Chapter 2: Biological and Environmental Foundations

Test Bank

Multiple Choice

1. A human cell's nucleus contains how many chromosomes?
a. 12
b. 12 pairs
c. 23
d. 23 pairs
Ans: D
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Genetics
Difficulty Level: Easy

2. Genes are composed of a complex molecule shaped like a twisted ladder or staircase called _____.
a. deoxyribonucleic acid
b. chorionic villi
c. zygotes
d. nuclei
Ans: A
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Genetics
Difficulty Level: Easy

3. Genes can be described as _____.
a. rod-shaped structures located in each human cell nucleus
b. the blueprint for creating all of the traits that organisms carry
c. sex cells that combine to create a unique individual
d. identical molecules for every existing species on earth
Ans: B
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Genetics
Difficulty Level: Medium

4. Researchers have estimated that how many genes reside within the chromosomes?
a. 10,000–15,000

b. 20,000–25,000
c. 50,000–70,000
d. 100,000–200,000
Ans: B
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Genetics
Difficulty Level: Medium

5. The set of instructions to create a living organism is the _____.
a. zygote
b. nucleus
c. genome
d. gamete
Ans: C
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Application
Answer Location: Genetics
Difficulty Level: Hard

6. Humans share what percentage of their DNA with their closest genetic relative, the chimpanzee?
a. 10
b. 25
c. 68
d. 99
Ans: D
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Genetics
Difficulty Level: Easy

7. Lu is from Korea and Pedro is from Ecuador. Lu and Pedro share what percentage of their genes?
a. 15.7%
b. 25.8%
c. 44.2%
d. 99.7%
Ans: D
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Application
Answer Location: Genetics
Difficulty Level: Hard

8. Most cells in the body reproduce through a process called _____.
a. mitosis

b. meiosis
c. fertilization
d. mutation
Ans: A
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Cell Reproduction
Difficulty Level: Easy

9. Which statement describes mitosis?
a. Chromosome pairs align and DNA segments cross over.
b. DNA replicates itself to result in new cells with identical genetic material.
c. Each cell ends up containing only half of the DNA the original cell had.
d. Cells match up with other cells that contain different DNA and merge.
Ans: B
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Cell Reproduction
Difficulty Level: Medium

10. Mitosis ultimately enables humans to _____.
a. reproduce and pass on their genetic material
b. develop from a single fertilized egg into a child, adolescent, and an adult
c. develop into either a male or a female
d. establish a unique genetic blueprint for development
Ans: B
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Cell Reproduction
Difficulty Level: Medium

11. Sex cells are called _____.
a. zygotes
b. chromosomes
c. gametes
d. alleles
Ans: C
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Cell Reproduction
Difficulty Level: Easy

12. Gametes are produced through a process called _____.
a. mitosis
b. meiosis
c. fertilization

d. heritability
Ans: B
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Cell Reproduction
Difficulty Level: Medium

13. Which process creates unique combinations of genes?
a. genomic imprinting
b. mutation
c. crossing over
d. heritability
Ans: C
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Cell Reproduction
Difficulty Level: Medium

14. Which process increases genetic variability and accounts for genetic uniqueness?
a. mitosis
b. meiosis
c. heritability
d. surrogacy
Ans: B
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Genes Shared by Twins
Difficulty Level: Medium

15. The term for a fertilized egg is _____.
a. chromosome
b. gamete
c. allele
d. zygote
Ans: D
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Cell Reproduction
Difficulty Level: Easy

16. A human zygote contains how many chromosomes from the biological mother and how many chromosomes from the biological father?
a. 10; 20
b. 23; 46
c. 23; 23

d. 46; 46
Ans: C
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Application
Answer Location: Cell Reproduction
Difficulty Level: Hard

17. How many pairs of human chromosomes are matched and contain similar genes in almost identical positions and sequence?
a. 5
b. 14
c. 20
d. 22
Ans: D
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Sex Determination
Difficulty Level: Medium

18. What does the 23rd pair of human chromosomes specify?
a. physical strength
b. biological sex
c. intelligence
d. personality
Ans: B
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Sex Determination
Difficulty Level: Medium

19. Child A has two large X-shaped chromosomes, and Child B has one large X-shaped chromosome and one much smaller Y-shaped chromosome. What is Child A, and what is Child B?
a. female; male
b. male; female
c. an identical twin; a fraternal twin
d. a fraternal twin; an identical twin
Ans: A
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Application
Answer Location: Sex Determination
Difficulty Level: Hard

20. Which structure contains genetic instructions that will cause the fetus to develop male reproductive organs?
a. X chromosome

b. Y chromosome
c. gamete
d. nucleus
Ans: B
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Sex Determination
Difficulty Level: Easy

21. Couples with a family history of sex-linked diseases wanting to have a healthy baby of the sex unaffected by the disease would most likely be interested in which process?
a. gender selection
b. gender modification
c. canalization
d. surrogacy
Ans: A
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Analysis
Answer Location: Applying Developmental Science: Prenatal Sex Selection
Difficulty Level: Hard

22. Preconception sperm sorting and pre-implantation genetic diagnosis are two methods of _____.
a. surrogacy
b. gene therapy
c. gender modification
d. sex selection
Ans: D
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Applying Developmental Science: Prenatal Sex Selection
Difficulty Level: Medium

23. Shannon and Frankie just found out that they are pregnant. The odds that they could have twins is about 1 in _____.
a. 10
b. 25
c. 33
d. 47
Ans: C
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Genes Shared By Twins
Difficulty Level: Medium

24. What are conceived when a woman releases more than one ovum and each is fertilized by a different sperm?
a. dizygotic twins
b. monozygotic twins
c. twins with X-linked disorders
d. twins with chromosomal abnormalities
Ans: A
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Genes Shared By Twins
Difficulty Level: Medium

25. Dizygotic twins can be described as _____.
a. being the same as identical twins
b. sharing about one half of their genes
c. being more similar to each other than ordinary siblings
d. occurring less frequently than monozygotic twins
Ans: B
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Genes Shared By Twins
Difficulty Level: Medium

