Chapter 19

ENRICHMENT

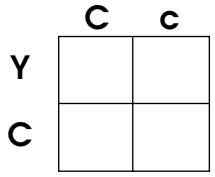
Use with Section 3

• Human Genetics

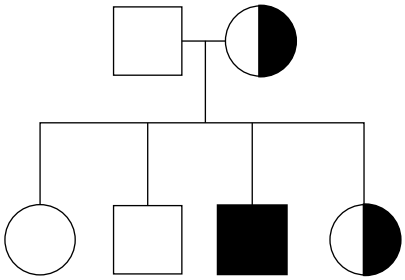
Pedigrees

Consider a sex-linked trait such as color blindness, inherited on the X chromosome. Let C stand for the dominant or normal allele and c for the recessive allele responsible for color blindness. Only a female has two alleles for the trait. A male inherits either a C or c allele along with the X chromosome from the mother. A male also inherits a Y chromosome from the father, which has no allele for color blindness. Consequently, a female's genotype can be CC, cc, or Cc, and a male's genotype can be YC or Yc. Remember that a male who has the recessive allele is affected by color blindness, while a female must have two recessive alleles to be affected. A heterozygous female is a carrier of the trait, but is not affected by it.

Make a Punnett square to show the possible offspring of a carrier female and a normal male.



Draw a pedigree for this family. Assume that there are four children, and that they inherit the trait in the ratio predicted by the Punnett square.



Assume that the homozygous daughter marries a color-blind male and has a daughter. Add the husband and daughter to the pedigree. Be sure to indicate whether the daughter is affected, not affected, or a carrier.