

Changes over Time

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 1. Which of these traits is controlled by a gene with multiple alleles?
 - a. straight hairline
 - b. smile dimples
 - c. widow's peak
 - d. blood type
- _____ 2. What are multiple alleles?
 - a. more than two genes that control a trait
 - b. three or more forms of a gene that code for a single trait
 - c. three or more chromosomes that determine a trait
 - d. more than two codominant genes in a chromosome
- _____ 3. Why does height in humans have such a wide variety of phenotypes?
 - a. Height is controlled by at least four genes.
 - b. The gene for height has only two alleles.
 - c. Height is controlled by sex-linked genes.
 - d. Height is controlled by a recessive allele.
- _____ 4. What controls variations in skin color among humans?
 - a. a person's diet
 - b. many genes
 - c. multiple alleles of a single gene
 - d. two alleles of a single gene
- _____ 5. Both parents of a child have type A blood. What might their child's blood type be?
 - a. Type A only
 - b. Type A or type B
 - c. Type A or type O
 - d. Type A or type AB
- _____ 6. Which combination of sex chromosomes results in a male human being?
 - a. XX
 - b. YY
 - c. XY
 - d. either XX or YY
- _____ 7. 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 always produce the trait in a male.
 - d. Any allele on the Y chromosome will be codominant with the matching allele on the X chromosome.
- _____ 8. Sex-linked genes are genes on
 - a. the X chromosome only.
 - b. the Y chromosome only.

- c. the X and Y chromosomes.
- d. all 23 pairs of chromosomes.

- _____ 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. The Human Genome Project's main goal has been to identify the DNA sequence of every gene in the human genome. How might knowing this be useful in gene therapy?
- a. Knowing the entire human genome may allow scientists to use bacterial cells to produce human insulin
 - b. Knowing the DNA sequence of the entire human genome may make it easier for doctors to identify defective alleles in an individual and to treat some genetic disorders.
 - c. Scientist may develop a method that allows cows to produce greater quantities of milk as a result of knowing the entire human genome.
 - d. The Human Genome Project will likely have no affect on gene therapy.
- _____ 11. Which of these human traits is altered by variations in environment?
- a. hairline
 - b. height
 - c. smile dimples
 - d. blood type
- _____ 12. What factors can affect a person's height?
- a. genes only
 - b. both genes and environmental factors
 - c. a person's blood type
 - d. a person's karyotype
- _____ 13. Many characteristics are affected by interactions between genes and
- a. chromosomes.
 - b. the environment.
 - c. alleles.
 - d. carriers.
- _____ 14. Genetic disorders are caused by
- a. pedigrees.
 - b. DNA mutations or changes in chromosomes.
 - c. dominant alleles only.
 - d. recessive alleles only.
- _____ 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. Hemophilia is caused by a(n)
- a. recessive allele on the X chromosome.

- b. extra chromosome.
- c. dominant allele.
- d. codominant allele.

- _____ 17. 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.
- _____ 18. What genetic disorder results in abnormally shaped blood cells?
 - a. hemophilia
 - b. Down syndrome
 - c. cystic fibrosis
 - d. sickle-cell disease
- _____ 19. 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 in humans
- _____ 20. What is a pedigree?
 - a. a chart that tracks which members of a family have a particular trait
 - b. a geneticist who studies the inheritance of traits in humans
 - c. a picture of all of the chromosomes in a cell
 - d. an allele passed from parent to child on a sex chromosome
- _____ 21. What is a karyotype?
 - a. a sex-linked genetic disorder
 - 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
- _____ 22. What would be the best way to predict the probability of a baby having cystic fibrosis?
 - a. by studying the parents' karyotypes
 - b. by studying the family's pedigree chart
 - c. by exploring new methods of genetic engineering
 - d. by determining whether the parents have codominant alleles
- _____ 23. Adults with Down syndrome can often find work because they have received
 - a. folic acid.
 - b. physical therapy.
 - c. education and job training.
 - d. genetic counseling.
- _____ 24. Cloning results in two organisms that are
 - a. both adult mammals.
 - b. produced from cuttings.
 - c. genetically similar.
 - d. genetically identical.
- _____ 25. Which of these is an example of the benefits of genetic engineering?
 - a. cross-breeding to create disease-resistant crops