26. What percentage of fraternal twin pairs is boy and girl?
a. 10%
b. 33%
c. 50%
d. 80%
Ans: C
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Genes Shared By Twins
Difficulty Level: Easy

27. Twins originate from the same zygote are always _____.
a. monozygotic
b. dizygotic
c. male
d. female
Ans: A
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Genes Shared By Twins
Difficulty Level: Easy

28. Identical twins occur in how many of every 1,000 U.S. births?

a. 4
b. 9
c. 17
d. 20
Ans: A
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Genes Shared By Twins
Difficulty Level: Easy

29. Chase and Carson share the same genotype. Therefore, Chase and Carson are considered _____.
a. dizygotic twins
b. monozygotic twins
c. to each have two large X-shaped chromosomes
d. to each have two small Y-shaped chromosomes
Ans: B
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Application
Answer Location: Genes Shared By Twins
Difficulty Level: Hard

30. The genes within each chromosome can be expressed in different forms called _____.
a. zygotes
b. nuclei
c. gametes
d. alleles
Ans: D
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Dominant-Recessive Inheritance
Difficulty Level: Easy

31. Maddox and Macy both carry alleles for brown hair. Their 4-year-old son, Drake, also has brown hair. Therefore, for the trait of brown hair, Drake is considered _____.
a. homozygous
b. heterozygous
c. imprinted
d. recessive
Ans: A
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Application
Answer Location: Dominant-Recessive Inheritance
Difficulty Level: Hard

32. When alleles of a pair of chromosomes for a trait are different, the person is considered _____.
a. homozygous
b. heterozygous
c. dominant
d. polygenic
Ans: B
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Dominant-Recessive Inheritance
Difficulty Level: Easy

33. Genes always being expressed, regardless of the gene they are paired with, and genes being expressed only if paired with another similar gene describes _____.
a. dominant-recessive inheritance
b. incomplete dominance
c. polygenic inheritance
d. genomic imprinting
Ans: A
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Dominant-Recessive Inheritance
Difficulty Level: Medium

34. What does incomplete dominance mean?
a. Many genes interact to influence a trait.
b. Some genes are always expressed.
c. Both paired genes influence the characteristic.
d. Many genes are recessive and unexpressed.
Ans: C
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Incomplete Dominance
Difficulty Level: Medium

35. Xavier has dark curly hair and facial dimples. What type of traits are these considered?
a. recessive
b. dominant
c. polygenic
d. codominant
Ans: B
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension

Answer Location: Dominant-Recessive Inheritance
Difficulty Level: Medium

36. Tonya has straight red hair, blue eyes, and her big toe is longer than her second toe. What type of traits are these considered?
a. recessive
b. dominant
c. polygenic
d. codominant
Ans: A
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Dominant-Recessive Inheritance
Difficulty Level: Medium

37. Height, intelligence, temperament, and susceptibility to certain forms of cancer are examples of what type of traits?
a. polygenic
b. recessive
c. dominant
d. mutated
Ans: A
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Polygenic Inheritance
Difficulty Level: Easy

38. Most traits are a function of the interaction of multiple genes, known as _____.
a. polygenic inheritance
b. genomic imprinting
c. incomplete dominance
d. heterozygous inheritance
Ans: A
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Polygenic Inheritance
Difficulty Level: Medium

39. Which genetic pattern is dependent upon which parent the gene is inherited from?
a. polygenic inheritance
b. genomic imprinting
c. incomplete dominance
d. heterozygous inheritance
Ans: B

KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Genomic Imprinting
Difficulty Level: Medium

40. Which syndrome is an example of genomic imprinting?
a. Down
b. Klinefelter
c. Angelman
d. Turner
Ans: C
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Genomic Imprinting
Difficulty Level: Easy

41. Few severe disorders are inherited through dominant inheritance because individuals who inherit the allele _____.
a. have a second dominant gene that overcomes the defective one
b. are always infertile
c. usually fail to survive long enough to reproduce and pass it on
d. are typically male and therefore cannot pass on the gene
Ans: C
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: Dominant-Recessive Disorders
Difficulty Level: Medium

42. Harris was has a degenerative brain disorder that affects his coordination and cognition. Which condition was he born with?
a. Huntington's disease
b. Duchenne muscular dystrophy
c. cystic fibrosis
d. sickle cell anemia
Ans: A
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Analysis
Answer Location: Dominant-Recessive Disorders
Difficulty Level: Hard

43. Paris was born with a disorder that she inherited through her parents. Which condition would this describe?
a. Down syndrome
b. Klinefelter syndrome

c. cystic fibrosis
d. acute asthma
Ans: C
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Analysis
Answer Location: Dominant-Recessive Disorders
Difficulty Level: Hard

44. Which genetic disorder is non-sex chromosome-linked?
a. Klinefelter syndrome
b. hemophilia
c. Turner syndrome
d. phenylketonuria
Ans: D
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Knowledge
Answer Location: Dominant-Recessive Disorders
Difficulty Level: Easy

45. Mandy has a condition that causes a deformity in her red blood cells. Which disorder was she born with?
a. hemophilia
b. sickle cell anemia
c. cystic fibrosis
d. phenylketonuria
Ans: B
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Analysis
Answer Location: Dominant-Recessive Disorders
Difficulty Level: Hard

46. Which condition is an example of dominant-recessive inheritance?
a. Prader-Willi syndrome
b. Down syndrome
c. color blindness
d. cystic fibrosis
Ans: D
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: Dominant-Recessive Disorders
Difficulty Level: Medium

47. Levi has a fatal condition that causes the central nervous system to deteriorate, leading to significant declines in muscle coordination and cognition. He was unaware that he had the condition until his late thirties because he did not experience any symptoms earlier in his life. The condition Levi has is _____.
a. cystic fibrosis
b. Turner syndrome
c. Huntington's disease
d. phenylketonuria
Ans: C
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Application
Answer Location: Dominant-Recessive Disorders
Difficulty Level: Hard

