

Chapter 02 - Mendel's Principles of Heredity

**Chapter 02**  
**Mendel's Principles of Heredity**

**Multiple Choice Questions**

1.

What was the importance of Mendel performing reciprocal crosses?

A.

To be able to breed plants all year round

B.

To obtain enough plants to perform the experiments that Mendel wanted, which would not have been sufficient without performing reciprocal crosses

C.

To disprove a hypothesis at the time the experiments were performed that stated the ovum carried all the information for progeny

**D.**

To demonstrate that the inheritance of a trait was not dependent on which parent carried the trait

*Bloom's: 2. Understand*

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

*Section: 2.01*

*Topic: Background - The Historical Puzzle of Inheritance*

2. What is the difference between cross and self fertilization?

- A. In cross-fertilization the gametes from one plant are used to fertilize the gametes of another plant
- B. In cross-fertilization the gametes from one plant are used to fertilize the gametes from the same plant
- C. In self-fertilization the gametes from one plant are used to fertilize the gametes from another plant
- D. In cross-fertilization insects are used to pollinate the plants while in self-fertilization the investigator pollinates the plants

*Bloom's: 2. Understand*

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

*Section: 2.01*

*Topic: Background - The Historical Puzzle of Inheritance*

3. What is the outcome of breeding two plants each pure bred and each having an antagonistic trait?

- 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

*Bloom's: 2. Understand*

*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.*

*Section: 2.01*

*Topic: Background - The Historical Puzzle of Inheritance*

4. According to Mendel's Law of Independent Assortment

- A. Genes of different chromosomes randomly assort into different gametes
- B. Alleles for one gene randomly assort into different gametes
- 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

*Bloom's: 2. Understand*

*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.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

## Chapter 02 - Mendel's Principles of Heredity

5.

If an  $Ss \times Ss$  mating is performed and the progeny have the following phenotypic ratios  $S-$  (– indicates that the other allele is unknown) 3 and  $ss$  1 it would indicate that

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. Cannot determine the relationship between the alleles based on the information given

*Bloom's: 4. Analyze*

*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 F<sub>2</sub> generation of a monohybrid cross.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

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.

$S-/RR$ : 12.5%

B. Homozygous recessive: 10%

C. Heterozygous both alleles: 50%

D.

$ss/R-$  : 15.5%

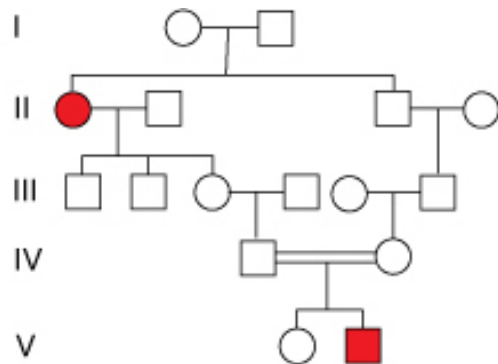
*Bloom's: 4. Analyze*

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

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

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 only arises by a new mutation in those individuals that are affected.

Bloom's: 4. Analyze

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

Section: 2.03

Topic: Mendelian Inheritance in Humans

## Chapter 02 - Mendel's Principles of Heredity

8.

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

**A.** Normal or near normal cellular function can occur from the protein produced by the normal allele

**B.**

The *CF* mutations that occur result in no protein being produced

**C.**

*CF* mutations only result in a protein that has normal function if there is also a normal *CF* protein in the cell.

**D.** *CF* is fatal and if the alleles that caused *CF* were dominant it would not be inherited.

*Bloom's: 2. Understand*

*Learning Objective: 02.03.02 Describe the most common molecular mechanism for recessively inherited human genetic diseases such as cystic fibrosis.*

*Section: 2.03*

*Topic: Mendelian Inheritance in Humans*

## Chapter 02 - Mendel's Principles of Heredity

9.

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

A.

The mutant *HD* allele suppress protein production from the normal *HD* allele

**B.**

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

C.

The normal *HD* allele does not normally produce a protein but the mutant *HD* allele does

D.

The protein produced from the mutant *HD* allele is non-functional

*Bloom's: 2. Understand*

*Learning Objective: 02.03.03 Explain why Huntington disease is caused by a dominant allele.*

*Section: 2.03*

*Topic: Mendelian Inheritance in Humans*

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

*Bloom's: 4. Analyze*

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

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

## Chapter 02 - Mendel's Principles of Heredity

11.

