

Chapter 3: Genetics: From Genotype to Phenotype

Multiple Choice Questions

1. Early researchers such as Mendel and Bateson learned about inheritance _____.

- a. by looking at the genes themselves
- b. by replicating small sequences of DNA
- c. by studying human traits
- d. by observing animal and plant traits

Correct Answer: d

Learning Objective: LO 3.1: Compare and contrast genotype and phenotype using the examples of the ABO blood type system and the biological basis of obesity.

Topic: From Genotype to Phenotype

Difficulty Level: Moderate

Skill Level: Understand the Concepts

2. Bateson used _____ to understand Mendel's principles.

- a. rabbits
- b. moths
- c. flies
- d. pea plants

Correct Answer: b

Learning Objective: LO 3.1: Compare and contrast genotype and phenotype using the examples of the ABO blood type system and the biological basis of obesity.

Topic: From Genotype to Phenotype

Difficulty Level: Easy

Skill Level: Remember the Facts

3. A gene that contains information important to initiating transcription is a _____ gene.

- a. structural
- b. regulatory
- c. coding
- d. phenotype

Correct Answer: b

Learning Objective: LO 3.1: Compare and contrast genotype and phenotype using the examples of the ABO blood type system and the biological basis of obesity.

Topic: From Genotype to Phenotype

Difficulty Level: Easy

Skill Level: Understand the Concepts

4. Structural genes _____.

- a. regulate a person's physical structure
- b. are surrounded by regulatory regions
- c. are always species-specific
- d. only carry mutations that do not affect the phenotype

Correct Answer: b

Learning Objective: LO 3.1: Compare and contrast genotype and phenotype using the examples of the ABO blood type system and the biological basis of obesity.

Topic: From Genotype to Phenotype

Difficulty Level: Moderate

Skill Level: Understand the Concepts

5. In many cases, the _____ is given by the interaction of the _____ with environmental stressors.

- a. genotype; phenotype
- b. allele; regulatory region
- c. phenotype; genotype
- d. protein; genotype

Correct Answer: c

Learning Objective: LO 3.1: Compare and contrast genotype and phenotype using the examples of the ABO blood type system and the biological basis of obesity.

Topic: From Genotype to Phenotype

Difficulty Level: Moderate

Skill Level: Apply What You Know

6. Which of the following best defines the term *genotype*?

- a. the actual alleles an organism carries
- b. the physical expression of an organism's genes
- c. the role the environment plays in gene expression
- d. an organism's haploid gametes

Correct Answer: a

Learning Objective: LO 3.1: Compare and contrast genotype and phenotype using the examples of the ABO blood type system and the biological basis of obesity.

Topic: From Genotype to Phenotype

Difficulty Level: Easy

Skill Level: Understand the Concepts

7. The observable physical features of an organism comprise its _____.

- a. genotype
- b. phenotype
- c. allele frequency
- d. recessive allele

Correct Answer: b

Learning Objective: LO 3.1: Compare and contrast genotype and phenotype using the examples of the ABO blood type system and the biological basis of obesity.

Topic: From Genotype to Phenotype

Difficulty Level: Easy

Skill Level: Understand the Concepts

8. A recessive allele _____.

- a. needs to be present on only one chromosome to be expressed
- b. is never expressed
- c. needs to be present on both chromosomes to be expressed
- d. occurs as a regulatory gene only

Correct Answer: c

Learning Objective: LO 3.1: Compare and contrast genotype and phenotype using the examples of the ABO blood type system and the biological basis of obesity.

Topic: From Genotype to Phenotype

Difficulty Level: Easy

Skill Level: Understand the Concepts

9. An allele that needs to be present on only one chromosomal locus to be expressed is called a _____ allele.

- a. recessive
- b. structural
- c. dominant
- d. phenotypic

Correct Answer: c

Learning Objective: LO 3.1: Compare and contrast genotype and phenotype using the examples of the ABO blood type system and the biological basis of obesity.

Topic: From Genotype to Phenotype

Difficulty Level: Easy

Skill Level: Understand the Concepts

10. If the allele for type O blood is recessive and the allele for type A blood is dominant, a person with a A and O alleles would have type _____ blood.

- a. A
- b. O
- c. AO
- d. OA

Correct Answer: a

Learning Objective: LO 3.1: Compare and contrast genotype and phenotype using the examples of the ABO blood type system and the biological basis of obesity.

