Mendelian Inheritance Worksheet Answer Key PDF

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Part 1: Building a Foundation

Who is known as the father of genetics?

undefined. A) Charles Darwin
undefined. B) Gregor Mendel ✓
undefined. C) James Watson
undefined. D) Francis Crick

Gregor Mendel is recognized as the father of genetics due to his pioneering work in heredity.

Which of the following are Mendel's Laws of Inheritance?

undefined. A) Law of Segregation ✓
undefined. B) Law of Independent Assortment ✓
undefined. C) Law of DominANCE ✓
undefined. D) Law of Mutation

The correct laws include the Law of Segregation, Law of Independent Assortment, and Law of Dominances.

Define the term 'alleles' and provide an example of how alleles can affect a trait.

Alleles are different forms of a gene that can influence the expression of a trait, such as flower color.

List two characteristics of a dominant allele and two characteristics of a recessiv allele.

1. Characteristic of dominant allele 1
Expresses phenotype in heterozygous condition.

2. Characteristic of dominant allele 2
Masks the effect of recessiv alleles.

3. Characteristic of recessiv allele 1

Only expressed in homozygous condition.

4. Characteristic of recessiv allele 2

Masked by dominant alleles.

Dominant alleles typically mask the effect of recessiv alleles and are expressed in the phenotype, while recessiv alleles are only expressed when homozygous.

What is the observable trait of an organism called?

undefined. A) Genotype

undefined. B) Phenotype ✓

undefined. C) Alleles

undefined. D) Chromosome

The observable trait of an organism is referred to as its phenotype.

Part 2: Understanding and Interpretation

In a monohybrid cross between two heterozygous individuals (Aa x Aa), what is the expected phenotypic ratio?

undefined. A) 1:1

undefined. B) 3:1 ✓

undefined. C) 9:3:3:1

undefined. D) 1:2:1

The expected phenotypic ratio for a monohybrid cross between two heterozygous individuals is 3:1.

Which of the following statements are true about a dihybrid cross?

undefined. A) It involves two traits. ✓

undefined. B) It can demonstrate the Law of Independent Assortment. ✓

undefined. C) It results in a 9:3:3:1 phenotypic ratio. ✓

undefined. D) It involves only one pair of alleles.

A dihybrid cross involves two traits, demonstrates the Law of Independent Assortment, and results in a 9:3:3:1 phenotypic ratio.

Explain the difference between homozygous and heterozygous genotypes, providing an example for each.

Homozygous genotypes have identical alleles, while heterozygous genotypes have different alleles. For example, AA is homozygous, and Aa is heterozygous.

Part 3: Application and Analysis

If a plant with genotype AaBb is crossed with a plant with genotype aabb, what proportion of the offspring will be homozygous recessiv for both traits?

undefined. A) 1/16

undefined. B) 1/4 ✓

undefined. C) 1/2

undefined. D) 1/8

The proportion of homozygous recessiv offspring from this cross is 1/4.

In a pedigree chart, which of the following symbols and lines indicate a mating and their offspring?

undefined. A) A horizontal line connecting a circle and a square ✓

undefined. B) A vertical line leading to a horizontal line ✓

undefined. C) A shaded circle

undefined. D) A square with a diagonal line

A horizontal line connecting a circle and a square indicates a mating, while a vertical line leading to a horizontal line indicates their offspring.

Describe how a Punnett square can be used to predict the outcome of a genetic cross. Provide an example using a monohybrid cross.

A Punnett square is a tool used to predict the genotypes and phenotypes of offspring from a genetic cross, such as Aa x Aa resulting in a 3:1 ratio.

Which of the following scenarios demonstrates codominANCE?

undefined. A) A red flower and a white flower produce pink offspring.

undefined. B) A black chicken and a white chicken produce speckled offspring. ✓

undefined. C) A tall plant and a short plant produce medium-height offspring.
undefined. D) A blue-eyed parent and a brown-eyed parent produce only brown-eyed children.

The scenario where a black chicken and a white chicken produce speckled offspring demonstrates codominANCE.

Analyze the following statements and identify which are true about incomplete dominance:

undefined. A) The heterozygous phenotype is a blend of the two homozygous phenotypes. ✓
undefined. B) Both alleles are fully expressed in the phenotype.
undefined. C) It results in a 1:2:1 phenotypic ratio in a monohybrid cross. ✓
undefined. D) It follows Mendel's Law of DominANCE.

In incomplete dominance, the heterozygous phenotype is a blend of the two homozygous phenotypes, resulting in a 1:2:1 phenotypic ratio.

Part 4: Evaluation and Creation

Which genetic disorder is an example of autosomal dominant inheritance?

undefined. A) Cystic fibrosis
undefined. B) Sickle cell anemia
undefined. C) Huntington's disease ✓
undefined. D) Hemophilia

Huntington's disease is an example of an autosomal dominant inheritance disorder.

Evaluate the following scenarios and identify which involve multiple alleles:

undefined. A) Blood type in humans ✓
undefined. B) Flower color in snapdragons
undefined. C) Eye color in fruit flies
undefined. D) Coat color in rabbits

Blood type in humans is an example of a trait that involves multiple alleles.

Design a hypothetical experiment using pea plants to demonstrate Mendel's Law of Independent Assortment. Describe the setup, procedure, and expected results.

A hypothetical experiment could involve crossing pea plants with different traits to observe the segregation of traits in the offspring, demonstrating independent assortment.

Propose two real-world applications of Mendelian genetics in modern science and briefly explain their significance.

1. Application 1

Selective breeding in agriculture to enhance crop yields.

2. Application 2

Genetic testing for hereditary diseases in humans.

Applications of Mendelian genetics include selective breeding in agriculture and genetic testing in medicine, both of which have significant impacts on health and food production.