***Genetics, 6e* (Hartwell)**

**Chapter 2 Mendel's Principles of Heredity**

1) Why did Mendel perform reciprocal crosses?

A) To obtain enough plants to perform the experiments that Mendel wanted.

B) To test a hypothesis that stated the ovum carries all the information for progeny.

C) To be able to breed plants year round.

D) To determine whether the inheritance of a trait depends on which parent carries the trait.

Answer: D

Section: 2.01

Topic: Background - The Historical Puzzle of Inheritance

Learning Objective: 02.01.03 Explain the importance of Mendel's inclusion of reciprocal crosses within his controlled breeding program of pea plants.

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

2) What is the difference between cross- and self-fertilization?

A) In cross-fertilization the pollen from one plant is used to fertilize the egg of another plant.

B) In cross-fertilization the pollen from one plant is used to fertilize the egg from the same plant.

C) In self-fertilization the pollen from one plant is used to fertilize the egg from another plant.

D) In cross-fertilization insects are used to pollinate the plants, whereas in self-fertilization the investigator pollinates the plants.

Answer: A

Section: 2.01

Topic: Background - The Historical Puzzle of Inheritance

Learning Objective: 02.01.02 Describe how Mendel cross-fertilized and self-fertilized pea plants.

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

3) What is the outcome of crossing two pure-breeding plants with antagonistic traits?

A) Only one of the traits will be seen in the progeny.

B) Both traits will be seen in the progeny.

C) Both traits will be seen in the progeny in a 3:1 ratio.

D) Only one trait will be seen and it will be the trait of the female.

Answer: A

Section: 2.01

Topic: Background - The Historical Puzzle of Inheritance

Learning Objective: 02.01.04 Predict the type of progeny produced by Mendel's crosses between pure-breeding plants with discrete, antagonistic traits, such as purple versus white flowers.

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

4) According to Mendel's Law of Independent Assortment,

A) alleles of genes on different chromosomes assort randomly into different gametes.

B) alleles of genes assort into gametes grouped according to how they were inherited originally.

C) dominant alleles for one gene must assort into the same gamete as the dominant alleles for another gene.

D) dominant alleles for one gene must assort into the same gamete as the recessive alleles for another gene.

Answer: A

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.03 Explain Mendel's law of independent assortment and how the 9:3:3:1 phenotypic ratio in a dihybrid cross provides evidence for this law.

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

5) An *Ss* × *Ss* mating is performed. If the phenotypic ratio of the progeny is 3 *S*– (– indicates that the other allele is unknown) to 1 *ss*, then

A) the *S* allele is dominant to the *s* allele.

B) neither allele is dominant.

C) the s allele is dominant to the *S* allele.

D) the relationship between the alleles cannot be determined.

Answer: A

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.01 Explain Mendel's law of segregation and how it predicts the 3:1 dominant-to-recessive phenotypic ratio among the F2 generation of a monohybrid cross.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

6) Which of the following probabilities is correct regarding a mating of an *Ss RR* individual to an individual who is *Ss Rr* ? (A – indicates the the second allele is either dominant or recessive.)

A) *S*– *RR*: 37.5%

B) Homozygous recessive: 10%

C) Heterozygous both alleles: 50%

D) *ss R*– : 15.5%

Answer: A

Section: 2.02

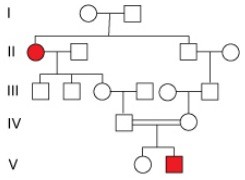
Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.05 Predict the genotypic and phenotypic ratios among progeny of complex multihybrid crosses using simple rules of probability.

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

7)



What does the pattern of inheritance in this pedigree indicate about the disease allele?

A) The disease allele is recessive.

B) The disease allele is dominant.

C) There is no indication that the disease allele is either dominant or recessive.

D) The disease allele is not inherited but arises only by a new mutation in affected individuals.

Answer: A

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

8) The mutations found in the *CF* gene that result in cystic fibrosis are recessive because

A) the protein produced by the normal allele is sufficient for normal cellular function.

B) the *CF* mutations always result in no protein being produced.

C) *CF* mutations result in a protein that has normal function only if normal CF protein also exists in the cell.

D) dominant alleles that cause a fatal disorder, such as cystic fibrosis, cannot be inherited.

Answer: A

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.02.06 Cite the most common molecular explanations for dominant and recessive alleles.

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

9) The reason that the *HD* allele acts as a dominant allele is that

A) the *HD* mutation results in a protein that can damage nerve cells even in the presence of the normal protein.

