

CHRISTCHURCH BOYS' HIGH SCHOOL



Year 11 NCEA Level 1

BIOLOGY/CHEMISTRY 2008

Name: Class

Welcome to NCEA Level 1 BioChem

We hope that you find the course **enjoyable, interesting and challenging**. We also trust that you will **work hard** to get the most out of your start to specialist biology and chemistry learning.

This is your first year of intensive biology and chemistry study. The course is very full with a mix of internal and external assessment that covers theory, practicals involving observations and different types of reactions, and problems to help your understanding of the nature of the biological and chemical sciences. This course is designed to give you a sound base leading to further study of biology and chemistry - it is a vital start to the next few years of high school biology and chemistry.

Course

AS	Title	Credits	Internal/External
AS90457	Biology 2.1	Carry out a practical biological investigation with supervision	3 Internal Credits
AS90162	Biology 1.2	Process information to describe a use of biology knowledge with direction	2 Internal Credits
AS90163	Biology 1.3	Describe the transfer of genetic information	3 External Credits
AS90167	Biology 1.7	Describe plant processes	4 External Credits
AS90168	Biology 1.8	Describe how humans use and are affected by micro-organisms	2 External Credits
AS90640	Chemistry 1.4	Describe properties and reactions of metals, acids and bases	4 External Credits
AS90648	Chemistry 1.7	Describe properties and reactions of carbon and its compounds	3 External Credits

Total Credits 21

You must read each standard carefully. Tick off each topic as you learn it and use the standards along with the course objectives as a revision checklist.

A copy of the plan for the year is at the end of this booklet, it is intended as a **guide only**, and is therefore unlikely to be followed rigidly.

Marking and Moderation

The teachers in the Biology department will mark the internal assessments. To ensure consistency in the marking, a number of procedures are followed. Markers meetings are held to set the standards and ensure that all teachers are familiar with the marking schedule. Either, one teacher will mark all papers, or a check marking system will be used to ensure that the standards are maintained.

Further moderation occurs outside the school with a number of samples of students work being check marked by moderators appointed by NZQA.

Reassessment

There is no opportunity for pupils to resit the internal standards to improve their grades. If you miss all or part of these assessments for medical reasons and have a medical certificate to explain your absence, then you may be offered the opportunity to resit the achievement standard later in the year or a grade will be assessed for you based on your year's performance. A copy of your medical certificate must be given to Mr. Burttt within one week after the assessment has taken place.

Appeals

Externally assessed achievement standards:

If a pupil would like their work reassessed then they can send away to NZQA for a remarking of the paper. This will carry a charge.

Internally assessed achievement standards:

The students receive their papers back from their teacher. If a pupil is not happy with the grade awarded then the student will have two school days to approach the teacher for a remarking of the paper or an explanation that satisfies the student. If the pupil is still not happy then he can ask for a ruling from the moderator for that assessment or Mr Burttt HOD Biology.

Usually at this stage things have been sorted out. If not then the teacher in charge of assessment Mr Thomas can become involved.

NB. All papers will be retained by the school for moderation and security purposes. No appeal can be made on any paper that has been removed from the school.

Exams

Tests and exams will mostly be set in the same style, and at the same level you can expect in the NCEA exams. You will always know exactly how you compare to the standard required. These grades are used by your teachers when writing your reports and as evidence for any aegrotat or special consideration grades requested for by NZQA. It is important that these reflect your best effort.

Notes and Texts

You will be issued with the Year 11 Biology write on notes that is a part of your stationary. For the Chemistry parts of the course you will be using the copy of the Level 1 Chemistry Study Guide by ESA Publications and Year 11 Chemistry write on notes mostly issued through Physical Science classes. During term 3 we will order in the AME Level 1 Chemistry and Biology Workbooks for those who wish to have one at a cost of approx \$15 to be charged to your school account.

Year 11 Biochemistry is the wrong time to discover you don't understand something. **You must ask for help early, when you realise you are struggling or having difficulty with a particular topic.** This is the most important message on this page!!

