Chapter 2—Heredity and Conception

MULTIPLE CHOICE

1. The field of biology that studies heredity is called:
   a. etiology.
   b. genetics.
   c. ecology..
   d. eugenics.

   ANS: B DIF: Easy REF: 2-1 The Influence of Heredity on Development
   OBJ: 2-1 MSC: TYPE: Factual

2. Genetics influence:
   a. physical traits.
   b. physical traits and social characteristics.
   c. physical traits and psychological problems.
   d. physical traits, social characteristics, and psychological problems.

   ANS: D DIF: Easy REF: 2-1 The Influence of Heredity on Development
   OBJ: 2-1 MSC: TYPE: Factual

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

   ANS: B DIF: Moderate REF: 2-1 The Influence of Heredity on Development
   OBJ: 2-1 MSC: TYPE: Factual

4. What shape best describes chromosomes?
   a. cones
   b. rods
   c. circles
   d. octagons

   ANS: B DIF: Difficult REF: 2-1 The Influence of Heredity on Development
   OBJ: 2-1 MSC: TYPE: Factual

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

   ANS: C DIF: Moderate REF: 2-1 The Influence of Heredity on Development
   OBJ: 2-1 MSC: TYPE: Factual

6. Polygenic traits are those that are :
   a. are determined by a single pair of genes.
   b. are uncommon in humans.
   c. are transmitted by the mother.
   d. a result of several pairs of genes.

   ANS: D DIF: Difficult REF: 2-1 The Influence of Heredity on Development
   OBJ: 2-1 MSC: TYPE: Factual

7. According to the International Human Genome Sequencing Consortium (2006), we have _____ genes in every cell of our bodies.
   a. 2,000-2,500
   b. 20,000-25,000
   c. 200,000-250,000
   d. 2,000,000-2,500,000

   ANS: B DIF: Difficult REF: 2-1 The Influence of Heredity on Development
   OBJ: 2-1 MSC: TYPE: Factual

8. If you were walking through a hardware stores such as Home Depot, which of the following items for sale would be the most likely to make you think of a strand of DNA?
   a. a twisting ladder.
   b. a rack of garden stakes.
   c. an aisle of pipes and tubes.
   d. a mixed-up tub of screws and nails.

   ANS: A DIF: Moderate REF: 2-1 The Influence of Heredity on Development
   OBJ: 2-1 MSC: TYPE: Application

9. In DNA, adenine is paired with:
   a. thymine.
   b. guanine.
   c. cytosine.
   d. polynine.

   ANS: A DIF: Difficult REF: 2-1 The Influence of Heredity on Development
   OBJ: 2-1 MSC: TYPE: Factual

10. 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 DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

11. Of the 46 chromosomes in a normal human cell, how many are contributed by the mother?
    a. 1
    b. 22
    c. 23
    d. It depends on the sex of the child

    ANS: C DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

12. Which of the following most accurately describes the function of genes?
    a. they regulate the development of traits
    b. they determine the gender of the child
    c. they work together with lutein to influence development
    d. they negate the influence of one's environment in the development of traits

    ANS: A DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

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

    ANS: A DIF: Easy REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

14. During mitosis:
    a. sperm and ova cells are created.
    b. 23 chromosomes are created.
    c. new cells with identical DNA are created.
    d. mutations are impossible.

    ANS: C DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

15. A(n) _____ refers to a sudden variation in a heritable characteristic that occurs by accident or chance.
    a. mutation
    b. teratogen
    c. germination
    d. ovum

    ANS: A DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

16. "Reduction division" is another term for:
    a. mitosis.
    b. cell death.
    c. meiosis.
    d. neural pruning.

    ANS: C DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

17. Which method of cell reproduction allows for more genetic "variability?"
    a. cloning
    b. meiosis
    c. cross-fertilization
    d. mitosis

    ANS: B DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Conceptual

18. Of the twenty-three pairs of chromosomes, twenty-two pairs look alike and possess genetic information concerning the same traits. These are called :
    a. sex chromosomes.
    b. homosomes.
    c. autosomes.
    d. monosomes.

    ANS: A DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

19. How many chromosomes does a cell created during meiosis contain?
    a. 23
    b. 25
    c. 43
    d. 46

    ANS: A DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

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

    ANS: D DIF: Easy REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

21. The typical sex chromosome pattern for males is _____.
    a. XX
    b. XY
    c. XYY
    d. XXY

    ANS: B DIF: Easy REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

22. The typical sex chromosome pattern for females is _____.
    a. XX
    b. XY
    c. XYY
    d. XXY

    ANS: A DIF: Easy REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

23. A zygote that divides into two cells that separate results in:
    a. identical twins.
    b. fraternal twins.
    c. conjoined twins.
    d. mitosis.

