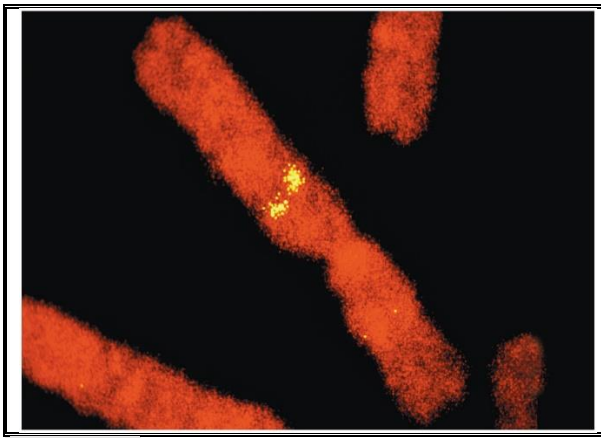


Essential Questions

Video

https://www.dnalc.org/resources/3d/chr11.html

Locating Genes Along Chromosomes

chromosome theory of inheritance

Figure 12.2: The chromosomal basis of Mendel's laws

If you crossed an F_1 plant with a plant that was homozygous recessive for both genes (yyrr), how would the phenotypic ratio of the offspring compare with the 9:3:3:1 ratio seen here?

Morgan showed that Mendelian inheritance has its physical basis in the behavior of chromosomes: Scientific Inquiry

Morgan's choice of experimental design

wild type-

12.4 INQUIRY
In a cross between a wild-type female fruit fly and a mutant white-eyed male, what color eyes will the F_1 and F_2 offspring have?
What If? Suppose this eye-color gene were located on an autosome. Predict the phenotypes (including gender) of the F_2 flies in this hypothetical cross.

Concept Check 12.1

1.

2.

3.

★2 Sex-linked genes exhibit unique patterns of inheritance

sex-linked gene-

X-linked genes-

Duchenne muscular dystrophy	Hemophilia

Barr body-

Figure 12.7: The transmission of X-linked recessive traits

If a color-blind woman married a man who had normal color vision, what would be the probable phenotypes of their children?

Concept Check 12.2

1.

2.

3.

Linked genes tend to be inherited together because they are located near each other on the same chromosome

linked genes-

genetic recombination-

12.9 Inquiry

How does linkage between two genes affect inheritance of characters?

What If?

Bozeman: Advanced Genetics

parental types-

recombinant types (recombinants)-

crossing over-

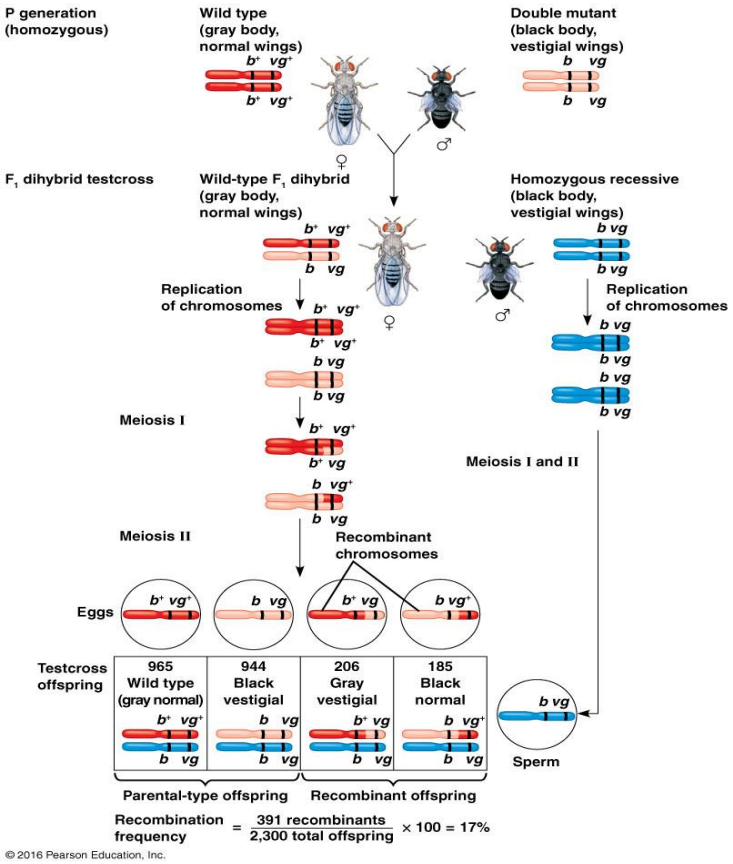
Evolution Link

New combinations of alleles: Variation for natural selection

genetic map-

Figure 12.10: Chromosomal basis for recombination of linked genes

Draw It



SCIENTIFIC SKILLS EXERCISE:

Using the Chi-Square Test

Are two genes linked or unlinked?

Offspring from testcross of *AaBb* (F_1) × *aabb*	Purple stem/short petals (*A–B–*)	Green stem/short petals (*aaB–*)	Purple stem/long petals (*A–bb*)	Green stem/long petals (*aabb*)
Expected ratio if the genes are unlinked	1	1	1	1
Expected number of offspring (of 900)				
Observed number of offspring (of 900)	220	210	231	239

Testcross offspring	**Expected (*e*)**	**Observed (*o*)**	**Deviation (*o* − *e*)**	**$(o - e)^2$**	**$(o - e)^2/e$**
(*A–B–*)		220			
(*aaB–*)		210			
(*A–bb*)		231			
(*aabb*)		239			
				χ^2 = Sum	

linkage map-

map units-

cytogenetic maps-

Concept Check 12.3

1.

2.

3.

★ Alterations of chromosome number or structure cause some genetic disorders

nondisjunction-

aneuploidy-

monosomic-

trisomic-

polyploidy-

Alterations of chromosome structure (define and Illustrate example)

deletion	duplication	inversion	translocation

Human disorders due to chromosomal alterations

Down Syndrome
Aneuploidy of sex chromosomes
Structurally altered chromosomes

Concept Check 12.4

1.

2.

3.

4.

Test Your Understanding

#	Answer	Mark	Response
1			
2			
3			
4			
5			
6			
7			
8			
9			