## Chapter 2—Heredity and Conception

**MULTIPLE CHOICE**

1. Heredity is defined as
   a. one's nature, and is based upon biological transmission of traits and characteristics.
   b. the spiral shaped structures found in cells.
   c. traits that are determined by pairs of genes.
   d. the process of cell division.

   ANS: A REF: The Influence of Heredity OBJ: 1 DIF: Factual

2. The field within the science of biology that studies heredity is called
   a. etiology.
   b. genetics.
   c. molecular biology.
   d. gametogenesis.

   ANS: B REF: The Influence of Heredity OBJ: 1 DIF: Factual

3. Genetics appears to play a role in not only the transmission of physical traits, such as height and eye color, but also in
   a. intelligence.
   b. personality traits such as shyness and anxiety.
   c. psychological problems such as schizophrenia and depression.
   d. All of the above

   ANS: D REF: The Influence of Heredity OBJ: 1 DIF: Factual

4. "Heredity" means
   a. biological transmission of traits and characteristics.
   b. how your traits manifest themselves in your characteristics.
   c. how cells divide to determine who we become.
   d. how genes combine to influence our phenotype.

   ANS: A REF: The Influence of Heredity OBJ: 1 DIF: Factual

5. Chromosomes contain thousands of segments called
   a. nuclei.
   b. genes.
   c. phosphates.
   d. cytosines.

   ANS: B REF: The Influence of Heredity OBJ: 1 DIF: Factual

6. What shape best describes chromosomes?
   a. Cone
   b. Rod
   c. An X
   d. An octagon

   ANS: C REF: The Influence of Heredity OBJ: 1 DIF: Factual

7. A normal human cell contains ____ chromosomes organized into ____ pairs.
   a. 20; 10
   b. 32; 16
   c. 46; 23
   d. 48; 24

   ANS: C REF: The Influence of Heredity OBJ: 1 DIF: Factual

8. Some traits, such as blood type, are transmitted by a single pair of genes. Other traits are determined by combinations of pairs of genes. These traits are called
   a. monogenic.
   b. polygenic.
   c. multigenic.
   d. recessive.

   ANS: B REF: The Influence of Heredity OBJ: 1 DIF: Factual

9. Polygenic traits
   a. are transmitted by a single pair of genes.
   b. are uncommon in humans.
   c. are transmitted by the mother.
   d. result in more complex characteristics.

   ANS: D REF: The Influence of Heredity OBJ: 1 DIF: Conceptual

10. According to the International Genome Sequencing Consortium (2006), we have ____ genes in every cell of our bodies:
    a. 1,000-1,500
    b. 10,000-20,000
    c. 20,000-25,000
    d. there has not been enough research to determine the number of genes in cells

    ANS: C REF: The Influence of Heredity OBJ: 1 DIF: Factual

11. DNA takes the form of
    a. a twisting ladder.
    b. a straight ladder.
    c. an octagon.
    d. interlocking circles.

    ANS: A REF: The Influence of Heredity OBJ: 1 DIF: Factual

12. In DNA, the sides of the ladder consist of alternating segments of phosphate and
    a. adenine.
    b. thymine.
    c. cytosine.
    d. simple sugar.

    ANS: D REF: The Influence of Heredity OBJ: 1 DIF: Factual

13. Which is the smallest?
    a. A gene
    b. The DNA helix
    c. A cell
    d. A zygote

    ANS: A REF: The Influence of Heredity OBJ: 1 DIF: Factual

14. In DNA, adenine is paired with ____ and cytosine with ____.
    a. thymine; simple sugar
    b. thymine; guanine
    c. guanine; simple sugar
    d. guanine; thymine

    ANS: B REF: The Influence of Heredity OBJ: 1 DIF: Factual

15. Each cell in our body
    a. contains 26 chromosomes.
    b. is turned "on" or "off" by cytosine.
    c. contains 30,000 to 40,000 genes.
    d. All of these

    ANS: C REF: The Influence of Heredity OBJ: 1 DIF: Factual

16. Of the 46 chromosomes in a normal human cell, how many are contributed by the mother?
    a. All
    b. It depends upon the gender of the child
    c. Twenty-three
    d. None

    ANS: C REF: The Influence of Heredity OBJ: 1 DIF: Factual

17. Which of the following MOST accurately describes what genes do?
    a. Regulate the development of traits
    b. Determine the gender of the child
    c. Work together with lutein to influence development
    d. Hardwire people for certain levels of certain traits

    ANS: A REF: The Influence of Heredity OBJ: 1 DIF: Conceptual

18. DNA consists of all of the following EXCEPT
    a. phosphate.
    b. indolamine.
    c. cytosine.
    d. guanine.

    ANS: B REF: The Influence of Heredity OBJ: 1 DIF: Factual

19. DNA stands for
    a. deoxyribonucleic acid.
    b. dionyotic acetate.
    c. diophosphate nucleic acetone.
    d. dionucleic acid.

    ANS: A REF: The Influence of Heredity OBJ: 1 DIF: Factual

20. Scientists took genetic material from one sheep to clone Dolly, making her genetically identical to the other sheep from which she was cloned. Cloning utilizes the process of
    a. mitosis.
    b. chromosomal replacement.
    c. autosome reproduction.
    d. meiosis.

    ANS: A REF: The Influence of Heredity OBJ: 2 DIF: Applied

21. Through the process of _____, our genetic code is carried into new cells in our bodies.
    a. meiosis
    b. autosome replacement
    c. Mendel replication
    d. mitosis

    ANS: D REF: The Influence of Heredity OBJ: 2 DIF: Factual

22. The process of mitosis results in new cells containing identical genetic codes. That is, unless what occurs?
    a. Reduction division
    b. Cell death
    c. Mutations
    d. Neural pruning

    ANS: C REF: The Influence of Heredity OBJ: 2 DIF: Factual

23. Sperm and ova are produced through meiosis, otherwise known as
    a. cloning.
    b. mutation.
    c. cross-fertilization.
    d. reduction division.