    ANS: A DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

24. Which pair of relatives has the most similar genetic material?
    a. dizygotic twins
    b. non-twin siblings
    c. cousins
    d. monozygotic twins

    ANS: D DIF: Moderate REF: p. 32 OBJ: 2-1
    MSC: TYPE: Application

25. Monozygotic twins are to dizygotic twins as
    a. sharing 50% of genes is to sharing 100% of genes
    b. sharing 100% of genes is to sharing 50% of genes
    c. sharing 50% of genes is to sharing 25% of genes
    d. sharing 25% of genes is to sharing 50% of genes

    ANS: B DIF: Easy REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Conceptual

26. 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 DIF: Easy REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

27. 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 DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

28. What is it called when someone has two alleles for the same trait?
    a. heterozygous
    b. dizygotic
    c. monozygotic
    d. homozygous

    ANS: D DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

29. If a child receives a dominant allele for "tallness" from one parent and a recessive allele for "shortness" from the other, what do we know?
    a. The child will be average in height.
    b. The child has two short parents.
    c. The child will probably be tall.
    d. The child will probably be born short.

    ANS: C DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Application

30. 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 DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Application

31. Someone with two alleles for brown eyes:
    a. is homozygous for that trait.
    b. has eye color as a co-dominant trait.
    c. is referred to as "atypical."
    d. will have blue eyes.

    ANS: A DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Application

32. Do you remember learning "When two vowels go walking, the first does the talking" as part of your English lessons? If we apply that lesson to genetics, finish the following thought: "When a dominant allele and a recessive allele go walking..."
    a. the dominant allele does the talking.
    b. the recessive allele does the talking.
    c. both alleles do the talking at the same time.
    d. the alleles cancel each other out and the trait will not appear.

    ANS: A DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Application

33. If an individual gets a recessive allele for eye color from both parents:
    a. the gender of the child will determine if that trait is shown.
    b. the recessive trait will develop in the child.
    c. the trait will develop 50% of the time.
    d. the trait will be turned off and the dominant trait will be expressed.

    ANS: B DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

34. 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 DIF: Easy REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

35. Jill has the genetic code for Von Willebrand disease in her body, but she has never developed the illness herself. Jill would be considered
    a. a carrier of Von Willebrand disease.
    b. monozygotic for Von Willebrand disease.
    c. dizygotic for Von Willebrand disease.
    d. homozygous for Von Willebrand disease.

    ANS: A DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

36. Which of the following would not be considered a multifactorial problem?
    a. cystic fibrosis.
    b. epilepsy.
    c. Diabetes mellitus
    d. peptic ulcers

    ANS: A DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

37. What do we know about Down's syndrome?
    a. It is caused by a defect on the sex chromosomes.
    b. It is significantly more likely in boys than girls.
    c. It is caused by a virus during pregnancy.
    d. It is increasingly likely among individuals born to older parents.

    ANS: D DIF: Easy REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

38. Individuals with Down's syndrome:
    a. do not typically suffer adjustment problems.
    b. have few, if any, physical problems.
    c. have moderate to severe cognitive impairments.
    d. have chromosomal damage on the 8^{th} chromosome.

    ANS: C DIF: Easy REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

39. Down's syndrome is linked to:
    a. alcohol abuse by the father.
    b. an extra 21^{st} chromosome.
    c. sex-linked chromosomal abnormalities.
    d. alcohol abuse by the mother.

    ANS: B DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

40. Which of the following describes the sex chromosomal structure of "supermales?"
    a. XY
    b. XXY
    c. XYY
    d. Y

    ANS: C DIF: Easy REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

41. Of every 500 males born, about how many are statistically likely to have Klinefelter syndrome?
    a. zero, because this disorder affects only females
    b. 50
    c. 5
    d. 1

    ANS: D DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

42. In comparison to the average male population, individuals with Klinefelter 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 DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

43. Rico is a man who has enlarged breasts and suffers from mild mental retardation. He has a particular problem learning language skills, and his body produces lower than normal levels of testosterone. From which condition does Rico suffer?
    a. Klinefelter syndrome
    b. Turner syndrome
    c. Tay-Sachs disease
    d. Down syndrome

    ANS: A DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Application

44. A girl with Turner syndrome would probably:
    a. have unusually well-developed skills in mathematics.
    b. produce higher than normal amounts of estrogen.
    c. have abnormal external genitalia.
    d. be infertile.

    ANS: D DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Application

45. Girls with Turner's syndrome:
    a. have visible physical abnormalities.
    b. produce low levels of estrogen.
    c. produce more testosterone than normal.
    d. are more likely to give birth to twins.

    ANS: B DIF: Easy REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

46. Klinefelter syndrome occurs when:
    a. genetic females have an extra X chromosome.
    b. genetic females have an extra Y chromosome.
    c. genetic males have an extra X chromosome.
    d. genetic males have an extra Y chromosome.

    ANS: C DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

47. Compared to girls with XX sex chromosomes, girls with Turner's syndrome:
    a. have an XXX chromosomal pattern.
    b. have an XXY chromosomal pattern.
    c. have an OO chromosomal pattern.
    d. have an XO chromosomal pattern.

