



GENETICS

SCIENCE

LEVEL 1

Strategy Guide

Like the other level one science externals, this standard can be intimidating due to all of the key terms and definitions you need to understand. If you find this tricky, focus on understanding the concepts of genetics - and then learning the words to describe them later. When it comes to concepts, we recommend learning them in association to each other. Have a go at drawing out 'mind maps' of the standard - as a lot of it is very connected!

OVERVIEW OF THE STANDARD/STRUCTURE OF THE EXAM

This standard is broken into three key parts:

1. DNA and mutations
2. Genotype and phenotype
3. Adaptation and genetic variation

The exam is likely to have two questions linking together the ideas of DNA, genotype and phenotype - and one on genetic variation. Expect to see punnett squares and pedigree charts popping up throughout the first two sections!

CONCEPTS AND SKILLS TO FOCUS ON

Although every aspect of the exam is equally important, here are some key concepts to focus your study on:

Understanding and drawing punnett squares and pedigree charts:

You are guaranteed to be given questions regarding punnett squares in your exam - and pedigree charts are almost as common! Make sure you are comfortable with drawing out punnett squares, as well as how to interpret them, and use them to identify unknown genotypes and phenotypes. Punnett squares are guaranteed marks if you know how to draw them well - so they are a good thing to practice! Students tend to neglect pedigree charts a bit more - but they are frequently assessed. Make sure you practice using them to interpret the genotypes and phenotypes of individuals down the familyline.

Linking the ideas of DNA, alleles, genotype and phenotype:

Although the genetics topic may seem like it involves learning a whole bunch of definitions, they are actually very interconnected! Make sure that you can go beyond defining key terms on their own - and that you can link them together to explain why genetic variation exists. A good place to start is by explaining how DNA - and the genes and alleles present on them, contribute to the formation of different genotypes and phenotypes.



Discussing the importance of genetic variation:

You will very commonly be asked to explain why genetic variation exists - and why it is important for the survival of a population. The good news here, is that the answer is always the same - but the context the examiner throws at you may differ! Practice writing out the answer to this one - and adapting it to link back to the context the exam asks of you.

COMMON MISTAKES:

From the NCEA gods themselves:

Not linking back to the question:

I know we've been banging on about questions repeating themselves in this standard - but it's important that you don't take us too literally! Although the underlying themes and the concepts you are being assessed on are very common each year, they tend to come with their unique and specific contexts. Focus on showing the examiner you really know what you are talking about, by linking your answer back to the specific species or situation they ask you about.

Drawing incomplete punnett squares:

This is the most preventable mark to lose! There are only a few possible punnett squares you can draw - so you can easily practice them all. Make sure you read the question in the exam thoroughly - and know the difference between heterozygous and homozygous parents in terms of which alleles they contribute to the square.

Getting language confused:

As we've mentioned, the genetics topic brings a lot of new terminology to learn. Make sure you know the difference between similar sounding words such as 'homologous' and 'homozygous'.

Getting environmental responses confused with genetic changes:

A key to understanding this topic, is knowing exactly what genetic changes are. Make sure you understand the difference between changes that are genetic - and changes that are a result of the environment.

OVERALL STUDY AND EXAM STRATEGY:

Although this paper may seem overwhelming, the beauty comes in its connections. Once you begin to see genetics as one cohesive topic, it becomes a lot less complex. As you learn about each independent term or idea, think about the concepts you have learnt previously that it may relate to. This will help you understand, as well as remember, the standard a lot better!

