Mendelian Genetics Quiz Answer Key PDF

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What is a dihybrid cross, and how does it differ from a monohybrid cross?

A dihybrid cross is a genetic cross that involves two traits, each represented by two alleles, while a monohybrid cross involves only one trait with two alleles.

Discuss the role of polygenic inheritance in determining human traits. Provide examples.

Polygenic inheritance plays a crucial role in determining human traits by involving multiple genes that collectively influence characteristics such as height, skin color, and eye color. For instance, height is influenced by numerous genes that affect growth and development, leading to a wide range of possible heights in the population.

How did Mendel's experiments with pea plants contribute to our understanding of genetics?

Through his systematic crossbreeding of pea plants, Mendel discovered the laws of inheritance, demonstrating how traits are passed from one generation to the next.

In a dihybrid cross, which of the following genotypic ratios is expected? (Select all that apply)

A. 9:3:3:1 ✓

B. 1:1:1:1

C. 3:1

D. 1:2:1

What tool is used to predict the outcome of genetic crosses?

A. Pedigree Chart

B. Punnett Square ✓

C. Genetic Map

D. Karyotype

Which of the following traits are examples of polygenic inheritance? (Select all that apply)

A. Skin color ✓
B. Height ✓
C. Blood type
D. Eye color ✓

In a monohybrid cross, what is the expected phenotypic ratio of the offspring?

A. 1:1
B. 3:1 ✓
C. 9:3:3:1
D. 1:2:1

What is the expected genotypic ratio in a monohybrid cross of heterozygous parents?

A. 1:1
B. 3:1
C. 1:2:1 ✓
D. 9:3:3:1

What is the phenotype of an organism?

A. The genetic makeup
B. The observable characteristics ✓
C. The location of a gene on a chromosome
D. The sequence of DNA

Which of the following are Mendel's laws of inheritance? (Select all that apply)

A. Law of Segregation ✓
B. Law of Independent Assortment ✓
C. Law of Genetic Linkage
D. Law of Dominanc

Which of the following statements about alleles are true? (Select all that apply)

A. Alleles are different forms of a gene ✓

B. Alleles are always dominant

C. Alleles can be recessiv ✓

D. Alleles are found on different chromosomes

Which of the following can be determined using a Punnett Square? (Select all that apply)

A. Phenotypic ratios ✓

B. Genotypic ratios ✓

C. Chromosome number

D. Probability of traits ✓

Explain Mendel's Law of Independent Assortment and its significance in genetics.

The Law of Independent Assortment, formulated by Gregor Mendel, asserts that the inheritance of one trait will not affect the inheritance of another trait, as alleles for different genes assort independently during gamete formation.

Describe the difference between incomplete dominance and codominace, providing an example for each.

Incomplete dominance occurs when the phenotype of the heterozygote is intermediate between the phenotypes of the two homozygotes, such as a red flower (RR) crossed with a white flower (WW) producing pink flowers (RW). Codominace occurs when both alleles in a heterozygote are fully expressed, such as in AB blood type where both A and B alleles are expressed.

Which of the following is an example of codominace?

A. A pink flower from red and white parents

B. A black and white spotted cow ✓

C. A tall plant from tall and short parents

D. A green pea from yellow and green parents

Which of the following principles is NOT one of Mendel's laws?

A. Law of Segregation

B. Law of Independent Assortment
C. Law of Dominanc
D. Law of Genetic Linkage ✓

Which term describes an organism with two identical alleles for a trait?

A. Heterozygous
B. Homozygous ✓
C. Dominant
D. Recessiv

Which of the following are characteristics of a pedigree chart? (Select all that apply)

A. Shows inheritance patterns ✓
B. Predicts genetic outcomes
C. Identifies carriers of genetic disorders ✓
D. Displays chromosome structure

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

A. Alleles of different genes assort independently
B. Alleles separate during gamete formation ✓
C. Dominant alleles mask recessiv alleles
D. Genes are linked on chromosomes

Why are pedigree charts important in studying human genetic disorders? Explain with an example.

Pedigree charts are important in studying human genetic disorders because they visually represent family relationships and the transmission of genetic traits, allowing researchers to identify carriers and assess the risk of inheritance. For instance, in a pedigree chart for cystic fibrosis, affected individuals can be traced through generations, helping to understand the disorder's inheritance pattern.