

## Genetics Problems

**Introduction:** Before you can work these problems you need to understand:  
Two-trait crosses and sex-linked inheritance

1. The quick brown fox jumped over the lazy dog. Turns out the fox was trying to get to the slow white fox. The two of them got married and were planning on having kits (babies). Quick (Q) is dominant to slow (q) and brown (B) is dominant to white (b). Determine the possible genotypes and phenotypes if the quick brown fox was heterozygous for both traits.

a. Write the allele symbols and indicate what trait they code for:

b. Write the P1 cross:

c. Write the Punnett square:

d. Write the genotypic ratio:

e. Write the phenotypic ratios:

2. Hemophilia, a blood clotting disorder, is caused by an X-linked recessive allele (h). What are the chances that the daughter of a normal man and a heterozygous woman will have hemophilia?

a. Write the allele symbols and indicate what trait they code for:

b. Write the P1 cross:

c. Write the Punnett square:

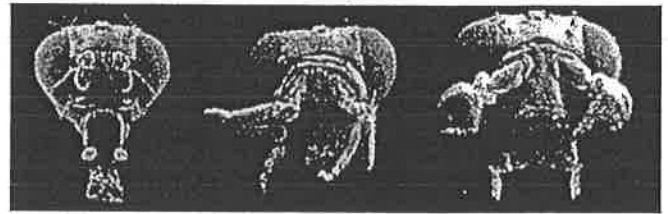
d. Write the genotypic ratio:

e. Write the phenotypic ratios:

3. A recessive allele on the X chromosome causes colorblindness. A woman with normal vision (whose father is colorblind) marries a colorblind man. What fraction of their children are expected to be colorblind boys? Show your work and circle your answer below:

4. Antennapedia is a gene in fruit flies that makes them grow legs on their heads. The trait is caused by a dominant allele. Below is offspring data from a cross between two flies:

575 Antennapedia  
625 normal heads



Normal

Antennapedia

A. What were the genotypes of the parent flies?

B. If two of the Antennapedia offspring self-crossed, predict the phenotypic and genotypic ratios:

a. Write the allele symbols and indicate what trait they code for:

b. Write the P1 cross:

c. Write the Punnett square:

d. Write the genotypic ratio:

e. Write the phenotypic ratios: