1. In humans, the Rh factor genetic information is inherited from our parents, but it is inherited independently of the ABO blood type alleles. In humans, Rh+ individuals have the Rh antigen on their red blood cells, while Rh− individuals do not. There are two different alleles for the Rh factor known as Rh+ and rh. Assume that a dominant gene Rh produces the Rh+ phenotype, and that the recessive rh allele produces the Rh− phenotype. In a population that is in Hardy-Weinberg equilibrium, if 160 out of 200 individuals are Rh+, calculate the frequencies of both alleles.

2. In corn, kernel color is governed by a dominant allele for white color (W) and by a recessive allele (w). A random sample of 100 kernels from a population that is in H-W equilibrium reveals that 9 kernels are yellow (ww) and 91 kernels are white. (a) Calculate the frequencies of the yellow and white alleles in this population.

3. A rare disease which is due to a recessive allele (a) that is lethal when homozygous, occurs within a specific population at a frequency of one in a million. How many individuals in a town with a population of 14,000 can be expected to carry this allele?

4. Evolution is one of the unifying themes of biology. Evolution involves change in the frequencies of alleles in a population. For a particular genetic locus in a population, the frequency of the recessive allele (*a*) is 0.4 and the frequency of the dominant allele (*A*) is 0.6.

   (a) What is the frequency of each genotype (*AA, Aa, aa*) in this population? What is the frequency of the dominant phenotype?

   (b) How can the Hardy-Weinberg principle of genetic equilibrium be used to determine whether this population is evolving?

(c) Identify a particular environmental change and describe how it might alter allelic frequencies in this population.