

10.14 ABO Blood Reactions Are Important in Transfusions (Page 199)



10.17 Quantitative Variation (Page 201)

EXPERIMENT

Question: Do alleles for different characteristics always assort independently?

Parent (P)

BbVgvg Wild type (gray body, normal wings) ♀ × *bbvgvg* (Black body, vestigial wings) ♂

E₁

Genotypes	<i>BbVgvg</i> Wild type	<i>bbvgvg</i> Black vestigial	<i>Bbvgvg</i> Gray vestigial	<i>bbVgvg</i> Black normal
Expected results	575	575	575	575
Observed phenotype (number of individuals)	965	944	206	185

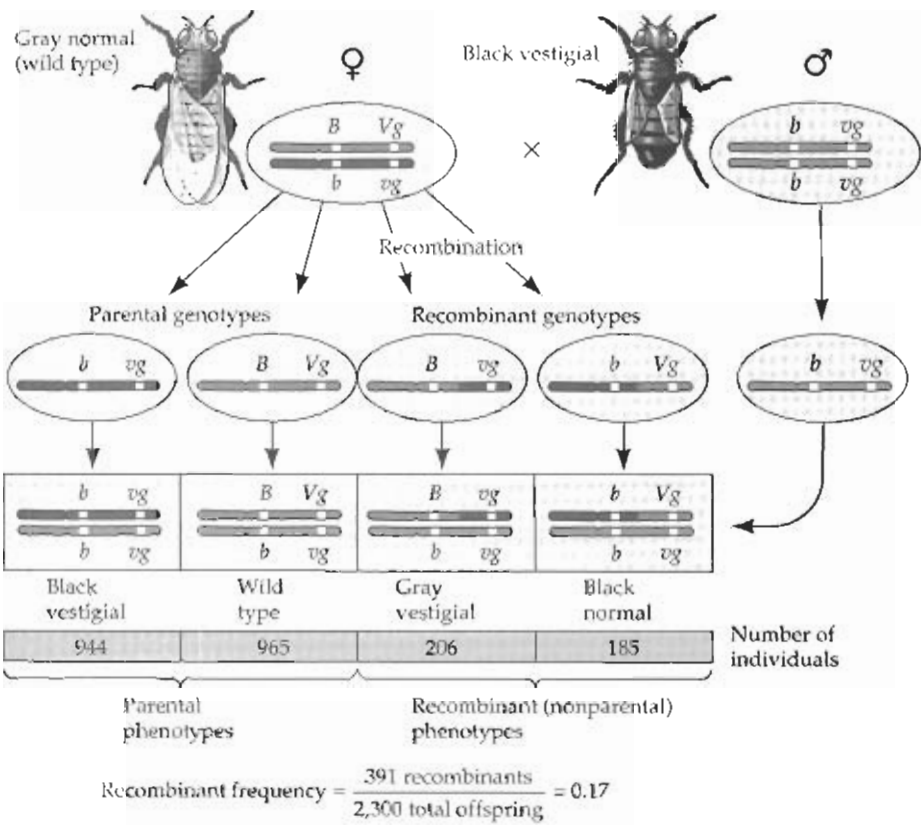
Parental phenotypes Recombinant phenotypes

These are the results expected from Mendel's second law (independent assortment)...

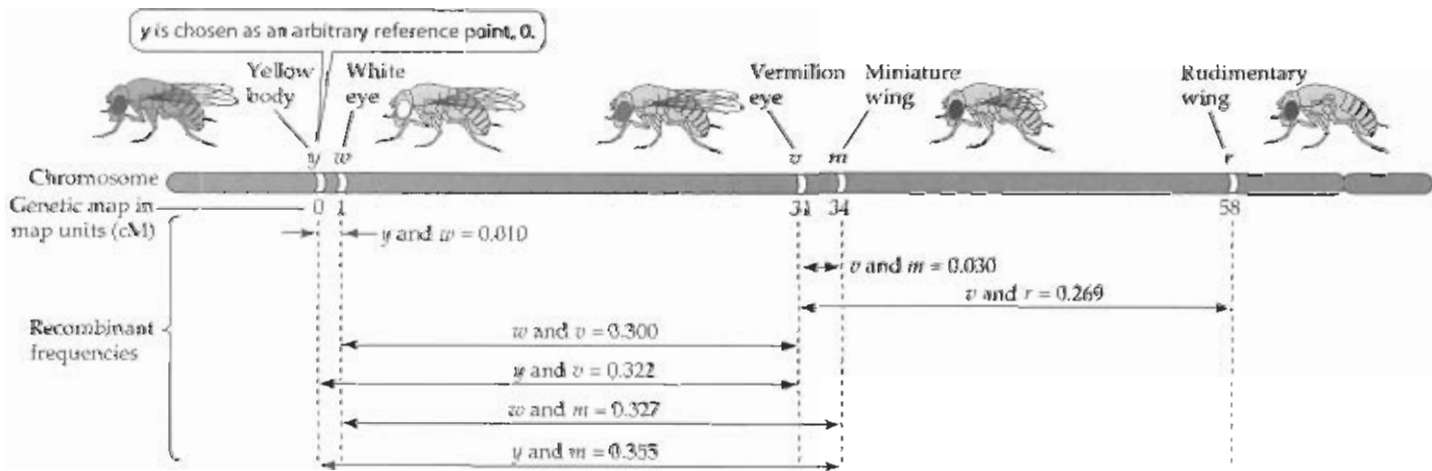
...but the actual results were inconsistent with the law.

Conclusion: These two genes do not assort independently. They are linked on the same chromosome.