- b. creating human insulin to treat people with diabetes
- c. analyzing karyotypes and pedigree charts
- d. growing a new plant from a cutting

- _____ 26. In an attempt to produce a potato that tastes good and also resists disease, plant breeders crossed a potato variety that tastes good with a variety that resists disease. This technique is an example of
- a. genetic engineering.
 - b. inbreeding.
 - c. hybridization.
 - d. cloning.
- _____ 27. Which form of selective breeding crosses parents with the same or similar sets of alleles?
- a. fertilization
 - b. inbreeding
 - c. hybridization
 - d. cloning
- _____ 28. A woman gives birth to a son who is red-green colorblind. Her daughter is also red-green colorblind. What can you conclude about the family's pedigree?
- a. The father must be colorblind, and the mother must carry one recessive allele for colorblindness.
 - b. The father must be colorblind, but the mother carries two dominant genes for normal vision.
 - c. The mother must be colorblind, and the father must carry one recessive allele for colorblindness.
 - d. The father must be colorblind, and the mother must carry two dominant genes for colorblindness.
- _____ 29. You are able to tell a person's sex by looking at his or her karyotype because a karyotype
- a. shows sex-linked disorders.
 - b. is a picture of a person's genes.
 - c. shows a person's genotype.
 - d. shows the sex chromosomes.
- _____ 30. Each individual has unique fingerprints. What might you conclude about the inheritance of fingerprint patterns?
- a. Fingerprint patterns are sex-linked genes.
 - b. Fingerprint patterns are determined by multiple genes.
 - c. Fingerprint patterns are influenced by environmental factors.
 - d. Fingerprint patterns are determined by multiple alleles on the same gene.

Modified True/False

Indicate whether the statement is true or false. If false, change the identified word or phrase to make the statement true.

- _____ 31. Even if a gene has multiple alleles, a person cannot have more than three of those alleles.
- _____

- _____ 32. Traits that have many different phenotypes, such as height and skin color, are often controlled by a single gene. _____
- _____ 33. Sex-linked traits that are controlled by recessive alleles are more likely to show up in males. _____
- _____ 34. A person's environment can affect his or her genotype for certain traits, such as height. _____
- _____ 35. A genetic disorder in which an abnormal form of hemoglobin is produced is hemophilia. _____
- _____ 36. A male is represented by a square in a pedigree. _____
- _____ 37. Down syndrome can be diagnosed using a karyotype. _____
- _____ 38. The technique called cloning produces an organism that is genetically identical to its parent. _____
- _____ 39. To create bacteria that produce insulin, a section of DNA is inserted into a bacterium's chromosome. _____
- _____ 40. A genetic counselor can help explain the risks of having a child with a disorder to couples who have a family history of genetic disorders. _____

Completion

Complete each statement.

