

Name: _____

Parent Signature: _____

CHAPTER 4 Study Guide

MULTIPLE CHOICE

- What are multiple alleles?
 - more than two genes that control a trait
 - three or more forms of a gene that code for a single trait
 - three or more chromosomes that determine a trait
 - more than two codominant genes in a chromosome
- What is the blood type of a child born to two parents with the genotypes $I^A I^A$ and $I^B I^B$ for blood type?
 - Type A
 - Type B
 - Type AB
 - Type O
- Why does height in humans have such a wide variety of phenotypes?
 - Height is controlled by at least four genes.
 - The gene for height has only two alleles.
 - Height is controlled by sex-linked genes.
 - Height is controlled by a recessive allele.
- What controls variations in skin color among humans?
 - a person's diet
 - at least three genes
 - multiple alleles of a single gene
 - two alleles of a single gene
- Which of these human traits is altered by variations in environment?
 - skin color
 - height
 - smile dimples
 - blood type
- Which combination of sex chromosomes results in a male human being?
 - XX
 - YY
 - XY
 - either XX or YY
- Sex-linked genes are genes on
 - all the chromosomes of the mother.
 - all the chromosomes of the father.
 - the X and Y chromosomes.
 - all 23 pairs of chromosomes.

8. Why are sex-linked traits more common in males than in females?
 - a. All alleles on the X chromosome are dominant.
 - b. All alleles on the Y chromosome are recessive.
 - c. A recessive allele on the X chromosome will produce the trait in a male.
 - d. Any allele on the Y chromosome will be codominant with the matching allele on the X chromosome.
9. A carrier is a person who has
 - a. one recessive and one dominant allele for a trait.
 - b. two recessive alleles for a trait.
 - c. two dominant alleles for a trait.
 - d. more than two alleles for a trait.
10. What must occur for a girl to be colorblind?
 - a. Each parent must be colorblind.
 - b. Each parent must have the dominant allele for colorblindness.
 - c. Each parent must have the recessive allele for colorblindness.
 - d. Each parent must have two codominant alleles for colorblindness.
11. How does a geneticist use pedigrees?
 - a. to create genetic crosses
 - b. to replicate identical strings of DNA
 - c. to prove that sex-linked traits are caused by codominant alleles
 - d. to trace the inheritance of traits over generations of families
12. Genetic disorders are caused by
 - a. pedigrees.
 - b. mutations.
 - c. karyotypes.
 - d. sickle-shaped cells.
13. Hemophilia is caused by a(n)
 - a. recessive allele on the X chromosome.
 - b. extra chromosome.
 - c. dominant allele.
 - d. codominant allele.
14. Down syndrome most often occurs when
 - a. a person inherits a recessive allele.
 - b. chromosomes fail to separate properly during meiosis.
 - c. sickle-shaped cells become stuck in blood vessels.
 - d. blood fails to clot properly.
15. Which genetic disorder causes the body to produce unusually thick mucus in the lungs and intestines?
 - a. hemophilia
 - b. Down syndrome
 - c. cystic fibrosis
 - d. sickle-cell disease
16. What is a karyotype?
 - a. blood from a newborn baby
 - b. a picture of a baby before it is born
 - c. a picture of the chromosomes in a cell
 - d. fluid that surrounds a baby before it is born

17. How can genetic counselors predict genetic disorders?
 - a. by studying karyotypes and pedigree charts
 - b. by taking pictures of a baby before it is born
 - c. by exploring new methods of genetic engineering
 - d. by eliminating codominant alleles in the parents
18. Which form of selective breeding crosses parents with the same or similar sets of alleles?
 - a. fertilization
 - b. inbreeding
 - c. hybridization
 - d. cloning
19. How do police use DNA fingerprinting to help solve crimes?
 - a. by proving that a suspect's blood type matches evidence in a crime
 - b. by showing that a suspect's fingerprints are at a crime scene
 - c. by comparing a suspect's DNA patterns with evidence from a crime scene
 - d. by matching phenotypes of suspects with DNA samples
20. What is the purpose of the Human Genome Project?
 - a. to identify the DNA sequence of every gene in the human genome
 - b. to clone every gene on a single chromosome in human DNA
 - c. to splice every gene on a single chromosome in human DNA
 - d. to inbreed the best genes on every chromosome in human DNA

