

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 1) Chromosomes are strands of \_\_\_\_\_  
A) DNA molecules. B) RNA molecules.  
C) cytosine molecules. D) guanine molecules.
- 2) If Jose is a typical male, we would expect that inside of the nucleus of each cell in his body, there are how many pairs of chromosomes? \_\_\_\_\_  
A) 22 pairs B) 13 pairs C) 23 pairs D) 46 pairs
- 3) The pairs of chromosomes that are the same across males and females are known as \_\_\_\_\_  
A) DNA strands. B) autosomes.  
C) alleles. D) sex chromosomes.
- 4) In the sex chromosomes, females \_\_\_\_\_  
A) and males both have one X and one Y chromosome.  
B) have two X chromosomes, whereas males have one X and one Y chromosome.  
C) have one X and one Y chromosome, whereas males have two X chromosomes.  
D) have two Y chromosomes, whereas males have one X and one Y chromosome.
- 5) British researchers James Watson and Francis Crick are famous for their 1953 discovery \_\_\_\_\_  
A) of the makeup and shape of DNA molecules.  
B) that men and women have different DNA profiles.  
C) of the number of genes humans have.  
D) of the number of chromosomes people have.
- 6) The shape of DNA resembles a \_\_\_\_\_  
A) ladder. B) pretzel. C) ball. D) spiral staircase.
- 7) The statement "adenine always pairs with thymine and guanine always pairs with cytosine" refers to the pairing of \_\_\_\_\_  
A) lipid bases in a DNA molecule.  
B) phosphate bases in a DNA cell.  
C) genes in the single pair of sex chromosomes.  
D) nucleotide bases in a DNA molecule.
- 8) If a strand of nucleotide base pairs follows the sequence of C, T, G, G, A, you know that its complementary sequence on the other strand will be \_\_\_\_\_  
A) T, C, C, A, G. B) T, A, G, G, C. C) G, T, C, C, G. D) G, A, C, C, T.
- 9) A person's genetic code, which determines his or her traits or characteristics, is known as the person's \_\_\_\_\_  
A) allele. B) phenome. C) pheromone. D) genome.
- 10) A segment of the DNA strand that provides specific instructions for a particular structure, trait, or function is called a \_\_\_\_\_  
A) genome. B) nucleotide. C) chromosome. D) gene.
- 11) Which of the following statements concerning the human genetic code is FALSE? \_\_\_\_\_  
A) DNA consists of two strands of sugar and phosphate molecules that twist around each other.

- B) There are around 3 billion pairs of nucleotide bases along the 46 chromosomes in a cell.
- C) There are around 20,000 to 30,000 genes aligned along the 46 chromosomes in each cell.
- D) About 75% of the nucleotide base pairs in DNA molecules provide active instructions.

- 12) Scientists from around the world collaborated on the Human Genome Project. What was the main purpose of this project? 12) \_\_\_\_\_
- A) To determine the number of genes each human typically has
  - B) To compare the genomes of people of various races and cultures
  - C) To compare human genomes to what was known about animal genomes
  - D) To locate the position of every gene in the human genome
- 13) The Human Genome Project has already made it possible to do which of the following? 13) \_\_\_\_\_
- A) Select the healthiest embryos to carry to birth
  - B) Determine the sexual orientation of fetuses
  - C) Allow parents to select the sex of their embryos
  - D) Select embryos for optimal height and weight
- 14) All of the following are alternative techniques for conception EXCEPT 14) \_\_\_\_\_
- A) in vitro fertilization.
  - B) assisted in vitro fertilization.
  - C) canalization.
  - D) cryopreservation.
- 15) In vitro fertilization is a possible alternative technique for conception 15) \_\_\_\_\_
- A) in which embryos are frozen for several years and then placed directly into a substitute mother's uterus.
  - B) involving the implantation of a fertilized egg into the uterus of a substitute mother who delivers the baby.
  - C) in which a male donor's frozen sperm are thawed and placed directly into a woman's uterus.
  - D) that involves uniting sperm and egg in a petri dish and then placing several embryos in the uterus.
- 16) Dan and Robin have had difficulty becoming pregnant. They decide to go to a doctor who collects Robin's eggs and Dan's sperm. The eggs and sperm are then injected into Robin's fallopian tubes. Dan and Robin have just undergone 16) \_\_\_\_\_
- A) cryopreservation.
  - B) chorionic villus sampling.
  - C) assisted in vitro fertilization.
  - D) in vitro fertilization.
- 17) Research on children conceived by artificial insemination and in vitro fertilization indicates that these children 17) \_\_\_\_\_
- A) have higher rates of emotional problems.
  - B) do not have any particular developmental problems.
  - C) are usually told how they were conceived.
  - D) tend to be smaller than other children.
- 18) A sperm and egg have united and the fertilized cell has begun to divide. After the first division of this cell occurs, by what name do we refer to the new organism? 18) \_\_\_\_\_
- A) Zygote
  - B) Fetus
  - C) Allele
  - D) Embryo
- 19) The process of cell division that occurs when chromosomes are copied into each new cell is referred to as 19) \_\_\_\_\_
- A) osmosis.
  - B) mitosis.
  - C) gameosis.
  - D) meiosis.