    ANS: D DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

48. If a child is diagnosed with phenylketonuria, they
    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 DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

49. Of the following disorders, the one with which a person would be least likely to be diagnosed is:
    a. Huntington's disease.
    b. phenylketonuria.
    c. Klinefelter syndrome.
    d. Turner's syndrome.

    ANS: A DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

50. Huntington's disease is characterized by all but which of the following symptoms?
    a. uncontrollable muscle movements
    b. loss of intellectual functioning
    c. personality change
    d. in ability to metabolize the amino acid phenylalanine

    ANS: D DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

51. The individual who would be most likely to develop sickle-cell anemia is:
    a. a European American
    b. an African American
    c. a Native American
    d. an Asian American

    ANS: B DIF: Easy REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

52. Sickle-cell anemia is caused by:
    a. a mutation of the 13th chromosome.
    b. a single segment found only on the Y chromosome.
    c. a recessive gene.
    d. high levels of cholesterol and blood sugar.

    ANS: C DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

53. Approximately _____ African Americans is a carrier of sickle-cell anemia.
    a. 1 in every 5
    b. 1 in every 10
    c. 1 in every 20
    d. 1 in every 100

    ANS: B DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

54. Which of the following illnesses involves a degenerative breakdown of the central nervous system?
    a. Tay-Sachs disease
    b. Huntington’s disease
    c. Cystic fibrosis
    d. Klinefelter syndrome

    ANS: B DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

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

    ANS: A DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Application

56. Which of the following individuals is LEAST likely to have Tay-Sachs disease?
    a. Mordecai, an 8-year-old boy
    b. Yisroel, a 4-year-old boy
    c. Shira-Leia, a 2-year-old girl
    d. Brindel, a 1-year-old girl

    ANS: A DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Application

57. Cystic fibrosis is caused by:
    a. incomplete mitosis.
    b. an abnormality in the 21st pair of chromosomes.
    c. a recessive gene.
    d. a dominant gene.

    ANS: C DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

58. Hemophilia is:
    a. a disease that only affects females.
    b. carried on the X chromosome.
    c. caused by damage to the 14th chromosomal pair.
    d. recessive with the father's chromosomes.

    ANS: B DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

59. Which of the following facts about color blindness is accurate?
    a. It is an enzymatic disorder.
    b. It is a protein-based disorder.
    c. It is a sex-linked abnormality.
    d. It is found only in females.

    ANS: C DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

60. Sex-linked diseases are more likely to affect sons of female carriers because:
    a. they are carried on the Y chromosome.
    b. they are carried on dominant genes.
    c. males only have one X chromosome, which they inherit from their mothers.
    d. males only have one X chromosome, which they inherit from their fathers.

    ANS: C DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Conceptual

61. 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 DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Conceptual

62. Which of the following people 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 DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Application

63. Which form of prenatal testing involves taking fluid from around the sac that contains the fetus?
    a. chorionic villus sampling
    b. amniocentesis
    c. ultrasound sonography
    d. alpha-fetoprotein (AFP) assay

    ANS: B DIF: Difficult REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

64. 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 sterile.

    ANS: A DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

65. CVS stands for:
    a. cervical variability study.
    b. chorionic villus sampling.
    c. chorionic variability sampling.
    d. cervical villus sampling.

    ANS: B DIF: Easy REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

66. Which of the following is true regarding amniocentesis and CVS?
    a. The risks of each procedure are equivalent.
    b. Both amniocentesis and CVS are performed 14 to 16 weeks after conception.
    c. Both procedures carry a small risk of causing a miscarriage.
    d. Both amniocentesis and CVS involve the examination of villi from the membrane that envelops the amniotic sac and fetus.

    ANS: C DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Conceptual

67. An ultrasound works by:
    a. using x-ray photography to take a picture of the unborn child.
    b. stimulating movements in the fetus that can be tracked using an internal camera.
    c. producing picture called a "cat-scan."
    d. reflecting sound waves off of the fetus.

    ANS: D DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

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

    ANS: A DIF: Easy REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

69. ____ is used to detect neural tube defects such as spina bifida.
    a. Genetic counseling
    b. An alpha-fetoprotein (AFP) assay
    c. An ultrasound
    d. A Rh compatibility test

    ANS: B DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Factual

70. Stephanie and Zack are expecting their first child. Their obstetrician recommends that they have an alpha-fetoprotein assay, because it can be used to:
    a. assess sex chromosome abnormalities.
    b. detect neural tube defects.
    c. assess the degree of mental retardation.
    d. measure enzyme levels in the fetus.

    ANS: B DIF: Moderate REF: 2-1 The Influence of Heredity on Development
    OBJ: 2-1 MSC: TYPE: Application

71. The genetic form or constitution of a person as determined by heredity is their:
    a. phenotype.
    b. temperament.
    c. genotype.
    d. personality.

    ANS: C DIF: Easy REF: 2-2 Heredity and the Environment
    OBJ: 2-2 MSC: TYPE: Factual

72. The actual characteristics or traits that a person displays are referred to as their:
    a. phenotype.
    b. temperament.
    c. genotype.
    d. personality.

