

Genetics Problem Solving

## Crosses Involving Multiple Alleles: Blood Types

Step 1 Combine the gamete genotypes of one parent with those of the other parent to show all possible offspring genotypes.

dad: heterozygous A  
 mom: AB

|   |    |    |
|---|----|----|
|   | A  | O  |
| A | AA | AO |
| B | AB | BO |

Step 2 State the genotype and phenotype ratios of the offspring:  
 1 AA, 1 AO, 1 AB, 1 BO = 1/4 AA, 1/4 AO, 1/4 AB, 1/4 BO ; 25% AA, 25% AO, 25% AB, 25% BO  
 2 type A: 1 type AB: 1 type B = 1/2 type A, 1/4 type AB, 1/4 type B ; 50% A, 25% AB, 25% B, 50% A

### EXERCISES

For each exercise draw the Punnett square when appropriate and answer the questions in the spaces provided.

1. A woman homozygous for type B blood marries a man who is heterozygous type A. What will be the possible genotypes and phenotypes of their children?

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2. A man with type O blood marries a woman with type AB blood. What will be the possible genotypes and phenotypes of their children?

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3. A type B woman whose mother was type O marries a type O man. What will be the possible genotypes and phenotypes of their children?

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4. A type A woman whose father was type B marries a type B man whose mother was type A. What will be their children's possible genotypes and phenotypes?

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5. What is the probability that a couple whose blood types are AB and O will have a type A child?

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6. A couple has a child with type A blood. If one parent is type O, what are the possible genotypes of the other parent?

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