- 20) Every cell in the human body contains an exact copy of the 46 original chromosomes in a single fertilized egg cell EXCEPT 20) \_\_\_\_\_  
A) certain mutations. B) sex cells.  
C) Both A and B are exceptions. D) Neither A nor B are exceptions.
- 21) A gamete is a 21) \_\_\_\_\_  
A) cluster of DNA strands along a specific sex chromosome.  
B) type of sex cell that becomes sperm upon entering the fallopian tube.  
C) sex cell containing half the number of chromosomes found in a regular cell.  
D) product of mitosis and is essential for healthy cell division.
- 22) Sperm and egg cells are formed during 22) \_\_\_\_\_  
A) fertilization. B) reproduction. C) mitosis. D) meiosis.
- 23) During meiosis, the chromosomes 23) \_\_\_\_\_  
A) increase in number from 23 to 46.  
B) remain single strands throughout the process.  
C) decrease in number from 46 to 23.  
D) do not exchange genetic material.
- 24) Which of the following is a function of meiosis? 24) \_\_\_\_\_  
A) Meiosis insures that genetic diversity occurs through "crossing over."  
B) Meiosis reduces the number of chromosomes in each gamete to 23.  
C) Both A and B are functions of meiosis.  
D) Neither A nor B is a function of meiosis.
- 25) The process of "crossing over" 25) \_\_\_\_\_  
A) ensures that characteristics will be transmitted from parents to offspring.  
B) ensures variability among the genetic codes of siblings.  
C) increases the potential for healthy sperm to reach the site of fertilization.  
D) decreases the likelihood of mutations, chromosomal abnormalities, and birth defects.
- 26) Brandon and Brenda are fraternal twins. Patty and Selma are sisters born four years apart. 26) \_\_\_\_\_  
Which of these two pairs of siblings is genetically most similar?  
A) The degree of similarity cannot be determined without DNA testing.  
B) Brandon and Brenda, the fraternal twins, are genetically most similar.  
C) The fraternal twins and the sisters are equal in genetic similarity.  
D) Patty and Selma, the sisters, are genetically most similar.
- 27) Which of the following statements regarding dizygotic (DZ) twins is FALSE? 27) \_\_\_\_\_  
A) DZ twins can be different sexes.  
B) DZ twins must have different fathers.  
C) The occurrence of DZ twins varies across ethnic groups.  
D) DZ twins can be very different in appearance.
- 28) DZ twinning occurs more often among 28) \_\_\_\_\_  
A) younger mothers. B) Africans.  
C) Caucasians. D) Asians.
- 29) Larry's new boyfriend, Alex, wants him to meet his twin sister, Alexis. Larry knows that Alex 29) \_\_\_\_\_  
must be a/an