    ANS: A DIF: Easy REF: 2-2 Heredity and the Environment
    OBJ: 2-2 MSC: TYPE: Factual

73. Our _____ reflect(s) both genetic and environmental influences.
    a. phenotype
    b. genes
    c. chromosomes
    d. genotype

    ANS: A DIF: Moderate REF: 2-2 Heredity and the Environment
    OBJ: 2-2 MSC: TYPE: Conceptual

74. Which of the following is true about children and siblings, assuming that they are not identical twins?
    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 DIF: Moderate REF: 2-2 Heredity and the Environment
    OBJ: 2-2 MSC: TYPE: Factual

75. Monozygotic twins:
    a. share 50% of their genetic material.
    b. are formed from two eggs but fertilized by the same sperm.
    c. are as different as typical siblings.
    d. will look very similar in physical appearance.

    ANS: D DIF: Moderate REF: 2-2 Heredity and the Environment
    OBJ: 2-2 MSC: TYPE: Factual

76. Berta and Rosie are dizygotic twins. Which of the following statement is probably the most applicable to these sisters?
    a. They will share 50% of their genes.
    b. They were formed from two eggs that were fertilized by the same sperm.
    c. They are very likely to be virtually identical in their physical appearance.
    d. They will share 100% of their genes.

    ANS: A DIF: Moderate REF: 2-2 Heredity and the Environment
    OBJ: 2-2 MSC: TYPE: Application

77. Which of the following would probably exert the most influence over the behavioral similarity of a pair of monozygotic twins?
    a. having parents and others who treat them alike.
    b. the degree of genetic similarity they share.
    c. whether the twins are male or female.
    d. whether their mother had an amniocentesis during the pregnancy.

    ANS: A DIF: Moderate REF: 2-2 Heredity and the Environment
    OBJ: 2-2 MSC: TYPE: Application

78. Which of the following are monozygotic twins more likely to inherit than dizygotic twins?
    a. schizophrenia
    b. depression and schizophrenia
    c. autism, depression, and schizophrenia
    d. autism, depression, schizophrenia, and a vulnerability to alcoholism

    ANS: D DIF: Moderate REF: 2-2 Heredity and the Environment
    OBJ: 2-2 MSC: TYPE: Application

79. If an adopted child is more similar on a particular characteristic to his/her natural 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 DIF: Difficult REF: 2-2 Heredity and the Environment
    OBJ: 2-2 MSC: TYPE: Conceptual

80. 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 DIF: Moderate REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Factual

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

    ANS: B DIF: Moderate REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Factual

82. Before meiosis, a sperm cell:
    a. contains 46 chromosomes.
    b. is significantly larger than an egg cell.
    c. contains two X chromosomes.
    d. is more likely to produce a girl than a boy.

    ANS: A DIF: Difficult REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Factual

83. Which of the following is true of a sperm cell?
    a. It is significantly larger than the egg cell.
    b. It contains two Y chromosomes.
    c. It does not determine the gender of the developing child.
    d. It is one of the smallest types of cells in the body.

    ANS: D DIF: Moderate REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Factual

84. Anna and Jason have recently decided to attempt to get pregnant. Jason says, "I really hope our first child is a boy!" Which of the following would be the most accurate response for Anna to make?
    a. Well, sperm cells with a Y chromosome swim faster than those with an X, so you may just get your wish!
    b. That probably won't happen, honey, because for every 100 boys who are conceived there are 120 to 150 girls who are conceived.
    c. That will probably be the case, because approximately 80% of "oldest siblings" are boys.
    d. Well, I don't think you have a say in the matter because the mother's egg determines the sex of the baby.

    ANS: A DIF: Difficult REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Application

85. Approximately how many sperm cells are contained in the average ejaculation of semen?
    a. 1000
    b. 150 million
    c. 350,000
    d. 2.5 billion

    ANS: B DIF: Easy REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Factual

86. Only 1 in 1,000 sperm will ever arrive in the vicinity of an ovum. Of the following, how many are known factors that prevent a sperm cell from reaching an ovum after ejaculation? (a) gravity, (b) vaginal acidity, (c) current of vaginal fluid coming from the cervix, (d) the length of the fallopian tubes.
    a. 1
    b. 2
    c. 3
    d. 4

    ANS: C DIF: Moderate REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Factual

87. 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 reject the chromosomes from the sperm cell.
    d. the chromosomes from an egg and a sperm combine to form 23 new pairs with a unique set of genetic instructions.

    ANS: D DIF: Easy REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Factual

88. The term “infertility” is typically applied after a couple has failed to conceive after:
    a. four attempts to get pregnant.
    b. one year of attempts.
    c. four years of attempts.
    d. two miscarriages in the fourth month of pregnancy.

    ANS: B DIF: Moderate REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Factual

89. In American couples, infertility occurs in approximately:
    a. one in every 6 or 7 couples.
    b. one in every 15 couples.
    c. one in every 25 couples.
    d. one in every 50 couples.