48. Which recessive disorder is most common?
a. sickle cell anemia
b. Tay-Sach's disease
c. Huntington's disease
d. cystic fibrosis
Ans: A
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Analysis
Answer Location: Dominant-Recessive Disorders
Difficulty Level: Hard

49. Corey has a disorder that causes his body to fail to process a particular amino acid. Which condition was he born with?
a. sickle cell anemia
b. phenylketonuria
c. color blindness
d. cystic fibrosis
Ans: B
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Analysis
Answer Location: Dominant-Recessive Disorders
Difficulty Level: Hard

50. Which condition is dominant-recessive but non-sex chromosome linked?
a. Huntington's disease
b. Duchenne muscular dystrophy
c. Jacob's syndrome
d. Turner syndrome
Ans: A

KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Knowledge
Answer Location: Dominant-Recessive Disorders
Difficulty Level: Easy

51. Javier's blood is unable to clot. Which condition was he born with?
a. hemophilia
b. sickle cell anemia
c. cystic fibrosis
d. phenylketonuria
Ans: A
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Analysis
Answer Location: X-Linked Disorders
Difficulty Level: Hard

52. A description of daughters who inherit the gene for hemophilia is that they _____.
a. usually die from the disease before reaching the age of 20
b. demonstrate more severe symptoms than sons who inherit the gene
c. typically fail to express the disorder due to a paired dominant gene
d. have an 80 percent chance of transmitting the gene to their offspring
Ans: C
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: X-Linked Disorders
Difficulty Level: Medium

53. A true statement about fragile X syndrome is that it _____.
a. affects both males and females
b. only affects females
c. occurs in about 1 in every 3,000 U.S. births
d. occurs in about 1 in every 6,000 U.S. births
Ans: A
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: X-Linked Disorders
Difficulty Level: Medium

54. Some research suggests that fragile X syndrome is strongly associated with _____.
a. autism

b. anxiety
c. cystic fibrosis
d. phenylketonuria
Ans: A
KEY: Learning Objective: 2.2 Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: X-Linked Disorders
Difficulty Level: Medium

55. The number of males affected by color blindness is about 1 in _____.
a. 5
b. 12
c. 70
d. 100
Ans: B
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Knowledge
Answer Location: X-Linked Disorders
Difficulty Level: Easy

56. Which condition is carried on a mother's X chromosome?
a. Huntington's disease
b. color blindness
c. phenylketonuria
d. sickle cell anemia
Ans: B
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Knowledge
Answer Location: X-Linked Disorders
Difficulty Level: Easy

57. Kevin was born with the most widely known chromosome disorder which is what syndrome?
a. Prader-Willi
b. Klinefelter
c. Down
d. Turner
Ans: C
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Application
Answer Location: Chromosomal Abnormalities
Difficulty Level: Hard

58. Down syndrome occurs in approximately 1 out of every how many births?
a. 500
b. 700
c. 1200
d. 1500
Ans: D
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Knowledge
Answer Location: Chromosomal Abnormalities
Difficulty Level: Easy

59. Down syndrome is also called _____.
a. trisomy 15
b. trisomy 17
c. trisomy 21
d. trisomy 23
Ans: C
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Knowledge
Answer Location: Chromosomal Abnormalities
Difficulty Level: Easy

60. What is the most common genetic cause of intellectual developmental disability?
a. fragile X syndrome
b. phenylketonuria
c. Tay-Sachs disease
d. Down syndrome
Ans: D
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: Chromosomal Abnormalities
Difficulty Level: Medium

61. Today, the average life expectancy of individuals with Down syndrome is _____.
a. childhood
b. adolescence
c. middle adulthood
d. older adulthood
Ans: C

KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: Chromosomal Abnormalities
Difficulty Level: Easy

62. Trenton, age 50, has Down syndrome. Compared to unaffected adults his age, Trenton is at greater risk for developing _____.
a. Huntington's disease
b. Alzheimer's disease
c. heart disease
d. cystic fibrosis
Ans: B
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Application
Answer Location: Chromosomal Abnormalities
Difficulty Level: Hard

63. Vince has one of the most common sex chromosome abnormalities which is what syndrome?
a. Klinefelter
b. Down
c. XYY
d. fragile X
Ans: A
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Application
Answer Location: Chromosomal Abnormalities
Difficulty Level: Hard

64. Kaden is very thin, has severe acne, and demonstrates poor coordination. He also produces excessive levels of testosterone. What syndrome does this describe?
a. Klinefelter
b. Down
c. XYY
d. fragile X
Ans: C
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Application
Answer Location: Chromosomal Abnormalities
Difficulty Level: Hard

65. Approximately 1 in 1,000 females are born with which syndrome?
a. Klinefelter
b. triple X
c. XYY
d. fragile X
Ans: B
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: Chromosomal Abnormalities
Difficulty Level: Medium

66. Danica, age 28, is very short in stature, has an abnormally small jaw, and her neck has extra folds of skin. Danica has never ovulated and she has underdeveloped breasts. Danica was born with which syndrome?
a. Klinefelter
b. triple X
c. fragile X
d. Turner
Ans: D
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Application
Answer Location: Chromosomal Abnormalities
Difficulty Level: Hard

67. What is the term for a sudden change and abnormality in the structure of genes?
a. mutation
b. inheritance
c. phenotype
d. allele
Ans: A
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Knowledge
Answer Location: Mutation
Difficulty Level: Easy

68. Which factor may case genes to mutate?
a. high-fat diet
b. exposure to radiation
c. young maternal age
d. vitamin deficiency
Ans: B

KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: Mutation
Difficulty Level: Medium

69. In Africa, children who inherit a single sickle cell allele are more resistant to malarial infection and more likely to survive. This demonstrates _____.
a. that nature is more influential than nurture
b. the epigenetic framework
c. that mutations can sometimes be beneficial
d. the purpose of behavioral genetics
Ans: C
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: Mutation
Difficulty Level: Medium