- 39) In order for a child to inherit a recessive trait, 39) \_\_\_\_\_  
A) only the mother needs to have the trait.  
B) there must be some underlying biological weakness.  
C) both parents must either have the trait or be a carrier.  
D) only the father needs to have the trait.
- 40) Gilda has a disease that occurs in about 1 in every 2,000 children. Gilda has serious respiratory 40) \_\_\_\_\_  
problems and lung infections. Gilda probably  
A) has cystic fibrosis, but this should not affect how long she lives.  
B) has sickle-cell disease, and she is likely to die before the age of thirty unless she gets a lung  
transplant.  
C) has sickle-cell disease, but this should not affect how long she lives.  
D) has cystic fibrosis, and she is likely to die before the age of thirty unless she gets a lung  
transplant.
- 41) Sickle-cell disease (SCD) 41) \_\_\_\_\_  
A) is a rare genetic disorder.  
B) involves defective hemoglobin.  
C) is curable with aggressive therapy.  
D) is most common among Native Americans and Asians.
- 42) Your son comes home from kindergarten talking about a classmate who has "sticky blood that is 42) \_\_\_\_\_  
funny-shaped." You wonder if this classmate might have  
A) Huntington's disease. B) sickle cell anemia.  
C) Trisomy X. D) cystic fibrosis.
- 43) Which of the following statements regarding Tay-Sachs disease is TRUE? 43) \_\_\_\_\_  
A) People with Tay-Sachs do not live to reproductive age.  
B) Tay-Sachs disease is caused by a dominant gene.  
C) Tay-Sachs disease affects body tissues that secrete mucus.  
D) Symptoms of Tay-Sachs begin after the age of thirty.
- 44) Which of the following individuals is most likely to be diagnosed with Tay-Sachs? 44) \_\_\_\_\_  
A) Levi, who is Jewish and mentally retarded  
B) Jodi, who is deaf and having problems with blood clotting  
C) Pauli, a teenager with has breathing problems  
D) Selvi, who is a 9-year-old Indian girl
- 45) Relative to females, males are much more likely to suffer from classic hemophilia because 45) \_\_\_\_\_  
A) when males inherit the dominant hemophilia gene on their Y chromosomes, it is highly  
likely that they will also carry the gene on their X chromosome.  
B) when males inherit the recessive hemophilia gene on their X chromosomes, their Y  
chromosomes do not have a corresponding dominant gene to mask the disease.  
C) only males can inherit the dominant gene responsible for the blood-clotting disease on the  
larger of their two sex chromosomes.  
D) when males inherit the recessive hemophilia gene on their Y chromosomes, their X  
chromosomes do not have a corresponding dominant gene to mask the disease.
- 46) Which of the following is an example of an X-linked recessive trait? 46) \_\_\_\_\_  
A) Rett Syndrome B) Fragile X Syndrome  
C) Rickets D) Retinitis pigmentosa

- 47) In regard to diseases caused by dominant genes on the X chromosome, 47) \_\_\_\_\_  
A) males are twice as likely to show these diseases as females.  
B) females are twice as likely to show these diseases as males.  
C) females will not be susceptible to any diseases caused by these genes.  
D) males will not be susceptible to any diseases caused by these genes.
- 48) If we know that Ike is mentally retarded, your best guess is that it is due to 48) \_\_\_\_\_  
A) hemophilia. B) Fragile X Syndrome  
C) Turner Syndrome. D) rickets.
- 49) Which of the following statements regarding Fragile X Syndrome is FALSE? 49) \_\_\_\_\_  
A) Fragile X Syndrome involves only the individual's sex chromosomes.  
B) Fragile X Syndrome occurs in about 1 in 5,000 males and 1 in 10,000 females.  
C) Mental retardation and facial deformities are the primary features of Fragile X Syndrome.  
D) Fragile X Syndrome causes mental retardation only among males.
- 50) Most miscarriages are due to 50) \_\_\_\_\_  
A) chromosomal abnormalities. B) unhealthy sperm.  
C) sex-linked traits. D) the mother's young age.
- 51) Which of the following disorders is due to a chromosomal abnormality? 51) \_\_\_\_\_  
A) Trisomy 21 B) Huntington's disease  
C) Duchenne muscular dystrophy D) Cystic fibrosis
- 52) More than half of all babies with Down syndrome are born to mothers who are 52) \_\_\_\_\_  
A) older than 45 years of age. B) younger than 35 years of age.  
C) younger than 16 years of age. D) older than 35 years of age.
- 53) Which of the following statements regarding sex chromosome abnormalities is TRUE? 53) \_\_\_\_\_  
A) Sex chromosome abnormalities cause physical but not cognitive or social difficulties.  
B) Sex chromosome abnormalities typically lead to pregnancy loss or early death of the infant.  
C) Sex chromosome abnormalities are among the most common human genetic disorders.  
D) Sex chromosome abnormalities are extremely rare occurring in only 1 out of 100,000 births.
- 54) If Roger is an XYY male, he is likely to 54) \_\_\_\_\_  
A) be infertile. B) experience motor skill problems.  
C) be taller than average. D) have all of the above characteristics.
- 55) If Fred has Klinefelter syndrome, he is most likely to 55) \_\_\_\_\_  
A) be shorter than average and overweight.  
B) have underdeveloped testicles.  
C) have issues with aggression.  
D) be above average in intelligence and creativity.
- 56) Your twelve-year-old daughter, Polly, describes a new female classmate, Holly, as "different." 56) \_\_\_\_\_  
Polly tells you that Holly is quite short, but has broad shoulders and a webbed neck. She also says that Holly is clumsy in gym class, slow in geometry, but okay in English. Of the following, which is most likely to be true?  
A) Holly has Turner syndrome. B) Holly is an XXX female.  
C) Holly has Trisomy X. D) Holly has Klinefelter syndrome.

