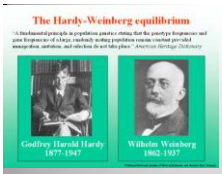
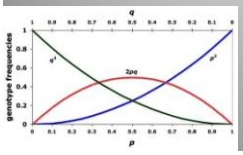
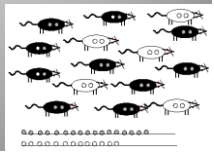


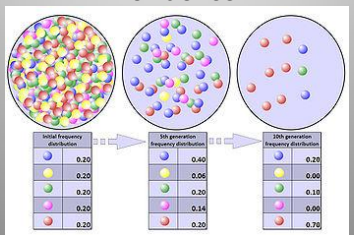
7.5 Hardy-Weinberg Equilibrium





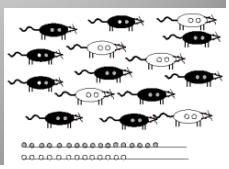
ENDURING UNDERSTANDING

EVO-1 Evolution is characterized by a change in the genetic makeup of a population over time and is supported by multiple lines of evidence.



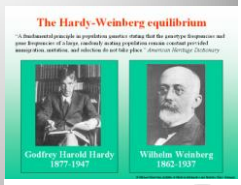
EVO-1.K Describe the conditions under which allele and genotype frequencies will change in populations.

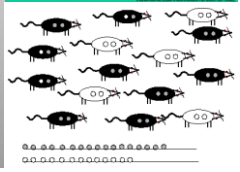
- Gene Pool
  - All genetic information in a population
  - Frequency of a certain **allele** in a population will determine the **phenotype** frequency
  - Frequency of alleles in a non-evolving population will remain constant unless acted upon by other agents.



EVO-1.K Describe the conditions under which allele and genotype frequencies will change in populations.

- Hardy-Weinberg is a model for describing and predicting allele frequencies in a non evolving population.
- Conditions for a population or an allele to be in Hardy-Weinberg equilibrium are:
  1. A large population size
  2. Absence of migration
  3. No net mutations
  4. Random mating
  5. Absence of selection
- These conditions are seldom met, but they provide a valuable null hypothesis





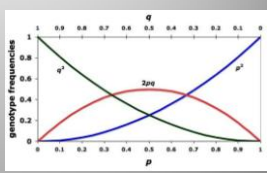
EVO-1.K Describe the conditions under which allele and genotype frequencies will change in populations.

- Allele frequencies in a population can be calculated from genotype frequencies.
- RELEVANT EQUATION
  - Hardy-Weinberg Equation:

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

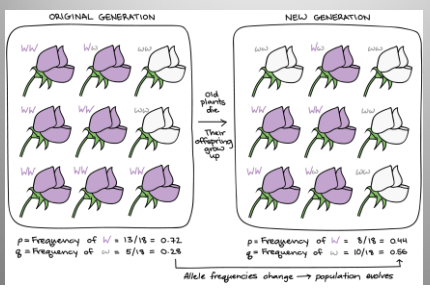
p^2 = frequency of alleles AA
$2pq$ = frequency of alleles Aa
q^2 = frequency of alleles aa

For only two alleles:
1- p = q or 1- q = p



EVO-1.L Explain the impacts on the population if any of the conditions of Hardy-Weinberg are not met.

- Changes in allele frequencies provide evidence for the occurrence of evolution in a population.



Do H-W practice for homework

EVO-1.L Explain the impacts on the population if any of the conditions of Hardy- Weinberg are not met.

- Small populations are more susceptible to random environmental impact than large populations.