    ANS: A DIF: Moderate REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Factual

90. _____ can cause infertility problems in men.
    a. Excess protein in the diet.
    b. Lack of exercise.
    c. Use of drugs.
    d. Excessive masturbation.

    ANS: C DIF: Moderate REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Factual

91. The sperm's ability to move is called:
    a. the backstroke.
    b. propulsion.
    c. evolution.
    d. motility.

    ANS: D DIF: Easy REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Factual

92. The most common infertility problem in women is:
    a. irregular or absent ovulation.
    b. endometriosis.
    c. barriers to the passageways through which the ovum must pass.
    d. PID.

    ANS: A DIF: Moderate REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Factual

93. 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. none of the above

    ANS: B DIF: Easy REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Factual

94. Surrogate mothers:
    a. provide eggs to be implanted into another woman.
    b. are allowed to keep the babies that they carry.
    c. usually give birth to twins.
    d. carry newly conceived babies to term for other women.

    ANS: D DIF: Easy REF: 2-3 Conception: Against All Odds
    OBJ: 2-3 MSC: TYPE: Factual

95. Shayla has a fertility problem where she does not produce ova on her own. To overcome this problem, she decides that she will undergo _____ in-vitro fertilization, where an ovum from another woman is fertilized with sperm from her husband and is then implanted in her uterus.
a. transfer
b. perinatal
c. surrogate
d. donor

ANS: D DIF: Difficult REF: 2-3 Conception: Against All Odds
OBJ: 2-3 MSC: TYPE: Application

96. What is the term for the process by which ova are fertilized in vitro, tested for sex chromosomal structure, and then embryos of the desired sex are implanted into the mother-to-be?
a. PID
b. PGD
c. IVF
d. "Microsort"

ANS: B DIF: Difficult REF: 2-3 Conception: Against All Odds
OBJ: 2-3 MSC: TYPE: Factual

97. The three prenatal stages, in order, are:
a. germinal, fetal, embryonic.
b. meiotic, embryonic, fetal.
c. germinal, embryonic, fetal.
d. embryonic, fetal, meiotic.

ANS: C DIF: Moderate REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

98. During the _____ stage of prenatal development, conception occurs, the zygote divides, and then implantation in the uterine wall occurs.
a. fetal
b. embryonic
c. mitotic
d. germinal

ANS: D DIF: Difficult REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

99. An _____ is to the formation of the digestive and respiratory systems as the _____ is to the formation of the excretory, reproductive, and circulatory systems.
a. endoderm; mesoderm
b. mesoderm; ectoderm
c. ectoderm; endoderm
d. mesoderm; endoderm

ANS: A DIF: Difficult REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Conceptual

100. The _____ is a fluid-filled ball of cells that develops during the germinal stage of pregnancy.
a. germin
b. blastocyst
c. fetus
d. umbilicus

ANS: B DIF: Moderate REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

101. Unfortunately, miscarriage occurs in approximately one-_____ of all pregnancies, and most occur within the first _____ of the pregnancy.
a. fifth; 1 month
b. third; 3 months
c. quarter; 2 months
d. half; 4 months

ANS: B DIF: Difficult REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

102. During the _____ stage of prenatal development, the major organ systems begin to differentiate.
a. germinal
b. embryonic
c. fetal
d. blastocystic

ANS: B DIF: Easy REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

103. The neural tube becomes the _____ during the embryonic stage of prenatal development.
a. central nervous system
b. digestive system
c. muscular system
d. arm buds and leg buds

ANS: A DIF: Moderate REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

104. Sexual differentiation occurs:
a. during the germinal period.
b. as a result of the presence or absence of an X chromosome.
c. because of the presence of secondary sex characteristics.
d. as a result of the presence or absence of a Y chromosome.

ANS: D DIF: Moderate REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Conceptual

105. The developing fetus is contained within the _____ sac.
a. amniotic
b. maternal
c. umbilical
d. placental

ANS: A DIF: Easy REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

106. The placenta:
a. develops from only the mother's tissue.
b. acts as a filter that permits oxygen and nutrients to reach the embryo from the mother.
c. is an impermeable barrier that protects the developing fetus from all toxins.
d. is reabsorbed by the mother's body after childbirth is complete.

ANS: B DIF: Moderate REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

107. During the _____ stage, the developing organism gains the most weight and length.
a. embryonic
b. fetal
c. diaphragmatic
d. germinal

ANS: B DIF: Easy REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

108. Research on fetuses during the third trimester has shown:
a. fetuses are unresponsive to outside stimuli.
b. fetuses respond to changes in loudness but not differences in pitch.
c. fetuses can learn to recognize the sounds of books being read to them.
d. fetuses respond to visual, but not auditory stimuli.

ANS: C DIF: Moderate REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

109. Which of the following is true regarding nutrition during pregnancy?
   a. Pregnant women can eat and drink whatever they want, since their fetuses are not affected by what the pregnant woman consumes and the placenta protects the child from any ingested toxins.
   b. Fetal overnutrition is more of a problem than fetal malnutrition.
   c. The effects of fetal malnutrition cannot be overcome after birth.
   d. Supplementing the diets of pregnant women with calories and protein has shown to have modest positive effects on motor development of infants.