- 57) Your teenaged son, Devon, describes a new male classmate, Leon, as "pretty weird." Devon tells you that Leon "looks more like a girl than a boy" because he's not growing facial hair like other boys. He also says that Leon seems to have difficulties reading, and that a lot of kids don't like him. Of the following, which is most likely to be true? 57) \_\_\_\_\_
- A) Leon is actually an XY female. B) Leon is an XXY male.  
C) Leon has Klinefelter syndrome. D) Leon is an XX male.
- 58) Your doctor explains that at your next appointment a technician will use an instrument that sends sound waves through the abdomen to produce an image of the fetus and nearby structures. This technique is referred to as 58) \_\_\_\_\_
- A) chorionic villus sampling. B) amniocentesis.  
C) ultrasonography. D) positron emission tomography.
- 59) If Kayley has gone for genetic screening, which of the following is LEAST likely to be done? 59) \_\_\_\_\_
- A) Amniocentesis B) Chorionic villus sampling  
C) Ultrasonography D) Intelligence assessments
- 60) Which of the following statements regarding amniocentesis is FALSE? 60) \_\_\_\_\_
- A) The results usually are available in about a week or two.  
B) There is about a 1 in 200 chance that the procedure itself will cause serious problems.  
C) Amniocentesis can only be performed before the 14th week of pregnancy.  
D) A karyotype is created from the cultured cells obtained during amniocentesis.
- 61) While pregnant and at her doctor office, Irene has a needle inserted through her abdomen and uterus. The doctor says that she wants to obtain a sample of amniotic fluid for analysis. What procedure is taking place? 61) \_\_\_\_\_
- A) Chorionic villus sampling B) Positron emission tomography  
C) Amniocentesis D) Computerized tomography
- 62) Which of the following procedures could involve either a catheter being inserted through the vagina or a needle inserted through the abdomen and uterus to obtain cells from the placenta? 62) \_\_\_\_\_
- A) Amniocentesis B) Computerized tomography  
C) Chorionic villus sampling D) Positron emission tomography
- 63) Which of the following statements regarding chorionic villus sampling (CVS) is TRUE? 63) \_\_\_\_\_
- A) The cells obtained in CVS originated in the zygote or fertilized egg.  
B) There is little to no risk associated with the use of CVS during pregnancy.  
C) CVS can be conducted only after the 14th week of pregnancy.  
D) It usually takes three to four weeks to obtain the results from CVS.
- 64) The "G x E interaction" describes how development is influenced by the interaction of 64) \_\_\_\_\_
- A) genetics and ethology. B) genetics and evolution.  
C) geography and the environment. D) genetics and the environment.
- 65) A child's genetic makeup or code is his or her 65) \_\_\_\_\_
- A) gamete. B) genome. C) genotype. D) phenotype.
- 66) Genotype is to phenotype as 66) \_\_\_\_\_
- A) dominant is to recessive. B) nature is to nurture.  
C) male is to female. D) hidden is to observable.
- 67) The manner in which a child's genetic code is expressed in observable and measurable characteristics 67) \_\_\_\_\_

tics is 67) \_\_\_\_\_  
referred \_\_\_\_\_  
to as his  
or her

- A) phenotype. B) dominance type.  
C) genotype. D) recessive type.