    ANS: D REF: The Influence of Heredity OBJ: 2 DIF: Conceptual

24. Of the 23 pairs of chromosomes, 22 pairs look alike and possess genetic information concerning the same traits. These are
    a. sex chromosomes.
    b. identical chromosomes.
    c. autosomes.
    d. None of the above

    ANS: C REF: The Influence of Heredity OBJ: 2 DIF: Factual

25. What factor determines the sex of a child?
    a. The sex chromosome received from the father
    b. It depends upon what time in the ovulation cycle conception occurs
    c. The age of the mother
    d. The presence or absence of teratogens at the time of conception

    ANS: A REF: The Influence of Heredity OBJ: 2 DIF: Factual

26. The typical sex chromosome pattern for males is _____ and for females is _____.
    a. XX; XY
    b. XY; XX
    c. XYY; XX
    d. XYY; XY

    ANS: B REF: The Influence of Heredity OBJ: 2 DIF: Factual

27. If a woman produced two ova in the same month and these are fertilized by different sperm cells, the result is
    a. monozygotic twins.
    b. dizygotic twins.
    c. homozygous twins.
    d. a single pregnancy.

    ANS: B REF: The Influence of Heredity OBJ: 2 DIF: Conceptual

28. A zygote that divides into two genetically identical replicas is called
    a. monozygotic twins.
    b. dizygotic twins.
    c. cross-fertilization.
    d. mitosis.

    ANS: A REF: The Influence of Heredity OBJ: 2 DIF: Factual

29. Of twin pregnancies, how many of these are dizygotic twins?
    a. One-half
    b. One-third
    c. Two-thirds
    d. One-fourth

    ANS: C REF: The Influence of Heredity OBJ: 2 DIF: Factual

30. Which statement is MOST accurate about monozygotic twins?
    a. They are also called “fraternal” twins
    b. They result when two eggs are fertilized
    c. They occur with different frequency in different ethnic groups
    d. They are more common in older women

    ANS: D REF: The Influence of Heredity OBJ: 2 DIF: Factual

31. Which statement about monozygotic twins is NOT true?
    a. They usually include one male and one female child
    b. They are also called "identical" twins
    c. They are more common now than in the past
    d. They occur with equal frequency among all ethnic groups

    ANS: A REF: The Influence of Heredity OBJ: 2 DIF: Factual

32. Which statement about dizygotic twins is MOST accurate?
    a. They are more common among African Americans than any other ethnic or racial group
    b. They are more common among Asian Americans
    c. They are more common among European Americans
    d. They occur with equal frequency among all ethnic and racial groups

    ANS: A REF: The Influence of Heredity OBJ: 2 DIF: Factual

33. A woman who gives birth to dizygotic twins
    a. is most likely an Asian American.
    b. has a decreased chance of subsequent pregnancies.
    c. is likely to be a young mother.
    d. has an increased chance of giving birth to twins in future pregnancies.

    ANS: D REF: The Influence of Heredity OBJ: 2 DIF: Factual

34. The chance of conceiving twins increases with parental age due to _____ and _____.
    a. irregular ovulation; fertility drugs
    b. irregular sperm; fertility drugs
    c. irregular ovulation; irregular sperm
    d. irregular sperm; genetic irregularities in ovum

    ANS: A REF: The Influence of Heredity OBJ: 2 DIF: Conceptual

35. Each member of a pair of genes is referred to as a/n
    a. homozygous trait.
    b. heterozygous trait.
    c. autosome.
    d. allele.

    ANS: D REF: The Influence of Heredity OBJ: 3 DIF: Factual

36. Gregor Mendel, in his work with pea plants, discovered that the offspring from crossing purebred tall pea plants with purebred dwarf pea plants were tall. Mendel called this the law of
    a. codominance.
    b. dominance.
    c. dominant autosomes.
    d. epigenesist.

    ANS: B REF: The Influence of Heredity OBJ: 3 DIF: Conceptual

37. If a child receives a dominant allele for brown hair from one parent and a recessive allele for blonde hair from the other, what do we know?
    a. The child will have blonde hair
    b. We cannot predict the potential hair color of the child based upon this information
    c. The child will have brown hair
    d. The child will be female

    ANS: C REF: The Influence of Heredity OBJ: 3 DIF: Applied

38. If a child receives an allele for blue eyes and an allele for brown eyes, then the child is
    a. going to have blue eyes.
    b. homozygous for that trait.
    c. heterozygous for that trait.
    d. exhibiting the law of dominance.

    ANS: C REF: The Influence of Heredity OBJ: 3 DIF: Applied

39. What percent of the offspring of brown-haired parents who carry recessive genes for blonde hair will have blond hair?
    a. 25%
    b. 50%
    c. 75%
    d. 100%

    ANS: A REF: The Influence of Heredity OBJ: 3 DIF: Factual

40. Dominant alleles
    a. will cause characteristics in individuals when paired with recessive alleles.
    b. come from the father of the developing child.
    c. determine physical characteristics.
    d. will determine physical characteristics in offspring of the same sex as the parent that contributed that trait.

    ANS: A REF: The Influence of Heredity OBJ: 3 DIF: Factual

41. Carriers of certain genetic characteristics can pass that characteristic on only if
    a. the other parent has a recessive gene for the same characteristic.
    b. characteristics in the environment activate it.
    c. they are male.
    d. they also have a dominant gene for the same characteristic.

    ANS: A REF: The Influence of Heredity OBJ: 3 DIF: Conceptual

42. Some examples of recessive traits include blonde hair, lactose intolerance, myopia, and:
    a. curly hair.
    b. type O blood.
    c. type A blood.
    d. farsightedness.

    ANS: B REF: The Influence of Heredity OBJ: 3 DIF: Factual

43. People who bear one dominant and one recessive gene for a trait are
    a. going to automatically pass that characteristic on to their offspring.
    b. definitely going to develop that characteristic.
    c. called "carriers" of the recessive gene.
    d. not going to pass that characteristic on to their offspring.

    ANS: C REF: The Influence of Heredity OBJ: 3 DIF: Factual

44. Jake carries a dominant trait for normal vision and a recessive trait for red-green color blindness. As a result, Jake will have
    a. farsighted vision.
    b. nearsighted vision (myopia).
    c. red-green color blindness.
    d. normal vision.

