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Punnett Square Practice Worksheet Answer Key PDF

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Part 1: Foundational Knowledge

What is the term for different versions of a gene?

undefined. Chromosomes

undefined. Alleles ✓

undefined. Genotypes

undefined. Phenotypes

The correct term for different versions of a gene is alleles.

Which of the following are true about dominant alleles?

undefined. They can mask the effect of recessiv alleles. ✓

undefined. They are always more common in a population.

undefined. They determine the phenotype in a heterozygous genotype. ✓

undefined. They are represented by lowercase letters.

Dominant alleles can mask recessives and determine phenotypes in heterozygous genotypes.

Explain the difference between homozygous and heterozygous genotypes.

Homozygous genotypes have identical alleles, while heterozygous genotypes have different alleles.

List two examples of a homozygous genotype and two examples of a heterozygous genotype.

1. Homozygous examples:

AA, aa

2. Heterozygous examples:

Aa, Bb

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Examples of homozygous genotypes include AA and aa; examples of heterozygous genotypes include Aa and Bb.

Part 2: Understanding Genetic Concepts

What does a Punnett square help predict?

undefined. The physical appearance of an organism

undefined. The probability of an offspring having a particular genotype ✓

undefined. The number of chromosomes in a cell

undefined. The mutation rate of a gene

A Punnett square helps predict the probability of offspring genotypes.

Which statements are true about phenotypes?

undefined. They are determined by genotypes. ✓

undefined. They can be influenced by the environment. ✓

undefined. They are always visible traits.

undefined. They are the genetic makeup of an organism.

Phenotypes are influenced by genotypes and the environment.

Describe how a monohybrid cross differs from a dihybrid cross.

A monohybrid cross involves one trait, while a dihybrid cross involves two traits.

Part 3: Applying Knowledge and Analyzing Relationships

If a plant with genotype Aa is crossed with a plant with genotype aa, what is the probability of the offspring being homozygous recessiv?

undefined. 0%

undefined. 25%

undefined. 50% ✓

undefined. 75%

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The probability of the offspring being homozygous recessiv is 50%.

In a dihybrid cross between two heterozygous parents (AaBb x AaBb), which of the following genotypic combinations are possible?

undefined. **AABB** ✓

undefined. **AaBb** ✓

undefined. **aabb** ✓

undefined. **Aabb** ✓

Possible genotypic combinations include AABB, AaBb, aabb, and Aabb.

Using a Punnett square, predict the phenotypic ratio of a cross between two heterozygous pea plants (Ttx T t) for tallness, where tall (T) is dominant over short (t).

The expected phenotypic ratio is 3 tall to 1 short.

In a genetic cross, what does a 3:1 phenotypic ratio typically indicate?

undefined. A monohybrid cross with incomplete dominance

undefined. **A monohybrid cross with complete dominance** ✓

undefined. A dihybrid cross with linked genes

undefined. A test cross with a homozygous recessiv

A 3:1 phenotypic ratio typically indicates a monohybrid cross with complete dominance.

Which factors can affect the accuracy of a Punnett square prediction?

undefined. **Environmental influences** ✓

undefined. **Mutations in the genes** ✓

undefined. **Random fertilization** ✓

undefined. **Linked genes** ✓

Factors affecting accuracy include environmental influences, mutations, random fertilization, and linked genes.

Analyze the potential outcomes of a genetic cross between two organisms with genotypes AaBb and AaBb. Discuss the expected genotypic and phenotypic ratios.

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The expected genotypic ratio is 1 AABB : 2 AaBb : 1 aabb, and the phenotypic ratio is 9:3:3:1.

Part 4: Synthesis and Reflection

Which of the following scenarios would most likely require a revision of Mendelian genetics predictions?

undefined. Discovery of new alleles ✓

undefined. Observation of incomplete dominance

undefined. Introduction of a new species

undefined. Identification of linked genes

Discovery of new alleles would likely require a revision of Mendelian predictions.

Which scenarios demonstrate the limitations of using Punnett squares for genetic predictions?

undefined. Predictin traits in polygenic inheritance ✓

undefined. Estimating probabilities in large populations

undefined. Accounting for epigenetic factors ✓

undefined. Determining exact phenotypes in complex traits ✓

Limitations include predicting traits in polygenic inheritance and accounting for epigenetic factors.

Design a genetic experiment using Punnett squares to determine the inheritance pattern of a new trait in a plant species. Describe the steps and expected outcomes.

The experiment should outline the cross, expected ratios, and analysis of results.

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