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D I A G R A M S H E E T

AQA A2 Level Biology

Companion to: Genetics and Populations - Population Genetics Explanation Sheet

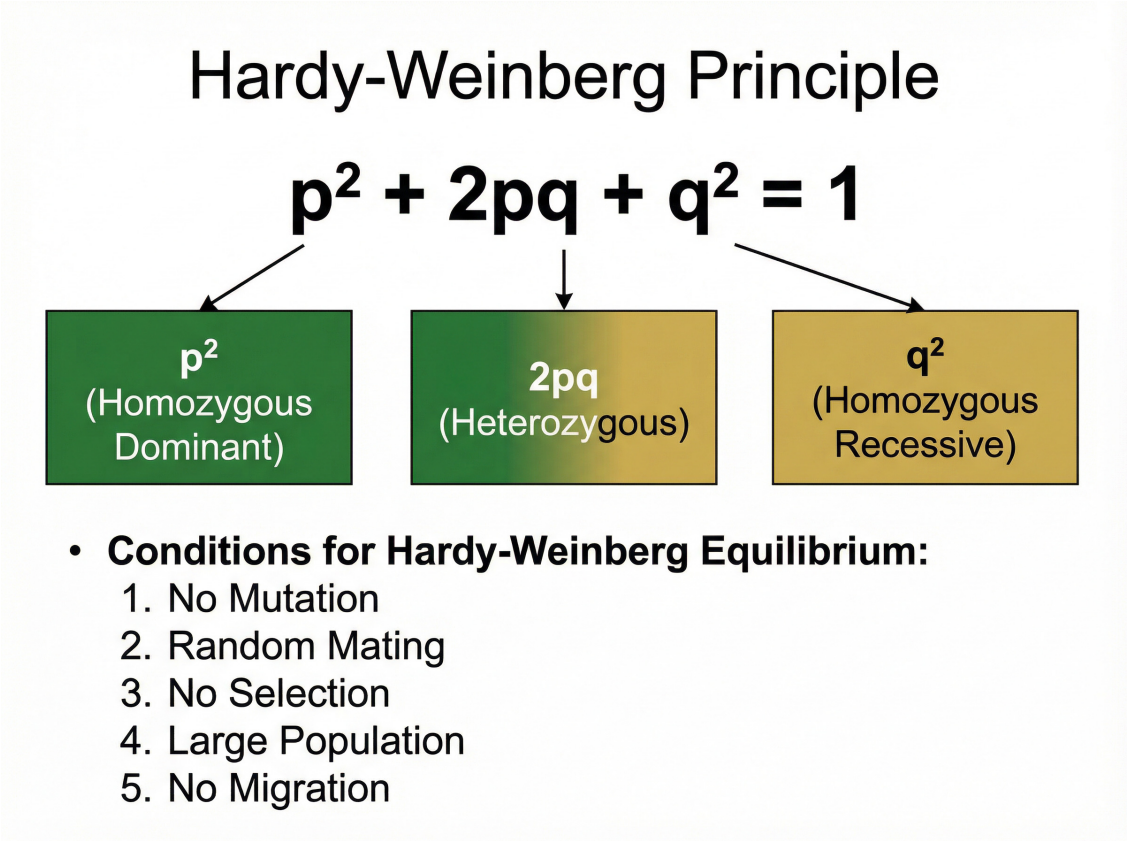
A2 LEVEL

Genetics and Populations - Population Genetics

Figures in this Sheet

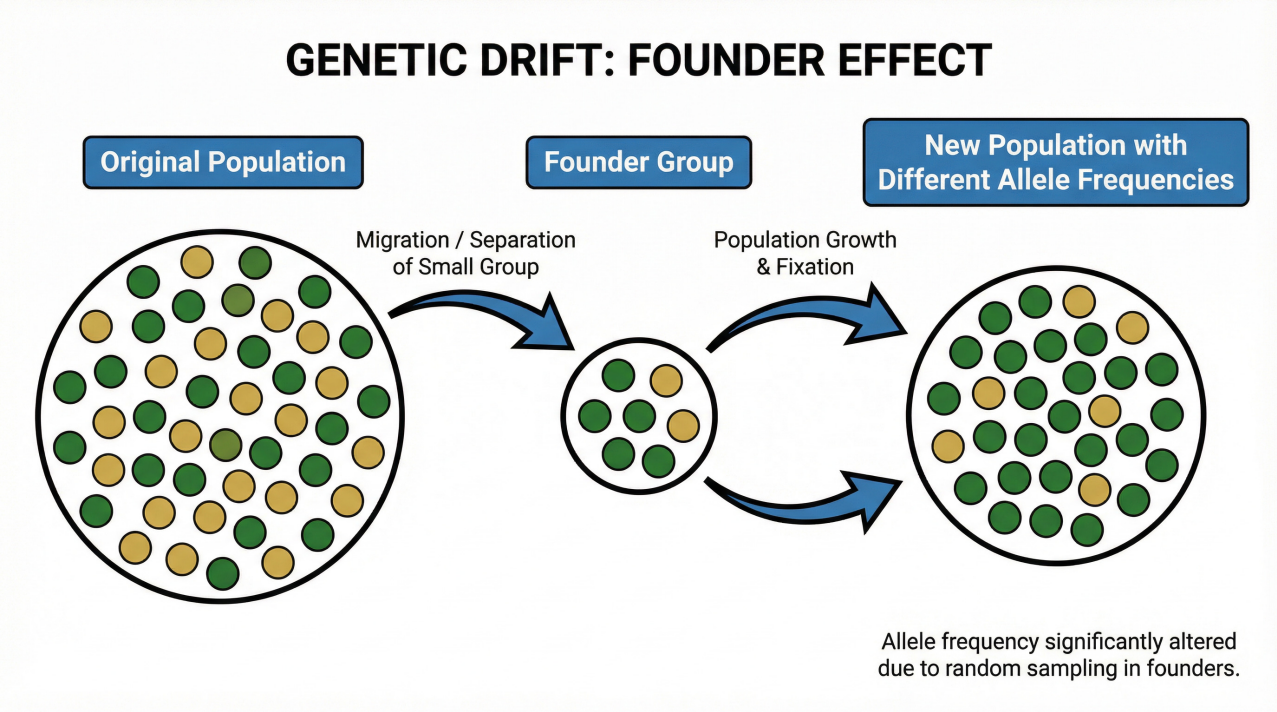
Genetics and Populations - Population Genetics — Diagram Sheet