B) the normal *HD* allele does not normally produce a protein but the mutant *HD* allele does.

C) the mutant *HD* allele suppresses protein production from the normal *HD* allele.

D) the protein produced from the mutant *HD* allele is nonfunctional.

Answer: A

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.02 Explain why Huntington disease is inherited as a dominant allele while cystic fibrosis is caused by a recessive allele.

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

10) If an individual has 10 gene pairs, how many different gametes can be formed if three of the gene pairs are homozygous and the remaining seven gene pairs are heterozygous?

A) 49

B) 100

C) 128

D) 1024

E) 131,072

Answer: C

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.05 Predict the genotypic and phenotypic ratios among progeny of complex multihybrid crosses using simple rules of probability.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

11) In some genetically engineered corn plants, a *Bt* gene was added to a chromosome. The *Bt* gene specifies a protein called Bt that is lethal to certain flying insect pests that eat the corn plants. If the corn plant is is heterozygous for the *Bt* gene (one homolog has the introduced *Bt* gene and the other does not), what proportion of the sperm would carry the *Bt* gene? Is the presence of the *Bt* gene (a mutation) dominant or recessive to its absence (the wild type)?

A) all pollen; dominant

B) 1/2; dominant

C) 1/3; recessive

D) 1/4; dominant

E) 1/8; recessive

Answer: B

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.01 Explain Mendel's law of segregation and how it predicts the 3:1 dominant-to-recessive phenotypic ratio among the F2 generation of a monohybrid cross.

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

12) Suppose that in plants, smooth seeds (*S*) is dominant to wrinkled seeds (*s*), and tall plants (*T*) is dominant to short plants (*t*). An F1 plant from a mating between homozygous plants that were tall/smooth and short/wrinkled was crossed to the short/wrinkled parent. What proportion of the progeny is homozygous for short and wrinkled alleles?

A) 1/2

B) 1/4

C) 1/8

D) 1/16

E) 0

Answer: B

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.03 Explain Mendel's law of independent assortment and how the 9:3:3:1 phenotypic ratio in a dihybrid cross provides evidence for this law.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

13) Sickle cell anemia is a recessive trait in humans. In a cross between a father who has sickle cell anemia and a mother who is heterozygous for the sickle cell allele, what is the probability that all of their first three children will be unaffected?

A) 1/4

B) 1/2

C) none

D) 1/8

E) 1/16

Answer: D

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.05 Predict the genotypic and phenotypic ratios among progeny of complex multihybrid crosses using simple rules of probability.

Bloom's: 5. Evaluate

Accessibility: Keyboard Navigation

14) In a monohybrid cross *AA* × *aa*, what proportion of homozygotes is expected among the F2 offspring?

A) 1/4

B) 1/2

C) 3/4

D) All are homozygotes.

E) None are homozygotes.

Answer: B

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.01 Explain Mendel's law of segregation and how it predicts the 3:1 dominant-to-recessive phenotypic ratio among the F2 generation of a monohybrid cross.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

15) In a dihybrid cross *AA bb* × *aa BB*, what proportion of the F2 offspring is expected to be homozygous for at least one gene?

A) 1/4

B) 1/2

C) 3/4

D) All are homozygotes.

E) None are homozygotes.

Answer: C

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.03 Explain Mendel's law of independent assortment and how the 9:3:3:1 phenotypic ratio in a dihybrid cross provides evidence for this law.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

16) In the testcross *Aa Bb* × *aa bb*, what proportion of individuals are expected to be homozygous for both genes in the F1 generation?

A) 1/4

B) 1/2

C) 3/4

D) All are homozygotes.

E) None are homozygotes.

Answer: A

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.03 Explain Mendel's law of independent assortment and how the 9:3:3:1 phenotypic ratio in a dihybrid cross provides evidence for this law.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

17) Among the dihybrid crosses below, which will produce a 1:1 phenotypic ratio?

A) *AA BB* × *aa bb*

B) *Aa Bb* × *Aa Bb*

C) *Aa Bb* × *aa bb*

D) *Aa BB* × *aa BB*

E) *AA bb* × *aa BB*

*Answer:* D

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.03 Explain Mendel's law of independent assortment and how the 9:3:3:1 phenotypic ratio in a dihybrid cross provides evidence for this law.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

18) Assume that in guinea pigs, dark brown fur (*B*) is dominant to black fur (*b*). If you mate a homozygous black guinea pig with a heterozygous brown guinea pig, what proportion of the progeny will be black?

A) none

B) 1/4

C) 1/2

D) 3/4

E) all

Answer: C

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.02 Distinguish between a monohybrid cross and a testcross.

