

CHAPTER 3 PERFORMANCE ASSESSMENT**Dominant or Recessive?****◆ Problem**

A geneticist found two different mutant fruit flies. One mutant fly had white eyes and the other had bar-shaped eyes. She wanted to know whether dominant alleles or recessive alleles caused these mutations. To find out, she crossed the white-eyed fly with a normal fly that had red eyes, and she crossed the bar-eyed fly with a normal fly that had round eyes. The table below shows the results of her crosses. How can you determine from this data whether each mutation is caused by a dominant or a recessive allele?

◆ Data

White-eyed fly × Red-eyed fly	
Phenotype of Offspring	Number of Offspring
red eyes (normal)	57
white eyes (mutant)	0

Bar-eyed fly × Round-eyed fly	
Phenotype of Offspring	Number of Offspring
round eyes (normal)	0
bar eyes (mutant)	68

◆ Analyze and Conclude

Answer the following questions on a separate sheet of paper.

1. Is the white-eyed phenotype caused by a dominant allele or by a recessive allele? Is the bar-eyed phenotype caused by a dominant allele or by a recessive allele? Explain how you know.
2. Write the genotype for each mutant fruit fly. Identify what your genetic symbols stand for.
3. Construct a Punnett square for each cross that the geneticist set up. (You can assume that the normal flies are homozygous.) How do the geneticist's results compare to those predicted by the Punnett squares?
4. For each cross, what results would you expect if the geneticist crossed the F_1 offspring? Construct a Punnett square to show the results of each cross. Also for each cross, calculate the probability of getting offspring with the mutant phenotype.