Monohybrid Worksheet

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Part 1: Building a Foundation

What is a monohybrid cross?

Hint: Think about the number of traits involved in the cross.

- ◯ A) A cross involving two traits
- ◯ B) A cross involving one trait
- ◯ C) A cross involving multiple alleles
- ◯ D) A cross involving only recessivetraits

Which of the following are examples of alleles?

Hint: Consider the different forms of a gene.

- ☐ A) AA
- ☐ B) Aa
- ☐ C) Bb
- ☐ D) CC

Explain the difference between a genotype and a phenotype.

Hint: Think about genetic makeup versus observable traits.

List the terms used to describe an organism with two identical alleles and an organism with two different alleles.

Hint: Consider the terms homozygous and heterozygous.

1. Term for two identical alleles

2. Term for two different alleles

What does the law of segregation state?

Hint: Consider how alleles behave during gamete formation.

- ◯ A) Alleles do not separate during gamete formation
- ◯ B) Each organism carries only one allele for each trait
- ◯ C) Alleles segregate independently during gamete formation
- ◯ D) Each organism carries two alleles for each trait, which segregate during gamete formation

Part 2: Application and Analysis

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

Hint: Consider the possible combinations of alleles from the parents.

- ◯ A) 0%
- ◯ B) 25%
- ◯ C) 50%
- ◯ D) 75%

In a monohybrid cross between two heterozygous individuals (Aa), which genotypes are possible in the offspring?

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

- ☐ A) AA
- ☐ B) Aa
- ☐ C) aa

- [ ] D) AaAa

Predict the phenotypic outcome of a cross between a homozygous dominant individual and a heterozygous individual.

Hint: Consider the traits expressed by each parent.

In a monohybrid cross, if the phenotypic ratio is 3:1, what can be inferred about the parental genotypes?

Hint: Think about the genotypes that would produce this ratio.

- ◯ A) Both are homozygous dominant
- ◯ B) Both are homozygous recessiv
- ◯ C) Both are heterozygous
- ◯ D) One is homozygous dominant, and the other is heterozygous

Which of the following scenarios demonstrate the law of segregation?

Hint: Consider how alleles are distributed in gametes.

- [ ] A) A parent with genotype Aa produces gametes with A and a alleles
- [ ] B) A parent with genotype AA produces only A alleles
- [ ] C) A parent with genotype aa produces only a alleles
- [ ] D) A parent with genotype Aa produces gametes with AA alleles

Analyze the impact of a mutation that changes a dominant allele to a recessiv allele in a population.

Hint: Consider how this change affects the traits expressed in the population.

Part 3: Evaluation and Creation

Which scenario would most likely result in a change in phenotypic ratios in a population?

Hint: Think about factors that influence genetic diversity.

- ◯ A) Random mating
- ◯ B) Introduction of a new allele
- ◯ C) Stable environment
- ◯ D) No mutations

Evaluate the following statements and identify which could lead to changes in allele frequency in a population:

Hint: Consider the mechanisms of evolution.

- ☐ A) Natural selection
- ☐ B) Genetic drift
- ☐ C) Gene flow
- ☐ D) Non-random mating

Design an experiment to test the effects of environmental changes on the expression of a recessiv trait in a population.

Hint: Consider the variables you would need to control.

Propose two real-world scenarios where understanding monohybrid crosses could be beneficial, and explain why.

Hint: Think about agriculture and medicine.

1. Scenario 1

2. Scenario 2