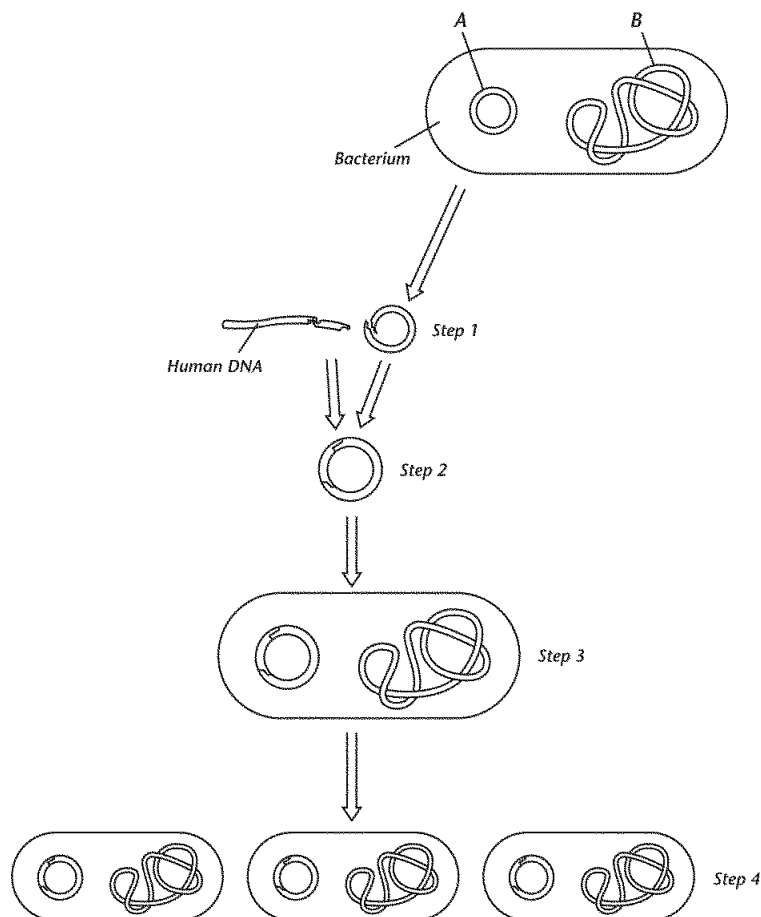
COMPLETION

21. When many genes control a trait, the trait will show a large number of _____.
22. Various combinations of _____ at each of several genes control human skin color.
23. A person's surroundings, or _____, can change the effects of a person's genes.
24. An egg that is fertilized by a sperm cell with a(n) _____ chromosome will develop into a female.
25. A recessive allele can be passed to offspring by a(n) _____ who does not show the trait.
26. People who have the genetic disorder called _____ disease suffer from a lack of oxygen in the blood.
27. A person who has the genetic disorder called _____ bleeds easily.
28. Down syndrome is caused by the presence of an extra _____.
29. A doctor performs a procedure called _____ to get cells from the fluid that surrounds a developing baby.
30. A karyotype can be used to diagnose the genetic disorder called _____.
31. Breeders use a technique called _____ to cross genetically different individuals.

32. A gene from one organism is inserted into the DNA of another organism in the process known as _____.
33. _____ helps to solve crimes because no two people, except identical twins, have the same DNA.
34. A selective breeding technique called _____ is used to breed purebred dogs.

SHORT ANSWER

Genetic Engineering



35. Identify structures A and B. What do these structures contain?
36. Explain what is happening in Step 1.
37. Explain what is happening in Step 2.
38. Explain what is happening in Step 3.
39. Why are bacteria often used in genetic engineering?

ESSAY

40. A person with blood type AB has the alleles I^A and I^B . A person with blood type O has the alleles ii . Is it possible for a person with blood type AB to have a child with blood type O? Explain why or why not.

41. Human eyes come in a variety of colors ranging from light blue to very dark brown. Explain why eye color is not likely to be controlled by a single gene.

42. Is it possible for a son to inherit an allele on an X chromosome from his father? Explain why or why not.

43. Contrast hybridization and inbreeding.