# Level 3 Biology



2017

# Welcome to Level 3 Biology 2017

# **Student Course Information:**

There are FIVE Achievement standards in the course. The credits contribute towards the NCEA and assessment methods are as follows:

Standard number	Credits	Version	Title	Status	Internal/ External	Timing/ Due date	FAO?
91604	3	1	Demonstrate understanding of how an animal maintains a stable internal environment	Registered	Internal	Term 1 Week 6	No
91607	3	1	Demonstrate understanding of human manipulations of genetic transfer and its biological implications	Registered	Internal	Term 3 Week 5	No
91603	5	1	Demonstrate understanding of the responses of plants and animals to their external environment	Registered	External	Nov	NA
91605	4	1	Demonstrate understanding of evolutionary processes leading to speciation	Registered	External	Nov	NA
91606	4	1	Demonstrate understanding of trends in human evolution	Registered	External	Nov	NA

The three external Achievement Standards will be assessed by one 3 hour examination at the end of the year.

You can gain the following grades in the Achievement Standards:

Standard not Attempted	SNA	Did not sit the standard
Not achieved	A	Did not meet the standard
Achieved	A	The standard was achieved
Achieved with Merit	M	The standard was achieved demonstrating very good work
Achieved with Excellence	E	The standard was achieved demonstrating excellent work

**External Achievement Standards** – A derived grade process will be followed as outlined in the Waikato Diocesan School for Girls 2012 Policy on Assessment in accordance with NZQA guidelines.

## FURTHER ASSESSMENT OPPORTUNITIES

It is NOT feasible and/or practicable to offer a further assessment opportunity.

# **Internal Assessment Policy and Procedures**

The Science Department will follow the procedures in the Waikato Diocesan School for Girls Assessment Policy booklet. Please ensure that you have read carefully the guidelines on **Authenticity, Appeals, Course completion, Deadlines and Absences.** 

**Internal Achievement Standards** – A student who is absent from an internal assessment may be provided with another assessment opportunity **where feasible**. A Medical Certificate **must** be provided for any illness/accident.

For all of the following Internal Assessments, Waikato Diocesan School for Girls Science Department has decided that:

# Achievement Standard 3.4 (91604)

Conditions: 3.4 will be assessed by an end of unit test in examination conditions. Any student violating these conditions may be in jeopardy of forfeiting their grade as determined by their supervising teacher.

- the summative assessment will take place in Term 1, Week 6
- there is no reassessment opportunity
- students will be told their grade for this Achievement Standard as soon as the quality assurance process has been completed for the final part of the Investigation.

# Achievement Standard 3.7 (91607)

Conditions: 3.7 will be assessed by one report written in and out of class time. The final report is to be written in your own words, word processed and submitted in electronic word file. file must be submitted via turnitin on the specified date.

- students will have one opportunity for the summatively assessed Achievement Standard in the year
- the summative assessment will take place in Term 3 Week 3
- students will be told their grade for this Achievement Standard as soon as the quality assurance process has been completed.

# Plagiarism and Consequence

All assessed work will be kept on file and can be easily checked if there is any suggestion of plagiarism. Anything over 6% will be a concern and will be thoroughly checked for referencing. Should the references be lacking, or no quotation marks supporting the quote, then the consequence will be a Not Achieved grade without any possibility of rewriting or re-submitting.

# ALL Internal Assessments are assessed by the following Assurance Process:

- Assessed by class/assigned teacher.
- Three samples across range 'Not Achieved, Achieved, Achieved with Merit, Achieved with Excellence of assessed work per class submitted for assurance to teacher in charge of Level 3 Biology.
- Samples are compared to exemplars.
- Samples indicate assessment decisions made by the teacher across the whole class.
- Students' results confirmed once assurance process has occurred.

## **Verifying Grades**

Students are required to verify the final grades awarded by checking and signing the recorded results.

# **Retention of Student Work**

ALL student internal assessment material will be retained by the Department.

# STUDENT OBLIGATIONS

- 1. Ensure you understand the assessment programme and policy.
- 2. Ensure you understand the requirements of each assessment being completed.
- 3. Ensure you keep a record of each assessment grade on your student tracking sheet.
- 4. Discuss problems/concerns with your Teacher/Head of Department.

## HOME STUDY

It is expected that you will need to supplement your knowledge by doing home study from textbooks, write-on workbooks and suggested websites. This will entail: your own note-taking, learning words and definitions, completing exercises, answering NCEA-type questions. You should review each lesson daily. If formal homework has not been set it is expected that you will review your topic or week's work to ensure that the concepts are understood. If in doubt, seek help quickly. Do NOT leave it as this can cause a considerable problem to catch up and may be too late. Many concepts are built on accumulated understanding. It can be difficult to catch up if concepts are left unattended for too long.

