

**The resources in this live document have been developed to support remote teaching of VCE Biology.**

These resources have been designed to be easily uploaded to your school learning management system (Compass or similar) and downloaded by students.

Resources are be downloaded in two different file formats: Digital (Word docx) or Printable (pdf).

All live **LINKS** in this document are coloured in BioLAB magenta and can be accessed by pressing CTRL and clicking on link.

The online lessons are comprehensively designed to address specific outcomes and key knowledge areas within VCE Biology units of study.

Each online lesson has a downloadable student and teacher workplan with instructions.

The **STUDENT WORKPLAN** has a link to an electronic workbook for online submission, as well as video and result data resources to complete the task.

To make feedback easier, suggested answer documents are included in the **TEACHER WORKPLAN**



### Lesson Introduction

Investigate the body's physiological and cellular responses to cold exposure and analyse a malfunction in homeostatic mechanisms that results in disease (hypothyroidism).

**Unit 1 Area of Study 2:** How do living organisms sustain life?

**Key Knowledge:** Survival through adaptations and regulation

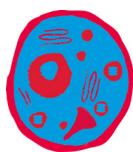
**Topic:** Temperature regulation.

**Learning Intention:** To understand how scientists test for the presence of a hormone and determine its role within a negative feedback system.

Task	Success Criteria	Time
<b>Introduction Task</b>	✓ Explain the role of a negative feedback system in maintaining a stable internal environment.	<b>Allow up to 45 mins</b>
<b>Main Task</b>	<ul style="list-style-type: none"> <li>✓ Describe the role of antibodies when testing for a hormone.</li> <li>✓ Interpret the colour change results of an ELISA test, in regards to solute concentration.</li> <li>✓ Use graphical representations of the body's internal responses to identify a malfunction in a feedback loop.</li> <li>✓ Relate the role of thyroxine to an athlete's performance.</li> </ul>	<b>Allow up to 1.5 hours</b>
<b>Further Task</b>	✓ Apply understanding of scientific research methods.	<b>Allow up to 45 mins</b>



**DOWNLOAD STUDENT WORKPLAN**



**DOWNLOAD TEACHER WORKPLAN**

### Lesson Introduction

Use DNA gel electrophoresis to determine phenotype and genotype of a different athletes and use punnet squares to determine phenotype and phenotype probabilities of offspring.

**Unit 2 Area of Study 2:** How is inheritance explained?

**Key Knowledge:** Genomes, genes and alleles.

Genotypes and Phenotypes.

**Topic:** Genetics

**Learning Intention:** To determine the inheritance pattern of a flexibility gene.

Task	Success Criteria	Time
<b>Introduction Task</b>	✓ Demonstrate a clear understanding of the terms genotype, phenotype, gene, allele, homozygous and heterozygous.	<b>Allow up to 1 hour</b>
<b>Main Task</b>	<ul style="list-style-type: none"> <li>✓ Explain how differences in DNA sequence within a gene result in different traits.</li> <li>✓ Identify the role of gel electrophoresis in organising and predicting DNA fragment size.</li> <li>✓ Calculate using a probability table, the genotypes and phenotypes of genetic crosses.</li> <li>✓ Express phenotypic ratio as a percentage and as a fraction.</li> </ul>	<b>Allow up to 1.5 hours</b>
<b>Further Task</b>	✓ Apply understanding of genotype and phenotype to a genetic screening problem solving task.	<b>Allow up to 1 hour</b>



**STUDENT WORKPLAN**



**TEACHER WORKPLAN**

### Lesson introduction

Interpret DNA and protein gel electrophoresis results to determine whether a superior endurance gene has a recessive or dominant inheritance pattern.

**Unit 2 Area of Study 2:** How is inheritance explained?

**Key Knowledge:** Genomes, genes and alleles.

Genotypes and Phenotypes.

**Topic:** Genetics

**Learning Intention:** To determine the inheritance pattern of an endurance gene.

Task	Success Criteria	Time
<b>Introduction Task</b>	<ul style="list-style-type: none"> <li>✓ Demonstrate a clear understanding of the terms genotype, phenotype, gene, allele, homozygous and heterozygous.</li> <li>✓ Explain the function of restriction enzymes and gel electrophoresis.</li> <li>✓ Identify the role of gel electrophoresis in separating and predicting DNA fragment size.</li> </ul>	<b>Allow up to 1 hour</b>
<b>Main Task</b>	<ul style="list-style-type: none"> <li>✓ Interpret DNA and protein electrophoresis results in order to determine genotypes.</li> <li>✓ Explain why the protein produced in a heterozygous individual helps determine the dominant allele.</li> </ul>	<b>Allow up to 1 hours</b>



**STUDENT WORKPLAN**



**TEACHER WORKPLAN**

### Lesson Introduction

Investigate whether athletes in a heavy training program more susceptible to respiratory diseases due to a compromised humoral immune response.