In some genetically engineered corn plants the dominant gene *Bt* produces a protein that is lethal to certain flying insect pests that eat the corn plants. If the corn plant is heterozygous for *Bt*, what proportion of the pollen would carry the dominant gene?

A. all pollen

**B.** 1/2

C. 1/3

D. 1/4

E. 1/8

*Bloom's: 3. Apply*

*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 F<sub>2</sub> generation of a monohybrid cross.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

12.

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

A. 1/2

**B.** 1/4

C. 1/8

D. 1/16

E. 0

*Bloom's: 4. Analyze*

*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.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

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 gene, what is the probability that their first three children will have the normal phenotype?

- A. 1/4
- B. 1/2
- C. none
- D. 1/8**
- E. 1/16 will be albino

*Bloom's: 4. Analyze*

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

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

14.

In a monohybrid cross  $AA \times aa$ , what proportion of homozygotes is expected among the  $F_2$  offspring?

- A. 1/4
- B. 1/2**
- C. 3/4
- D. All are homozygotes.
- E. None are homozygotes.

*Bloom's: 4. Analyze*

*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  $F_2$  generation of a monohybrid cross.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*



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15.

In a dihybrid cross  $AAbb \times aaBB$ , what proportion of the  $F_2$  offspring is expected to be homozygotic for at least one gene?

- A. 1/4
- B. 1/2
- C. 3/4**
- D. All are homozygotes.
- E. None are homozygotes.

*Bloom's: 4. Analyze*

*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.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

16.

In the dihybrid cross  $AaBb \times aabb$ , what proportion of individuals are expected to be homozygotic for both genes in the  $F_1$  generation?

- A. 1/4**
- B. 1/2
- C. 3/4
- D. All are homozygotes.
- E. None are homozygotes.

*Bloom's: 4. Analyze*

*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.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

Chapter 02 - Mendel's Principles of Heredity

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

A.

$AABB \times aabb$

B.

$AaBb \times AaBb$

C.

$AaBb \times aabb$

**D.**

$AaBB \times aaBB$

E.

$AAbb \times aaBB$

*Bloom's: 4. Analyze*

*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.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

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

*Bloom's: 3. Apply*

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

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

## Chapter 02 - Mendel's Principles of Heredity

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

*Bloom's: 3. Apply*

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

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

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.

*Bloom's: 2. Understand*

*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 F<sub>2</sub> generation of a monohybrid cross.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

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.

*Bloom's: 1. Remember*

*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.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

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

- A. recombinant types.
- B. zygote.
- C. dominant allele.
- D. allele.
- E. genotype.**

*Bloom's: 1. Remember*

*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 F<sub>2</sub> generation of a monohybrid cross.*

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*Topic: Genetic Analysis According to Mendel*

23. The first offspring from the parents are called

- A. P.
- B. F<sub>1</sub>.**
- C. F<sub>2</sub>.
- D. testcross.
- E. backcross.

*Bloom's: 1. Remember*

*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 F<sub>2</sub> generation of a monohybrid cross.*

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24.

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

- A.** testcross
- B. dihybrid
- C. monohybrid
- D. backcross
- E. controlled

*Bloom's: 1. Remember*

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

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

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

- A. 1
- B. 1/2
- C. 1/3
- D.** 1/4
- E. 1/8

*Bloom's: 4. Analyze*

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

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

26.

Suppose that in plants, smooth seeds (*S*) are dominant to wrinkled seeds (*s*) and tall plants (*T*) are dominant to short plants (*t*). A tall plant with smooth seeds was backcrossed to a parent 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

*Bloom's: 4. Analyze*

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

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

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. None of these is correct.

*Bloom's: 2. Understand*

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

*Section: 2.03*

*Topic: Mendelian Inheritance in Humans*

28. The dominant trait, Huntington disease 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. 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%

*Bloom's: 4. Analyze*

*Learning Objective: 02.03.03 Explain why Huntington disease is caused by a dominant allele.*

*Section: 2.03*

*Topic: Mendelian Inheritance in Humans*

29.

In a monohybrid cross  $AA \times aa$ , what proportion of heterozygotes is expected among the  $F_2$  offspring?