    ANS: D REF: The Influence of Heredity OBJ: 3 DIF: Applied

45. Someone suffering from cystic fibrosis
    a. carries it as a recessive gene.
    b. did not have a dominant gene to cancel it out.
    c. has more than 23 chromosomal pairs.
    d. is likely to have a younger mother.

    ANS: B REF: The Influence of Heredity OBJ: 4 DIF: Conceptual

46. The following is caused by a single pair of genes
    a. cystic fibrosis.
    b. Down syndrome.
    c. sex-linked chromosomal abnormalities.
    d. All of these

    ANS: A REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

47. Diabetes mellitus, epilepsy, and peptic ulcers are multifactorial problems, that is, they
    a. have unknown causes.
    b. are the result of genetics.
    c. are the result of factors in the person's environment.
    d. reflect genetic and environmental causes.

    ANS: D REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

48. Dev is 45 years old. Compared to men who are below the age of 30, Dev is five to six times more likely to have a child with
    a. red-green color blindness.
    b. Turner's syndrome.
    c. cystic fibrosis.
    d. Down syndrome.

    ANS: D REF: Chromosomal Abnormalities OBJ: 4 DIF: Applied

49. There is a positive correlation between age of parents and incidence of Down syndrome. What does this mean?
    a. Younger parents are more likely to have children with Down syndrome
    b. Older parents are more likely to have children with Down syndrome
    c. Older parents are less likely to have children with Down syndrome
    d. All parents, regardless of their age, are equally likely to have children with Down syndrome

    ANS: B REF: Chromosomal Abnormalities OBJ: 4 DIF: Conceptual

50. Individuals with Down syndrome
    a. do not typically suffer adjustment problems.
    b. have few, if any, physical problems.
    c. show deficits in cognitive development.
    d. have chromosomal damage on the 8th chromosome.

    ANS: C REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

51. Down syndrome is linked to
    a. alcohol abuse by the father.
    b. abnormalities of the 21st pair of chromosomes.
    c. sex-linked chromosomal abnormalities.
    d. None of these

    ANS: B REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

52. The textbook suggests that XYY males are over-represented in prison populations. This suggests
    a. they may be less intelligent than "normal."
    b. they are much more aggressive than is "normal."
    c. they commit more crimes against persons, not property.
    d. All of these

    ANS: A REF: Chromosomal Abnormalities OBJ: 4 DIF: Applied

53. Males with XYY sex chromosomal structure
    a. tend to be shorter than average.
    b. have higher levels of intelligence than average.
    c. are often mildly delayed, such as in language development.
    d. are much less aggressive than average.

    ANS: C REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

54. What is the approximate rate of occurrence of males who have an extra Y chromosome, resulting in the configuration XYY?
    a. Zero, because this disorder affects females only
    b. One in 50 to 70
    c. One in 700 to 1,000
    d. One in 3

    ANS: C REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

55. In comparison to the average male population, individuals with Klinefelter's syndrome
    a. produce more estrogen than normal.
    b. produce less estrogen than normal.
    c. produce more testosterone than normal.
    d. produce less testosterone than normal.

    ANS: D REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

56. What is the incidence, or rate of occurrence, of Klinefelter's syndrome?
    a. 1 in 150 men
    b. 1 in 300 men
    c. 1 in 500-900 men
    d. 1 in 2,500 men

    ANS: C REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

57. Roger is undergoing treatment for a sex-linked chromosomal abnormality. He is treated with testosterone replacement therapy, which fosters the growth of male sex characteristics and elevates his mood, but does not reverse his sterility. Roger is being treated for
    a. Klinefelter's syndrome.
    b. Turner syndrome.
    c. "Supermale" syndrome.
    d. Down syndrome.

    ANS: A REF: Chromosomal Abnormalities OBJ: 4 DIF: Applied

58. A girl who does not develop breasts or menstruate
    a. likely produces low levels of estrogen.
    b. may have only one X sex chromosome.
    c. may have Turner's syndrome.
    d. All of these

    ANS: D REF: Chromosomal Abnormalities OBJ: 4 DIF: Applied

59. Girls with Turner's syndrome
    a. are physically the same as girls who do not have Turner's syndrome.
    b. produce little estrogen.
    c. produce more testosterone than normal.
    d. are more likely to give birth to twins.

    ANS: B REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

60. Compared to girls with XY sex chromosomes, girls with Turner's syndrome
    a. have an extra X sex chromosome.
    b. have an extra Y sex chromosome.
    c. are taller than average.
    d. have a single X sex chromosome.

    ANS: D REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

61. Anya is female. She is infertile and has trouble with visual-spatial skills and mathematics. She most likely has
    a. Turner syndrome.
    b. Single X syndrome.
    c. Triple Y syndrome.
    d. "Superfemale" syndrome.

    ANS: A REF: Chromosomal Abnormalities OBJ: 4 DIF: Applied

62. If both parents are carriers of PKU,
    a. one child out of four will develop the disorder.
    b. none of the children will develop the disorder.
    c. their daughters are more likely to develop the disorder than their sons.
    d. all of their children will develop the disorder.

    ANS: A REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

63. Phenylketonuria is
    a. an enzyme disorder.
    b. transmitted by a dominant gene.
    c. a disorder that manifests itself in all children of carriers.
    d. All of these

    ANS: A REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

64. Children with PKU
    a. cannot eat fruits or vegetables.
    b. have damage to the 21st pair of chromosomes.
    c. should be placed on a special diet at soon as possible.
    d. usually live for only a few weeks.

    ANS: C REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

65. Children with PKU cannot metabolize an amino acid called phenylalanine. As a result, the substance builds up in their bodies and
    a. causes them to be overweight.
    b. causes night blindness.
    c. causes hemophilia.
    d. impairs central nervous system functioning.

