Name:

**Genetic Drift on Two Different Islands**

Question or Problem:

* How will genetic drift affect the diversity among the organisms in a small population on a small island vs. a larger population on a large island?

Materials:

* Big Island Plate
* Little Island Bowl
* Gene pool cup
* 3 paper towels
* Candy Organisms: red, blue, yellow, orange, green
* Data Table

Methods:

* 1. Wash your hands.
  2. Gather your materials.
  3. Dump your candy onto a paper towel.
  4. Place ten (10) candies of each color into the Big Island plate (Total = 50 candies).
  5. Place only two (2) candies of each color into the Small Island Bowl (Total = 10 candies).
  6. Place the remaining candy from the paper towel in the “gene pool” cup.
  7. Record your data for each island in your data table.
  8. With your eyes closed (remember that Genetic Drift is random, and not like Natural Selection), sample 25 lucky members from the Big Island (50% of the population) and 5 lucky members from the Small Island (50% of that population) to reproduce. The candies you selected are your “breeding” candies.
  9. Keep the two groups of breeding candies in separate piles (one for Big island, one for small island) on a paper towel.
  10. Empty the remaining non-breeding candy from both of the islands into the “gene pool” cup off to the side.
  11. Let each breeding candy reproduce one individual of its own kind by selecting alleles from the gene pool. (For each blue candy, select another blue candy from the gene pool. Do the same for each remaining color.)
  12. Place those parents and their children back into their appropriate islands. (The big island should ALWAYS have 50 candies and the small island should ALWAYS have 10 candies.)
  13. Record the new number of each color of candy on each island in your data table under "Year 2".
  14. Continue this procedure for three (3) more years (for a total of 5 years).
  15. Graph and label your initial and final population data as Pie Graphs.

Data, Observations, and Calculations

* Data Table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Island | Color Allele | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| Small Island | Red |  |  |  |  |  |
| Blue |  |  |  |  |  |
| Yellow |  |  |  |  |  |
| Orange |  |  |  |  |  |
| Green |  |  |  |  |  |
| Total |  |  |  |  |  |
| Big Island | Red |  |  |  |  |  |
| Blue |  |  |  |  |  |
| Yellow |  |  |  |  |  |
| Orange |  |  |  |  |  |
| Green |  |  |  |  |  |
| Total |  |  |  |  |  |

Pie Graphs

* Initial(Year 1) Big Island Population o Initial(Year 1) Small Island Population
* Final(Year 5) Big Island Population o Final(Year 5) Small Island Population

Discussion

1. Describe how the proportion of alleles (for bean colors) changed over time on each of the islands.
   1. Big Island:
      1. Red-
      2. Blue-
      3. Yellow-
      4. Orange-
      5. Green-
   2. Small Island:
      1. Red-
      2. Blue-
      3. Yellow-
      4. Orange-
      5. Green-
2. Did the proportion (amount of each type compared to the other types) of alleles change more on one of the islands than on the other? If so, then try to explain why.
3. Did any alleles go extinct on either of the islands? \_\_\_\_\_\_\_\_\_\_\_\_\_
4. Do you think that losing alleles will help or hurt the population (please explain why)?
5. Name at least 2 ways that an island could get extinct alleles back into its gene pool.
6. Natural Selection and Genetic Drift can both cause populations to evolve over time, but they do it differently. Explain how they're different.