

14.1 Human Chromosomes pg. 392-397

Lesson Objectives

-  Identify the types of human chromosomes in a karyotype.
-  Describe the patterns of the inheritance of human traits.
-  Explain how pedigrees are used to study human traits.

Karyotypes

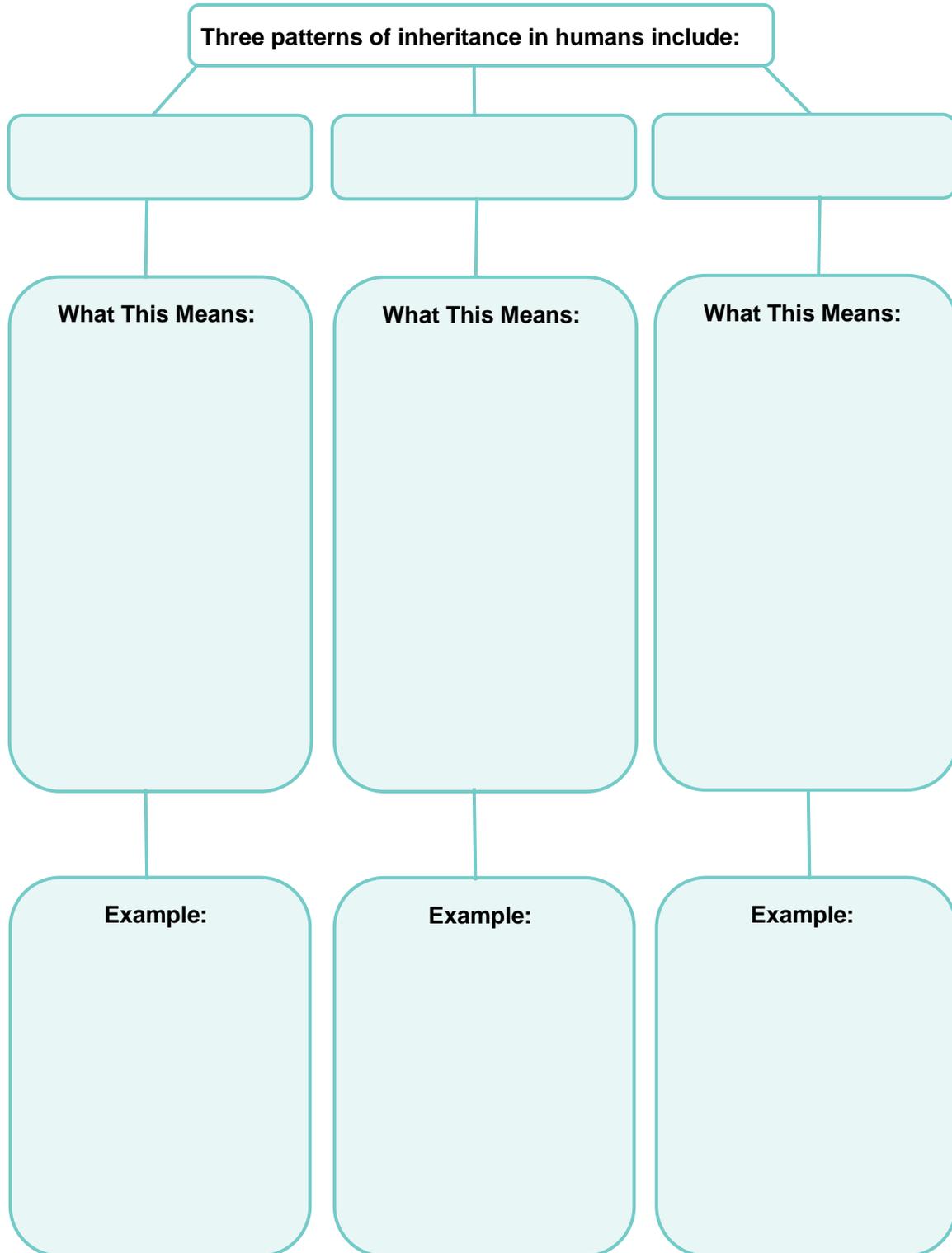
1. **THINK VISUALLY** Make a sketch of a human karyotype. Number the chromosome pairs. Label autosomes and sex chromosomes.