70. How many conceptions are estimated to include mutated chromosomes?
a. one eighth
b. one fourth
c. one third
d. one half
Ans: C
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Knowledge
Answer Location: Mutation
Difficulty Level: Easy

71. Marcus and J.J. grew up in the same neighborhood, which has a reputation for poverty and gang violence. Both of their fathers were violent alcoholics, and they experienced periodic homelessness. Marcus carries the low-MAOA gene, while J.J. carries the high-MAOA gene. Which statement about Marcus and J.J. is true?
a. Both boys are at equal risk for aggression and criminal behavior in adulthood.
b. Marcus is at greater risk for aggression and criminal behavior in adulthood than J.J.
c. J.J. is at greater risk for aggression and criminal behavior in adulthood that Marcus.
d. Neither boy is at-risk for aggression and criminal behavior in adulthood.
Ans: B
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Application

Answer Location: Lives in Context: Genes as Protective Factors in Development
Difficulty Level: Hard

72. A medical specialty that helps prospective parents determine the risk their children will inherit chromosomal abnormalities is _____.
a. obstetrics
b. behavioral genetics
c. gynecology
d. genetic counseling
Ans: D
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Genetic Counseling
Difficulty Level: Easy

73. Which individual would be a good candidate for genetic counseling?
a. Maria, who previously had twins
b. Beth, who is pregnant for the first time at 37
c. Ariel, who is a pregnant at 17
d. Coral, who is unsure if she wants children
Ans: B
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Application
Answer Location: Genetic Counseling
Difficulty Level: Hard

74. Prenatal screening likely to be recommended when _____.
a. genetic counseling has determined a risk for abnormalities
b. the mother is under age 20 or over age 30
c. the mother has gained more than the recommended weight in the first trimester
d. history of twins is determined to run in the family
Ans: A
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Comprehension
Answer Location: Genetic Counseling
Difficulty Level: Medium

75. Jack has African American heritage and his partner, Marisol, is uncertain of her heritage since she was adopted as an infant. Jack and Marisol want to start of family but are concerned about their child having sickle cell anemia. Their best option is to consult a _____.
a. fertility specialist
b. family physician

c. behavioral geneticist
d. genetic counselor
Ans: D
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Analysis
Answer Location: Genetic Counseling
Difficulty Level: Hard

76. Which couple may find genetic counseling most useful?
a. Kathy and Jiho, whose heritages are European and Korean
b. Bella and Danielle, who both have European heritage and will be using surrogacy
c. Noah and Ava, whose heritages are Central European Jewish
d. Liam and Emma, who both have European heritage and want to have twins
Ans: C
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Analysis
Answer Location: Genetic Counseling
Difficulty Level: Hard

77. Which approach is used by a genetic counselor?
a. constructs family history of inheritable disorders
b. performs in vitro fertilization
c. diagnoses prenatal chromosomal abnormalities
d. studies interactions between phenotype and genotype
Ans: A
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Comprehension
Answer Location: Genetic Counseling
Difficulty Level: Medium

78. Which method determines chromosomal abnormalities in prospective parents?
a. constructing family history of heritable disorders
b. asking about the mother’s and the father’s ethnicity
c. performing a genetic screening blood test
d. educating the mother and father about genetic concepts
Ans: C
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Comprehension
Answer Location: Genetic Counseling
Difficulty Level: Medium

79. Which method involves injection of sperm into a woman for reproduction?
a. in vitro fertilization
b. artificial insemination
c. chorionic villus sampling
d. amniocentesis
Ans: B
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Reproductive Technology
Difficulty Level: Easy

80. Which method involves fertilizing ova with sperm in a dish then placing the fertilized ova in a woman's uterus?
a. in vitro fertilization
b. artificial insemination
c. chorionic villus sampling
d. amniocentesis
Ans: A
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Reproductive Technology
Difficulty Level: Easy

81. Which statement describes surrogacy?
a. studying tissue from the chorion for the presence of chromosomal abnormalities
b. fertilizing ova with sperm in a dish then placing the fertilized ova in a woman's uterus
c. injecting sperm into a woman for fertilization
d. impregnating a woman to carry a baby for others to raise
Ans: D
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Comprehension
Answer Location: Reproductive Technology
Difficulty Level: Medium

82. A research finding about adopted children is that they _____.
a. show more engagement during class in school
b. have more educational resources than other children
c. are more likely to have adjustment difficulties
d. have more achievements throughout life
Ans: C

KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Analysis
Answer Location: Reproductive Technology
Difficulty Level: Hard

83. What is the strongest factor in the development of emotional resilience and self-esteem in adopted children?
a. variety of community resources
b. high level of education
c. close bond with parents
d. close bond with peers
Ans: C
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Analysis
Answer Location: Reproductive Technology
Difficulty Level: Hard

84. Among the most consistent deficiency experienced by newly internationally adopted children is a delay in _____.
a. motor skills
b. language
c. growth
d. metabolism
Ans: B
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Cultural Influences on Development: Internationally Adopted Children
Difficulty Level: Easy

85. How many years does it usually take internationally adopted children to reach normal speech and language skill levels?
a. 1–2
b. 2–3
c. 3–4
d. 4–5
Ans: A
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Cultural Influences on Development: Internationally Adopted Children
Difficulty Level: Easy

86. The most widespread and routine method of prenatal diagnosis is _____.
a. amniocentesis
b. chorionic villus sampling
c. noninvasive prenatal testing
d. ultrasound
Ans: D
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Prenatal Diagnosis
Difficulty Level: Easy

87. Ultrasound allows physicians to _____.
a. analyze the genotype of the fetus
b. administer hormones to the developing fetus
c. diagnose most chromosomal disorders in the fetus
d. determine the sex of the fetus
Ans: D
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Comprehension
Answer Location: Prenatal Diagnosis
Difficulty Level: Medium