    ANS: D REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

66. Maria and Michael have just been told that their newborn child has tested positive for PKU. What does this mean?
    a. PKU can be cured through medication
    b. PKU can be controlled through a strict exercise regiment
    c. The condition will disappear by the time their child is six months old
    d. Their child can develop normally if placed on a special diet early

    ANS: D REF: Chromosomal Abnormalities OBJ: 4 DIF: Applied

67. Huntington's disease is a fatal, progressive degenerative disorder. People who have Huntington's disorder
    a. have special diets.
    b. are common, as the rate of this genetic disorder is very high.
    c. usually have delayed onset of this disorder at age 35 or older.
    d. use medications that cure the disorder.

    ANS: C REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

68. Huntington's disease is characterized by which of the following symptoms?
    a. Uncontrollable muscle movements
    b. Loss of intellectual functioning
    c. Personality change
    d. All of the above

    ANS: D REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

69. The following individual would be most likely to develop sickle-cell anemia:
    a. a Caucasian female under the age of 15.
    b. an African American.
    c. a Caucasian male of any age.
    d. a person of Asian heritage.

    ANS: B REF: Chromosomal Abnormalities OBJ: 4 DIF: Conceptual

70. Sickle-cell anemia is caused by
    a. white blood cells that take on the shape of a sickle and clump together.
    b. red blood cells that expand the blood vessels and increase the oxygen supply.
    c. a recessive gene.
    d. a slow destruction of the liver leading to jaundice and swollen joints.

    ANS: C REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

71. The following most accurately represents the percentage of African Americans who are carriers of sickle-cell anemia:
    a. one in 5.
    b. one in 10.
    c. one in 20.
    d. one in 100.

    ANS: B REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

72. Tia is from Central America. She has a genetic disorder caused by a recessive gene. Her symptoms include impaired cognitive skills caused by decreased oxygen supply, painful joints, and jaundice. Tia has
    a. sickle-cell anemia.
    b. Tay-Sachs disease.
    c. cystic fibrosis.
    d. PKU.

    ANS: A REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

73. The following is TRUE of Tay-Sachs disease:
    a. it results in delayed blood clotting.
    b. it is characterized by an accumulation of lipids in the nervous system.
    c. it is caused by a dominant gene.
    d. it is linked to the X chromosome.

    ANS: B REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

74. Which of the following individuals is MOST likely to have Tay-Sachs disease?
    a. A 4-year-old Jewish child of Eastern-European background
    b. A 10-year-old African American
    c. A 5-year-old European American
    d. A 20-year-old Hispanic male

    ANS: A REF: Chromosomal Abnormalities OBJ: 4 DIF: Conceptual

75. Which of the following individuals is LEAST likely to have Tay-Sachs disease?
    a. An 8-year-old
    b. A 4-year-old
    c. A 2-year-old
    d. A 1-year-old

    ANS: A REF: Chromosomal Abnormalities OBJ: 4 DIF: Applied

76. Tay-Sachs disease results in
    a. death by approximately the age of 5.
    b. painful and swollen joints.
    c. thick mucus that clogs the pancreas and lungs.
    d. All of the above

    ANS: A REF: Chromosomal Abnormalities OBJ: 4 DIF: Conceptual

77. According to the Cystic Fibrosis Foundation,
    a. cystic fibrosis is the most common fatal hereditary disease among European Americans.
    b. about 30,000 Americans have the disorder.
    c. 1 in every 31 people is carriers of this illness.
    d. All of these are true about cystic fibrosis

    ANS: D REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

78. Elliot was born with a genetic disorder that is caused by a recessive gene. His symptoms are thick mucus that clogs his pancreas and lungs. He has many respiratory infections. Elliot most likely has
    a. Huntington's disease.
    b. Tay-Sachs disease.
    c. cystic fibrosis.
    d. PKU.

    ANS: C REF: Chromosomal Abnormalities OBJ: 4 DIF: Applied

79. Sex-linked diseases are more likely to afflict sons of female carriers because
    a. males inherit two X chromosomes from their mothers.
    b. males have only one X sex chromosome.
    c. sex-linked disorders are recessive in fathers.
    d. it is carried only on the Y chromosome.

    ANS: B REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

80. Which is true of hemophilia?
    a. It is more likely to afflict sons of female carriers than daughters
    b. It occurs more often in Caucasians than other racial and ethnic groups
    c. It damages the frontal lobe of the brain
    d. It often co-occurs with Down syndrome

    ANS: A REF: Chromosomal Abnormalities OBJ: 4 DIF: Conceptual

81. Color blindness is
    a. an enzyme disorder.
    b. a protein-based disorder.
    c. a sex-linked abnormality.
    d. found only in females.

    ANS: C REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

82. Color blindness is more likely to occur in
    a. males.
    b. females.
    c. various people, depending upon racial and ethnic background.
    d. those people with higher socioeconomic status.

    ANS: A REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

83. Which of the following is NOT a sex-linked abnormality?
    a. Duchenne muscular dystrophy
    b. Hemophilia
    c. Color blindness
    d. Down syndrome

    ANS: D REF: Chromosomal Abnormalities OBJ: 4 DIF: Factual

84. Females are less likely than males to show sex-linked disorders because females
    a. have higher levels of estrogen.
    b. do not inherit recessive genes.
    c. have an additional X chromosome.
    d. have higher levels of testosterone.

    ANS: C REF: Chromosomal Abnormalities OBJ: 4 DIF: Conceptual

85. Genetic counseling occurs _____, whereas prenatal testing happens_____.
    a. after a woman is pregnant; before a woman is pregnant
    b. before a woman is pregnant; while a woman is pregnant
    c. both occur before conception
    d. both occur after conception

    ANS: B REF: Chromosomal Abnormalities OBJ: 5 DIF: Conceptual

86. The primary purpose of genetic counseling is to
    a. advise couples to abort unborn children.
    b. prove that a child will develop a certain illness.
    c. assist would-be parents in making procreation decisions.
    d. outline the genetic risks of unprotected sex.

    ANS: C REF: Chromosomal Abnormalities OBJ: 5 DIF: Factual

87. A couple is deciding whether or not to try and conceive a child. They meet with a health professional who asks them questions regarding their genetic heritage in order to explore whether their child might develop genetic abnormalities. This process is called
    a. prenatal testing.
    b. genetic counseling.
    c. chorionic villus sampling.
    d. adoption counseling.