Topic: From Genotype to Phenotype

Difficulty Level: Moderate

Skill Level: Apply What You Know

11. The pea plants Mendel studied were ideal because they display _____ for several independent traits.

- a. blended inheritance
- b. no variation
- c. dominant alleles
- d. dichotomous variation

Correct Answer: d

Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Moderate

Skill Level: Understand the Concepts

12. Blended inheritance was the hereditary theory that _____ considered as the most likely during his research.

- a. Watson
- b. Crick
- c. Lyell
- d. Darwin

Correct Answer: d

Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Moderate

Skill Level: Understand the Concepts

13. Mendel undertook his pea plants experiments even though he was a _____.

- a. monk
- b. politician
- c. farmer
- d. trucker

Correct Answer: a

Learning Objective: Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Moderate

Skill Level: Remember the Facts

14. In Mendel's experiments, the F₁ generation _____.

- a. was a mating of two lines that were true-breeding
- b. had a 3:1 ratio in the expression of the original parental lines
- c. revealed dominant and recessive traits
- d. was a mating of different species

Correct Answer: a

Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Moderate

Skill Level: Understand the Concepts

15. Which of the following was a characteristic of Mendel's F₂ generation?

- a. it had a 3:1 ratio in the expression of the original parental lines
- b. dominant and recessive traits were blended
- c. it was a mating of four lines that were true-breeding
- d. it exhibited the traits of hybrid plants

Correct Answer: a

Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Moderate

Skill Level: Understand the Concepts

16. The "unit factors" mentioned in Mendel's postulates correspond with which biological unit?

- a. alleles
- b. cells
- c. entire DNA strands
- d. chromosomes

Correct Answer: a

Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Moderate

Skill Level: Understand the Concepts

17. Mendel found that when an individual has two different unit factors responsible for a characteristic, _____.

- a. that characteristic was not expressed
- b. only the allele from the father was expressed
- c. the factor that is expressed is dominant
- d. only the allele from the mother was expressed

Correct Answer: c

Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Easy

Skill Level: Understand the Concepts

18. Which of the following best describes *Mendel's Law of Segregation*?

- a. dominant alleles suppress recessive alleles
- b. inheritance is governed by discrete particles
- c. segregating pairs of unit factors assort independently
- d. chromosomes randomly segregate into sex cells

Correct Answer: d

Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Moderate

Skill Level: Understand the Concepts

19. Dihybrid cross experiments were essential to _____.

- a. Mendel's Law of Segregation
- b. Mendel's Law of Independent Assortment
- c. discovering the particulate nature of inheritance in general
- d. discovering the nature of dominant and recessive alleles

Correct Answer: b

Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Moderate

Skill Level: Apply What You Know

20. *Mendel's Law of Independent Assortment* indicates that _____.

- a. dominant alleles suppress recessive alleles
- b. inheritance is governed by discrete particles
- c. segregating pairs of unit factors assort independently
- d. chromosomes randomly segregate into sex cells

Correct Answer: c

Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Easy

Skill Level: Understand the Concepts

21. *Linkage* refers to _____.

- a. genes that are on the same chromosome
- b. alleles that appear on different chromosomes but are linked to the same trait
- c. several traits that are linked to the same genes
- d. the correlation of biological and cultural traits

Correct Answer: a

Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Easy

Skill Level: Understand the Concepts

22. The closer genes are to each other on a chromosome _____.

- a. the more likely they are to be separated due to crossing over
- b. the less likely they are to be separated due to crossing over
- c. the more likely they are to be linked in mitosis
- d. the less likely they are to be linked

Correct Answer: b

Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Difficult

Skill Level: Apply What You Know

23. Mutations during meiosis are especially important because they _____.

- a. are usually lethal
- b. tend to occur in regulatory genes
- c. are inherited
- d. are more common

Correct Answer: c

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Moderate

Skill Level: Understand the Concepts

24. Mutations in _____ are much more critical.

- a. non-coding regions
- b. structural genes
- c. introns
- d. RNA

Correct Answer: b

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Moderate

Skill Level: Understand the Concepts

25. A point mutation occurs when _____ is changed.

- a. a single gene
- b. an allele pair is changed
- c. an intron is changed
- d. a single base in a gene

Correct Answer: d

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Easy

Skill Level: Understand the Concepts

26. Which of the following is true of sickle cell disease?

- a. it shortens the life span of red blood cells
- b. it is protective against typhoid fever
- c. it affects the white blood cells
- d. it only affects adults

Correct Answer: a

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Moderate

Skill Level: Understand the Concepts

27. An autosomal recessive disease occurs when an individual is _____.

- a. heterozygous for a dominant, disease-causing allele
- b. codominant for a recessive, disease-causing allele
- c. homozygous for a dominant, disease-causing allele
- d. homozygous for a recessive, disease-causing allele

Correct Answer: d

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Difficult

Skill Level: Understand the Concepts

28. Because sickle cell anemia is an autosomal recessive disease, there is a _____ % chance that the child of two carriers will have the disease.