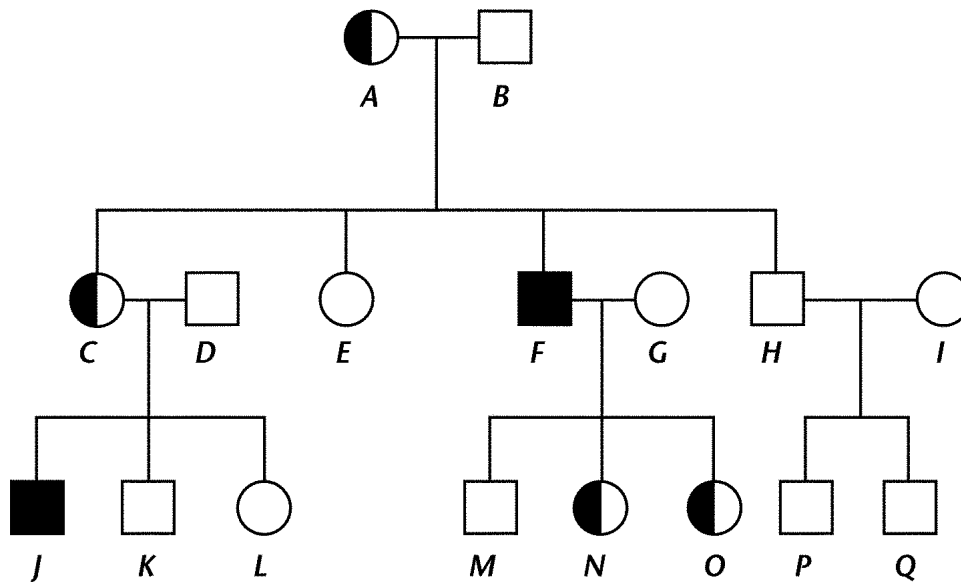
41. The three alleles on the single gene that controls blood type are said to be _____ alleles.
42. When many genes control a trait, the trait will show a large number of _____.
43. A gene is said to have multiple alleles if it has more than _____ alleles.
44. An egg that is fertilized by a sperm cell with a(n) _____ chromosome will develop into a female.
45. A carrier is a person who has one _____ allele for a trait.
46. Improvements in _____ can alter the effects of genes on height.
47. A person's surroundings, or _____, can change the effects of a person's genes.
48. People who have the genetic disorder called _____ suffer from abnormally low levels of oxygen in the blood.
49. A person who has the genetic disorder called _____ bleeds easily.
50. Down's syndrome is caused by the presence of an extra _____.
51. A(n) _____ is used to track the occurrence of a trait in a family.

52. A karyotype can be used to diagnose the genetic disorder called _____.
53. A genetic counselor uses karyotypes, Punnett squares, and _____ to help couples understand their chances of having a child with a genetic disorder.
54. A karyotype can be used to determine the number of _____ in a person's cells.
55. Breeders use a technique called _____ to cross genetically different individuals.
56. A gene from one organism is inserted into the DNA of another organism in the process known as _____.
57. A selective breeding technique called _____ has been used to breed purebred racehorses.
58. If you see two DNA fingerprints that are exactly the same but come from different individuals, you know you are looking at the DNA fingerprints of _____.
59. Many people with genetic disorders can live active and productive lives if they modify factors in their _____ such as diet, medicine, and/or education.
60. In a country experiencing several consecutive years of famine, you might expect growing children to be _____ than their genes for height suggest, due to the environmental factor of poor nutrition.

Short Answer

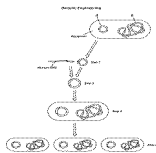
Use the diagram to answer each question.

Pedigree



61. Could the trait that is traced by this pedigree be sex-linked? Explain why or why not.
62. What do the circles in the pedigree represent? What do the squares represent?
63. Which pairs of individuals in the pedigree have children?
64. Which individuals have the trait that is traced by the pedigree?
65. Which individuals are carriers of the trait that is traced by the pedigree?
66. Which individuals neither have the trait nor are carriers?

Use the diagram to answer each question.



67. Identify structures A and B. What do these structures contain?
68. Explain what is happening in Step 1.
69. Explain what is happening in Step 2.
70. Explain what is happening in Step 3.
71. Explain what is happening in Step 4.
72. Why are bacteria often used in genetic engineering?

Essay

73. 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.
74. 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.
75. Is it possible for a son to inherit an allele on an X chromosome from his father? Explain why or why not.
76. Explain what causes cystic fibrosis and describe its effects on the body.
77. Archaeologists and geneticists use DNA from mummies to trace the complicated relationships among Ancient Egyptian kings and queens, following patterns of descent from one generation to the next. What kind of DNA is used, and how do you know?
78. A plant breeder clones a plant with beautiful flowers. Define cloning and explain how the cloned offspring compare to the parent plant.
79. Contrast hybridization and inbreeding.
80. In the 1900s, hemophilia was commonly found in European royal families, most of which were descended from a common ancestor. Royal marriages were frequently between cousins, in order to keep the royal blood 'pure.' What type of selective is this an example of? Explain how this practice contributed to cases of hemophilia in European royal families.