## Achievement Standard - Biology 3.3 (91603)

Title: Demonstrate understanding of the responses of plants and animals to their external environment

Level 3	Credits 4	Assessment External
Subfield Science	Domain Biology	Status Registered
Status date 4 December 2012	Planned review date 31 December 2018	Date version published 17 November 2016

This achievement standard involves demonstrating understanding of the responses of plants and animals to their external environment.

#### Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of the responses of plants and animals to their external environment.	Demonstrate in-depth understanding of the responses of plants and animals to their external environment.	Demonstrate comprehensive understanding of the responses of plants and animals to their external environment.

#### **Explanatory Notes**

This achievement standard is derived from The New Zealand Curriculum, Learning Media, Ministry of Education, 2007, Level 8 within the Science learning area. It is aligned with the following achievement objective from the Living World strand: Life processes, ecology and evolution - 'Understand the relationship between organisms and their environment'. It is also related to the material in the Teaching and Learning Guide for Biology, Ministry of Education, 2010 at <a href="http://seniorsecondary.tki.org.nz">http://seniorsecondary.tki.org.nz</a>.

**Demonstrate understanding** involves describing plant and animal responses to their external environment. The description includes: the process(es) within each response and/or the adaptive advantage provided for the organism in relation to its ecological niche.

**Demonstrate in-depth understanding** involves using biological ideas to explain: how the responses occur, and why the responses provide an adaptive advantage for the organism in relation to its ecological niche.

**Demonstrate comprehensive understanding** involves linking biological ideas to explain why the responses provide an adaptive advantage for the organism in relation to its ecological niche. The linking of ideas may involve justifying, relating, evaluating, comparing and contrasting, and analysing.

Responses are selected from those relating to:

- orientation in space (tropisms, nastic responses, taxes, kineses, homing, migration)
- orientation in time (annual, daily, lunar, tidal rhythms)
- interspecific relationships (competition for resources, mutualism, exploitation including herbivory, predation, and parasitism)
- intraspecific relationships (competition for resources, territoriality, hierarchical behaviour, cooperative interactions, reproductive behaviours).

External environment will include both biotic and abiotic factors

Assessment Specifications for this achievement standard can be accessed through the Biology Resources page found at <u>www.nzqa.govt.nz/ncea/resources</u>.

## Achievement Standard - Biology 3.4 (91604)

## Title: Demonstrate understanding of how an animal maintains a stable internal environment

Level 3	Credits 3	Assessment Internal
Subfield Science	Domain Biology	Status Registered
Status date 4 December 2012	Planned review date 31 December 2018	Date version published 17 November 2016

This achievement standard involves demonstrating understanding of how an animal maintains a stable internal environment.

#### Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of how an animal maintains a stable internal environment.	Demonstrate in-depth understanding of how an animal maintains a stable internal environment	Demonstrate comprehensive understanding of the responses of plants and animals to their external environment.

#### **Explanatory Notes**

This achievement standard is derived from The New Zealand Curriculum, Learning Media, Ministry of Education, 2007, Level 8 within the Science learning area. It is aligned with the following achievement objective from the Living World strand: Life processes, ecology, and evolution - 'Understand the relationship between organisms and their environment'. It is also related to the material in the Teaching and Learning Guide for Biology, Ministry of Education, 2010, at <a href="http://seniorsecondary.tki.org.nz">http://seniorsecondary.tki.org.nz</a>.

**Demonstrate understanding** involves using biological ideas to describe a control system by which an animal maintains a stable internal environment. Annotated diagrams or models may be used to support the description.

**Demonstrate in-depth understanding** using biological ideas to explain how or why an animal maintains a stable internal environment. This includes explaining how a specific disruption results in responses within a control system to re-establish a stable internal environment.

**Demonstrate comprehensive understanding** linking biological ideas about maintaining a stable internal environment in an animal. This includes at least one of:

- a discussion of the significance of the control system in terms of its adaptive advantage
- an explanation of the biochemical and/or biophysical processes underpinning the mechanism (such as equilibrium reactions, changes in membrane permeability, metabolic pathways)
- an analysis of a specific example of how external and/or internal environmental influences result in a breakdown of the control system

A control system that maintains a stable internal environment (homeostatic system) refers to those that regulate:

- body temperature
- blood pressure
- osmotic balance
- level of blood glucose
- levels and balance of respiratory gases in tissues

The biological ideas related to the control system includes the:

- purpose of the system
- components of the system
- mechanism of the system (how it responds to the normal range of environmental fluctuations, interaction and feedback mechanisms between parts of the system)
- potential effect of disruption to the system by internal or external influences

Environmental influences that result in a breakdown of the control system may be external influences such as extreme environment conditions, disease or infection, drugs or toxins, or internal influences such as genetic conditions or metabolic disorders.