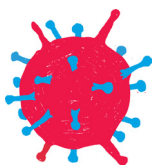
**Unit 3 Area of Study 2:** How do cells communicate?

**Key Knowledge:** Responding to antigens ; Immunity.

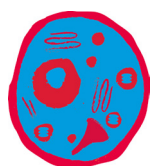
**Topic:** Humoral immune response.

**Learning Intention:** To understand the use of an ELISA test to determine human antibody production in response to a vaccine.

Task	Success Criteria	Time
<b>Introduction Task</b>	<ul style="list-style-type: none"> <li>✓ Demonstrate a clear understanding of the terms pathogen, antigen, antibody, humoral immune response and immunity.</li> <li>✓ Outline the steps involved in the humoral immune response.</li> <li>✓ Relate antibody production to primary and secondary immune responses.</li> </ul>	<b>Allow up to 45 mins</b>
<b>Main Task Part One</b>	<ul style="list-style-type: none"> <li>✓ Understand how to interpret an ELISA test.</li> <li>✓ Identify the independent and dependent variables in a method.</li> <li>✓ Write a hypothesis.</li> </ul>	<b>Allow up to 1.5 hours</b>
<b>Main Task Part Two</b>	<ul style="list-style-type: none"> <li>✓ Interpret the colour change results of an ELISA test and relate the results to human antibody production.</li> <li>✓ Explain how a vaccine elicits a humoral immune response.</li> <li>✓ Interpret graphical representations of the primary and secondary immune response to explain the humoral immune response.</li> </ul>	



**STUDENT WORKPLAN**



**TEACHER WORKPLAN**

### DNA Technology, Mutations and Cloning Tasks

These tasks are digital workbook tasks that can be used as individual tasks or completed in the suggested sequence. Individual tasks can be accessed via the links. The student and teacher sequence links contain all resource links in a single document.

**Unit 4 Area of study 1:** How are species related?

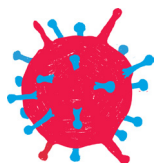
**Key Knowledge:** Changes in the genetic makeup of a population.

**Unit 4 Area of study 2:** How do humans impact on biological processes?

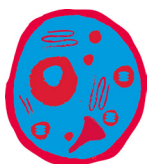
**Key Knowledge:** DNA manipulation

**Topics:** DNA mutations and transforming plasmids.

Topic	Success Criteria	Resource
<b>DNA technology</b>	<ul style="list-style-type: none"> <li>✓ Demonstrate an understanding of the action of restriction enzymes.</li> <li>✓ Interpret gel electrophoresis results.</li> <li>✓ Explain the steps taken to create a recombinant DNA plasmid.</li> <li>✓ Interpret bacterial growth to determine successful bacterial transformation.</li> </ul>	<p><a href="#"><u>DNA technology task</u></a></p> <p><a href="#"><u>Gene transformation task</u></a></p> <p><a href="#"><u>DNA electrophoresis task</u></a></p>
<b>DNA mutations</b>	<ul style="list-style-type: none"> <li>✓ Identify DNA mutation types.</li> <li>✓ Determine protein expression for DNA sequence.</li> <li>✓ Identify mutation effect types.</li> </ul>	<p><a href="#"><u>DNA mutations task</u></a></p>



**STUDENT SEQUENCE**

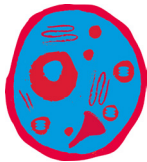


**TEACHER SEQUENCE**

## BioQUIZ

For the duration of the remote learning period BioLAB will produce a weekly quiz to help students revise for the final exam.

Each quiz will be 10-15 questions long and will focus on a key concept in VCE Biology Units 3 and 4. The format allows students to reveal the answer to and obtain immediate feedback, and also to reset the question to try at a later date.



**Week 1: Plasma Membrane Edition**

**Week 2: Nucleic Acids and Proteins Edition**

## Biology Review Ten Point Challenge

**Coming soon!** A revision task guide to assist with VCE Biology exam preparation.