   ANS: D DIF: Difficult REF: 2-4 Prenatal Development
   OBJ: 2-4 MSC: TYPE: Factual

110. What is the most accurate information regarding how much weight women gain during pregnancy?
   a. All women should gain 10 pounds or fewer during pregnancy.
   b. The average weight gain during pregnancy is 25 to 35 pounds, but this can vary for different women based on their body size before getting pregnant.
   c. Women should gain the most during their first trimester of pregnancy.
   d. All of the weight gain should be in the baby, not in the mother's body.

   ANS: B DIF: Moderate REF: 2-4 Prenatal Development
   OBJ: 2-4 MSC: TYPE: Factual

111. Teratogens:
   a. are environmental agents that can harm the embryo or fetus.
   b. are most damaging during the fetal period of development.
   c. are only those substances the mother's body produces.
   d. harm the fetus only when taken in extremely large doses.

   ANS: A DIF: Moderate REF: 2-4 Prenatal Development
   OBJ: 2-4 MSC: TYPE: Factual

112. Routine blood tests early in a pregnancy can detect the _____ bacterium, which is a teratogen that can cause a miscarriage or stillbirth.
   a. gonorrhea
   b. chlamydia
   c. syphilis
   d. herpes

   ANS: C DIF: Easy REF: 2-4 Prenatal Development
   OBJ: 2-4 MSC: TYPE: Factual

113. The human immunodeficiency virus can be transmitted in several ways. Which of the following is *not* one of them?
   a. sexual relations
   b. blood transfusions
   c. a dirty toilet seat
   d. breast feeding

   ANS: C DIF: Easy REF: 2-4 Prenatal Development
   OBJ: 2-4 MSC: TYPE: Factual

114. Rubella, or German measles:
   a. only causes a mild rash in newborns.
   b. causes deafness, mental retardation, heart disease, and eye problems.
   c. should be vaccinated against during pregnancy.
   d. is never seen in American children anymore.

   ANS: B DIF: Moderate REF: 2-4 Prenatal Development
   OBJ: 2-4 MSC: TYPE: Factual

115. Dana is pregnant with her first child, and she has been diagnosed with toxemia. This condition, which is also called _____, is responsible for 15 to 20% of pregnancy-related maternal deaths.
a. maternal hypercholesterolemia
b. Bahcet's disease
c. preeclampsia
d. gestational diabetes

ANS: C DIF: Difficult REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Application

116. Rh incompatibility:
a. is usually most severe during a woman's first pregnancy.
b. is an untreatable condition.
c. is a problem for about 90% of American couples.
d. causes a mother's body to produce antibodies that attack the fetus or newborn and cause brain damage or death.

ANS: D DIF: Moderate REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

117. Commonly used medications:
a. never harm a developing fetus.
b. should be taken after consultation with one's doctor.
c. can never be taken during pregnancy.
d. are not toxic to a fetus; only illicit drugs are.

ANS: B DIF: Easy REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

118. _____ was/were a drug used to treat insomnia and nausea and caused major birth defects, including missing or stunted limbs.
a. Antibiotics
b. Hormones
c. Thalidomide
d. DES

ANS: C DIF: Difficult REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

119. Which of the following hormones can lead to an alteration of the genitals of a female baby when taken by a pregnant woman?
a. DES
b. Melatonin
c. Progestin
d. Adrenal androgen

ANS: C DIF: Moderate REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

120. Alcohol consumption during pregnancy:
a. should be encouraged, since it relaxes the mother.
b. may lead to cognitive deficits and physical malformations.
c. is safe as long as there are fewer than two drinks consumed per day.
d. is safe after the end of the second trimester.

ANS: B DIF: Moderate REF: 2-4 Prenatal Development
OBJ: 2-4 MSC: TYPE: Factual

121. Research on the effects of caffeine consumption during pregnancy is:
    a. unethical to conduct.
    b. never done, since few women consume caffeine while pregnant.
    c. likely to prove that it has the same effect as cocaine on the developing fetus.
    d. inconsistent in terms of its effects.

    ANS: D DIF: Moderate REF: 2-4 Prenatal Development
    OBJ: 2-4 MSC: TYPE: Factual

122. Cigarette smoking during pregnancy:
    a. has no long-term adverse effects.
    b. is not toxic to the developing fetus since the placenta protects it from harm.
    c. is associated with low-birth weight and increased risk of stillbirth and infant mortality.
    d. is only a problem if the woman smokes; secondhand smoke holds no risk for the developing fetus.

    ANS: C DIF: Moderate REF: 2-4 Prenatal Development
    OBJ: 2-4 MSC: TYPE: Factual

123. Environmental hazards:
    a. are only a problem if the pregnant woman was exposed during the embryonic period of development.
    b. include lead, mercury, PCBs, zinc, and radiation.
    c. can lead to mental retardation, but rarely cause physical deformations.
    d. include ultrasound and x-rays.

