

Teacher's guide to the Punnett program

The Punnett program deals with genetic ratios for the case of two loci. It uses a single example, the case of a 2-locus intercross. The program does not require any changes before being given to a class.

The program introduces the example via a 2-generation crossing scheme involving:

Pure-breeding parent cross

F1 intercross

F2

These are concepts which come from animal and plant genetics. They are not strictly necessary for the introduction of genetic ratios, although the use of such ratios comes most naturally in this kind of example. The program could be run without explaining these concepts, but ideally they should be introduced first. The student also needs to understand the concepts of unlinked or independent loci before tackling the program.

The program runs in two stages:

(1) Punnett square

The Punnett square has traditionally been used to calculate genetic ratios. The method has the advantage that it shows the female and male gametic contributions explicitly. It also lays out all possible genotypes and phenotypes, thereby allowing frequencies to be calculated.

(2) Probability method

The frequency of any genotype or phenotype can be written down almost without any working once the principle of the probability calculation is seen. Essentially it requires the focus to be put on genotypes and phenotypes, ignoring the gamete stage.

The program introduces the probability method using proportions, essentially counting up the numbers. It then takes the student through four examples. Students should be encouraged to try different versions of these examples if they have not answered them correctly the first time, but the program does not insist on this.

The program counts up the number of errors made, and calculates the time taken to run the program. However it will only display these numbers at the end if requested.

The written instructions for student supplied with this program are essentially repeated in the Help menu. Most students will probably not need to read them before running the program.