88. Which procedure is recommended for women ages 35 and over, especially if the woman and partner are both known carriers of genetic diseases?
a. ultrasound
b. amniocentesis
c. chorionic villus sampling
d. noninvasive prenatal testing
Ans: B
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Prenatal Diagnosis
Difficulty Level: Easy

89. Amniocentesis should be conducted after which week of pregnancy to decrease the risk of miscarriage?
a. 15th
b. 20th
c. 27th
d. 30th
Ans: A

KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Prenatal Diagnosis
Difficulty Level: Easy

90. Which procedure is used to follow up ultrasound imaging to provide more detailed views of any suspected abnormalities?
a. amniocentesis
b. chorionic villus sampling
c. noninvasive prenatal testing
d. fetal MRI
Ans: D
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Prenatal Diagnosis
Difficulty Level: Easy

91. Which procedure requires studying tissue from the chorion to determine the presence of chromosomal abnormalities?
a. amniocentesis
b. chorionic villus sampling
c. noninvasive prenatal testing
d. ultrasound
Ans: B
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Prenatal Diagnosis
Difficulty Level: Easy

92. Which procedure may increase the likelihood of limb defects and miscarriage when conducted prior to 10 weeks gestational age?
a. ultrasound
b. amniocentesis
c. chorionic villus sampling
d. noninvasive prenatal testing
Ans: C
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Prenatal Diagnosis
Difficulty Level: Easy

93. Which test is the least intrusive for detecting chromosomal abnormalities?

a. ultrasound
b. amniocentesis
c. chorionic villus sampling
d. noninvasive prenatal testing
Ans: D
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Comprehension
Answer Location: Prenatal Diagnosis
Difficulty Level: Medium

94. Cell-free fetal DNA is examined by drawing blood from the mother in the procedure of _____.
a. amniocentesis
b. chorionic villus sampling
c. noninvasive prenatal testing
d. ultrasound
Ans: C
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Prenatal Diagnosis
Difficulty Level: Easy

95. Which procedure can repair defects of the heart, lung, urinary tract and other areas?
a. fetoscopy
b. chorionic villus sampling
c. noninvasive prenatal testing
d. ultrasound
Ans: A
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Comprehension
Answer Location: Prenatal Diagnosis
Difficulty Level: Medium

96. Ultrasound and fetal MRI showed that Janna’s baby has mild incomplete closure over his spinal cord, a condition called spina bifida. Which procedure would most likely be used to perform surgery to correct this condition before he is born?
a. fetoscopy
b. chorionic villus sampling
c. noninvasive prenatal testing
d. ultrasound
Ans: A

KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Application
Answer Location: Prenatal Diagnosis
Difficulty Level: Hard

97. Heredity from biological parents consists of a complex blend of characteristics known as _____.
a. genotype
b. phenotype
c. allele dominance
d. genomic imprint
Ans: A
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Comprehension
Answer Location: Heredity and Environment
Difficulty Level: Medium

98. Lia has brown hair, brown eyes, and dark skin. These traits are part of Lia's _____.
a. genotype
b. phenotype
c. reaction range
d. epigenetic framework
Ans: B
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Application
Answer Location: Heredity and Environment
Difficulty Level: Hard

99. Dr. Rashaud recognizes that even traits that have a strong heredity component, such as height, are modified by environmental influences. What is Dr. Rashaud studying?
a. behavioral genetics
b. genetic counseling
c. prenatal testing
d. fetal medicine
Ans: A
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Application
Answer Location: Behavioral Genetics
Difficulty Level: Hard

100. Which term means the extent to which variation among people on a given characteristic is due to genetic differences?
a. genomic imprinting
b. genotype
c. reaction range
d. heritability
Ans: D
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Knowledge
Answer Location: Methods of Behavioral Genetics
Difficulty Level: Easy

101. During which approach do behavior geneticists modify the genetic makeup of animals to examine the influence of heredity on attributes and behavior?
a. research on twins
b. selective breeding studies
c. family studies
d. heritability estimates
Ans: B
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Knowledge
Answer Location: Methods of Behavioral Genetics
Difficulty Level: Easy

102. Family studies usually involve which two types of studies?
a. twin and selective breeding
b. identical twin and fraternal twin
c. environmental and twin
d. twin and adoption
Ans: D
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Comprehension
Answer Location: Methods of Behavioral Genetics
Difficulty Level: Medium

103. Michael and Matthew are participating in an identical twin study. The boys share what percentage of their genes?
a. 25%
b. 50%
c. 75%
d. 100%
Ans: D

KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Application
Answer Location: Methods of Behavioral Genetics
Difficulty Level: Hard

104. C.J. and Naya are participating in a fraternal twin study. They share about what percentage of their genes?
a. 25%
b. 50%
c. 75%
d. 100%
Ans: B
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Application
Answer Location: Methods of Behavioral Genetics
Difficulty Level: Hard

105. Cara and Evan are participating in a half-sibling study. They share about what percentage of their genes?
a. 25%
b. 50%
c. 75%
d. 100%
Ans: A
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Application
Answer Location: Methods of Behavioral Genetics
Difficulty Level: Hard

106. Twin studies help estimate how much of a trait or behavior is attributable to _____.
a. genes
b. hormones
c. siblings
d. a controlled environment
Ans: A
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Comprehension
Answer Location: Methods of Behavioral Genetics
Difficulty Level: Medium

107. Adoption studies shed light on the extent to which attributes and behaviors

are influenced by _____.
a. the environment
b. genes
c. siblings
d. random events
Ans: A
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Comprehension
Answer Location: Methods of Behavioral Genetics
Difficulty Level: Medium

108. According to research examining the relationship between genotype and environment to intellectual abilities, which pairs would be MOST similar in intelligence?
a. Casey and Jordan, who are biological siblings
b. Eileen and Sarah, who are mother and daughter
c. Hugh and Connor, who are grandfather and grandson
d. Maleeka and Chantel, who are adopted siblings
Ans: A
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Application
Answer Location: Genetic Influences on Personal Characteristics
Difficulty Level: Hard