- 68) The concept of reaction range emphasizes that 68) \_\_\_\_\_  
A) an infant's range of behavior is determined by genetic factors, whereas an adult's range of behavior is determined by the environment.  
B) human behaviors are determined by wide differences in environments, and genetics accounts for very little human diversity.  
C) human behaviors are determined by a wide array of genetic factors, and the environment contributes very little to human diversity.  
D) genetic factors determine the field of possible outcomes, and the environment affects the emergence of specific outcomes within this field.
- 69) Which of the following concepts places the heaviest emphasis on genetic determinism? 69) \_\_\_\_\_  
A) Canalization B) Niche-picking  
C) Evocative heritability D) Probabilistic epigenesis
- 70) Which of the following statements regarding canalization is FALSE? 70) \_\_\_\_\_  
A) The deeper the "canal," the smaller the influence of genetics on development.  
B) Canalization illustrates the protective role that genetics can play in development.  
C) Canalization claims that the environment can have many different potential impacts on the individual.  
D) Human genetics limits the extent to which environmental factors can affect development.
- 71) "The environment must be strong to have any significant effect on an individual's developmental path." This statement reflects the idea of 71) \_\_\_\_\_  
A) amniocentesis. B) niche-picking.  
C) behavioral evolution. D) canalization.
- 72) Which of the following is the BEST example of canalization? 72) \_\_\_\_\_  
A) Keith, an XYY male, is tall for his age, of average intelligence, and currently having behavioral problems in school.  
B) Jon and Jerry, MZ twins reared in highly different environments, have different temperaments as adults.  
C) Terry and May, who both have brown eyes, are the biological parents of Jessica, who has brilliant blue eyes.  
D) Regardless of when they are born, all human infants smile at exactly forty weeks after their conception.
- 73) Until about one year of age, infants respond similarly to sounds that occur in all languages. However, after one year of age, they can detect subtle differences among sounds only in their native language. This is a good example of 73) \_\_\_\_\_  
A) active niche-picking. B) heritability.  
C) experiential canalization. D) genetic determinism.
- 74) According to Sandra Scarr, children's genetic codes can influence the types of environments in which they are placed or which they select for themselves. Scarr is describing 74) \_\_\_\_\_  
A) probabilistic epigenesis. B) behavioral evolution.



C) mitosis.

D) the different roles genetics play.

- 75) As she always loved music, Julie's parents enrolled her in music lessons, made many trips with her to concerts, and tried to have music playing in the home as much as possible. This demonstrates the \_\_\_\_\_  
A) active role of her genetic code. B) concept of niche-picking.  
C) evocative role of her genetic code. D) passive role of her genetic code.
- 76) Fifteen-year-old Jacob loves bluegrass music. He bought himself a used banjo with money he saved and regularly plays music with a local band. He keeps in contact with other musicians through the Internet and plans to move to Nashville when he graduates from high school. Jacob's behavior illustrates the \_\_\_\_\_  
A) concept of niche-picking. B) active role of his genetic code.  
C) evocative role of his genetic code. D) both A and B.
- 77) Which of the following is the BEST example of niche-picking? \_\_\_\_\_  
A) Daniel chooses to play basketball rather than go with his family to antique shops.  
B) Sam's father, who is an architect, brings him models and building blocks with which to play.  
C) Barb wins first prize in the science fair with the help of her mother, who is a physicist.  
D) Krista enjoys her mother's yoga tapes and goes on weekend meditation retreats with her.
- 78) According to his parents, Taylor was a testy, finicky, and somewhat irritable kid from the moment he was born. In preschool, the other children called him "Grumpy" and wouldn't play with him, and his teacher found him "difficult to work with." This example best illustrates \_\_\_\_\_  
A) heritability. B) niche-picking.  
C) the evocative role that genes can play. D) the passive role that genes can play.
- 79) The unique idea within the concept of probabilistic epigenesis is that \_\_\_\_\_  
A) our environment influences which parts of our genetic potential are activated and expressed.  
B) genetics can influence the environments that individuals choose.  
C) the environment influences how an individual's genetic code is expressed.  
D) genetics determines how much influence the environment can have.
- 80) Which of the following is an example given in your text of behavioral evolution as a result of probabilistic epigenesis? \_\_\_\_\_  
A) Cats growing two tails B) Humans lacking thumbs  
C) Birds developing teeth D) Salamanders having five legs
- 81) Which of the following statements regarding heritability estimates is FALSE? \_\_\_\_\_  
A) Complex traits never show heritability estimates as high as 1.0.  
B) Theoretically, it is possible for heritability estimates to be as high as 1.0.  
C) Higher values of heritability estimates indicate stronger environmental influence.  
D) Heritability estimates over .50 generally are considered fairly high.
- 82) Heritability estimates can range from \_\_\_\_\_  
A) 0 to +1.0. B) 0 to 100. C) 0 to 10. D) -1.0 to +1.0.
- 83) Pretend for a moment that people's attitudes toward racial tolerance has a heritability estimate of .10. This indicates that \_\_\_\_\_  
A) the variation is due mostly to learning experiences.

