

**Section 14–2 Human Chromosomes (pages 349–353)**

*This section describes the structure of human chromosomes. It also describes genetic disorders that are sex-linked, as well as disorders caused by nondisjunction.*

**Human Genes and Chromosomes (page 349)**

1. Circle the letter of each sentence that is true about human genes and chromosomes.
  - a. Chromosomes 21 and 22 are the largest human chromosomes.
  - b. Chromosome 22 contains long stretches of repetitive DNA that do not code for proteins.
  - c. Biologists know everything about how the arrangements of genes on chromosomes affect gene expression.
  - d. Human genes located close together on the same chromosome tend to be inherited together.

**Sex-Linked Genes (pages 350–351)**

2. What are sex-linked genes? \_\_\_\_\_
3. Is the following sentence true or false? The Y chromosome does not contain any genes at all. \_\_\_\_\_
4. Complete the compare-and-contrast table for sex-linked genes.

**SEX-LINKED DISORDERS IN HUMANS**

Disorder	Description	Cause
Colorblindness		
		A recessive allele in either of two genes resulting in a missing protein required for normal blood clotting.
		A defective version of the gene that codes for a muscle protein

5. Is the following sentence true or false? All X-linked alleles are expressed in males, even if they are recessive. \_\_\_\_\_

**Chapter 14, The Human Genome** (continued)

6. Complete the Punnett square to show how colorblindness is inherited.

	$X^cY$	
	$X^c$	$Y$
$X^cX^c$	$X^c$	
	$X^c$	

**X-Chromosome Inactivation** (page 352)

7. How does the cell "adjust" to the extra X chromosome in female cells? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

8. What is a Barr body? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

9. Is the following sentence true or false? Barr bodies are found only in males.

\_\_\_\_\_

10. If you saw a white cat with orange and black spots, is it most likely a male or a female? Explain. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Chromosomal Disorders** (pages 352–353)

11. What occurs during nondisjunction? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

12. Is the following sentence true or false? If nondisjunction occurs, gametes may have abnormal numbers of chromosomes. \_\_\_\_\_

13. The condition in which an individual has three copies of a chromosome is known as \_\_\_\_\_, which means "three bodies."

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

14. Is the following sentence true or false? Down syndrome occurs when an individual has two copies of chromosome 21. \_\_\_\_\_
15. Circle the letter of the characteristic of Down syndrome.
- a. dwarfism
  - b. mental retardation
  - c. colorblindness
  - d. muscle loss
16. Why does an extra copy of one chromosome cause so much trouble? \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
17. Circle the letter of each sentence that is true about sex chromosome disorders.
- a. A female with the karyotype 45,X has inherited only one X chromosome and is sterile.
  - b. Females with the karyotype 47,XXY have Klinefelter's syndrome.
  - c. Babies have been born without an X chromosome.
  - d. The Y chromosome contains a sex-determining region that is necessary for male sexual development.

### Reading Skill Practice

Writing an outline is a useful way to organize the important facts in a section. Write an outline of Section 14-2. Use the section headings as the headings in your outline. Include only the important facts and main ideas in your outline. Be sure to include the vocabulary terms. Do your work on a separate sheet of paper.