- A. 1/4
- B. 1/2
- C. 3/4
- D. All are heterozygotes.
- E. None are heterozygotes.

*Bloom's: 4. Analyze*

*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  $F_2$  generation of a monohybrid cross.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

## Chapter 02 - Mendel's Principles of Heredity

30.

In a dihybrid cross  $AABB \times aabb$ , what proportion of heterozygotes for both gene pairs is expected among the  $F_2$  offspring?

- A. 1/4
- B. 1/2
- C. 3/4
- D. All are heterozygotes.
- E. None are heterozygotes.

*Bloom's: 4. Analyze*

*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.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

31.

In the dihybrid cross  $AaBb \times aabb$ , what proportion of heterozygotes for both gene pairs is expected among the  $F_1$  offspring?

- A. 1/4
- B. 1/2
- C. 3/4
- D. All are heterozygotes.
- E. None are heterozygotes.

*Bloom's: 4. Analyze*

*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.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*



32. Among the dihybrid crosses below, which will give a 1:1:1:1 ratio?

A.

$AABB \times aabb$

B.

$AaBb \times AaBb$

C.

$AaBb \times aabb$

D.

$AaBB \times aaBB$

E.

$AAbb \times aaBB$

*Bloom's: 4. Analyze*

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

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

33.

What is the term for cross(es) between parents that differ in only one trait.

A. Self-fertilization

B. Cross fertilize

C. Monohybrid crosses

D. Artificial selection

E. Reciprocal crosses

*Bloom's: 1. Remember*

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

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

Chapter 02 - Mendel's Principles of Heredity

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

- A. parental.
- B. dihybrid.
- C. reciprocal.
- D. allele.
- E. recessive.

*Bloom's: 1. Remember*

*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 F<sub>2</sub> generation of a monohybrid cross.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

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.

*Bloom's: 1. Remember*

*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 F<sub>2</sub> generation of a monohybrid cross.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

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

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## Chapter 02 - Mendel's Principles of Heredity

36.



**A.**

Unaffected male

B.

Unaffected female

C.

Mating

D.

Affected male

E.

Affected female

*Bloom's: 1. Remember*

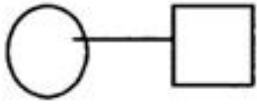
*Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.*

*Section: 2.03*

*Topic: Mendelian Inheritance in Humans*

Chapter 02 - Mendel's Principles of Heredity

37.



A.

Unaffected male

B.

Unaffected female

**C.**

Mating

D.

Affected male

E.

Affected female

*Bloom's: 1. Remember*

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

*Section: 2.03*

*Topic: Mendelian Inheritance in Humans*

Chapter 02 - Mendel's Principles of Heredity

38.



A.

Unaffected male

**B.**

Unaffected female

C.

Mating

D.

Affected male

E.

Affected female

*Bloom's: 1. Remember*

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

*Section: 2.03*

*Topic: Mendelian Inheritance in Humans*

## Chapter 02 - Mendel's Principles of Heredity

39.



A.

Unaffected male

B.

Unaffected female

C.

Mating

**D.**

Affected male

E.

Affected female

*Bloom's: 1. Remember*

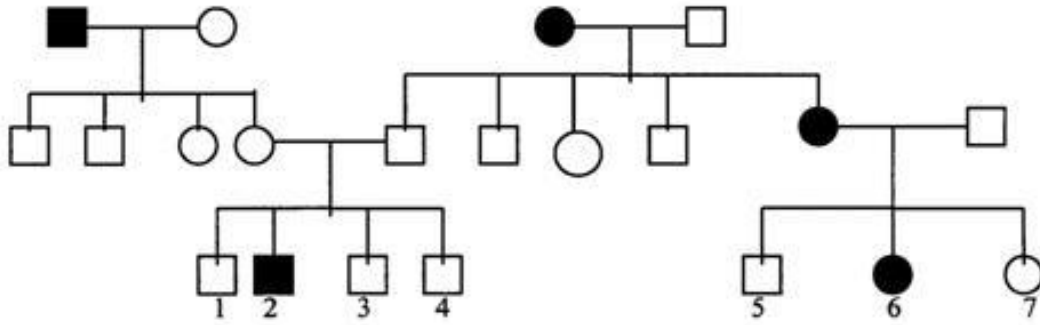
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Below is a pedigree for a human trait. Shaded symbols are for individuals exhibiting the trait.