109. A wide variety of potential expressions of a genetic trait, depending on environmental opportunities and constraints, is called _____.
a. canalization
b. behavioral genetics
c. range of reaction
d. gene–environment correlation
Ans: C
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Knowledge
Answer Location: Range of Reaction
Difficulty Level: Easy

110. Although both of his parents are 5 feet 7 inches tall, 17-year-old Theo is 6 feet tall. He is healthy and has been well nourished since birth. This example illustrates the concept of _____.
a. canalization
b. behavior genetics
c. range of reaction
d. gene–environment correlation

Ans: C
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Application
Answer Location: Range of Reaction
Difficulty Level: Hard

111. Which term means the tendency of heredity to narrow the range of development to only one or a few outcomes?
a. range of reaction
b. epigenesis
c. canalization
d. passive correlation
Ans: C
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Knowledge
Answer Location: Canalization
Difficulty Level: Easy

112. Which trait is strongly canalized?
a. personality
b. intelligence
c. weight
d. crawling
Ans: D
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Application
Answer Location: Canalization
Difficulty Level: Hard

113. Which term refers to the concept that many of traits are supported by both heredity and surroundings?
a. range of reaction
b. niche-picking
c. canalization
d. gene–environment correlation
Ans: D
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Comprehension
Answer Location: Gene–Environment Correlations
Difficulty Level: Medium

114. Four-year-old Sam’s parents were star athletes in high school and college.

They are both coaches and manage a gym during the summer months. Sam has been exposed to sports since he was a baby. In addition to throwing and kicking balls with his parents, Sam recently started soccer and T-ball. He has also been enrolled in swimming lessons since he was 9 months old. Sam is already demonstrating strong athletic skills, despite being very young. This example demonstrates what type of gene–environment correlation?
a. passive
b. evocative
c. active
d. positive
Ans: A
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Application
Answer Location: Gene–Environment Correlations
Difficulty Level: Hard

115. Baby Carter is a very happy baby. Everyone smiles when they see Baby Carter and most people talk baby talk to Baby Carter. What form of gene–environment correlation does this example illustrate?
a. passive
b. active
c. evocative
d. reactive
Ans: C
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Application
Answer Location: Gene–Environment Correlations
Difficulty Level: Hard

116. Marlow’s parents are talented artists. When he was young, Marlo was exposed to drawing and painting lessons, taken to art shows, and encouraged to be creative in his daily life. Today, at age 18, Marlow enjoys spending weekends at the park or other public areas drawing people and objects. He often invites friends to various art exhibits in the city and he has enrolled in several art classes in college. He even helped paint a mural at a local children’s hospital. Marlo’s artistic endeavors at age 18 are an example of what type of gene–environment correlation?
a. passive
b. evocative
c. active
d. positive
Ans: C
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.

REF: Cognitive Domain: Application
Answer Location: Gene–Environment Correlations
Difficulty Level: Hard

117. The tendency to actively seek out experiences and environments compatible and supportive of genetic tendencies is called _____.
a. heritability
b. range of reaction
c. canalization
d. niche-picking
Ans: D
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Analysis
Answer Location: Gene–Environment Correlations
Difficulty Level: Hard

118. The term for heredity expressed as different phenotypes in different contexts or situations is _____.
a. genetic studies
b. epigenetics
c. range of reaction
d. niche-picking
Ans: B
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Knowledge
Answer Location: Epigenetics Influences on Development
Difficulty Level: Easy

119. Which statement describes epigenetics?
a. Genetics have a greater influence on development than environmental factors.
b. Environmental factors play a greater role in development than genetics.
c. Development is impossible when genetics interact with environment.
d. Development results from ongoing interactions between genetics and environment.
Ans: D
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Analysis
Answer Location: Epigenetics Influences on Development
Difficulty Level: Hard

120. A particularly important finding associated with the study of epigenetics is that _____.
a. heredity actually plays a minimal role in long-term development

b. what people eat could affect the health and characteristics of their children
c. females are actually more vulnerable to genetic diseases than males
d. passive gene–environment correlations influence development well into old age
Ans: B
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Application
Answer Location: Applying Developmental Science: Altering the Epigenome
Difficulty Level: Hard

True/False

1. Although all humans share the basic genome, each person has a slightly different code.
Ans: T
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Genetics
Difficulty Level: Easy

2. A human zygote contains 46 matching pairs of chromosomes.
Ans: F
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Cell Reproduction
Difficulty Level: Easy

3. All ova contain one X sex chromosome.
Ans: T
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Sex Determination
Difficulty Level: Easy

4. Even if a person is homozygous for a specific characteristic, such as hair color, that trait may be unexpressed.
Ans: F
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Dominant-Recessive Inheritance
Difficulty Level: Medium

5. According to the concept of incomplete dominance, a heterozygous person with the alleles for blood type A and B will have blood type O.
Ans: F

KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Incomplete Dominance
Difficulty Level: Medium

6. Prader-Willi and Angelman syndromes are both caused by an abnormality in the 15th chromosome.
Ans: F
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Knowledge
Answer Location: Genomic Imprinting
Difficulty Level: Easy

7. Females are more likely than males to be affected by X-linked disorders.
Ans: F
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Knowledge
Answer Location: X-Linked Disorders
Difficulty Level: Easy

8. Fragile X syndrome occurs more often in males than females.
Ans: F
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: X-Linked Disorders
Difficulty Level: Medium

9. Contrary to popular belief, most individuals with Down syndrome are of average intelligence.
Ans: F
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Knowledge
Answer Location: Chromosomal Disorders
Difficulty Level: Easy

10. Turner syndrome only affects males.
Ans: T
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: Chromosomal Abnormalities
Difficulty Level: Medium

11. The majority of sex chromosome abnormalities are fatal.
Ans: F
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: Chromosomal Disorders
Difficulty Level: Medium

12. Most mutations are fatal.
Ans: T
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Knowledge
Answer Location: Mutation
Difficulty Level: Easy

13. Today, genetic counseling is recommended for all couples planning to have children.
Ans: F
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Genetic Counseling
Difficulty Level: Easy

14. Genetic counseling is recommended for couples from the same ethnic group.
Ans: T
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Comprehension
Answer Location: Genetic Counseling
Difficulty Level: Medium

15. Noninvasive prenatal testing is without risk to the developing fetus.
Ans: T
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Prenatal Diagnosis
Difficulty Level: Easy

16. Risks of fetoscopy include infection, rupture of the amniotic sac, premature labor and fetal death.
Ans: T
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.