Conditions of Assessment related to this achievement standard can be found at <u>http://www.tki.org.nz/e/community/ncea/conditions-assessment.php</u>.

## Achievement Standard - Biology 3.5 (91605)

## Title: Demonstrate understanding of evolutionary processes leading to speciation

Level 3	Credits 4	Assessment External
Subfield Science	Domain Biology	Status Registered
Status date 4 December 2012	Planned review date 31 December 2018	Date version published 17 December 2016

This achievement standard involves demonstrating understanding of evolutionary processes leading to speciation.

#### Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of	Demonstrate in-depth understanding	Demonstrate comprehensive
evolutionary processes leading to	of evolutionary processes leading to	understanding of evolutionary
speciation.	speciation.	processes leading to speciation.

#### **Explanatory Notes**

This achievement standard is derived from The New Zealand Curriculum, Learning Media, Ministry of Education, 2007, Level 8 within the Science learning area. It is aligned with the achievement objectives in the following two strands: Living World strand:

- Life processes, ecology, and evolution, 'Explore the evolutionary processes that have resulted in the diversity of life on Earth and appreciate the place and impact of humans within these processes' Nature of Science strand:
- Understanding about science, 'Understand that scientists have an obligation to connect their new ideas to current and historical scientific knowledge and to present their findings for peer review and debate'.
   It is also related to the material in the Teaching and Learning Guide for Biology, Ministry of Education, 2010, at <a href="http://seniorsecondary.tki.org.nz">http://seniorsecondary.tki.org.nz</a>.

**Demonstrate understanding** involves using biological ideas and/or scientific evidence to describe evolutionary processes leading to speciation.

**Demonstrate in-depth understanding** involves using biological ideas and/or scientific evidence to explain how or why evolutionary processes lead to speciation.

**Demonstrate comprehensive understanding** involves linking linking biological ideas and/or scientific evidence about evolutionary processes leading to speciation. The linking of ideas may involve justifying, relating, evaluating, comparing and contrasting, or analysing the evolutionary processes that lead to speciation.

Evolutionary processes involve the following biological ideas:

- role of mutation
- gene flow
- role of natural selection and genetic drift
- modes of speciation (sympatric, allopatric)
- reproductive isolating mechanisms that contribute to speciation (geographical, temporal, ecological, behavioural, structural barriers, polyploidy)
- patterns such as divergence, convergence, adaptive radiation, co-evolution, punctuated equilibrium, and gradualism

*Scientific evidence* for evolution, which may include examples from New Zealand's flora and fauna, will be selected from:

- fossil evidence
- comparative anatomy (homologous and analogous structures)
- molecular biology (proteins and DNA analysis)
- biogeography

Assessment Specifications for this achievement standard can be accessed through the Biology Resources page found at <u>www.nzqa.govt.nz/ncea/resources</u>.

#### Achievement Standard - Biology 3.6 (91606)

## Title: Demonstrate understanding of trends in human evolution

Level 3	Credits 4	Assessment External
Subfield Science	Domain Biology	Status Registered
Status date 4 December 2012	Planned review date 31 December 2018	Date version published 17 December 2016

This achievement standard involves demonstrating understanding of trends in human evolution.

#### Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of trends in human evolution.	Demonstrate in-depth understanding of trends in human evolution.	Demonstrate comprehensive understanding of trends in human evolution.

#### **Explanatory Notes**

This achievement standard is derived from The New Zealand Curriculum, Learning Media, Ministry of Education, 2007, Level 8 within the Science learning area. It is aligned with the achievement objectives in the following two strands: *Nature of Science strand:* 

- Understanding about science, 'Understand that scientists have an obligation to connect their new ideas to current and historical scientific knowledge and to present their findings for peer review and debate'
- Investigating in science, 'Develop and carry out investigations that extend their science knowledge, including developing their understanding of the relationship between investigations and scientific theories and models'.

#### Living World strand:

• Life processes, ecology, and evolution, 'Explore the evolutionary processes that have resulted in the diversity of life on Earth and appreciate the place and impact of humans within these processes'.

It is also related to the material in the Teaching and Learning Guide for Biology, Ministry of Education, 2010 at <u>http://seniorsecondary.tki.org.nz</u>.

Demonstrate understanding involves using biological ideas to describe trends in human evolution.