Changes over Time

Answer Section

MULTIPLE CHOICE

1. ANS: D PTS: 1 DIF: L1
OBJ: CaLS.6.1.1 Identify some patterns of inheritance in humans.
STA: S 7.2 BLM: knowledge
2. ANS: B PTS: 1 DIF: L1
OBJ: CaLS.6.1.1 Identify some patterns of inheritance in humans.
STA: S 7.2.c BLM: knowledge
3. ANS: A PTS: 1 DIF: L2
OBJ: CaLS.6.1.1 Identify some patterns of inheritance in humans.
STA: S 7.2.c BLM: comprehension
4. ANS: B PTS: 1 DIF: L1
OBJ: CaLS.6.1.1 Identify some patterns of inheritance in humans.
STA: S 7.2.c BLM: knowledge
5. ANS: C PTS: 1 DIF: L2
OBJ: CaLS.6.1.1 Identify some patterns of inheritance in humans.
STA: S 7.2.c BLM: analysis
6. ANS: C PTS: 1 DIF: L1
OBJ: CaLS.6.1.2 Describe the functions of the sex chromosomes.
STA: S 7.2.c BLM: knowledge
7. ANS: C PTS: 1 DIF: L2
OBJ: CaLS.6.1.2 Describe the functions of the sex chromosomes.
STA: S 7.2.c BLM: comprehension
8. ANS: C PTS: 1 DIF: L1
OBJ: CaLS.6.1.2 Describe the functions of the sex chromosomes.
STA: S 7.2.c BLM: knowledge
9. ANS: A PTS: 1 DIF: L1
OBJ: CaLS.6.1.2 Describe the functions of the sex chromosomes.
STA: S 7.2.c BLM: knowledge
10. ANS: B PTS: 1 DIF: L3
OBJ: CaLS.6.3.2 Identify two applications of DNA technology in human genetics.
STA: S 7.2.c BLM: synthesis
11. ANS: B PTS: 1 DIF: L1
OBJ: CaLS.6.1.3 Explain the relationship between genes and the environment.
STA: S 7.2 BLM: knowledge
12. ANS: B PTS: 1 DIF: L2
OBJ: CaLS.6.1.3 Explain the relationship between genes and the environment.
STA: S 7.2 BLM: comprehension
13. ANS: B PTS: 1 DIF: L1
OBJ: CaLS.6.1.3 Explain the relationship between genes and the environment.
STA: S 7.2 BLM: knowledge

14. ANS: B PTS: 1 DIF: L1
OBJ: CaLS.6.2.1 Identify two major causes of genetic disorders in humans.
STA: S 7.2.d BLM: knowledge
15. ANS: C PTS: 1 DIF: L1
OBJ: CaLS.6.2.1 Identify two major causes of genetic disorders in humans.
STA: S 7.2.d BLM: knowledge
16. ANS: A PTS: 1 DIF: L1
OBJ: CaLS.6.2.1 Identify two major causes of genetic disorders in humans.
STA: S 7.2.d BLM: knowledge
17. ANS: B PTS: 1 DIF: L1
OBJ: CaLS.6.2.1 Identify two major causes of genetic disorders in humans.
STA: S 7.2.d BLM: knowledge
18. ANS: D PTS: 1 DIF: L1
OBJ: CaLS.6.2.1 Identify two major causes of genetic disorders in humans.
STA: S 7.2.d BLM: knowledge
19. ANS: D PTS: 1 DIF: L1
OBJ: CaLS.6.2.2 Explain how geneticists trace the inheritance of traits.
STA: S 7.2.b BLM: knowledge
20. ANS: A PTS: 1 DIF: L1
OBJ: CaLS.6.2.2 Explain how geneticists trace the inheritance of traits.
STA: S 7.2.b BLM: knowledge
21. ANS: C PTS: 1 DIF: L1
OBJ: CaLS.6.2.3 Describe how genetic disorders are diagnosed and treated.
STA: S 7.2.d BLM: knowledge
22. ANS: B PTS: 1 DIF: L2
OBJ: CaLS.6.2.3 Describe how genetic disorders are diagnosed and treated.
STA: S 7.2.b BLM: comprehension
23. ANS: C PTS: 1 DIF: L1
OBJ: CaLS.6.2.3 Describe how genetic disorders are diagnosed and treated.
STA: S 7.2.d BLM: knowledge
24. ANS: D PTS: 1 DIF: L2
OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.
STA: S 7.2.a BLM: comprehension
25. ANS: B PTS: 1 DIF: L2
OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.
STA: S 7.5.b BLM: comprehension
26. ANS: C PTS: 1 DIF: L2
OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.
STA: S 7.2.b BLM: application
27. ANS: B PTS: 1 DIF: L1
OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.
STA: S 7.2.b BLM: knowledge
28. ANS: A PTS: 1 DIF: L3
OBJ: CaLS.6.2.2 Explain how geneticists trace the inheritance of traits.
BLM: application