For Questions 2–8, write the letter of the correct answer on the line at the left.

- _____ 2. The complete set of genetic information an organism carries in its DNA is its
A. karyotype.
B. genome.
C. chromosomes.
D. autosomes.
- _____ 3. From what is a karyotype made?
A. A photograph of cells in mitosis
B. A series of X-diffraction images
C. A preparation of gametes on a microscope slide
D. A Punnett square
- _____ 4. How many chromosomes are in a normal human karyotype?
A. 23
B. 46
C. 44
D. 2 (either XX or XY)
- _____ 5. Which of the following genetic abbreviations denotes a male human?
A. 23, XX
B. 23, XY
C. 46, XX
D. 46, XY
- _____ 6. Why is the ratio of male to female births roughly 50:50?
A. All egg cells carry an X chromosome.
B. Half of all egg cells carry a Y chromosome.
C. All sperm cells carry an X chromosome.
D. Half of all sperm cells carry a Y chromosome.
- _____ 7. How are the X and Y chromosomes different?
A. Only one is an autosome.
B. The X is smaller than the Y.
C. The Y carries fewer genes than the X.
D. Only females have a Y.
- _____ 8. All human cells carry
A. at least one X chromosome.
B. at least one Y chromosome.
C. a pair of X chromosomes.
D. one X and one Y chromosome.

Transmission of Human Traits

9. Complete the graphic organizer to list, describe, and give examples of three types of inheritance patterns in humans:



10. Colorblindness is a sex-linked trait. Let C represent an allele for normal color vision. Let c represent an allele for colorblindness. The genotype for a male with normal color vision is $X^C Y$. The genotype for a female heterozygous for normal color vision is $X^C X^c$.

Complete the Punnett square to show the genotypes and phenotypes of their possible offspring.

	Male Gamete:	Male Gamete:
Female Gamete:	Genotype: Phenotype:	Genotype: Phenotype:
Female Gamete:	Genotype: Phenotype:	Genotype: Phenotype:

11. Use your Punnett square to explain why a female with one c allele has normal color vision but a male with one c allele is colorblind.

12. How does the cell “adjust” to the extra X chromosome in female cells?

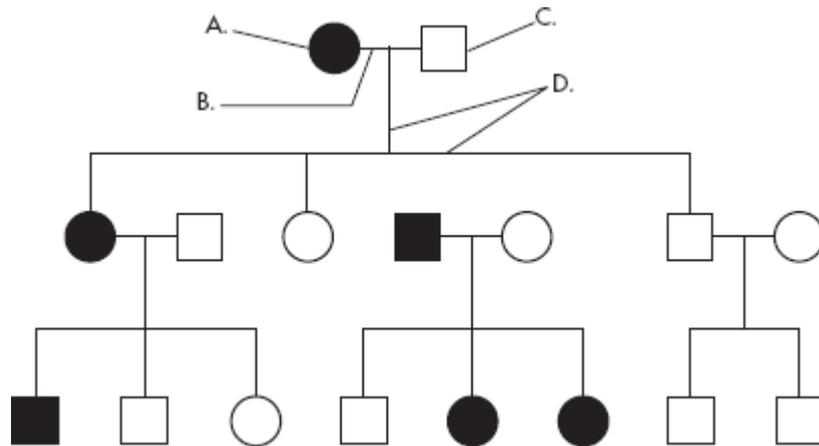
13. What is a Barr body?

14. Why don't males have Barr bodies?

15. Is a cat with three colors of spots more likely to be male or female?

Human Pedigrees

For Questions 16–21, match the labels to the parts of the pedigree chart shown below. Some of the labels may be used more than once.



- _____ 16. A person who expresses the trait
- _____ 17. A male
- _____ 18. A person who does not express the trait
- _____ 19. A marriage
- _____ 20. A female
- _____ 21. A connection between parents and offspring

Apply the Big idea

22. Dimples in the cheeks are inherited as a dominant trait on an autosome. Using the proper form and symbols, draw a pedigree chart, beginning with a heterozygous, dimpled father (Dd), and a nondimpled mother (dd). Show four children of the expected types: boys, girls, dimples, and no dimples. Label your pedigree with phenotypes and genotypes.