- a. 0
- b. 25
- c. 50
- d. 100

Correct Answer: b

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Moderate

Skill Level: Apply What You Know

29. Trinucleotide repeat diseases are caused by _____.

- a. insertion mutations
- b. autosomal recessive mutations
- c. deletion mutations
- d. point mutations

Correct Answer: a

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Easy

Skill Level: Understand the Concepts

30. Which of the following is caused by an insertion mutation?

- a. sickle cell disease
- b. Down's syndrome
- c. Habsburg face
- d. Huntington's disease

Correct Answer: d

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Moderate

Skill Level: Understand the Concepts

31. An autosomal dominant disease occurs when an individual is _____.

- a. heterozygous for a dominant deleterious allele
- b. codominant for a recessive deleterious allele
- c. homozygous for a recessive beneficial allele
- d. homozygous for a deleterious allele

Correct Answer: a

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Moderate

Skill Level: Understand the Concepts

32. Huntington's disease is an example of a _____.

- a. disease caused by exposure to second hand smoke
- b. genomic deletion
- c. trinucleotide repeat disease
- d. disease common among African populations

Correct Answer: c

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Moderate

Skill Level: Understand the Concepts

33. About half of the known trinucleotide diseases are characterized by _____ repeats.

- a. CAG
- b. GA
- c. ATA
- d. GCA

Correct Answer: a

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Difficult

Skill Level: Remember the Facts

34. The vast majority of mutations are probably _____.

- a. good
- b. bad
- c. neutral
- d. fatal

Correct Answer: c

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Easy

Skill Level: Understand the Concepts

35. Mutations often have little phenotypic effect because _____.

- a. they often occur in non-coding regions
- b. codon changes are usually deleterious
- c. protein synthesis is not linked to DNA
- d. they are often beneficial

Correct Answer: a

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Moderate

Skill Level: Understand the Concepts

36. Of the 22nd pair of chromosomes, the _____.

- a. Y is larger in size
- b. X is larger in size
- c. size is equal
- d. size varies

Correct Answer: b

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Easy

Skill Level: Understand the Concepts

37. Because X-linked disorders are essentially _____, they will only appear in the _____ sex.

- a. autosomal recessive disorders; homogametic
- b. autosomal dominant disorders; homogametic
- c. autosomal recessive disorders; heterogametic
- d. autosomal dominant disorders; heterogametic

Correct Answer: c

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Difficult

Skill Level: Apply What You Know

38. The non-X-linked disorder below is _____?

- a. red-color blindness
- b. green-colorblindness
- c. Huntington's disease
- d. hemophilia

Correct Answer: c

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Easy

Skill Level: Understand the Concepts

39. DNA changes are categorized as insertion, point, and _____ mutations.

- a. revision
- b. deletion
- c. additive
- d. collateral

Correct Answer: b

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Easy

Skill Level: Understand the Concepts

40. _____ variation lends itself to Mendelian explanations.

- a. Phenotypic
- b. Qualitative
- c. Phylogenic
- d. Quantitative

Correct Answer: b

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Understand the Concepts

41. Quantitative variation refers to _____.

- a. rare variations
- b. non-overlapping phenotypic variants
- c. monogenic traits
- d. continuous variation for a given trait

Correct Answer: d

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Easy

Skill Level: Understand the Concepts

42. Traits that occur as a continuum in a population are likely to be due to _____.

- a. X-linked disorders
- b. polygenic inheritance
- c. single gene effect
- d. the effects of pollutants

Correct Answer: b

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Analyze It

43. Polygenic traits _____.

- a. are usually caused by single genes
- b. are easily explained by Mendelian genetics
- c. appear as a continuum in a population
- d. are very rare in humans

Correct Answer: c

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Easy

Skill Level: Understand the Concepts

44. *Pleiotropy* is best defined as _____.