    ANS: B REF: Chromosomal Abnormalities OBJ: 5 DIF: Applied

88. The following person is MOST likely to be given an amniocentesis:
    a. an African-American female.
    b. an Asian-American female.
    c. a female younger than age 20.
    d. a female over the age of 35.

    ANS: D REF: Chromosomal Abnormalities OBJ: 5 DIF: Factual

89. With amniocentesis,
    a. a biopsy is taken from the pregnant mother's spine.
    b. fluid is tested from the "sac" containing the fetus.
    c. the father's sperm is tested for genetic abnormalities.
    d. the mother's ova are tested for genetic abnormalities.

    ANS: B REF: Chromosomal Abnormalities OBJ: 5 DIF: Factual

90. The biggest drawback to amniocentesis is that it can cause
    a. miscarriages in 1 of every 100 women who undergo the procedure.
    b. Cesarean deliveries.
    c. mental retardation.
    d. the unborn child to be infertile.

    ANS: A REF: Chromosomal Abnormalities OBJ: 5 DIF: Factual

91. Amniocentesis is encouraged for
    a. women over the age of 40.
    b. women carrying the children of aging fathers.
    c. women, or their partners, who have family histories of chromosomal and/or genetic disorders.
    d. All of these

    ANS: D REF: Chromosomal Abnormalities OBJ: 5 DIF: Conceptual

92. The earliest detection of fetal abnormalities is possible with use of
    a. amniocentesis.
    b. ultrasound.
    c. chorionic villus sampling.
    d. fetoscopy.

    ANS: C REF: Chromosomal Abnormalities OBJ: 5 DIF: Factual

93. Molly is in her 10th week of pregnancy. She is undergoing a procedure in which small threads are removed from the outer membrane that envelops the amniotic sac and fetus. Which procedure is she undergoing?
    a. Cervical variability study
    b. Chorionic villus sampling
    c. Chorionic variability sampling
    d. None of the above

    ANS: B REF: Chromosomal Abnormalities OBJ: 5 DIF: Applied

94. Which of the following is TRUE regarding amniocentesis and CVS?
    a. The risks of amniocentesis are much higher than those of CVS
    b. Both are performed 14 to 16 weeks after conception
    c. Some practitioners are better at carrying out these procedures than others
    d. Both involve the examination of villi from the membrane that envelops the amniotic sac and fetus

    ANS: C REF: Chromosomal Abnormalities OBJ: 5 DIF: Conceptual

95. An ultrasound
    a. uses x-ray photography to make a picture of the unborn child.
    b. can be heard by the human ear.
    c. yields a picture called a CT-scan.
    d. bounces sound waves off of the fetus.

    ANS: D REF: Chromosomal Abnormalities OBJ: 5 DIF: Factual

96. A sonogram is produced by using
    a. ultrasound.
    b. fetoscopy.
    c. chorionic villus sampling.
    d. amniocentesis.

    ANS: A REF: Chromosomal Abnormalities OBJ: 5 DIF: Factual

97. Ultrasound can be used to detect
    a. Klinefelter syndrome.
    b. cystic fibrosis.
    c. PKU.
    d. position of the fetus.

    ANS: D REF: Chromosomal Abnormalities OBJ: 5 DIF: Factual

98. Mia's fetus has Rh disease, and an intrauterine transfusion is necessary. Which of the following procedures will generate a picture of the fetus to determine fetal positioning and fetal structures?
    a. Ultrasound
    b. CVS
    c. AFP assay
    d. Amniocentesis

    ANS: A REF: Chromosomal Abnormalities OBJ: 5 DIF: Applied

99. The procedure that poses LEAST risk to the fetus is
    a. amniocentesis.
    b. ultrasound.
    c. chorionic villus sampling.
    d. alpha-fetoprotein assay (AFP).

    ANS: D REF: Chromosomal Abnormalities OBJ: 5 DIF: Factual

100. _____ is used to detect neural tube defects such as spina bifida.
    a. Genetic counseling
    b. Alpha-fetoprotein assay (AFP)
    c. Ultrasound
    d. Rh disease test

    ANS: B REF: Chromosomal Abnormalities OBJ: 5 DIF: Factual

101. Alpha-fetoprotein assay can be used to
    a. assess sex chromosome abnormalities.
    b. detect neural tube defects.
    c. assess degree of mental retardation.
    d. measure insulin levels in the fetus.

    ANS: B REF: Chromosomal Abnormalities OBJ: 5 DIF: Factual

102. If a mother has an elevated AFP level, this means her fetus
    a. has a neural tube defects.
    b. may have neural tube defects and this would be examined by amniocentesis or ultrasound.
    c. has a sex-linked disorder.
    d. will be born early.

    ANS: B REF: Chromosomal Abnormalities OBJ: 5 DIF: Applied

103. Of the following, the accurate statement is
    a. there is no risk associated with fetal testing.
    b. although there is some risk with fetal testing, it is sometimes necessary.
    c. because of risk, fetal testing should not be done.
    d. the risk in fetal testing is to the mother, not the fetus.

    ANS: B REF: Chromosomal Abnormalities OBJ: 5 DIF: Conceptual

104. Our inherited traits can vary in expression given our unique environments. This is referred to as
    a. reaction range.
    b. phenotype.
    c. genotype.
    d. "averaging" of genetic instructions carried by one's parents.

    ANS: A REF: Heredity and the Environment OBJ: 6 DIF: Conceptual

105. Charlotte inherited personality traits, such as her activity and sociability levels, from her parents. Traits we inherit from our parents are referred to as our
    a. phenotype.
    b. temperament.
    c. genotype.
    d. personality.

    ANS: C REF: Heredity and the Environment OBJ: 6 DIF: Applied

106. Theo not only inherited a tendency to be of very high intelligence from his parents, but on IQ tests, he scores very high. Our actual set of traits that we exhibit, such as an excellent performance on an IQ test, is called
    a. phenotype.
    b. temperament.
    c. genotype.
    d. personality.

