

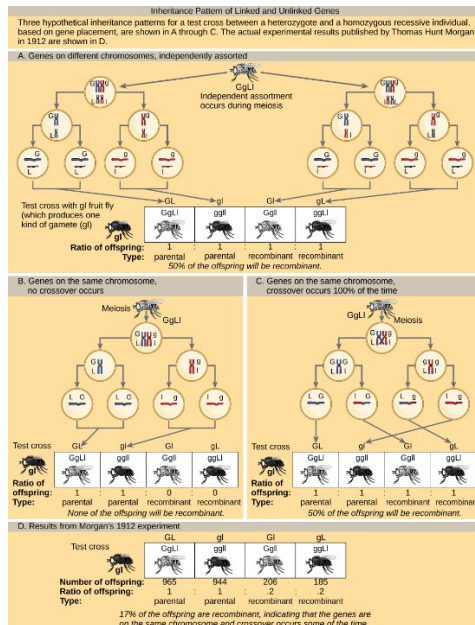
## Biology

### Unit 3: Genetics

### Chapter 13: Modern Understandings of Inheritance

#### Visual Connection Questions

1. In a test cross for two characteristics such as the one shown here, can the recombinant offspring's frequency be 60 percent? Why or why not?



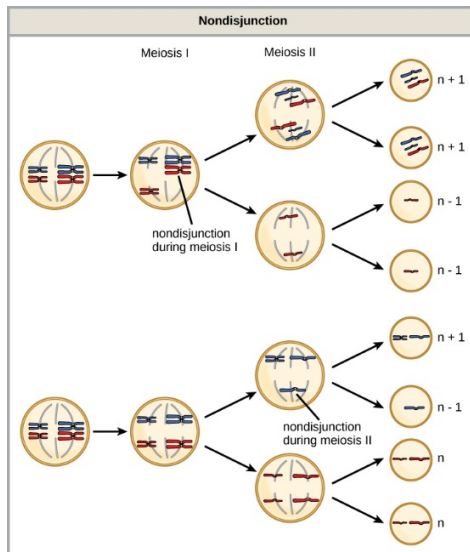
No. The predicted frequency of recombinant offspring ranges from 0% (for linked traits) to 50% (for unlinked traits).

2. Which of the following statements is true?

Genetic Map Based on Recombination Frequencies in <i>Drosophila</i>			
MUTANT		WILD TYPE	
Short aristae	0	Long aristae	
Black body	48.5	Gray body	
Cinnabar eyes	57.5	Red eyes	
Vestigial wings	65.5	Normal wings	
Brown eyes	104.5	Red eyes	
Values in centimorgan (cM) map units; recombination frequency of 0.01 = 1 cM			

d. Recombination of the red/brown eye and long/short aristae alleles will occur more frequently than recombination of the alleles for wing length and body color.

3. Which of the following statements about nondisjunction is true?



b. Nondisjunction occurring during meiosis II results in 50 percent normal gametes.

### Review Questions

4. X-linked recessive traits in humans (or in *Drosophila*) are observed \_\_\_\_\_.

a. in more males than females

5. The first suggestion that chromosomes may physically exchange segments came from the microscopic identification of \_\_\_\_\_.

c. chiasmata

6. Which recombination frequency corresponds to independent assortment and the absence of linkage?

c. 0.50

7. Which recombination frequency corresponds to perfect linkage and violates the law of independent assortment?

a. 0

8. Which of the following codes describes position 12 on the long arm of chromosome 13?

b. 13q12

9. In agriculture, polyploid crops (like coffee, strawberries, or bananas) tend to produce \_\_\_\_\_.

c. larger yields

**10.** Assume a pericentric inversion occurred in one of two homologs prior to meiosis. The other homolog remains normal. During meiosis, what structure—if any—would these homologs assume in order to pair accurately along their lengths?

c. loop

**11.** The genotype XXY corresponds to

a. Klinefelter syndrome

**12.** Abnormalities in the number of X chromosomes tends to have milder phenotypic effects than the same abnormalities in autosomes because of \_\_\_\_\_.

d. X inactivation

**13.** By definition, a pericentric inversion includes the \_\_\_\_\_.

a. centromere

### Critical Thinking Questions

**14.** Explain how the Chromosomal Theory of Inheritance helped to advance our understanding of genetics.

The Chromosomal Theory of Inheritance proposed that genes reside on chromosomes. The understanding that chromosomes are linear arrays of genes explained linkage, and crossing over explained recombination.

**15.** Using diagrams, illustrate how nondisjunction can result in an aneuploid zygote.

Exact diagram style will vary; diagram should look like Figure 13.6.