- B) most people have unchangeable racist tendencies.
- C) most people tolerate people of various races.
- D) little of the variation in attitudes is due to the environment.

- 84) Which of these is the BEST example of a shared environment? 84) \_\_\_\_\_
- A) How your parents treated you and your siblings
  - B) Growing up in the U.S. following 9/11
  - C) People's religious views
  - D) A person's favorite movie
- 85) Jack and Jill are siblings being raised in a very active household. The family attends many sporting events and participates in a wide range of athletic activities. Which of the following would be the BEST example of a nonshared environment? 85) \_\_\_\_\_
- A) Their parents enforce a strict, daily regimen of at least thirty minutes of vigorous exercise.
  - B) When the children were toddlers, the family went on a five-day backpacking trip to Yellowstone.
  - C) Jack, a Special Olympian with Down syndrome, needs certain accommodations to participate in family sporting activities.
  - D) Their financial status allows the family to travel to upscale events, such as the Indianapolis 500 and the running of the bulls in Pamplona.
- 86) Which of following research methods is LEAST likely to be used in studying the heritability of traits? 86) \_\_\_\_\_
- A) Twin studies
  - B) Experimental studies
  - C) Adoption studies
  - D) Correlational studies
- 87) If the heritability estimate for height is high, then the greatest degree of similarity in height should be between 87) \_\_\_\_\_
- A) identical twins.
  - B) fraternal twins.
  - C) child and father.
  - D) adopted siblings of differing ages.
- 88) One of the primary reasons that behavior geneticists study identical twins is because identical twins are 88) \_\_\_\_\_
- A) usually reared within the same family.
  - B) more likely to engage in active niche-picking.
  - C) generally treated similarly by the people around them.
  - D) more genetically similar than other biological siblings.
- 89) Imagine that Dr. Walsh measures the heritability of anger in pairs of siblings who are being reared together. She finds a correlation of .15 between pairs of adopted siblings who are biologically unrelated, a correlation of .63 for fraternal twins, and a correlation of .92 for identical twins. These results suggest that 89) \_\_\_\_\_
- A) relative to the influence of genetics, the environment contributes relatively little to variability in anger.
  - B) compared to the impact of the environment, genetics contributes relatively little to variability in anger.
  - C) the shared environment contributes greatly to the variability in anger only among identical twins.
  - D) both the environment and genetics contribute substantially to the variability in anger.
- 90) Heritability estimates for cognitive skills 90) \_\_\_\_\_
- A) are highly stable across age, indicating a strong genetic influence on these skills.

- B) increase with age, indicating a strong environmental influence on these skills.
- C) decrease with age, indicating a strong environmental influence on these skills.
- D) increase with age, indicating a strong genetic influence on these skills.

**ESSAY. Write your answer in the space provided or on a separate sheet of paper.**

- 91) How many pairs of chromosomes do most people have in most of their cells? Which pair determines our sex, and what is the difference between the male and female pairs of chromosomes?
- 92) What is the difference between mitosis and meiosis?
- 93) Explain the relationship between dominant and recessive traits and how it is determined which one will emerge.
- 94) What is cystic fibrosis?
- 95) What is amniocentesis and why would it be used?
- 96) What is the difference between a person's genotype and his or her phenotype?
- 97) Using the concept of niche-picking, explain why someone might become a boxer.
- 98) What does the federal Genetic Nondiscrimination Act of 2007 propose?
- 99) As described by Jamie Commissaris, what were the steps involved in her becoming pregnant?
- 100) Name and describe two of the newest techniques for genetic testing, besides gene therapy, that were mentioned by Robin L. Bennett.