29. ANS: D PTS: 1 DIF: L3
OBJ: CaLS.6.2.3 Describe how genetic disorders are diagnosed and treated.
BLM: synthesis
30. ANS: B PTS: 1 DIF: L2
OBJ: CaLS.6.1.1 Identify some patterns of inheritance in humans.
BLM: application

MODIFIED TRUE/FALSE

31. ANS: F, two
- PTS: 1 DIF: L2
OBJ: CaLS.6.1.1 Identify some patterns of inheritance in humans.
STA: S 7.2.d BLM: application
32. ANS: F, many genes
- PTS: 1 DIF: L2
OBJ: CaLS.6.1.1 Identify some patterns of inheritance in humans.
STA: S 7.2.c BLM: comprehension
33. ANS: T PTS: 1 DIF: L1
OBJ: CaLS.6.1.2 Describe the functions of the sex chromosomes.
STA: S 7.2.c BLM: knowledge
34. ANS: F, phenotype
- PTS: 1 DIF: L1
OBJ: CaLS.6.1.3 Explain the relationship between genes and the environment.
STA: S 7.2 BLM: knowledge
35. ANS: F, sickle-cell disease
- PTS: 1 DIF: L1
OBJ: CaLS.6.2.1 Identify two major causes of genetic disorders in humans.
STA: S 7.2.d BLM: knowledge
36. ANS: T PTS: 1 DIF: L1
OBJ: CaLS.6.2.2 Explain how geneticists trace the inheritance of traits.
STA: S 7.2.b BLM: knowledge
37. ANS: T PTS: 1 DIF: L2
OBJ: CaLS.6.2.3 Describe how genetic disorders are diagnosed and treated.
STA: S 7.2.d BLM: comprehension
38. ANS: T PTS: 1 DIF: L1
OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.
STA: S 7.2.a BLM: knowledge
39. ANS: F, plasmid
- PTS: 1 DIF: L2
OBJ: CaLS.6.3.2 Identify two applications of DNA technology in human genetics.

- BLM: comprehension
40. ANS: T PTS: 1 DIF: L2
OBJ: CaLS.6.2.3 Describe how genetic disorders are diagnosed and treated.
BLM: comprehension

COMPLETION

41. ANS: multiple

PTS: 1 DIF: L1
OBJ: CaLS.6.1.1 Identify some patterns of inheritance in humans.
STA: S 7.2.c BLM: knowledge
42. ANS: phenotypes

PTS: 1 DIF: L2
OBJ: CaLS.6.1.1 Identify some patterns of inheritance in humans.
STA: S 7.2.c BLM: comprehension
43. ANS:
two
2

PTS: 1 DIF: L1
OBJ: CaLS.6.1.1 Identify some patterns of inheritance in humans.
STA: S 7.2.c BLM: knowledge
44. ANS: X

PTS: 1 DIF: L2
OBJ: CaLS.6.1.2 Describe the functions of the sex chromosomes.
STA: S 7.2.a BLM: application
45. ANS: recessive

PTS: 1 DIF: L1
OBJ: CaLS.6.1.2 Describe the functions of the sex chromosomes.
STA: S 7.2.d BLM: knowledge
46. ANS: diet

PTS: 1 DIF: L2
OBJ: CaLS.6.1.3 Explain the relationship between genes and the environment.
STA: S 7.2 BLM: application
47. ANS: environment