REF: Cognitive Domain: Knowledge
Answer Location: Prenatal Treatment of Genetic Disorders
Difficulty Level: Easy

17. Selective breeding studies are used to compare people who live together and share varying degrees of relatedness.
Ans: F
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Knowledge
Answer Location: Methods of Behavioral Genetics
Difficulty Level: Easy

18. Because identical twins share 100% of their genes, they are usually exactly alike in personality and intelligence.
Ans: F
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Knowledge
Answer Location: Genetic Influences on Personal Characteristics
Difficulty Level: Medium

19. For strongly canalized traits, such as walking, only extreme experiences or changes in the environment can prevent the skill from developing.
Ans: T
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Comprehension
Answer Location: Canalization
Difficulty Level: Medium

20. Passive gene–environment correlations primarily influence development in late childhood and adolescence.
Ans: F
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Knowledge
Answer Location: Gene–Environment Correlations
Difficulty Level: Easy

Short Answer

1. Explain the difference between dizygotic and monozygotic twins.
Ans: Dizygotic (DZ) twins are also called fraternal twins. DZ twins are conceived when a woman releases more than one ovum and each is fertilized by a different

sperm. DZ twins share about one half of their genes and, like other siblings, most fraternal twins differ in appearance, such as hair color, eye color, and height. Monozygotic (MZ), or identical twins, originate from the same zygote, sharing the same genotype with identical instructions for all physical and psychological characteristics. MZ twins occur when the zygote splits into two distinct separate but identical zygotes that develop into two infants.
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Comprehension
Answer Location: Genes Shared by Twins
Difficulty Level: Medium

2. Think about your own phenotype. List three examples of dominant traits you have and three examples of recessive traits you have.
Ans: Answers will vary among students. Examples of dominant traits include dark hair, curly hair, hair, non-red hair, facial dimples, brown eyes, second toe longer than big toe, normal color vision, and extra digits. Examples of recessive traits include: blond hair, straight hair, baldness, red hair, no dimples, blue/green/hazel eyes, big toe longer than second toe, color blindness, and five digits.
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Application
Answer Location: Dominant-Recessive Inheritance
Difficulty Level: Hard

3. List four disorders that are acquired through dominant-recessive inheritance. Are males or females at greater risk for these disorders? Why?
Ans: Four disorders that are acquired through dominant-recessive inheritance include: Huntington's disease, cystic fibrosis, phenylketonuria, sickle-cell anemia, and Tay-Sach's disease. Males and females are equal risk for all of these disorders because these are not X-linked disorders
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: Dominant-Recessive Disorders
Difficulty Level: Medium

4. List four syndromes or diseases that are acquired through X-linked inheritance. Are males or females at greater risk for these disorders?
Ans: Four syndromes or diseases that are acquired through X-linked inheritance include: color blindness, Duchenne muscular dystrophy, fragile X syndrome, and hemophilia. Males are at significantly greater risk for all of these disorders.
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: X-Linked Disorders
Difficulty Level: Medium

5. Explain why males are more likely than females to be affected by X-linked disorders.
Ans: Males are more likely to be affected by X-linked genetic disorders because they have only one X chromosome and therefore any genetic marks on their X chromosome are displayed. Females (XX) have two X chromosomes; a recessive gene located on one X chromosome will be masked by a dominant gene on the other X chromosome. Females are thereby less likely to display X-linked genetic disorders because both of their X-chromosomes must carry the recessive genetic disorder for it to be displayed.
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Comprehension
Answer Location: X-Linked Disorders
Difficulty Level: Medium

6. List four groups of people who are candidates for genetic counseling.
Ans: Candidates for genetic counseling include those whose relatives have a genetic condition, couples who have had difficulties bearing children, women over the age of 35, and couples from the same ethnic group.
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Knowledge
Answer Location: Genetic Counseling
Difficulty Level: Easy

7. Explain the difference between surrogacy and adoption.
Ans: Surrogacy is an alternative form of reproduction known in which a woman (the surrogate) is impregnated and carries a fetus to term and agrees to turn the baby over to a woman, man, or couple who will raise it. Single parent, same-sex couples, and couples in which one or both members are infertile choose surrogacy. Sometimes the surrogate carries a zygote composed of one or both of the couple's gametes. Other times the ova, sperm, or zygote are donated. Adoption involves bringing a nonbiological child into a family, and it does not involve any medical procedures. Single parent, same-sex couples, and couples in which one or both members are infertile can choose adoption.
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Analysis
Answer Location: Genetic Counseling
Difficulty Level: Hard

8. Identify four methods of prenatal diagnosis. Which two pose some risk to the developing fetus, especially if performed early in the pregnancy?
Ans: The four methods of prenatal diagnosis include: ultrasound, amniocentesis, chorionic villus sampling, and noninvasive prenatal testing. Amniocentesis and

chorionic villus sampling can cause harm to the fetus, particularly if performed early in the pregnancy.
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Knowledge
Answer Location: Prenatal Diagnosis
Difficulty Level: Easy

9. List the three types of gene–environment correlations. How do these correlations change with age?
Ans: Three types of gene–environment correlations are passive, evocative, and active. Passive gene–environment correlations are seen early in life because children are reared in environments that are created by their parents, who share their genotype. In evocative gene–environment correlations, a child's genetic traits (e.g., personality characteristics including openness to experience) influence the social and physical environment, which shape development in ways that support the genetic trait. Active gene–environment correlations occur when the child actively creates experiences and environments that correspond to and influence his genetic predisposition.
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Comprehension
Answer Location: Gene–Environment Correlations
Difficulty Level: Medium