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

- 101) DNA consists of two strands of sugar and \_\_\_\_\_ molecules that twist around in a spiral staircase pattern. 101) \_\_\_\_\_
- 102) \_\_\_\_\_ are the molecules that dictate how our cells develop. 102) \_\_\_\_\_
- 103) In terms of quantity, there are approximately \_\_\_\_\_ genes aligned along the set of chromosomes in each human cell. 103) \_\_\_\_\_
- 104) An alternate version of a gene is called a(n) \_\_\_\_\_. 104) \_\_\_\_\_
- 105) The term \_\_\_\_\_ refers to the newly fertilized cell that has just divided for the first time after the sperm and egg unite. 105) \_\_\_\_\_
- 106) While identical twins are said to be monozygotic twins, fraternal or nonidentical twins are called \_\_\_\_\_ twins. 106) \_\_\_\_\_
- 107) Traits are said to be either dominant or \_\_\_\_\_. 107) \_\_\_\_\_
- 108) The most common recessive disease among Caucasians is \_\_\_\_\_. 108) \_\_\_\_\_
- 109) While males have only one chance, females have \_\_\_\_\_ chances of inheriting dominant disease alleles on the X chromosome. 109) \_\_\_\_\_
- 110) Trisomy 21 is better known as \_\_\_\_\_. 110) \_\_\_\_\_

- 111) \_\_\_\_\_ involves an instrument that sends sound waves into the expectant mother's abdomen. 111) \_\_\_\_\_
- 112) A \_\_\_\_\_ is a picture of a set of chromosomes — that are obtained via amniocentesis or VCS — that are arranged by size. 112) \_\_\_\_\_
- 113) According to the \_\_\_\_\_ canalization perspective, the environment limits the expression of genes. 113) \_\_\_\_\_
- 114) The tendency to choose activities and environments that fit our genetic predispositions is known as \_\_\_\_\_. 114) \_\_\_\_\_
- 115) The term \_\_\_\_\_ refers to the emergence of a trait, characteristic, or behavior over the course of development. 115) \_\_\_\_\_

**ESSAY. Write your answer in the space provided or on a separate sheet of paper.**

- 116) Briefly describe the Human Genome Project (HGP). Then identify two ways in which findings from the HGP have influenced how scientists and medical personnel utilize "genetic testing." Finally, discuss one ethical question that will arise from this project.
- 117) Name and describe two of the alternative techniques for conception. Of the ones you named, which would you prefer to use and why?
- 118) Briefly discuss the labeling of experiences within a family as "shared" or "non-shared." Include clear examples of shared and non-shared environments. Then discuss an example of a situation in which the labeling depends to some extent on the researcher's perspective.
- 119) How can two siblings have a non-shared environment?
- 120) What is one of the major ways in which mapping the human genome will impact people?

- 1) A
- 2) C
- 3) B
- 4) B
- 5) A
- 6) D
- 7) D
- 8) D
- 9) D
- 10) D
- 11) D
- 12) D
- 13) C
- 14) C
- 15) D
- 16) C
- 17) B
- 18) A
- 19) B
- 20) C
- 21) C
- 22) D
- 23) C
- 24) C
- 25) B
- 26) C
- 27) B
- 28) B
- 29) B
- 30) C
- 31) B
- 32) C
- 33) D
- 34) B
- 35) A
- 36) D
- 37) D
- 38) B
- 39) C
- 40) D
- 41) B
- 42) B
- 43) A
- 44) A
- 45) B
- 46) D
- 47) B
- 48) B
- 49) D
- 50) A
- 51) A