PTS: 1 DIF: L2
OBJ: CaLS.6.1.3 Explain the relationship between genes and the environment.
STA: S 7.2 BLM: comprehension
48. ANS:

sickle-cell disease
sickle cell disease

- PTS: 1 DIF: L1
OBJ: CaLS.6.2.1 Identify two major causes of genetic disorders in humans.
STA: S 7.2.d BLM: knowledge
49. ANS: hemophilia
- PTS: 1 DIF: L1
OBJ: CaLS.6.2.1 Identify two major causes of genetic disorders in humans.
STA: S 7.2.d BLM: knowledge
50. ANS: chromosome
- PTS: 1 DIF: L1
OBJ: CaLS.6.2.1 Identify two major causes of genetic disorders in humans.
STA: S 7.2.d BLM: knowledge
51. ANS: pedigree
- PTS: 1 DIF: L1
OBJ: CaLS.6.2.2 Explain how geneticists trace the inheritance of traits.
STA: S 7.2.b BLM: knowledge
52. ANS: Down syndrome
- PTS: 1 DIF: L2
OBJ: CaLS.6.2.3 Describe how genetic disorders are diagnosed and treated.
STA: S 7.2.d BLM: comprehension
53. ANS: pedigree charts
- PTS: 1 DIF: L2
OBJ: CaLS.6.2.3 Describe how genetic disorders are diagnosed and treated.
STA: S 7.2.d BLM: comprehension
54. ANS: chromosomes
- PTS: 1 DIF: L1
OBJ: CaLS.6.2.3 Describe how genetic disorders are diagnosed and treated.
STA: S 7.2.d BLM: knowledge
55. ANS: hybridization
- PTS: 1 DIF: L1
OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.
STA: S 7.2.b BLM: knowledge
56. ANS: genetic engineering
- PTS: 1 DIF: L1
OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.
STA: S 7.2.b BLM: knowledge

57. ANS: inbreeding

PTS: 1 DIF: L1

OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.

STA: S 7.2.b BLM: knowledge

58. ANS: identical twins.

PTS: 1 DIF: L2

OBJ: CaLS.6.3.2 Identify two applications of DNA technology in human genetics.

BLM: comprehension

59. ANS: environment

PTS: 1 DIF: L2

OBJ: CaLS.6.2.3 Describe how genetic disorders are diagnosed and treated.

BLM: comprehension

60. ANS: shorter

PTS: 1 DIF: L3

OBJ: CaLS.6.1.3 Explain the relationship between genes and the environment.

BLM: synthesis

SHORT ANSWER

61. ANS:

Yes, the trait could be sex-linked. All of the individuals who have the trait are male, and all of the carriers are female. These characteristics are typical of traits that are controlled by genes on the X chromosome.

PTS: 1 DIF: L2

OBJ: CaLS.6.1.2 Describe the functions of the sex chromosomes.

STA: S 7.2.b BLM: analysis

62. ANS:

The circles represent females. The squares represent males.

PTS: 1 DIF: L2

OBJ: CaLS.6.2.2 Explain how geneticists trace the inheritance of traits.

STA: S 7.2.b BLM: comprehension

63. ANS:

Pair A and B, pair C and D, pair F and G, and pair H and I have children.

PTS: 1 DIF: L2

OBJ: CaLS.6.2.2 Explain how geneticists trace the inheritance of traits.

STA: S 7.2.d BLM: analysis

64. ANS:

F and J have the trait.