Section: 2.03

## Chapter 02 - Mendel's Principles of Heredity

40.

Identify the mode of inheritance of the trait.

A.

Dominant

**B.**

Recessive

C.

Either dominant or recessive

D.

Cannot be determined

*Bloom's: 4. Analyze*

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

*Section: 2.03*

*Topic: Mendelian Inheritance in Humans*



## Chapter 02 - Mendel's Principles of Heredity

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.**

$1/3$

D.

$2/3$

E.

0

*Bloom's: 4. Analyze*

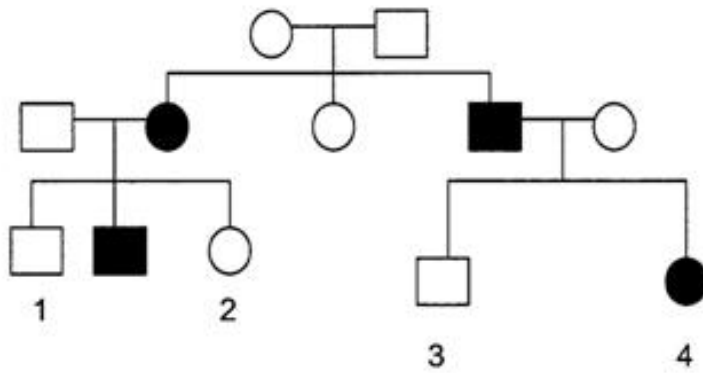
*Learning Objective: 02.03.01 Analyze human pedigrees to determine whether a genetic disease exhibits recessive or dominant inheritance.*

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



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## Chapter 02 - Mendel's Principles of Heredity

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

*Bloom's: 4. Analyze*

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

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*Topic: Mendelian Inheritance in Humans*

## Chapter 02 - Mendel's Principles of Heredity

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

*Bloom's: 4. Analyze*

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

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*Topic: Mendelian Inheritance in Humans*

## Chapter 02 - Mendel's Principles of Heredity

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

*Bloom's: 4. Analyze*

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

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*Topic: Mendelian Inheritance in Humans*

## Chapter 02 - Mendel's Principles of Heredity

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

*Bloom's: 4. Analyze*

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

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## Chapter 02 - Mendel's Principles of Heredity

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

*Bloom's: 4. Analyze*

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

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## Chapter 02 - Mendel's Principles of Heredity

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%

*Bloom's: 4. Analyze*

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

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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%

*Bloom's: 4. Analyze*

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

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In corn, liguleless (*l*) is recessive to ligules (*L*) and green leaves (*G*) is dominant to non-green leaves (*g*).

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49.

If a testcross is performed with a plant heterozygous for 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

*Bloom's: 3. Apply*

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

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

## Chapter 02 - Mendel's Principles of Heredity

50.

If a plant homozygous for liguleless and green leaves is crossed to one homozygous for non-green with ligules, predict the proportion of F<sub>2</sub> progeny with the genotype *Llgg*.

A.

1/16

**B.**

1/8

C.

1/4

D.

1/2

E.

Cannot be determined

*Bloom's: 3. Apply*

*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.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

## Chapter 02 - Mendel's Principles of Heredity

51.

If a plant homozygous for liguleless and green leaves is crossed to one homozygous for non-green with ligules, predict the phenotypes and genotypes of the F<sub>1</sub>.

A.

*LLGG*, green and ligules

B.

*LiGG*, green and ligules

**C.**

*LiGg*, green and ligules

D.

*llgg*, non-green and liguleless

E.

*Llgg*, green and liguleless

*Bloom's: 3. Apply*

*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.*

*Section: 2.02*

*Topic: Genetic Analysis According to Mendel*

Chapter 02 - Mendel's Principles of Heredity

52.

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

A. Mendel repeated his experiments

B.

Mendel only manipulated a single variable.

C.

Mendel used the same technical methods are used today.

D.

Mendel's experiments challenged several hypotheses that were favored at the time.

*Bloom's: 1. Remember*

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

*Section: 2.01*

*Topic: Background - The Historical Puzzle of Inheritance*