- 52) B
- 53) C
- 54) C
- 55) B
- 56) A
- 57) C
- 58) C
- 59) D
- 60) C
- 61) C
- 62) C
- 63) A
- 64) D
- 65) C
- 66) D
- 67) A
- 68) D
- 69) A
- 70) A
- 71) D
- 72) D
- 73) C
- 74) D
- 75) C
- 76) D
- 77) A
- 78) C
- 79) A
- 80) C
- 81) C
- 82) A
- 83) A
- 84) A
- 85) C
- 86) B
- 87) A
- 88) D
- 89) A
- 90) D
- 91) People typically have 23 pairs of chromosomes and the 23rd pair determines whether a person is male or female. The male pattern is XY, and the female pattern is XX.
- 92) Mitosis involves a cell copying its own chromosomes and then dividing to form two cells. Meiosis involves gametes reducing the number of chromosomes per cell from 46 to 23.
- 93) Dominant alleles typically determine the trait. If a person receives two of the same dominant alleles, or one dominant and one recessive allele, the dominant trait will be shown. However, if the person receives two recessive alleles, the recessive trait will be shown.
- 94) Cystic fibrosis is the most most common recessive disease among Caucasians. Cystic fibrosis affects tissues in the body that produce mucus secretions. The lungs, gastrointestinal tract, pancreas, and liver are often affected. People with cystic fibrosis usually experience serious respiratory problems and lung infections, and without lung transplants most do not live past the age of 30.
- 95) Amniocentesis involves using a needle to draw a small amount of fluid from the amniotic sac; the cells in this fluid are then cultured for genetic testing. This procedure — which can be conducted after the 14th week of pregnancy —

- is advised when parents have a high risk of passing a genetic defect to the baby, or when the mother is 35 or older.
- 96) While the genotype is the person's genetic make up, the phenotype refers to the individual's observable traits.
  - 97) The person might be genetically predisposed to violence. Likewise, the child may grow up in a home where violence is watched or tolerated. Then the child may start to act aggressively with his or her peers. The parents might even enroll the child in violent activities. Eventually, the child will choose those activities for himself or herself.
  - 98) It states that health insurers and employers cannot discriminate against people with genetic disorders.
  - 99) She used in vitro fertilization. She had several weeks of hormone pills and injections. The eggs were retrieved and then fertilized in the lab. Then two were transferred back to her uterus.
  - 100) Presymptomatic testing involves testing people for the potential of a genetic disorder. Pharmacogenomics involves testing people for many susceptibilities so that "designer medications" can be prescribed.
  - 101) phosphate
  - 102) Genes
  - 103) 20,000 to 25,000
  - 104) allele
  - 105) zygote
  - 106) dizygotic
  - 107) recessive
  - 108) cystic fibrosis
  - 109) two
  - 110) Down syndrome
  - 111) Ultrasonography (or ultrasound)
  - 112) karyotype
  - 113) experiential
  - 114) niche-picking
  - 115) epigenesis
  - 116) The HGP is a multinational research program that has a goal of eventually mapping the entire sequencing of human genes. Information gathered from the HGP already allows medical personnel to help parents select the sex of their embryos. In addition, embryos can be tested to determine whether or not they are carrying disease-causing genes. In these ways, parents can make decisions about whether to abort an embryo or to allow it to fully develop. There are many ethical and moral issues that will arise as we learn more about the human genome. Students' answers to this part of the question will vary, but will probably be based on information found in the text.
  - 117) The answer will vary based on which ones (such as IVF, artificial insemination, cryopreservation, assisted IVF, and surrogates) the student chooses. The student should properly name and describe the techniques based on the information in Table 2.1.
  - 118) Shared environments are those experiences that are common to all individuals who are living together. Shared environmental factors may include certain family activities such as taking vacations together or dealing with a serious family trauma. In contrast, non-shared environments are those experiences that vary among individuals who are living together. For example, a sister and brother may be treated differently because of their gender. Although the conceptual distinction may be easy to make, researchers are now beginning to realize that environmental factors that they once believed were shared by all family members can actually be non-shared environmental factors. Parents adjust their interactions with their children to fit the temperament of each child. Therefore, parenting style can be a nonshared environmental factor.
  - 119) One way is that they can perceive the situation differently. (For example, one child is delighted about having a new baby in the family, and the other is not.) Another way is that they had different experiences. (For example, one child went to day care the other did not.)
  - 120) Eventually, there will be a shift to more personalized treatment and medicine. Pharmaceutical companies may look for more customized treatment for each individual.