10.18 Some Alleles Do Not Assort Independently (Page 202)



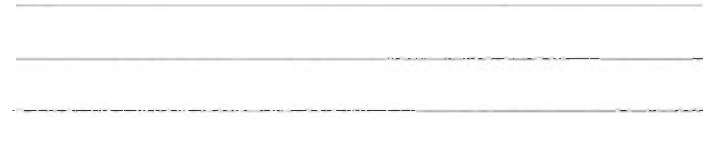
10.20 Recombinant Frequencies (Page 204)

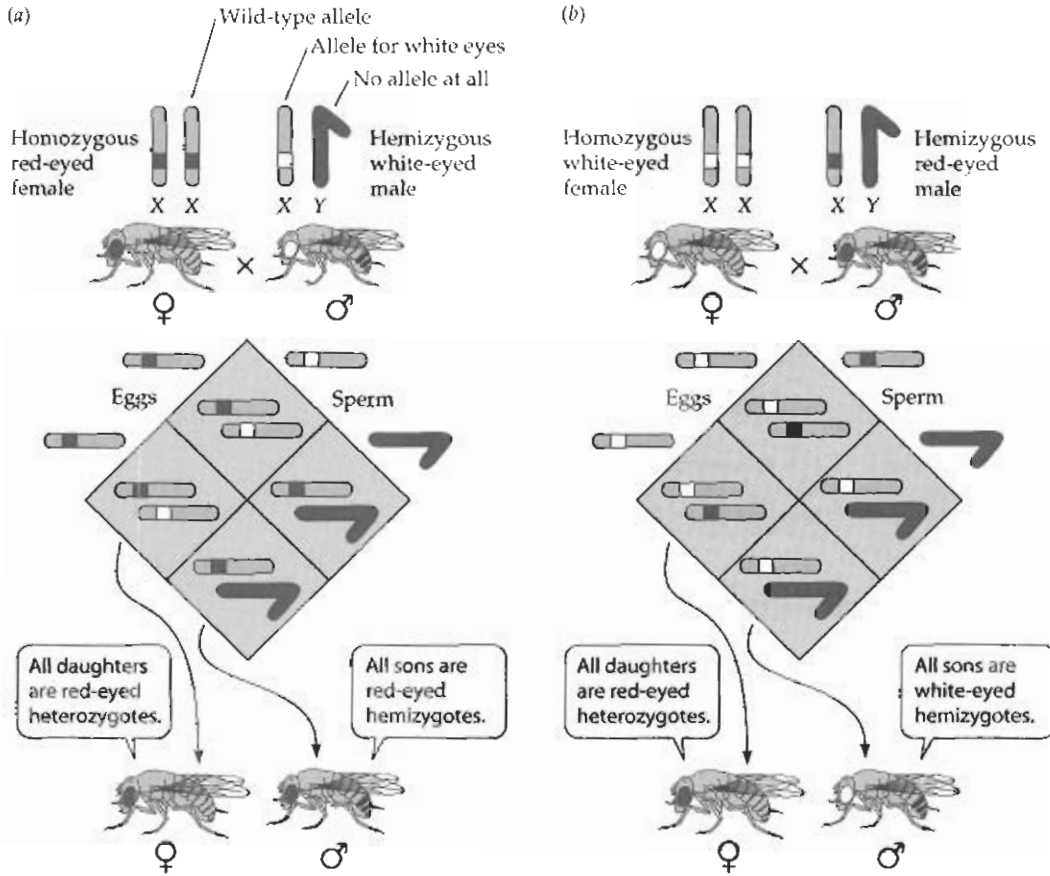


10.21 Steps toward a Genetic Map (Page 204)

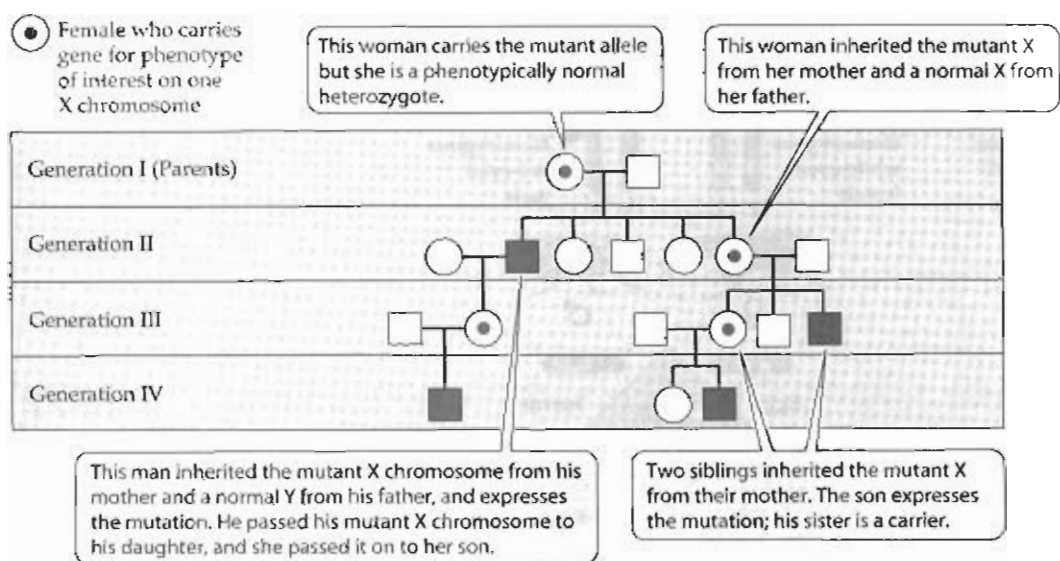








10.23 Eye Color Is a Sex-Linked Trait in *Drosophila* (Page 207)



10.24 Red-Green Color Blindness Is a Sex-Linked Trait in Humans (Page 208)