    ANS: B DIF: Moderate REF: 2-4 Prenatal Development
    OBJ: 2-4 MSC: TYPE: Factual

124. How is parents' age related to successful childbearing?
    a. Parents' age is unrelated to childbearing success.
    b. The optimal time for childbearing is during one's teens.
    c. Women in their 20s are at greater risk for miscarriage and inadequate prenatal care compared with teen and older mothers.
    d. There may be an optimal time for childbearing for both mothers and fathers.

    ANS: D DIF: Moderate REF: 2-4 Prenatal Development
    OBJ: 2-4 MSC: TYPE: Conceptual

125. Marvin is a 53-year old man, and his wife is pregnant with their first child. Statistically, Marvin's age would be associated with a ___ in 10,000 chance that his child will have an autism spectrum disorder.
    a. 6
    b. 9
    c. 32
    d. 52

    ANS: D DIF: Difficult REF: 2-4 Prenatal Development
    OBJ: 2-4 MSC: TYPE: Application

MATCHING

Match the following:

a. An example of a sex-linked genetic abnormality that is not chromosomal in nature
b. Both alleles for a trait are the same
c. Cell division that results in identical cells
d. The genetic material received from parents
e. An illness caused by a recessive gene
f. A trait that is determined by a single gene
g. The primary male hormone
h. The chromosomal pattern for a male
i. Twins that are produced from a single fertilized ovum
j. Cell division that results in non-identical cells
k. The union of an ovum and a sperm cell
l. A primary female hormone
m. A condition associated with an extra of the 21st pair of chromosomes
n. How genetic material manifests itself in characteristics
o. Twins that are produced from two fertilized ova
p. A condition caused by XXY sex chromosomal pattern
q. A characteristic that is determined by one's father
r. When both alleles for a trait differ
s. A condition caused by a dominant gene
t. The chromosomal pattern for a female

1. XY
2. Monozygotic
3. Sickle-cell anemia
4. Meiosis
5. Phenotype
6. Homozygous
7. Hemophilia
8. Down syndrome
9. Huntington's disease
10. Blood type
11. Dizygotic
12. Mitosis
13. Genotype
14. Heterozygous
15. Testosterone
16. Sex of a child
17. XX
18. Estrogen
19. Conception
20. Klinefelter syndrome

1. ANS: H
2. ANS: I
3. ANS: E
4. ANS: J
5. ANS: N
6. ANS: B
7. ANS: A
8. ANS: M
9. ANS: S
10. ANS: F
11. ANS: O
12. ANS: C
13. ANS: D
14. ANS: R
15. ANS: G
16. ANS: Q
17. ANS: T
18. ANS: L
19. ANS: K
20. ANS: P

COMPLETION

1. The branch of biology that studies heredity is called **_____.**

   ANS: genetics

2. **_____** is the process of duplicating identical cells.

   ANS: Mitosis

3. **_____** produces ova ('egg') and sperm cells.

   ANS: Meiosis

4. Each member of a pair of genes is termed a(n) **_____.**

   ANS: allele

5. Diabetes mellitus, epilepsy, and peptic ulcers are **_____** problems, which means they reflect both a genetic predisposition and environmental contributors.

   ANS: multifactorial

6. Approximately 1 girl in 2,500 has a single X chromosome and as a result develops **_____** syndrome.

   ANS: Turner

7. Some of the physical problems caused by **_____** include painful and swollen joints, jaundice, and potentially fatal conditions such as pneumonia, stroke, and heart and kidney failure.

   ANS: sickle-cell anemia

8. Amniocentesis is usually performed between **_____** weeks after conception.

   ANS: 14-16

9. The **_____ assay** is used to detect neural tube defects such as spina bifida and certain chromosomal abnormalities.

   ANS: alpha-fetoprotein (AFP)

10. **_____** is the union of an egg cell and a sperm cell.

    ANS: Conception

11. The sperm are injected into the woman's uterus at the time of ovulation in the process of artificial **_____**.

    ANS: insemination

12. During the _____ stage of prenatal development, the dividing cell mass takes the form of a fluid-filled ball of cells called a blastocyst.

    ANS: germinal

13. Development follows _____ (Latin for "head to tail") and _____ (Latin for "near to far") trends.

    ANS: cephalocaudal, proximodistal

14. The _____ is a mass of tissue that permits the embryo (and, later on, the fetus) to exchange nutrients and wastes with the mother.

    ANS: placenta

15. Maternal _____ has been linked to low birth weight, prematurity, retardation of brain development, cognitive deficiencies, behavioral problems, and even cardiovascular disease.

    ANS: malnutrition

16. _____ are environmental agents that can harm the embryo or fetus.

    ANS: Teratogens

17. Exposure to particular teratogens is most harmful during _____ periods that correspond to the times when organs are developing.

    ANS: critical periods

18. Women who are infected with _____ during the first 20 weeks of pregnancy stand at least a 20% chance of bearing children with birth defects such as deafness, mental retardation, heart disease, or eye problems, including blindness.

