**Unit Two - Review #2 KEY**

1. **For Frog Colour, assume that there is one Gene with two Alleles.**

**G = Dark Green - Dominant**

**g = Yellowish Green - Recessive**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **GG** | **Gg** | **Gg** | **gg** | **GG** |
| **GG** | **GG** | **gg** | **gg** | **GG** |
| **Gg** | **Gg** | **Gg** | **GG** | **Gg** |
| **Gg** | **Gg** | **GG** | **Gg** | **gg** |

* **Use the data above to calculate the following:  
  A) Phenotypic Ratio**

**B) Genotypic Ratio**

**C) Allelic Frequency**

1. **A) Total of 20 Frogs**

**16 out of 20 frogs are GREEN = 80%**

**4 out of 20 frogs are YELLOWISH-GREEN = 20%**

**B) There are three different GENOTYPES:**

**- GG – 7 out of 20 frogs have GG = 35%**

**-Gg – 9 out of 20 frogs have Gg = 45%**

**-gg – 4 out of 20 frogs have gg = 20%**

**C) Total of 20 frogs with two alleles each equals a total of 40 alleles in the sample**

**- 23 out of 40 alleles were G = 57.5%**

**- 17 out of 40 alleles were g = 42.5%**

1. **If the allelic frequency for "g" goes from 42.5% up to 62% over a 10-year period due to Natural Selection, then the yellowish-green phenotype is more fit for survival.**
2. **Genetic Equilibrium**
3. **The main five conditions or requirements necessary to keep a gene pool in Genetic Equilibrium are:**

* **Large Population**
* **Random Mating**
* **No new Mutations**
* **No Differential Migration**
* **Equal Viability (Equal Fertility, Life Span, health etc among all members)**

1. **The key things (Drivers) that cause gene pools to evolve are:**
2. **Natural Selection**
3. **Mutation**
4. **Genetic Drift**
5. **Differential Migration**
6. **Selective Mating**
7. **Isolation- Bottle Neck Effect**
8. **Selective Mating**
9. **Artificial Selection- Selective Breeding has been used to alter/create the following crops and domesticated animals:**

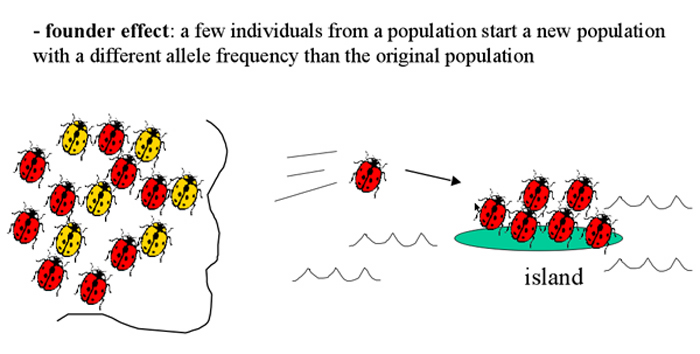
* **Tomatoes, Dairy Cows, Chickens, Corn, Dog Breeds, Various Livestock, also Mustard Plant to give rise to offshoot plants such as Broccoli, Cauliflower, Brussel Sprouts and Cabbage and Kale.**

1. **The frequency of the allele that codes for the more desirable phenotype will go up due to Survival of the Fittest.**
2. **In our original population of frogs in question #1, the allelic frequencies were "G" = 57.5% while "g" was 42.5%**

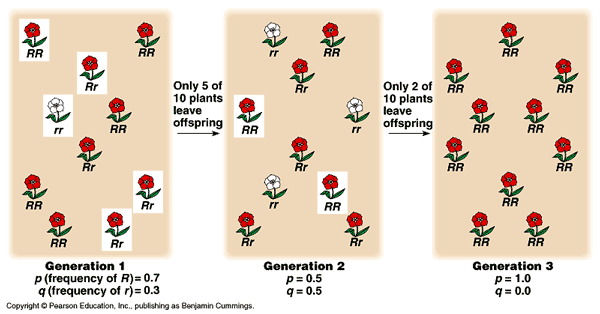
**For the allelic frequency for "G" to go up to 70% due to differential migration, we would have to have a fair number of yellowish-green frogs and heterozygous frogs to Emigrate out of the population, while a few Homozygous Green frogs Immigrated into the population.**

**Example - gg, Gg, Gg, gg, Leave  
 while GG and GG enter**

1. **ISOLATION – “FOUNDER Effect” – Bottle Necking.**



1. **Most mutations that arise are not ADVANTAGEOUS, because over millions of years of evolution most of the best fit (advantageous) alleles have already been selected and established.**
2. **Random Genetic Drift is a process that drives evolution. It occurs when allelic frequencies for a gene just change by CHANCE, no natural selection is involved. Another example was the change in allelic frequencies for flipping nickles**



1. **We saw that it shifted so that the frequency of “H” change to \_\_\_\_\_\_% while the frequency for “h” changed \_\_\_\_% in one generation of change.**

**Results varied from one class to another**

1. **Equal Viability, refers to when all members of a population have equal health, equal chance of mating, equal life expectancy etc.**

**15. The big three drivers of evolution are :**

**A) Natural Selection B) Mutation C) Genetic Drift**

**16. A POPULATION is a "Collection of individuals of the same SPECIES in a given area whose members can breed with one another"**

1. **A GENE POOL is “A common group of genes shared by the members of a population”**
2. **Evolutionary change involves a change in the relative frequencies of alleles in the gene pool of a population.**
3. **A SPECIES is a group of similar-looking organisms that breed with one another and produce fertile offspring in the natural environment.**

**Both populations of Mule Deer belong to the same species.**