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

19) Assume that in guinea pigs, dark brown fur (*B*) is dominant to black fur (*b*). If you mate a black guinea pig with a homozygous brown guinea pig, what proportion of the progeny will be homozygous?

A) none

B) 1/4

C) 1/2

D) 3/4

E) all

Answer: A

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.02 Distinguish between a monohybrid cross and a testcross.

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

20) An allele that expresses its phenotype even when heterozygous with a recessive allele is termed

A) recessive.

B) recombinant.

C) dominant.

D) parental.

E) independent.

Answer: C

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.01 Explain Mendel's law of segregation and how it predicts the 3:1 dominant-to-recessive phenotypic ratio among the F2 generation of a monohybrid cross.

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

21) The diploid cell formed by the fertilization of the egg by the sperm during sexual reproduction is a

A) reciprocal.

B) zygote.

C) dihybrid.

D) gamete.

E) monohybrid.

Answer: B

Section: 2.01

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.01 Explain Mendel's law of segregation and how it predicts the 3:1 dominant-to-recessive phenotypic ratio among the F2 generation of a monohybrid cross.

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

22) The alleles present in an individual make up the individual's

A) recombinant types.

B) recessiveness.

C) dominance.

D) phenotype.

E) genotype.

Answer: E

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.02 Distinguish between a monohybrid cross and a testcross.

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

23) The first offspring from the parents are called

A) P.

B) F1.

C) F2.

D) a testcross.

E) P2.

Answer: B

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.01 Explain Mendel's law of segregation and how it predicts the 3:1 dominant-to-recessive phenotypic ratio among the F2 generation of a monohybrid cross.

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

24) What type of cross is performed to determine the genotype of an individual?

A) A testcross

B) A dihybrid cross

C) A monohybrid cross

D) A  genotyping cross

E) A controlled cross

Answer: A

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.02 Distinguish between a monohybrid cross and a testcross.

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

25) If the parents of a family already have two boys, what is the probability that the next two offspring will both be girls?

A) 1

B) 1/2

C) 1/3

D) 1/4

E) 1/8

Answer: D

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.05 Predict the genotypic and phenotypic ratios among progeny of complex multihybrid crosses using simple rules of probability.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

26) Suppose that in plants, smooth seeds (*S*) is dominant to wrinkled seeds (*s*) and tall plants (*T*) is dominant to short plants (*t*). An F1 tall plant with smooth seeds was crossed to a parent plant that was short and wrinkled. What proportion of the progeny is expected to be heterozygous for tall and smooth?

A) 1/2

B) 1/4

C) 1/8

D) 1/16

E) 0

Answer: B

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.03 Explain Mendel's law of independent assortment and how the 9:3:3:1 phenotypic ratio among the F2 of a dihybrid cross provides evidence for this law.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

27) A rare recessive trait in a pedigree is indicated by which pattern of inheritance?

A) vertical

B) horizontal

C) diagonal

D) both vertical and horizontal

E) pure-breeding

Answer: B

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

28) The dominant Huntington disease allele causes severe neural/brain damage at approximately age 40. A female whose mother has Huntington disease marries a male whose parents are normal. It is not known if the female has the disease. Keeping in mind that the disease allele is rare in the population, what is the probability that their firstborn will inherit the gene that causes Huntington disease?

A) 25%

B) 50%

C) 75%

D) 100%

E) 0%

Answer: A

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.02 Explain why Huntington disease is inherited as a dominant allele while cystic fibrosis is caused by a recessive allele.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

29) In a monohybrid cross *AA* × *aa*, what proportion of heterozygotes is expected among the F2 offspring?

A) 1/4

B) 1/2

C) 3/4

D) All are heterozygotes.

E) None are heterozygotes.

Answer: B

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.01 Explain Mendel's law of segregation and how it predicts the 3:1 dominant-to-recessive phenotypic ratio among the F2 generation of a monohybrid cross.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

30) In a dihybrid cross *AA BB* × *aa bb*, what proportion of heterozygotes for both gene pairs is expected among the F2 offspring?

A) 1/4

B) 1/2

C) 3/4

D) All are heterozygotes.

E) None are heterozygotes.

Answer: A

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.03 Explain Mendel's law of independent assortment and how the 9:3:3:1 phenotypic ratio in a dihybrid cross provides evidence for this law.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

31) In the dihybrid cross *Aa Bb* × *aa bb*, what proportion of heterozygotes for both gene pairs is expected among the F1 offspring?