    ANS: A REF: Heredity and the Environment OBJ: 6 DIF: Applied

107. Because Sebastian lacks access to healthy food, he may not grow to be as tall as he could. However, if healthy food becomes available, his body may "snap back into its genetically determined path." What is the term used to describe this process?
    a. Canalization
    b. Invariant development
    c. Chromosomalization
    d. Genotype expression

    ANS: A REF: Heredity and the Environment OBJ: 6 DIF: Applied

108. Which of the following is LESS highly canalized?
    a. Learning to sit up
    b. Learning to crawl
    c. Learning to speak two-word utterances
    d. Intelligence

    ANS: D REF: Heredity and the Environment OBJ: 6 DIF: Conceptual

109. Developmental psychologist Sandra Scarr described three types of correlations between genetic and environmental influences. These are passive correlation, active correlation, and
    a. ongoing correlation.
    b. evocative correlation.
    c. restrictive correlation.
    d. inherent correlation.

    ANS: B REF: Heredity and the Environment OBJ: 6 DIF: Applied

110. Nicole is a long-distance runner. She believes in the importance of proper diet and exercise. As such, she provides a healthy diet for her two-year-old daughter, enrolls her in toddler gymnastic classes, and encourages her daughter's outdoor physical activities. Which of the following genetic-environment correlations does this BEST represent?
    a. Passive
    b. Evocative
    c. Active
    d. Industrious

    ANS: A REF: Heredity and the Environment OBJ: 6 DIF: Applied

111. Elijah is very shy. He is quiet and rarely seeks out other children to play with. His parents, teachers, and friends leave him alone to play and spend time by himself. Which genetic-environment correlation does this best represent?
    a. Passive
    b. Evocative
    c. Active
    d. Industrious

    ANS: B REF: Heredity and the Environment OBJ: 6 DIF: Applied

112. Jenny is a high school freshman. She has always enjoyed playing musical instruments. As a result, she decides to join the marching band at her school as well as take a class in music theory. Which of the following genetic-environment correlations does this best represent?
    a. Passive
    b. Evocative
    c. Active
    d. Industrious

    ANS: C REF: Heredity and the Environment OBJ: 6 DIF: Applied

113. Matthew likes to sing, dance, and act. Due to this, he decided to join the theatre club at his high school. Choosing environments that allow us to develop inherited preferences is termed
    a. niche-picking.
    b. epigenesist.
    c. ecological interaction.
    d. evocative genotype.

    ANS: A REF: Heredity and the Environment OBJ: 6 DIF: Applied

114. Which of the following is TRUE regarding parents and their children?
    a. They share about 50% of their genetic material
    b. They share recessive genes only
    c. They share dominant genes only
    d. They share about 25% of their genetic material

    ANS: A REF: Heredity and the Environment OBJ: 6 DIF: Conceptual

115. If genes are implicated in any given physical trait or behavior pattern, then you would expect
    a. DZ twins would be more similar on the trait than MZ twins.
    b. all people in a given family would express the trait similarly.
    c. cousins would be more similar on the trait than siblings.
    d. siblings would be more similar on the trait than cousins.

    ANS: D REF: Heredity and the Environment OBJ: 6 DIF: Conceptual

116. The following twin pair would physically resemble each other the most:
    a. dizygotic of either sex.
    b. monozygotic.
    c. dizygotic males.
    d. monozygotic, but only if female.

    ANS: B REF: Heredity and the Environment OBJ: 6 DIF: Factual

117. In comparison to dizygotic (DZ) twins, monozygotic (MZ) twins are
    a. less likely to look alike or be of similar height.
    b. more likely to be similar on physical characteristics, such as blood pressure and brain wave patterns.
    c. less likely to share the same psychological disorders.
    d. more likely to differ on levels of happiness and sociability.

    ANS: B REF: Heredity and the Environment OBJ: 6 DIF: Applied

118. The following could influence behavioral similarity in monozygotic twins:
    a. parents and others who treat them alike.
    b. the degree of genetic similarity they share.
    c. whether the twins are male or female.
    d. none of these would influence behavioral similarity.

    ANS: A REF: Heredity and the Environment OBJ: 6 DIF: Conceptual

119. Dizygotic twins are MORE likely to inherit _____ than monozygotic twins.
    a. schizophrenia
    b. depression
    c. autism
    d. None of these

    ANS: D REF: Heredity and the Environment OBJ: 6 DIF: Factual

120. Kia and Mia are monozygotic twins. At birth, they were separated and adopted by different families. Kia grew up in Los Angeles. Mia grew up in New York City. Given the research, you would expect Kia and Mia to
    a. share the same degree of genetic similarity as twins reared together.
    b. be less alike, genetically, than dizygotic twins reared together.
    c. be identical in genetics, behaviors and preferences.
    d. be no more alike in genetics, behaviors and preferences than regular siblings.

    ANS: A REF: Heredity and the Environment OBJ: 6 DIF: Applied

121. If an adopted child is more similar on a particular characteristic to his/her biological parents than to the adoptive parents, we can conclude that
    a. the adoptive parents have tried very hard to raise the child as their own.
    b. heredity is solely responsible for who we become.
    c. environment is solely responsible for who we become.
    d. genetics play a role in the development of that particular characteristic.

    ANS: D REF: Heredity and the Environment OBJ: 6 DIF: Conceptual

122. At birth, the typical human female will contain
    a. enough ova to be fertile for 10 years.
    b. no ova, they only develop during puberty.
    c. around 400,000 ova.
    d. millions of ova.

    ANS: C REF: Conception OBJ: 7 DIF: Factual

123. During menstruation,
    a. a female is more likely to get pregnant than at any other time.
    b. the unfertilized egg is discharged.
    c. the fertilized egg undergoes meiosis.
    d. the fertilized egg undergoes mitosis.

    ANS: B REF: Conception OBJ: 7 DIF: Factual

124. Before meiosis, the sperm cell,
    a. contains 46 chromosomes.
    b. is significantly larger than the egg cell.
    c. contains two X chromosomes.
    d. is more likely to conceive a girl than a boy.

    ANS: A REF: Conception OBJ: 7 DIF: Factual

125. The sperm cell
    a. is significantly larger than the egg cell.
    b. contains two Y chromosomes.
    c. does not determine the sex of the developing child.
    d. is one of the smallest types of cells in the body.

