

You are advised to spend 60 minutes answering the questions in this booklet.

QUESTION ONE: NEW ALLELES

Mutations can result in the formation of new alleles, but not all new alleles enter the gene pool of a population.

Discuss this statement, considering the following points in your response:

- what is meant by the terms: mutation and gene pool
- differences between somatic and gametic mutation
- the factors that determine whether an allele enters the gene pool.

A gene pool is the allele frequency of a population of reproducing species. A mutation is a change in ^{either} the ~~the~~ gene/genotype or the DNA sequence. A somatic mutation is a change in the DNA sequence and a gametic mutation is a change in the gamete. Gametic mutations are passed on to future offsprings whereas somatic ^{because it is acquired after birth} only affects the individual. The factors that would depend on this mutation entering the gene pool is whether the phenotype is favoured by the reproducing species because it aids their survival and ensures that the species doesn't die out. If the mutation doesn't benefit the species' survival then natural selection will determine that the ~~is~~ mutated species doesn't reproduce or find a mate and the mutation will die out. But if this mutation is an asset to the species and benefits its survival in the environment whether it be helping them escape predators, adapt to a new environment or get food ^(prey) easier then this mutation will become ~~the~~ favourable and it ~~is~~ is highly likely that

this ^{mutated} species will survive and be able to find a mate and reproduce, assuming that it is a gametic mutation.

Natural Selection is when a favoured phenotype is favoured because it aids the species survival. Similarly a mutation that aids the species survival will be selected as potential mate because it had the ability to survive in its environment. This is when a new allele or mutation enters a gene pool.