A) 1/4

B) 1/2

C) 3/4

D) All are heterozygotes.

E) None are heterozygotes.

Answer: A

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.03 Explain Mendel's law of independent assortment and how the 9:3:3:1 phenotypic ratio in a dihybrid cross provides evidence for this law.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

32) Among the dihybrid crosses below, which will produce offspring with a 1:1:1:1 genotypic ratio?

A) *AA BB* × *aa bb*

B) *Aa Bb* × *Aa Bb*

C) *Aa Bb* × *aa bb*

D) *Aa BB* × *aa BB*

E) *AA bb* × *aa BB*

*Answer:* C

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.04 Interpret phenotypic ratios of progeny to infer how particular traits are inherited.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

33) What is the term for crosses between parents that differ in only one trait?

A) Testcrosses

B) Cross fertilize

C) Monohybrid crosses

D) Dihybrid crosses

E) Reciprocal crosses

Answer: C

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.02 Distinguish between a monohybrid cross and a testcross.

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

34) An alternative form of a single gene is known as

A) a parental.

B) a dihybrid.

C) a reciprocal.

D) an allele.

E) a recessive.

Answer: D

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.01 Explain Mendel's law of segregation and how it predicts the 3:1 dominant-to-recessive phenotypic ratio among the F2 generation of a monohybrid cross.

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

35) A phenotype reflecting a new combination of genes occurring during gamete formation is called

A) a recombinant type.

B) an independent assortment.

C) heterozygous.

D) homozygous.

E) a multihybrid cross.

Answer: A

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.03 Explain Mendel's law of independent assortment and how the 9:3:3:1 phenotypic ratio in a dihybrid cross provides evidence for this law.

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

For each of the following pedigree symbols, select the correct meaning.

36)



A) Unaffected male

B) Unaffected female

C) Mating

D) Affected male

E) Affected female

Answer: A

Section: 2.03

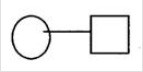
Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

37)



A) Unaffected male

B) Unaffected female

C) Mating

D) Affected male

E) Affected female

Answer: C

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

38)



A) Unaffected male

B) Unaffected female

C) Mating

D) Affected male

E) Affected female

Answer: B

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

39)



A) Unaffected male

B) Unaffected female

C) Mating

D) Affected male

E) Affected female

Answer: D

Section: 2.03

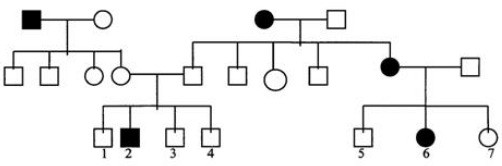
Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

Below is a pedigree for a common human trait (not a disease) controlled by a single gene. Shaded symbols are for individuals exhibiting the trait.



40) Identify the mode of inheritance of the trait.

A) Dominant

B) Recessive

C) Either dominant or recessive

D) Cannot be determined

Answer: B

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

41) If individuals 4 and 7 have a child, what is the probability that the child will exhibit the trait?

A) 1/4

B) 1/2

C) 1/6

D) 2/3

E) 0

Answer: C

Section: 2.03

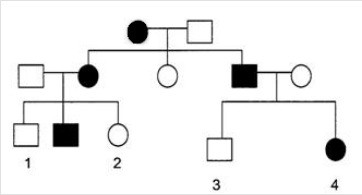
Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

Below is a pedigree of a human genetic disease in which solid color indicates affected individuals. Assume that the disease is caused by a gene that can have the alleles *A* or *a*.



42) Based on this pedigree, what is the most likely mode of inheritance?

A) Dominant

B) Recessive

C) Either dominant or recessive

D) Cannot be determined

Answer: A

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

43) What is/are the possible genotype(s) of person 1?

A) *AA*

B) *Aa*

C) Either *AA* or *Aa*

D) *aa*

E) Cannot be determined

Answer: D

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

44) What is/are the possible genotype(s) of person 2?

A) *AA*

B) *Aa*

C) Either *AA* or *Aa*

D) *aa*

E) Cannot be determined

Answer: D

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

45) What is/are the possible genotype(s) of person 3?

A) *AA*

B) *Aa*

C) Either *AA* or *Aa*

D) *aa*

E) Cannot be determined

Answer: D

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

46) What is/are the possible genotype(s) of person 4?

A) *AA*

B) *Aa*

C) Either *AA* or *Aa*

D) *aa*

E) Cannot be determined

Answer: B

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

47) If individuals 1 and 4 have a child together, what is the probability that the child will exhibit the disease?

