Year 13 Science: Mutation, gene flow, natural selection and genetic drift

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. A mutation happens in a skin cell of a gecko. Can its offspring inherit the new allele?

2. A population of 50 breeding animals has p = 0.5. Find the typical chance change in p in one generation, $\sqrt{(p(1 - p) \div 2N)}$.

3. Very light and very heavy newborn lambs die more often than average ones. Which type of selection is this?

4. 100 snails are 36 AA, 48 Aa and 16 aa. A thrush eats half of the AA snails. Find f(A) among the survivors, to 2 decimal places.

5. DOC moves a few kiwi from one population to another every few years. Which process is this, and what does it do to the two gene pools?

Exam-style question: tauhou on the islands

Tauhou (silvereyes) crossed the Tasman from Australia on their own and became common in New Zealand from the 1850s. From the mainland, small groups later reached offshore islands such as the Chathams. Genetic studies find that each population founded in this chain carries fewer alleles than the one it came from, and some island birds are now larger than mainland birds.

6. Describe gene flow and genetic drift.

7. Explain why each new island population has fewer alleles than its source.

8. Explain why mutation will only slowly restore the lost diversity.

9. Discuss how drift, natural selection and the lack of gene flow could together make an island population of tauhou diverge from the mainland population.

Fix the mistake

10. Correct this statement: "The bacteria mutated to become resistant because they were exposed to the antibiotic."

11. Correct this statement: "Genetic drift means the population moved to a new place."

12. Correct this statement: "Natural selection gives organisms what they need to survive."

13. Correct this statement: "A bottleneck only lowers the number of individuals, so diversity returns when numbers recover."