    ANS: rubella (or the German measles)

19. _____ is a life-threatening disease characterized by high blood pressure that may afflict women late in the second or early in the third trimester.

    ANS: Toxemia (or preeclampsia)

20. _____ was taken by women in the 1940s and 1950s to prevent miscarriage, but it was shown to cause cervical and testicular cancer in some offspring.

    ANS: DES

21. The babies of women who regularly used _____ show increased tremors and startling, suggesting immature development of the nervous system.

    ANS: marijuana

22. Infants whose mothers abused _____ during pregnancy are often excitable and irritable, or lethargic.

    ANS: cocaine

23. Some children of heavy drinkers develop _____ syndrome.

    ANS: fetal alcohol

24. Oxygen deprivation associated with maternal _____ is connected with impaired motor development, academic delays, learning disabilities, mental retardation, and hyperactivity.

    ANS: cigarette smoking (instructors may choose to accept “tobacco use”)

25. Women’s fertility declines gradually until the _____, after which it declines more rapidly.

    ANS: mid-30s

SHORT ANSWER

1. 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 genetic counseling 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. She should also have regular medical check-ups so that the progress of her pregnancy can be monitored by a physician. Lastly, her overall chances of delivering a healthy child are significantly higher than her chances of having a child with a disease or a disorder.

2. 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.

3. 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. If a person carries both a dominant and recessive gene for a given trait, they would be referred to as a carrier of the recessive gene. It would not be expressed in their phenotype, but could be passed along to the person’s offspring.

4. What is "amniocentesis?" When is it likely to be performed and what can be determined by doing so?

   ANS: Amniocentesis is a procedure that is sometimes used to detect genetic abnormalities in unborn children. The procedure involves withdrawing fluid from the amniotic sac that contains the fetus. Fetal cells that are contained in the fluid can then be examined for genetic abnormalities. This procedure is more likely to be done in mothers over the age of 35 because of increased risk for disorders such as Down syndrome. While it can also be used to determine the sex of the baby, the use of amniocentesis for this purpose is no longer practiced because it does carry about a 1% risk of causing a miscarriage.

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.

6. What are some of the major fertility problems for males and females? What are possible causes of these problems?

   ANS: For males, the primary fertility problems include low sperm count, deformed and low sperm motility and chronic diseases such as diabetes. For females, the primary fertility problems are irregular ovulation, declining hormones levels, endometriosis, and obstructions or malfunctions of the reproductive tract. The problems have genetic and environmental causes, such as overheating and pressure on the testes, aging, drug use, and bacterial or viral infections.

7. Describe two examples of recessive genetic disorders.

   ANS: There are several answers that can satisfy this question. Two such disorders are as follow: Sickle-cell anemia is a recessive disorder, since both parents must contribute a recessive allele for the disorder in order for the offspring to display the problem. In this disorder, the red blood cells become sickle-shaped which allows less oxygen to be carried in the body. This may impair cognitive abilities. Tay-Sachs disease is another recessive disorder, again, since both parents must contribute a recessive allele for the disease. It causes the central nervous system to degenerate with a loss in sensory abilities, mental ability, and then death by around age 5.

8. How does studying monozygotic and dizygotic twins help one understand the genetic basis for a trait or behavior?

   ANS: Monozygotic twins are identical in their genetic endowment, whereas dizygotic twins share as much of their genetics as non-twin siblings do. This difference allows researchers to tease apart the relative contributions of genetics and environment for a variety of different traits and behaviors, such as temperament, intelligence, personality, and so forth. When monozygotic twins have very different characteristics, there is a greater likelihood that genetics are not involved or at least are less involved in the development process. It is not always possible to determine whether something is genetically determined, however, since monozygotic twins often are treated in very similar ways since they appear to be so similar.

9. Describe two different methods of helping infertile couples.

   ANS: In vitro fertilization involves extracting ripened ova from a woman and introducing them to a man's sperm in a laboratory dish. Following fertilization, the fertilized ovum is then injected into the woman's uterus. In some cases, the ova are actually from a donor, if the woman is unable to release her own viable eggs. Surrogate mothers are also used by some infertile couples. The surrogate mother may either use her own ova or those of another woman and the sperm of the biological father or another donor and then carry the resulting baby to term. Surrogate mothers are often compensated for their time and effort. Adoption, while not a direct intervention to cause a pregnancy, is a way of helping couples who cannot conceive their own child become a family while providing important opportunities for children who need parents.

10. What is a teratogen? Describe two teratogens and the effects they have on the developing organism.

    ANS: A teratogen is any agent that can cause a birth defect. It may be an environmental factor, a maternal illness, or a drug or substance. There are many teratogens that can be cited for this answer. Two include thalidomide and alcohol. Thalidomide was a drug used to control insomnia and nausea during the 1960s for pregnant women. It led to the birth of thousands of babies with severe limb malformations. Alcohol use during pregnancy may cause facial and other abnormalities as well as mental retardation, hyperactivity, and other cognitive deficits.