- a. one gene, one effect
- b. one gene having multiple phenotypic effects
- c. heritability
- d. the effect of the environment on gene function

Correct Answer: b

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Easy

Skill Level: Understand the Concepts

45. The twin method is a way of investigating _____.

- a. the role of the environment on trait expression
- b. the role of differential selection
- c. the role of negative selection
- d. the role of convergent evolution

Correct Answer: a

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Understand the Concepts

46. A significantly higher concordance rate for a trait in monozygotic twins indicates that _____ may be important in the expression of that trait.

- a. the environment
- b. pleiotropy
- c. genetic factors
- d. the house in which the twins were raised

Correct Answer: c

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Apply What You Know

47. Heritability is a _____.

- a. direct measure of a specific gene's contribution to the expression of a trait
- b. general population statistic used to characterize genotypic influence on trait expression
- c. direct measure used to characterize environmental influence on trait expression
- d. way to determine if twins are monozygotic or dizygotic

Correct Answer: b

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Easy

Skill Level: Understand the Concepts

48. Which group consistently scores highest on IQ tests?

- a. Caucasian Americans
- b. African Americans
- c. Asian Americans
- d. Native Americans

Correct Answer: c

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Remember the Facts

49. With regards to IQ tests, heritability scores only apply _____.

- a. within a population
- b. among populations
- c. within a sex category
- d. within a specific social class

Correct Answer: a

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Understand the Concepts

50. A misapplication of Mendelian genetics is _____.

- a. eugenics
- b. progenics
- c. in vitro fertilization
- d. stem cell research

Correct Answer: a

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Understand the Concepts

51. Certain artifacts from the Adena people have been interpreted as observations of phenotypic traits, such as _____.

- a. obesity
- b. anorexia
- c. dwarfism
- d. sickle cell disease

Correct Answer: c

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Understand the Concepts

52. Eugenics is thought to have been a guiding principle for the _____.

- a. Romans
- b. Greeks
- c. Nazis
- d. Vikings

Correct Answer: c

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Understand the Concepts

53. A 1920s public presentation of Mendelian genetics would emphasize _____.

- a. the dangers of evolution
- b. the dangers of mating with “abnormal” people
- c. Darwin’s ideas of natural selection
- d. ideas of blending inheritance

Correct Answer: b

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Apply What You Know

54. The Eugenics movement has frequently been employed against _____.

- a. recent immigrants
- b. the ‘upper class’
- c. the elderly
- d. Germanic people

Correct Answer: c

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Remember the Facts

55. Encouraging the educated upper classes to procreate was an example of _____.

- a. positive eugenics
- b. negative eugenics
- c. natural selection
- d. positive selection

Correct Answer: a

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Understand the Concepts

56. The popularity of the eugenics movement waned in the United States _____.

- a. by the 1920s
- b. after WWII
- c. in the late twentieth century
- d. before WWII

Correct Answer: d

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Remember the Facts

57. The symptoms of phenylketonuria include _____.

- a. macrocephaly
- b. characteristic gait and stance
- c. hyperpigmentation
- d. blood clumping in capillaries

Correct Answer: b

Learning Objective: LO 3.5: Summarize how phenylketonuria serves to illustrate the relationship between genotype and phenotype.

Topic: Phenylketonuria: Illustrating Mendelian and Post-Mendelian Concepts

Difficulty Level: Moderate

Skill Level: Understand the Concepts

58. The effects of the phenylketonuria allele _____.

- a. can be combated with dietary regulation
- b. are immediately fatal
- c. pose no threat to infants
- d. are more dangerous in adults

Correct Answer: a

Learning Objective: LO 3.5: Summarize how phenylketonuria serves to illustrate the relationship between genotype and phenotype.

Topic: Phenylketonuria: Illustrating Mendelian and Post-Mendelian Concepts

Difficulty Level: Moderate

Skill Level: Understand the Concepts

59. From a gene's perspective, the "environment" is made up mainly of _____.

- a. nutritional factors
- b. factors such as air temperature and atmospheric gasses
- c. body temperature
- d. other genes

Correct Answer: d

Learning Objective: LO 3.5: Summarize how phenylketonuria serves to illustrate the relationship between genotype and phenotype.

Topic: Phenylketonuria: Illustrating Mendelian and Post-Mendelian Concepts

Difficulty Level: Moderate

Skill Level: Understand the Concepts

60. Phenylketonuria is caused by _____.

- a. a single point mutation
- b. a dominant allele
- c. environmental factors such as diet
- d. a recessive allele

Correct Answer: d

Learning Objective: LO 3.5: Summarize how phenylketonuria serves to illustrate the relationship between genotype and phenotype.

