

# THE HARDY-WEINBERG PRINCIPLE

The frequencies of different alleles and genotypes within a population will remain constant through time, as long as there are no evolutionary influences present.

**This means:**

- the population is very large
- there are no new mutations
- there is no migration
- there is no natural selection
- there is no sexual selection (mating is random)

## THE HARDY-WEINBERG EQUATIONS

**p** = frequency of allele A in population

**q** = frequency of allele a in population

If there are only 2 alleles for a gene then:

$$p + q = 1$$

Allele frequencies can be used to determine genotype frequencies too!

$$p^2 + 2pq + q^2 = 1$$

**EXAMPLE:** If there are 200 M alleles in the gene pool and 800 m alleles, then

$$\underset{\text{M}}{0.2} + \underset{\text{m}}{0.8} = 1$$

and

$$\underset{\text{MM}}{(0.2)^2} + \underset{\text{Mm}}{2(0.2 \times 0.8)} + \underset{\text{mm}}{(0.8)^2} = 1$$

**0.04**

**0.32**

**0.64**

The Hardy-Weinberg equilibrium is never achieved in nature, but it's very useful in studying populations.

# Hardy Weinberg Equation Cheat Sheet

**Princeton Review**



## Hardy Weinberg Equation Cheat Sheet:

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