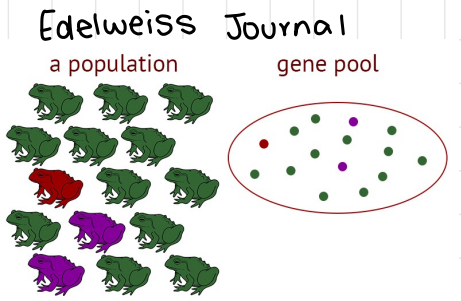
Evolution

1) evolution occurs within populations
2) mutation + sexual reproduction produce the genetic variation that make evolution possible
3)Hardy weinberg equation can test whether a population is evolving

Population

population = group of individuals of the same species
- living at same placeltime individuals within population may interbred
- can measure evolution as a change in heritable traits

gene pool = total collection of genes in a population at any time
· microevolution is a change in the relative frequencies of alleles in a gene pool



Hardy Weinberg Principle

hardy weinberg
- within a sexually reproducing diploid population, allele + genotype frequencies **will remain in equilibrium, unless outside forces act to change those frequencies**

p = dominant allele

q = recessive allele

Allele Frequency

$$p + q = 1$$

Genotype Frequency

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

Parent population:			
Phenotypes			
Genotypes	*RR*	*Rr*	*rr*
Number of plants (total = 500)	320	160	20
Genotype frequencies	$\frac{320}{500} = 0.64$ *RR*	$\frac{160}{500} = 0.32$ *Rr*	$\frac{20}{500} = 0.04$ *rr*
Number of alleles in gene pool (total = 1,000)	×2: 640 *R*	160 *R*, 160 *r*	×2: 40 *r*
Allele frequencies	$\frac{800}{1,000} = 0.8$ *R*	$\frac{200}{1,000} = 0.2$ *r*	

p = frequency of *R* = 0.8 *q* = frequency of *r* = 0.2

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

$(0.8)^2 + 2(0.8)(0.2) + (0.2)^2$

$0.64 + 0.32 + 0.04$

$0.96 + 0.04 = 1$ ✓