



Zoo Matchmaker - Disease Resistance Simulation

Students simulate selective breeding of captive tigers through four generations with the goal of maximizing resistance to feline distemper by increasing the presence of the hypothetical resistance gene (dd) in the population. Theoretically, a disease resistant population would be more successful in the wild. Students must also be aware, however, of inbreeding in their population. A high total inbreeding score could result in an unhealthy population of tigers.

Procedure

Complete the four generations of simulated tiger breeding, selecting tigers for the maximum disease resistance but least relatedness based on distemper resistance alleles and the relationship scale. Students would probably breed tigers that were the least related but most resistant. The Punnett Square is drawn for each breeding event to allow you to visualize the alleles and the offspring. On a separate worksheet, keep track of the parents and offspring for each generation. Write down each tiger's phenotype and genotype and which tigers are "matched".

Important Concepts:

- Mean kinship (also called shared genes) is the average relatedness of an individual to all individuals in the population.
- The relationship scale shows the relationship between tigers that are to be bred. Specifically, it shows the likelihood that the two tigers selected will pass on identical genetic material to their offspring. (A 25% chance for full siblings, etc.).

When you have completed the four generations of breeding and produced four sets of 12 offspring each, study the graph of your results.

1. What is the pattern between your breeding selections and your results?
2. Compare your breeding selections and the degree of inbreeding at the end of four generations.
3. Compare your breeding selections and the level of disease resistance at the end of four generations.