# 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

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 0.2 + 0.8 = 1

and 
$$(0.2)^2 + 2(0.2 \times 0.8) + (0.8)^2 = 1$$
MM Mm mm
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**

**DJ Losen** 

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#### **Table of Contents Hardy Weinberg Equation Cheat Sheet**

- 1. Understanding the eBook Hardy Weinberg Equation Cheat Sheet
  - The Rise of Digital Reading Hardy Weinberg Equation Cheat Sheet
  - o Advantages of eBooks Over Traditional Books
- 2. Identifying Hardy Weinberg Equation Cheat Sheet
  - Exploring Different Genres
  - $\circ\,$  Considering Fiction vs. Non-Fiction
  - $\circ \ \ Determining \ Your \ Reading \ Goals$
- 3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Hardy Weinberg Equation Cheat Sheet
  - User-Friendly Interface
- 4. Exploring eBook Recommendations from Hardy Weinberg Equation Cheat Sheet
  - Personalized Recommendations
  - Hardy Weinberg Equation Cheat Sheet User Reviews and Ratings
  - Hardy Weinberg Equation Cheat Sheet and Bestseller Lists
- 5. Accessing Hardy Weinberg Equation Cheat Sheet Free and Paid eBooks
  - Hardy Weinberg Equation Cheat Sheet Public Domain eBooks
  - Hardy Weinberg Equation Cheat Sheet eBook Subscription Services
  - Hardy Weinberg Equation Cheat Sheet Budget-Friendly Options
- 6. Navigating Hardy Weinberg Equation Cheat Sheet eBook Formats
  - o ePub, PDF, MOBI, and More
  - Hardy Weinberg Equation Cheat Sheet Compatibility with Devices
  - Hardy Weinberg Equation Cheat Sheet Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Hardy Weinberg Equation Cheat Sheet
  - Highlighting and Note-Taking Hardy Weinberg Equation Cheat Sheet
  - Interactive Elements Hardy Weinberg Equation Cheat Sheet
- 8. Staying Engaged with Hardy Weinberg Equation Cheat Sheet

- Joining Online Reading Communities
- Participating in Virtual Book Clubs
- Following Authors and Publishers Hardy Weinberg Equation Cheat Sheet
- 9. Balancing eBooks and Physical Books Hardy Weinberg Equation Cheat Sheet
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Hardy Weinberg Equation Cheat Sheet
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Hardy Weinberg Equation Cheat Sheet
  - Setting Reading Goals Hardy Weinberg Equation Cheat Sheet
  - ∘ Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Hardy Weinberg Equation Cheat Sheet
  - Fact-Checking eBook Content of Hardy Weinberg Equation Cheat Sheet
  - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
- 14. Embracing eBook Trends
  - Integration of Multimedia Elements
  - Interactive and Gamified eBooks

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