Demonstrate in-depth understanding involves using biological ideas to explain how or why trends in human evolution occur.

**Demonstrate comprehensive understanding** involves linking biological ideas about trends in human evolution. The linking of ideas may involve justifying, relating, evaluating, comparing and contrasting, and analysing using scientific evidence.

Trends in human evolution refers to change over a period of time in relation to:

- human biological evolution
- human cultural evolution
- patterns of dispersal of hominins. Hominins refers to living and fossil species belonging to the human lineage. This is a subgroup of hominids, a group which includes both humans and the great apes.

Trends in human biological evolution begin with early bipedal hominins and may require comparison with living hominids. These trends involve:

- skeletal changes linked to bipedalism
- changes in skull and endocranial features
- changes in the manipulative ability of the hand.

Trends in human cultural evolution involve:

- use of tools (stone, wood, bone)
- use of fire
- clothing
- abstract thought (communication, language, art)
- food-gathering (hunter-gatherer, domestication of plants and animals)
- shelter (caves, temporary settlement, permanent settlement).

Interpretations of the trends in human evolution are based on current scientific evidence which is widely accepted and presented in peer-reviewed scientific publications.

Assessment Specifications for this achievement standard can be accessed through the Biology Resources page found at <u>www.nzqa.govt.nz/ncea/resources</u>.

# Achievement Standard - Biology 3.7 (91607)

Title: Demonstrate understanding of human manipulations of genetic transfer and its biological implications

Level 3	Credits 3	Assessment Internal
Subfield Science	Domain Biology	Status Registered
Status date 4 December 2012	Planned review date 31 December 2018	Date version published 17 December 2016

This achievement standard involves demonstrating understanding of human manipulations of genetic transfer and its biological implications.

#### Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of human manipulations of genetic transfer and its biological implications.	Demonstrate in-depth understanding of human manipulations of genetic transfer and its biological implications.	Demonstrate comprehensive understanding of human manipulations of genetic transfer and its biological implications.

#### **Explanatory Notes**

This achievement standard is derived from The New Zealand Curriculum, Learning Media, Ministry of Education, 2007, Level 8 within the Science learning area. It is aligned with the following achievement objectives in the Living World strand Life processes, ecology, and evolution:

- Understand how humans manipulate the transfer of genetic information from one generation to the next and make informed judgements about the social, ethical, and biological implications relating to this manipulation
- Explore the evolutionary processes that have resulted in the diversity of life on Earth and appreciate the place and impact of humans within these processes.
   It is also related to the material in the Teaching and Learning Guide for Biology, Ministry of Education, 2010, at <a href="http://seniorsecondary.tki.org.nz">http://seniorsecondary.tki.org.nz</a>.

**Demonstrate understanding** involves using biological ideas to describe human manipulations of genetic transfer and its biological implications.

**Demonstrate in-depth understanding** involves using biological ideas to explain how humans manipulate genetic transfer and the biological implications of these manipulations.

**Demonstrate comprehensive understanding** involves linking biological ideas about human manipulations of genetic transfer and its biological implications. The linking of ideas may involve justifying, relating, evaluating, comparing and contrasting, and analysing.

Human manipulations of genetic transfer may involve:

- selective breeding (could include embryo selection, animal breeding, plant breeding, development of new crops)
- whole organism cloning
- transgenesis
- investigation and modification of the expression of existing genes.

*Biological implications* may involve the impact on:

- ecosystems
- genetic biodiversity
- health or survival of individuals
- survival of populations
- evolution of populations.

Conditions of Assessment related to this achievement standard can be found at www.tki.org.nz/e/community/ncea/conditions-assessment.php.

	TERM ONE (11 weeks)			
Week	Teaching Programme	Achievement Standard	Assessment	
1	Admin			
2	<ul> <li>3.4 Internal Assessment Content Teaching</li> <li>How an animal maintains a stable internal environment</li> <li>Systems overview</li> </ul>	Biology 3.4 (91604) INTERNAL		
3-5	<ul> <li>Thermoregulation (1.5 weeks)</li> <li>Purpose/components/mechanisms/disruption</li> <li>Blood Glucose Regulation (1.5 weeks)</li> <li>Purpose/components/mechanisms/disruption</li> </ul>			
6	<ul> <li>+ Review</li> <li>+ Summative assessment (test in exam conditions)</li> </ul>		Biology 3.4 (91604) Summative Assessment	
7	<ul> <li>3.3 Plant and Animal Responses to their Environment         <ul> <li>Introduction</li> <li>Animal behaviour</li> <li>Biotic vs abiotic factors</li> </ul> </li> <li>Orientation responses in animals         <ul> <li>Taxis</li> <li>kinesis</li> </ul> </li> </ul>	Biology 3.3 (91603) EXTERNAL		
8	Orientation response in animals <ul> <li>homing</li> <li>migration</li> </ul>			
9	Orientation response in plants <ul> <li>tropism</li> <li>nastic response</li> </ul>			
10	Timing response in animals         • internal clocks         • biorhythms			
11	<ul> <li>Timing response in plants</li> <li>photoperiodism</li> <li>flowering, germination, dormancy, vernalisation</li> </ul>			

