Punnett Square Worksheet Questions and Answers PDF

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Part 1: Building a Foundation

What is a Punnett Square used for?

Hint: Think about its purpose in genetics.

- ◯ **A) Calculating genetic probabilities ✓**
- ◯ B) Measuring plant growth
- ◯ C) Recording experimental data
- ◯ D) Analyzing chemical reactions

> A Punnett Square is used to calculate genetic probabilities.

Which of the following are terms related to genetics? (Select all that apply)

Hint: Consider the vocabulary used in genetics.

- ☐ **A) Alleles ✓**
- ☐ B) Photosynthesis
- ☐ **C) Genotype ✓**
- ☐ **D) Homozygous ✓**

> Terms related to genetics include alleles, genotype, and homozygous.

Explain the difference between a genotype and a phenotype.

Hint: Consider how each term relates to observable traits.

A genotype refers to the genetic makeup of an organism, while a phenotype refers to the observable traits.

List the two types of alleles and provide an example of each.

Hint: Think about dominant and recessives.

1. Type of allele 1 and example

Dominant allele (A)

2. Type of allele 2 and example

Recessiv allele (a)

The two types of alleles are dominant and recessiv, with examples being 'A' for dominant and 'a' for recessiv.

Who is credited with devisING the Punnett Square?

Hint: Consider the historical figures in genetics.

- ◯ A) Gregor Mendel
- ◯ **B) Reginal Punnett ✓**
- ◯ C) Charles Darwin
- ◯ D) James Watson

Reginal Punnett is credited with devisING the Punnett Square.

Part 2: Application and Analysis

If a homozygous dominant plant (AA) is crossed with a homozygous recessiv plant (aa), what will be the genotype of the offspring?

Hint: Consider the combinations of alleles.

- ◯ A) AA
- ◯ **B) Aa ✓**
- ◯ C) aa
- ◯ D) Aa and aa

> The genotype of the offspring will be Aa.

Consider a dihybrid cross between two heterozygous parents (AaBb x AaBb). Which of the following genotypes are possible in the offspring? (Select all that apply)

Hint: Think about the combinations of alleles from both parents.

- ☐ **A) AABB ✓**
- ☐ **B) AaBb ✓**
- ☐ **C) aabb ✓**
- ☐ **D) Aabb ✓**

> Possible genotypes include AABB, AaBb, aabb, and Aabb.

Using a Punnett Square, predict the phenotypic ratio of offspring from a cross between two heterozygous pea plants (Yy x Yy) for yellow (Y) and green (y) seed color.

Hint: Consider the dominant and recessiv traits.

> **The phenotypic ratio will be 3 yellow to 1 green.**

In a dihybrid cross, what does the 9:3:3:1 ratio represent?

Hint: Think about the outcomes of the cross.

- ◯ A) The genotypic ratio of offspring
- ◯ **B) The phenotypic ratio of offspring ✓**
- ◯ C) The probability of dominant traits
- ◯ D) The ratio of homozygous to heterozygous genotypes

> The 9:3:3:1 ratio represents the phenotypic ratio of offspring.

Which of the following factors can affect the outcome of a Punnett Square prediction? (Select all that apply)

Hint: Consider external influences on genetic outcomes.

- ☐ **A) Environmental influences ✓**
- ☐ **B) Mutation in alleles ✓**
- ☐ **C) Incorrect setup of the Punnett Square ✓**
- ☐ **D) The law of independent assortment ✓**

> Factors include environmental influences, mutation in alleles, incorrect setup of the Punnett Square, and the law of independent assortment.

Analyze how a mutation in one of the alleles could affect the results predicted by a Punnett Square.

Hint: Consider the implications of genetic mutations.

> **A mutation could lead to unexpected phenotypes or genotypes that differ from the predictions.**

Part 3: Evaluation and Creation

Which scenario would most likely lead to a deviation from expected Punnett Square results?

Hint: Think about genetic principles.

- ◯ A) Random mating
- ◯ **B) Linked genes ✓**
- ◯ C) Large population size
- ◯ D) Independent assortment

> Linked genes would most likely lead to a deviation from expected results.

Evaluate the following statements and select those that are true regarding the limitations of Punnett Squares. (Select all that apply)

Hint: Consider the assumptions made by Punnett Squares.

- ☐ **A) They assume no environmental influence on gene expression. ✓**
- ☐ B) They can predict exact offspring numbers.
- ☐ **C) They do not account for genetic linkage. ✓**
- ☐ **D) They assume alleles segregate independently. ✓**

> True statements include that they assume no environmental influence on gene expression, do not account for genetic linkage, and assume alleles segregate independently.

Design a hypothetical scenario where a Punnett Square could be used to predict the inheritance of a genetic disorder. Describe the genotypes of the parents and the potential outcomes for the offspring.

Hint: Think about a specific genetic disorder.

> **A scenario could involve two carriers of a recessiv genetic disorder, predicting the likelihood of affected offspring.**