    ANS: D REF: Conception OBJ: 7 DIF: Factual

126. The following can be said about male conception:
    a. fewer males are conceived, but more survive to birth.
    b. more males are conceived and more survive to birth.
    c. more males are conceived and more are spontaneously aborted.
    d. about the same number of males and females are conceived.

    ANS: C REF: Conception OBJ: 7 DIF: Applied

127. The following number correctly illustrates approximately how many sperm cells are contained in a single ejaculate:
    a. around 1,000.
    b. 200 to 400 million.
    c. it depends upon the size of the ejaculate.
    d. it depends upon the man's progesterone levels.

    ANS: B REF: Conception OBJ: 7 DIF: Factual

128. Only 1 in 1,000 sperm will ever arrive in the vicinity of an ovum. Which of the following factors prevent sperm cells from traveling the entire distance to the egg?
    a. Gravity
    b. Vaginal acidity
    c. Current of fluid from the cervix
    d. All of these

    ANS: D REF: Conception OBJ: 7 DIF: Factual

129. Ova
    a. are surrounded by a gelatinous layer.
    b. do not have a gelatinous layer.
    c. are surrounded by a gelatinous layer but only after released from the ovarian follicle.
    d. develop a gelatinous layer after a sperm has penetrated the ovum.

    ANS: A REF: Conception OBJ: 7 DIF: Factual

130. Sperm
    a. travel at random inside a woman's reproductive tract.
    b. find ovum as a matter of luck.
    c. are attracted to ova by the odor of a chemical they secrete.
    d. are attracted to ova by a sound wave they emit.

    ANS: C REF: Conception OBJ: 7 DIF: Factual

131. Conception has occurred when
    a. the egg cell is released from the ovary.
    b. the sperm cell is released from the testis.
    c. the chromosomes from the egg cell align with those from the sperm cell.
    d. the chromosomes combine to form 23 new pairs with a unique set of genetic instructions.

    ANS: D REF: Conception OBJ: 7 DIF: Factual

132. In American couples, infertility occurs in approximately
    a. one in 6 or 7 couples.
    b. one in 15 couples.
    c. it depends upon ethnicity.
    d. it depends upon socioeconomic status.

    ANS: A REF: Infertility OBJ: 8 DIF: Factual

133. The following can cause infertility problems in men:
    a. excess protein in the diet.
    b. lack of exercise.
    c. sexually transmitted infections (STIs).
    d. excessive masturbation.

    ANS: C REF: Infertility OBJ: 8 DIF: Factual

134. The sperm's ability to move is called
    a. involution.
    b. propulsion.
    c. evolution.
    d. motility.

    ANS: D REF: Infertility OBJ: 8 DIF: Factual

135. The following can cause infertility in women:
    a. obstruction of the reproductive tract.
    b. irregular ovulation.
    c. endometriosis.
    d. All of these

    ANS: D REF: Infertility OBJ: 8 DIF: Factual

136. The MOST common infertility problem in women is
    a. irregular ovulation or lack of ovulation.
    b. endometriosis.
    c. barriers to the passageways through which the ovum must pass.
    d. pelvic inflammatory disease (PID).

    ANS: A REF: Infertility OBJ: 8 DIF: Factual

137. Lily visits her doctor to determine the cause/s of her infertility. The physician tells her that she has endometriosis and that this is caused by
    a. irregular ovulation or lack of ovulation.
    b. chronic disease, such as diabetes.
    c. endometrial tissue that has been sloughed off into the abdominal cavity.
    d. the use of fertility drugs, such as clomiphene or pergonal.

    ANS: C REF: Infertility OBJ: 8 DIF: Applied

138. Which of the following describes the process by which sperm is injected into the uterus at the time of ovulation?
    a. IVF
    b. Artificial insemination
    c. Donor IVF
    d. Surrogacy

    ANS: B REF: Infertility OBJ: 8 DIF: Factual

139. Jill does not produce ova of her own. An ovum is harvested from another woman, is fertilized in vitro, and placed into Jill's uterus where it becomes implanted and develops prenatally. Which fertility method does this best represent?
    a. Artificial insemination
    b. IVF
    c. Donor IVF
    d. Surrogate mother

    ANS: C REF: Infertility OBJ: 8 DIF: Applied

140. Meghan is carrying a newly fertilized ova to term for another woman. Meghan is a(n)
    a. sperm donor.
    b. adoptive parent.
    c. surrogate.
    d. None of the above

    ANS: C REF: Infertility OBJ: 8 DIF: Factual

141. It is estimated that the ratio of boys to girls in China is approximately 120 to 100. Why are there so many more boys than girls in China?
    a. Better genetic counseling
    b. An increase in the use of fertility drugs
    c. Higher rates of adopting boys than girls
    d. Selective abortion of female fetuses

    ANS: D REF: Infertility OBJ: 8 DIF: Factual

**MATCHING**

*Match the following:*

a. takes the form of a double helix
b. person who carries and transmits characteristics but does not express them
c. correlation between child's genetic endowment and responses elicited from others
d. the genetic material received from parents
e. caused by a recessive gene
f. polygenically determined
g. female sex hormone
h. neural tube defect
i. twins produced from a single egg
j. cell division that results in non-identical cells
k. union of an ovum and a sperm cell
l. samples the membrane enveloping amniotic sac and fetus
m. associated with the 21st pair of chromosomes
n. how genetic material manifests itself in characteristics
o. twins produced from two eggs
p. XXY sex chromosomal pattern
q. determined by the father
r. both alleles for a trait differ
s. caused by a dominant gene
t. self-propulsion

| | |
|---|---|
| 1. Spinal bifida | 1. ANS: H |
| 2. Monozygotic | 2. ANS: I |
| 3. Deoxyribonucleic acid (DNA) | 3. ANS: A |
| 4. Meiosis | 4. ANS: J |
| 5. Phenotype | 5. ANS: N |
| 6. Carrier | 6. ANS: B |
| 7. PKU | 7. ANS: E |
| 8. Down syndrome | 8. ANS: M |
| 9. Huntington's disease | 9. ANS: S |
| 10. Intelligence | 10. ANS: F |
| 11. Dizygotic | 11. ANS: O |
| 12. Evocative genotype-environmental correlation | 12. ANS: C |
| 13. Genotype | 13. ANS: D |
| 14. Heterozygous | 14. ANS: R |
| 15. Estrogen | 15. ANS: G |
| 16. Gender of child | 16. ANS: Q |
| 17. Motility | 17. ANS: T |
| 18. Chorionic villus sampling | 18. ANS: L |
| 19. Conception | 19. ANS: K |
| 20. Klinefelter's syndrome | 20. ANS: P |

