

Monohybrid Crosses Worksheet

Answer the following questions. Use a Punnett square as required to illustrate your answer.

1. Inflated pea pods are dominant (C) over constricted pea pods (c).

a) Use a Punnett square to determine the genotypes and phenotypes of a cross between a plant that is homozygous dominant and a plant that is homozygous recessive.

b) Cross two plants from the first filial generation, and determine the ratio of genotypes and phenotypes of the offspring that result.

2. Tall pea plants are dominant (T) over short pea plants (t).

a) Use a Punnett square to determine the genotypes and phenotypes of a cross between a plant that is homozygous dominant and a plant that is heterozygous for plant size.

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b) Cross two heterozygous plants from the first filial generation, and determine the ratio of genotypes and phenotypes of the offspring that result.

3. Short hair is dominant (H) over long hair (h) in cats. If a homozygous dominant female mates with a homozygous recessive male, give the phenotype ratio of the second filial generation.

4. Curly hair is dominant (C) over straight hair (c) in humans. Is it possible for a curly haired man to produce curly haired children if his wife has straight hair? Explain using Punnett squares.

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5. A cross between a tall pea plant and a short pea plant produces offspring of which roughly half are tall and half are short. What are the genotypes of the parental plants? Support your answer with a Punnett square. Which of the parental genotypes is true breeding?

6. Assume that, in humans, the allele for brown eyes (B) is dominant to the allele for blue eyes.

a) What is the probability that the first child of two heterozygous brown-eyed parents will be blue-eyed? Support your answer with a Punnett square.

b) If the first child is blue-eyed, what is the probability that the second child will be blue-eyed?

c) What is the probability that, if the couple has two children, they will both be blue eyed? (Note: This question differs from (b).)

7. In some cases, you can determine the genotype of an organism by examining the phenotype alone. In the case of Mendel's pea plants, you know that round seeds (R) are dominant over wrinkled seeds (r).

a) Identify the genotypes for seed shape that you can determine by inspection alone. Explain.

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b) How could you determine the genotypes that you cannot determine by inspection?

c) With what would you cross each of your unknowns?

d) Use a Punnett square to show the results for test crosses performed on all unidentified genotypes for seed shape. Explain how each test cross can show which genotype you had in each case.