Topic: Phenylketonuria: Illustrating Mendelian and Post-Mendelian Concepts

Difficulty Level: Moderate

Skill Level: Understand the Concepts

True/False Questions

61. Regulatory regions are likely to play a stronger role than structural genes in creating variations between related species.

- a. True
- b. False

Correct Answer: a

Learning Objective: LO 3.1: Compare and contrast genotype and phenotype using the examples of the ABO blood type system and the biological basis of obesity.

Topic: From Genotype to Phenotype

Difficulty Level: Moderate

Skill Level: Understand the Concepts

62. Mendel's work supported the blended nature of inheritance.

- a. True
- b. False

Correct Answer: b

Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Easy

Skill Level: Understand the Concepts

63. One gene can have multiple phenotypic effects.

- a. True
- b. False

Correct Answer: a

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Easy

Skill Level: Understand the Concepts

64. Determining heritability provides direct insight into individual genetic mechanisms.

- a. True
- b. False

Correct Answer: b

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Understand the Concepts

65. Nutritional intervention can completely suppress the effects of the phenylketonuria allele.

- a. True
- b. False

Correct Answer: a

Learning Objective: LO 3.5: Summarize how phenylketonuria serves to illustrate the relationship between genotype and phenotype.

Topic: Phenylketonuria: Illustrating Mendelian and Post-Mendelian Concepts

Difficulty Level: Moderate

Skill Level: Understand the Concepts

Essays

66. Explain the difference between structural and regulatory genes. What is the role of regulatory genes in creating variation between related species?

Learning Objective: LO 3.1: Compare and contrast genotype and phenotype using the examples of the ABO blood type system and the biological basis of obesity.

Topic: From Genotype to Phenotype

Difficulty Level: Moderate

Skill Level: Understand the Concepts

67. Explain the mechanics of the ABO blood system. What is the relationship between genotype and phenotype within this system? Be sure to include the terms *recessive*, *dominant*, and *codominant*.

Learning Objective: LO 3.1: Compare and contrast genotype and phenotype using the examples of the ABO blood type system and the biological basis of obesity.

Topic: From Genotype to Phenotype

Difficulty Level: Difficult

Skill Level: Understand the Concepts

68. Using obesity as an example, explain the complex relationship among genes, environments, and phenotypes.

Learning Objective: LO 3.1: Compare and contrast genotype and phenotype using the examples of the ABO blood type system and the biological basis of obesity.

Topic: From Genotype to Phenotype

Difficulty Level: Moderate

Skill Level: Apply What You Know

69. Outline and explain Mendel's postulates.

Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Moderate

Skill Level: Understand the Concepts

70. Using a Punnett square, illustrate and explain the F₂ generation of Mendel's pea experiments.

Learning Objective: LO 3.2: Describe Mendel's experiments on the garden pea and how they formed the basis of his genetic laws and postulates.

Topic: Mendelian Genetics

Difficulty Level: Difficult

Skill Level: Apply What You Know

71. Using specific examples, explain the difference between *autosomal recessive* and *autosomal dominant* disorders.

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Moderate

Skill Level: Understand the Concepts

72. Citing examples, explain how some mutations can have deleterious effects while others may be neutral, emphasizing the role of the environment.

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Difficult

Skill Level: Apply What You Know

73. Please characterize the role of advantageous mutations in evolutionary terms.

Learning Objective: LO 3.3: Recognize the different types of mutations, and discuss their importance for genetic disease and as a source of variation for natural selection to act upon.

Topic: Mutation

Difficulty Level: Difficult

Skill Level: Analyze It

74. Discuss the concept of heritability. How might twin studies help us determine heritability?

Learning Objective: LO 3.4: Summarize how scientists can measure the relative contributions of genetics and the environment to produce phenotypes. Compare and contrast: pleiotropy/polygenic traits, qualitative variation/quantitative variation.

Topic: Genetics Beyond Mendel

Difficulty Level: Moderate

Skill Level: Analyze It

75. What is phenylketonuria and how is it inherited? Explain how phenylketonuria is as much a result of environment as it is of genetics.

Learning Objective: LO 3.5: Summarize how phenylketonuria serves to illustrate the relationship between genotype and phenotype.

Topic: Phenylketonuria: Illustrating Mendelian and Post-Mendelian Concepts

Difficulty Level: Moderate

Skill Level: Apply What You Know