Figure 1: Hardy-Weinberg Principle and Equation



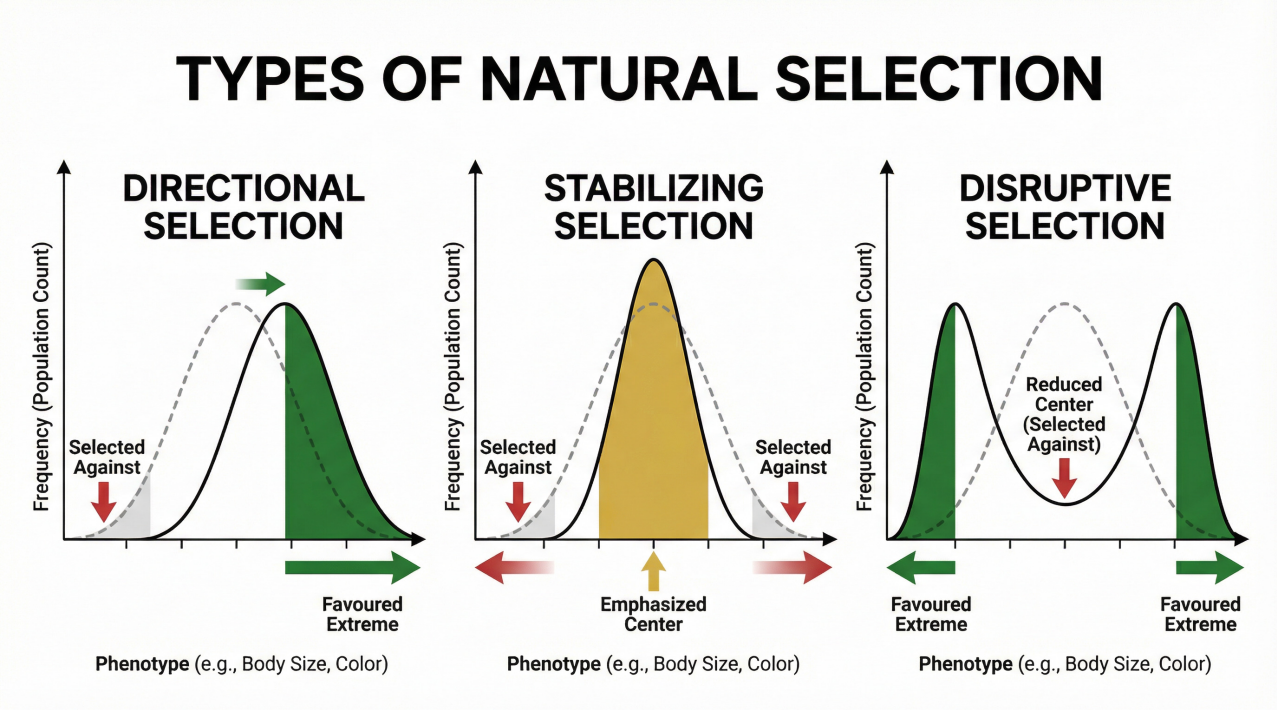
This diagram illustrates the **Hardy-Weinberg principle**, which describes the genetic equilibrium in a population where allele and genotype frequencies remain constant across generations in the absence of evolutionary forces. It shows the equation $p^2 + 2pq + q^2 = 1$, representing the frequencies of homozygous dominant (p^2), heterozygous ($2pq$), and homozygous recessive (q^2) genotypes, where p and q are allele frequencies. Understanding this principle is crucial as it provides a null hypothesis model to detect when populations are evolving. The diagram also highlights the five conditions required for Hardy-Weinberg equilibrium, underscoring factors that disrupt genetic stability.

Figure 2: Genetic Drift and Founder Effect



This figure demonstrates the concept of **genetic drift**, focusing on how allele frequencies fluctuate randomly in small populations. It highlights the **founder effect**, showing a small group migrating from a large population and establishing a new population with reduced genetic variation. The diagram depicts allele frequency changes visually with coloured circles representing different alleles, illustrating loss or fixation of alleles over time. This is important because genetic drift can lead to significant evolutionary changes independent of natural selection, especially in isolated or bottlenecked populations.

Figure 3: Selection Pressure and Changes in Allele Frequency



This diagram visualizes how **selection pressures** affect allele frequencies in a population over time. It depicts three different types of natural selection: directional, stabilizing, and disruptive. Each type shows changes in the distribution curve of a phenotypic trait, illustrating how advantageous alleles increase in frequency while disadvantageous alleles decrease. This figure is essential for understanding how populations evolve in response to environmental challenges and the role of selection in shaping genetic diversity.

Study Notes

Use this space to annotate the diagrams above, add your own labels, or note down exam-style questions that relate to each figure. Try covering the labels and testing yourself from memory.