	TERM TWO (10 weeks)		
Week	Teaching Programme	Achievement Standard	Assessment
1	<ul> <li>Interspecific relationships - Plants and animals</li> <li>Competitive</li> <li>Mututalistic</li> <li>Exploitative - herbivory, predation, parasitism</li> <li>Commensal</li> </ul>		
2	Intraspecific relationships - Plants and Animals <ul> <li>Competition</li> <li>Territoriality</li> <li>Hierarchical behaviour</li> <li>Co-operative interactions</li> <li>Reproductive behaviours</li> </ul>		
3	+ Revision + Formative assessment (test)		Biology 3.3 (91603) TEST
4	<ul> <li>3.5 Evolutionary Processes Leading to Speciation</li> <li>Introduction - biogeographical history of New Zealand</li> <li>Revision – agents that change allele frequencies</li> <li>Role of mutation</li> </ul>	Biology 3.5 (91605) EXTERNAL	
5	<ul> <li>Evolutionary processes</li> <li>Gene flow</li> <li>Role of natural selection and genetic drift</li> <li>Modes of speciation (sympatric, allopatric)</li> </ul>		
6	<ul> <li>Reproductive isolating mechanisms that contribute to speciation (geographical, temporal, ecological, behavioural, structural barriers, polyploidy)</li> </ul>		
7	Patterns of evolution         Divergence         Convergence         adaptive radiation         Co-evolution         punctuated equilibrium         gradualism		
8	<ul> <li>Scientific evidence for evolution</li> <li>Fossil evidence, comparative anatomy (homologous and analogous structures), molecular biology (proteins and DNA analysis), biogeography.</li> </ul>		
9	+ Revision + Formative assessment (test)		Biology 3.5 (91605) TEST
10	<ul> <li>3.7 Internal Assessment Commences - Human Manipulations of Genetic Transfer</li> <li>Introduction to Gene Therapy and Selective Breeding</li> </ul>		

TERM THREE (10 weeks)			
Week	Teaching Programme	Achievement Standard	Assessment
1	Research • Milestone 1 - Topic selection		
2	Research Milestone 2 - Information and biological implications + Report writing		
3	Report writing Report due end of week		Biology 3.7 (91607) due Week 3 via Electronic Submission on Turnitin
4	<ul> <li>3.6 Trends in Human Evolution <ul> <li>Difference between hominid and hominin</li> <li>Differences between Humans and Apes</li> </ul> </li> <li>Trends in biological evolution <ul> <li>skeletal changes linked to bipedalism</li> <li>changes in skull and endocranium</li> <li>changes in manipulative ability of the hand</li> </ul> </li> </ul>	Biology 3.6 (91606) EXTERNAL	
5	<ul> <li>Overview of hominin classification</li> <li>Trends in cultural evolution         <ul> <li>tool cultures and techniques</li> <li>food gathering/hunting</li> <li>communication and abstract thought</li> <li>fire</li> <li>shelter</li> <li>domestication of plants and animals</li> </ul> </li> </ul>		
6	<ul> <li>H. neanderthalensis</li> <li>Denisovans</li> <li>Patterns of, and reasons for, dispersal of hominins <ul> <li>Origin of modern humans</li> <li>Multi-regional vs Out of Africa hypotheses</li> </ul> </li> <li>Auckland Zoo and Museum – Primate and early human behaviour and characteristics</li> </ul>		
7	<ul> <li>Domestication of Plants and animals</li> <li>Metal ages to modern technology</li> <li>+ Revision</li> </ul>		
8	Prelims	Biology 3.3 (91603), Biology 3.5 (91605) and Biology 3.6 (91606) Prelims	
9	Prelims		
10	Preliminary Exam Review		

TERM FOUR (8 weeks)			
Week	Teaching Programme	Achievement Standard	Assessment
1	+ Revision		
2	+ Revision		

3	+ Revision NCEA Examinations begin 9th November	
4	NCEA Examinations	
5	NCEA Examinations	
6	NCEA Examinations	
7		
8		