A) 0%

B) 25%

C) 50%

D) 75%

E) 100%

Answer: C

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

48) If individuals 2 and 3 have a child together, what is the probability that the child will exhibit the disease?

A) 0%

B) 25%

C) 50%

D) 75%

E) 100%

Answer: A

Section: 2.03

Topic: Mendelian Inheritance in Humans

Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.

Bloom's: 4. Analyze

Accessibility: Keyboard Navigation

In corn, having ligules (*L*) is dominant to liguleless (*l*), and green leaves (*G*) is dominant to white leaves (*g*).

49) If a testcross is performed with a dihybrid plant with ligules and green leaves, what proportion of the progeny would be green and liguleless?

A) 1/16

B) 1/8

C) 1/4

D) 1/2

E) Cannot be determined

Answer: C

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.03 Explain Mendel's law of independent assortment and how the 9:3:3:1 phenotypic ratio in a dihybrid cross provides evidence for this law.

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

50) If a pure-breeding liguleless plant with green leaves is crossed to pure-breeding plant with ligules and white leaves, predict the proportion of F2 progeny with the genotype *Ll gg*.

A) 1/16

B) 1/8

C) 1/4

D) 1/2

E) Cannot be determined

Answer: B

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.03 Explain Mendel's law of independent assortment and how the 9:3:3:1 phenotypic ratio in a dihybrid cross provides evidence for this law.

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

51) If a pure-breeding plant that is liguleless and has green leaves is crossed to a pure-breeding plant with white leaves and ligules, predict the genotypes and phenotypes of the F1.

A) *LL GG*, green and ligules

B) *Ll GG*, green and ligules

C) *Ll Gg*, green and ligules

D) *ll gg*, white and liguleless

E) *Ll gg*, green and liguleless

Answer: C

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.03 Explain Mendel's law of independent assortment and how the 9:3:3:1 phenotypic ratio in a dihybrid cross provides evidence for this law.

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

52) How was the approach taken by Mendel similar to the approaches taken by modern scientific inquiry?

A) Mendel repeated his experiments.

B) Mendel examined both continuous and discrete traits.

C) Mendel used the same technical methods that are used today.

D) Mendel's experiments challenged no hypotheses that were favored at the time.

Answer: A

Section: 2.01

Topic: Background - The Historical Puzzle of Inheritance

Learning Objective: 02.01.01 Relate how Mendel's experimental approach is similar to the process of modern scientific inquiry.

Bloom's: 1. Remember

Accessibility: Keyboard Navigation

53) Pea shape is controlled by a gene that specifies an enzyme known as Sbe1 (for Starch-branching enzyme 1). A recessive allele of *Sbe1* likely encodes

A) an Sbe1 enzyme with reduced function.

B) an Sbe1 enzyme with a new function.

C) a different type of enzyme.

D) an Sbe1 enzyme with enhanced catalytic activity.

Answer: A

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.06 Cite the most common molecular explanations for dominant and recessive alleles.

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

54) An allele of the pea color gene specifies the enzyme Sgr, which normally functions in a pathway to break down chlorophyll during pea maturation, resulting in yellow mature peas. A second allele of the *Sgr* gene produces no enzyme and is the \_\_\_\_\_\_\_\_ allele.

A) dominant

B) recessive

C) wild-type

D) functioning

Answer: B

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.06 Cite the most common molecular explanations for dominant and recessive alleles.

Bloom's: 2. Understand

Accessibility: Keyboard Navigation

55) Mendel's law of independent assortment dictates than an *Aa Bb* dihybrid would make equal numbers of four gamete types. What are these four gamete types?

A) *A; a; B; b*

B) *AA; BB; aa; bb*

C) *A B; A b; a B; a b*

D) *AA BB; AA bb; Aa Bb; aa BB*

*Answer:* C

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.03 Explain Mendel's law of independent assortment and how the 9:3:3:1 phenotypic ratio in a dihybrid cross provides evidence for this law.

Bloom's: 3. Apply

Accessibility: Keyboard Navigation

56) According to Mendel's law of equal segregation, an *Aa* monohybrid makes two types of gametes with equal frequency. These two gamete types are:

A) *AA* and *aa*

B) *A* and *a*

C) *Aa* and *aa*

D) *AA* and *Aa*

*Answer:* B

Section: 2.02

Topic: Genetic Analysis According to Mendel

Learning Objective: 02.02.03 Explain Mendel's law of independent assortment and how the 9:3:3:1 phenotypic ratio in a dihybrid cross provides evidence for this law.

Bloom's: 3. Apply

Accessibility: Keyboard Navigation