PTS: 1 DIF: L2
OBJ: CaLS.6.2.2 Explain how geneticists trace the inheritance of traits.
STA: S 7.2.d BLM: analysis

65. ANS:
A, C, N, and O are carriers of the trait.

PTS: 1 DIF: L2
OBJ: CaLS.6.2.2 Explain how geneticists trace the inheritance of traits.
STA: S 7.2.d BLM: analysis

66. ANS:
B, D, E, G, H, I, K, L, M, P, and Q do not have the trait and are not carriers.

PTS: 1 DIF: L2
OBJ: CaLS.6.2.2 Explain how geneticists trace the inheritance of traits.
STA: S 7.2.d BLM: analysis

67. ANS:
A is a plasmid, and B is the bacterial chromosome. Both structures contain DNA.

PTS: 1 DIF: L2
OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.
STA: S 7.2.e BLM: comprehension

68. ANS:
An enzyme is cutting open the plasmid and is removing a gene from the human DNA.

PTS: 1 DIF: L2
OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.
STA: S 7.2.e BLM: comprehension

69. ANS:
The human gene is attaching to the open ends of the plasmid and forming a closed ring.

PTS: 1 DIF: L2
OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.
STA: S 7.2.e BLM: comprehension

70. ANS:
The plasmid containing the human gene is being taken up by a bacterial cell.

PTS: 1 DIF: L2
OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.
STA: S 7.2.b BLM: comprehension

71. ANS:
The bacterial cell is reproducing to make new bacteria, each with a plasmid containing the human gene.

PTS: 1 DIF: L2
OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.

STA: S 7.2.b BLM: comprehension

72. ANS:

Bacteria reproduce quickly. In a short time they can produce large amounts of the protein coded for by the gene that has been attached to the plasmid.

PTS: 1 DIF: L3

OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.

STA: S 7.2.b BLM: synthesis

ESSAY

73. ANS:

Traits that show a large number of phenotypes are usually controlled by many genes. With multiple genes and two or more alleles for each gene, there are many possible combinations of alleles and phenotypes.

PTS: 1 DIF: L3

OBJ: CaLS.6.1.1 Identify some patterns of inheritance in humans.

STA: S 7.2.c BLM: synthesis

74. ANS:

No, it is not possible. A person with blood type O receives one allele from each parent. The offspring of a person with blood type AB would inherit either an I^A or an I^B allele. A person with blood type O must inherit an i allele from each parent.

PTS: 1 DIF: L3

OBJ: CaLS.6.1.1 Identify some patterns of inheritance in humans.

STA: S 7.2.c BLM: application

75. ANS:

It is not possible because males only have one X chromosome, which always comes from the mother.

PTS: 1 DIF: L2

OBJ: CaLS.6.1.2 Describe the functions of the sex chromosomes.

STA: S 7.2.c BLM: analysis

76. ANS:

Cystic fibrosis is caused by a recessive allele that causes the body to produce abnormally thick mucus in the lungs and intestines. People with cystic fibrosis have difficulty breathing.

PTS: 1 DIF: L2

OBJ: CaLS.6.2.1 Identify two major causes of genetic disorders in humans.

STA: S 7.2.d BLM: comprehension

77. ANS:

Mitochondrial DNA is used. Mitochondrial DNA is passed from a mother to her children and can therefore be used to trace the relationship between a woman and her descendants.

PTS: 1 DIF: L3
OBJ: CaLS.6.3.2 Identify two applications of DNA technology in human genetics.
STA: S 7.2.d BLM: application

78. ANS:

Cloning produces an organism that is genetically identical to the organism from which it was produced. The offspring of this plant would look exactly like the parent plant.

PTS: 1 DIF: L2
OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.
STA: S 7.2.a BLM: application

79. ANS:

Hybridization is the process in which breeders cross two genetically different individuals. Inbreeding involves crossing two individuals that have the same or similar sets of alleles.

PTS: 1 DIF: L2
OBJ: CaLS.6.3.1 Describe three ways of producing organisms with desired traits.
STA: S 7.2.b BLM: analysis

80. ANS:

Intermarriage between close relatives is an example of inbreeding. In this case, the desired trait was purity of royal bloodlines. Because inbred organisms have very similar genetic composition, inbreeding increases the risk of genetic disorders. In the case of hemophilia, which is a sex-linked disorder caused by a recessive allele on the X chromosome, one woman could have passed the gene to both a son and a daughter. If these children passed the genes to their children, and their children married each other, the likelihood that the resulting children would have hemophilia would be very high.

PTS: 1 DIF: L3
OBJ: CaLS.6.2.2 Explain how geneticists trace the inheritance of traits.
STA: S 7.2.c BLM: synthesis