**TRUE/FALSE**

1. Polygenic traits are transmitted by a single pair of genes.

   ANS: F REF: The Influence of Heredity OBJ: 1

2. Sex chromosomes utilize meiosis to divide.

   ANS: T REF: The Influence of Heredity OBJ: 2

3. The typical sex chromosome pattern for females is XY.

   ANS: T REF: The Influence of Heredity OBJ: 3

4. Monozygotic twins are conceived from separate egg cells.

   ANS: F REF: The influence of Heredity OBJ: 3

5. "Carriers" for traits have two recessive genes for those traits.

   ANS: F REF: Chromosomal Abnormalities OBJ: 4

6. Klinefelter's syndrome affects females and males equally.

   ANS: F REF: Chromosomal Abnormalities OBJ: 4

7. PKU, which causes intellectual disability, can be controlled by diet.

   ANS: T REF: Chromosomal Abnormalities OBJ: 4

8. Ultrasound is used in amniocentesis and CVS.

   ANS: T REF: Chromosomal Abnormalities OBJ: 5

9. Our phenotype is influenced by the environment.

   ANS: T REF: Heredity and the Environment OBJ: 6

10. Parents and children have 25% overlap in genes.

    ANS: F REF: Heredity and the Environment OBJ: 6

11. Male fetuses have a lower rate of spontaneous abortion than females.

    ANS: F REF: Conception OBJ: 7

12. The term "infertility" is applied to couples that have failed to conceive for a year or more.

    ANS: T REF: Infertility OBJ: 8

13. Pelvic inflammatory disease (PID) can result from a variety of bacterial or viral infections.

    ANS: T REF: Infertility OBJ: 8

14. Preimplantation genetic diagnosis is a reliable method for selecting the sex of a child.

    ANS: T REF: Infertility OBJ: 8

15. Mothers who give up their children for adoption often experience guilt, feelings of loss, and curiosity about how their child is developing and adjusting.

    ANS: T REF: Infertility OBJ: 8

**SHORT ANSWER**

1. Briefly describe the difference(s) between cell division as the result of "meiosis" and cell division as the result of "mitosis."

   ANS:
   Meiosis is also referred to as "reduction division." This means that the 46 chromosomes within the cell nucleus line up into 23 pairs. These 23 pairs then split and one member from each pair goes to each newly formed cell. Because of this, the newly formed cells have half the genetic material contained in the original cell. In this sense, the cells are not identical but share 50 percent genetic similarity. With mitosis, the identical genetic code is carried into each newly formed cell in the body. In other words, these cells, when they divide, are identical to the cells that divided to form them. Cloning results from mitosis. Because the newly formed cells are "replications" of the preceding cell, there is no genetic variability.

   OBJ: 2

2. Briefly describe the difference(s) between "recessive" and "dominant" genes.

   ANS:
   Some genes are "dominant" and others are "recessive." Dominant genes are more likely to be expressed than recessive genes. Eye color is a good example. With eye color, brown eyes are dominant and blue eyes are recessive. If one parent carries the gene for brown eyes only and the other for blue eyes only, the offspring would have brown eyes (that color would dominate). If, however, both parents carry recessive genes for blue eyes, those can combine and blue eyes will be expressed. In a sense, two recessive genes can overcome the dominance of a single gene.

   OBJ: 3

*Chapter 2*

3. What are chromosomal disorders?

   ANS:
   Chromosomal disorders occur when children do not have the correct pairings or complement of 46 chromosomes. Chromosomal abnormalities are more common in children of older mothers and fathers. Down syndrome, for example, is caused by having an extra chromosome on the 21st pair, resulting in 47 chromosomes. There are also disorders linked to the sex chromosomes. For example, "supermales" have an extra Y chromosome on the 23rd pair. Males with an extra X chromosome are said to have Klinefelter's syndrome, characterized by underdeveloped male secondary sex characteristics and mild mental retardation. A female with a single X chromosome is said to have Turner's syndrome, characterized by underdevelopment of female secondary sex characteristics and problems in mathematics and visual-spatial skills.

   OBJ: 4

4. A friend of yours is pregnant. She has read about the potential problems that could occur with a pregnancy. Based on this chapter, what three pieces of advice would you offer to ease this person's concerns for her unborn child?

   ANS:
   The chances of problems during pregnancy are enhanced by external factors such as toxins (alcohol, smoking) and maternal characteristics (such as genetics and age at conception). Some of these things can be minimized and/or avoided. If the person is really worried, she may want to consider prenatal testing to see if there are serious disorders she might want to be aware of. Additionally, however, it should be acknowledged that genetic screening procedures do bring some element of risk to the pregnancy. The best thing the mother can do is to make the fetal environment as healthy as possible. She can exercise, take prenatal vitamins, eat a balanced diet, and refrain from smoking or ingesting alcohol and other drugs. Lastly, her overall chances of delivering a healthy child are significantly higher than of having a child with a disease or a disorder.

   OBJ: 5

5. A friend has asked you to describe the difference between "genotype" and "phenotype." Based upon the material in Chapter Two of the textbook, how would you describe the difference?

   ANS:
   Genotype refers to the genetic material that is received from one's parents. Characteristics such as blood type and eye color, for example, are determined by our genotype. Genotype determines a range in which we might develop. It might, for example, determine how intelligent we could become. But genotype alone does not determine who or what we become. Our phenotype refers to how our characteristics are expressed. Someone might, for example, have the potential to grow quite tall. But the environment and other forces, such as nutrition, may influence how much of that genotype potential for height is realized. Phenotypes, then, are the product of both genetic and environmental influences.

   OBJ: 6