10. Explain what range of reaction means in terms of genetics.
Ans: Everyone has a different genetic makeup and therefore responds to the environment in a unique way. In addition, any one genotype can be expressed in a variety of phenotypes. There is a range of reaction a wide range of potential expressions of a genetic trait, depending on environmental opportunities and constraints.
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Analysis
Answer Location: Range of Reaction
Difficulty Level: Hard

Essay

1. Distinguish between the two processes of cell reproduction.
Ans: Most cells in the human body reproduce through a process known as mitosis in which DNA replicates itself, permitting the duplication of chromosomes, and ultimately the formation of new cells with identical genetic material. In the first stage of mitosis, the rungs of the ladder-shaped DNA split, opening like a zipper. Then each half of the DNA molecule regenerates and replaces its missing parts,

forming two distinct cells. It is this process that enables humans to develop from a single fertilized egg into a child, adolescent, and finally, adult. The process of mitosis accounts for the replication of all body cells.

The second process—meiosis—the reproduction of gametes (sex cells), occurs in two stages. First, the 46 chromosomes begin to replicate as in mitosis, duplicating themselves. But before the cell completes dividing, a critical process called crossing-over takes place. Chromosome pairs align and DNA segments cross over, moving from one member of the pair to the other. Crossing-over creates unique combinations of genes. The cell then divides into two cells, each with 46 chromosomes. As the new cells replicate, they create cells containing only 23 single, unpaired chromosomes. The resulting gametes each have only one chromosome from each pair (that is, one each from the male and female). This permits the joining of sperm and ovum at fertilization to produce a fertilized egg, or zygote**,** with 46 chromosomes, forming 23 pairs with half from the biological mother and half from the biological father.
KEY: Learning Objective: 2.1: Discuss the genetic foundations of development.
REF: Cognitive Domain: Analysis
Answer Location: Cell Reproduction
Difficulty Level: Medium

2. Kendon and Sharice just had a baby who was diagnosed with phenylketonuria. Describe this disorder. How can Kendon and Sharice ensure that their son will not develop permanent intellectual disability?
Ans: Phenylketonuria is a disorder that prevents the body from producing an enzyme that breaks down phenylalanine, an amino acid, from proteins. The phenylalanine builds up quickly to toxic levels that damage the central nervous system, contributing to mental retardation by 1 year of age. However, permanent damage is not inevitable. Infants who are placed on a strict diet low in phenylalanine (which must continue throughout the childhood into adolescence and adulthood) usually attain average or near-average levels of intelligence.
KEY: Learning Objective: 2.2: Identify examples of genetic disorders and chromosomal abnormalities.
REF: Cognitive Domain: Application
Answer Location: Dominant-Recessive Disorders
Difficulty Level: Hard

3. Consider this scenario: Your best friend recently married. Your friend has a cousin with autism, and her husband's side of the family has a history of several genetic disorders, including Huntington's disease. The couple is worried about having children and they want to know if their potential offspring will be at risk for one of these disorders. They have an appointment to see a genetic counselor in 2 weeks. Explain to your friends what will happen during their visit.
Ans: Upon meeting your friends, the genetic counselor will construct a family history of heritable disorders for both prospective parents in order to determine the prevalence of various disorders and diseases. If either member of the couple appears to carry a genetic disorder, genetic screening blood tests may be carried

out on both parents to detect chromosomal abnormalities and the presence of dominant and recessive genes for various disorders. Based on the test results, the counselor will help your friends make an informed decision about their risk for passing on a genetic disorder to their children.
KEY: Learning Objective: 2.3: Discuss the choices available to prospective parents in having healthy children.
REF: Cognitive Domain: Application
Answer Location: Genetic Counseling
Difficulty Level: Hard

4. Professor Kahn is an expert in behavior genetics. Her research team primarily conducts family studies to compare people who live together and share varying degrees of relatedness. Describe the two types of family studies that Professor Kahn most likely uses in her research, including what these studies tell about genetic and environmental influences on behavior.
Ans: Two kinds of family studies are common: twin studies and adoption studies. Twin studies compare identical and fraternal twins to estimate how much of a trait or behavior is attributable to genes. If genes affect the attribute, identical twins should be more similar than fraternal twins because identical twins share 100% of their genes whereas fraternal twins share about only 50%. Adoption studies on the other hand, compare the degree of similarity between adopted children and their biological parents whose genes they share (50%) and their adoptive parents with whom they share no genes. If the adopted children share similarities with their biological parents, even though they were not raised by them, it suggests that the similarities are genetic. Adoption studies also shed light on the extent to which attributes and behaviors are influenced by the environment. For example, the degree to which two genetically unrelated adopted children reared together are similar speaks to the role of environment. Comparisons of identical twins reared in the same home with those reared in different environments can also illustrate environmental contributions to phenotypes. If identical twins reared together are more similar than those reared apart, an environmental influence can be inferred.
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Application
Answer Location: Method of Behavioral Genetics
Difficulty Level: Hard

5. Describe the epigenetics using the example of brain development.
Ans: Providing an infant with a healthy diet and opportunities to explore the world will support the development of brain cells, governed by genes that are switched on or off. Brain development influences motor development, further supporting the infant's exploration of the physical and social world, thereby promoting cognitive and social development. Active engagement with the world encourages connections among brain cells. Exposure to toxins or extreme trauma might suppress the activity of some genes, potentially influencing brain development

and its cascading effects on motor, cognitive, and social development. In this way, an individual's neurological capacities are the result of epigenetic interactions among genes and contextual factors that determine his or her phenotype.
KEY: Learning Objective: 2.4: Describe the interaction of heredity and environment, including behavioral genetics and the epigenetic framework.
REF: Cognitive Domain: Application
Answer Location: Epigenetics Influences on Development
Difficulty Level: Hard