

Without doing a Punnett square, what's the probability of any given phenotype?
The probability of any two events occurring at once is the product of their frequencies.

So: -probability of round and yellow is $3/4 \times 3/4 = 9/16$

-probability of wrinkled and green is $1/4 \times 1/4 = 1/16$

Multiple alleles

It is possible to have many different type of *alleles* at one locus (a position on a chromosome).

geneticists assume there is an infinite number of alleles (both qualitatively and quantitatively) for any given gene.

Incomplete dominance

Four O'clocks: Red crossed with white, get pink

Make Punnett square of F2, get 1:2:1.

Codominance

Clover chevron example. When two alleles are both detectable in the heterozygote, the two alleles demonstrates codominance.

Complementation Test

Given the fact that so many different phenotypes can arise from mutation in the same gene, how can we tell if two independently isolated mutations occurred in the same or different genes?

Complementation test. *Cross the two mutations together*, somehow. Can cross two heterozygotes, two homozygotes, or a het by a homo - that last one is a **testcross**.

If the cross generates only wild type progeny, the two mutations are said to complement. When two mutations complement, they are mutations in different genes.

If the cross generates mutant progeny (frequency dependent on the type of cross made), the two mutations failed to complement, and are alleles of the same gene.