Mr M. Burttt
HOD Biology/Science

Mr J. Andersen
HOD Chemistry

Mr S. McLeod
TIC BioChem

Achievement Standard

Subject Reference	Chemistry 1.4				
Title	Describe characteristic properties and reactions of metals, acids and bases				
Level	1	Credits	4	Assessment	External
Subfield	Science				
Domain	Chemistry				
Status	Registered	Status date	5 November 2007		
Planned review date	28 February 2009	Date version published	5 November 2007		

This achievement standard involves the description of characteristic properties and reactions of metals, acids and bases.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none">Describe characteristic properties and reactions of metals, acids and bases.	<ul style="list-style-type: none">Explain characteristic properties and reactions of metals, acids and bases.	<ul style="list-style-type: none">Apply an understanding of characteristic properties and reactions of metals, acids and bases.

Explanatory Notes

- This achievement standard is derived from *Chemistry in the New Zealand Curriculum*, Learning Media, Ministry of Education, 1994, achievement objectives 6.2 and 6.3, p. 18.
- Metals* are limited to Li, Na, Ca, Mg, Al, Zn, Fe, Pb, Cu, Ag and Au.
- Acids* are limited to HCl, H₂SO₄, HNO₃, CH₃COOH.
- Bases* are limited to metal oxides, hydroxides, carbonates, and hydrogen carbonates.
- Assessment of the *characteristic properties and reactions of metals* will involve a selection from the following:
 - physical properties – electrical conductivity, thermal conductivity, density, lustre, malleability and ductility
 - relating the properties of metals to their uses
 - relating the relative reactivity of metals to their uses and method of extraction from their ores
 - observations and word/balanced equations for reactions of metals with oxygen, water and acids.
- Assessment of the *characteristic properties and reactions of acids and bases* will involve a selection from the following:
 - effects on litmus, universal indicator
 - pH value
 - observations of reaction of acids with carbonates and hydrogen carbonates
 - naming products and writing word/balanced equations for reactions of acids with bases.
- Assessment may involve identification and explanation of factors affecting rates of reaction, restricted to changes in concentration, temperature and surface area.
- A table of ions will be provided.
- A periodic table showing symbols, atomic numbers and molar mass values only will be provided.

Achievement Standard

Subject Reference	Chemistry 1.7				
Title	Describe properties and reactions of carbon and its compounds				
Level	1	Credits	3	Assessment	External
Subfield	Science				
Domain	Chemistry				
Registration date	21 November 2003	Date version published	21 November 2003		

This achievement standard involves the description of properties and reactions of carbon and its compounds.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none">Describe properties and reactions of carbon and its compounds.	<ul style="list-style-type: none">Link properties and reactions of carbon and its compounds.	<ul style="list-style-type: none">Apply an understanding of properties and reactions of carbon and its compounds.

Explanatory Notes

- This achievement standard is derived from *Chemistry in the New Zealand Curriculum*, Learning Media, Ministry of Education, 1994, achievement objectives 6.1 and 6.3, p. 18.
- Properties and reactions* of carbon will be selected from the following:
 - state at room temperature, colour, and reaction with oxygen
 - carbon cycle
 - allotropes of carbon – structure, physical properties and uses
- Compounds of carbon are restricted to oxides of carbon, hydrocarbons (straight chain alkanes up to 6 carbon atoms, ethene and propene), methanol, ethanol and ethanoic acid, polymers formed from ethene and propene. Assessment will include naming (using IUPAC nomenclature) and writing structural formulae.
- Properties and reactions* of oxides of carbon will be selected from the following:
 - properties of carbon dioxide – density, solubility in water, the acidic nature of its aqueous solution, inability to support combustion, reaction with lime water
 - uses of carbon dioxide related to properties
 - laboratory preparation of carbon dioxide
 - combustion of carbon monoxide.
- Properties and reactions* of hydrocarbons and alcohols will be selected from the following:
 - complete and incomplete combustion reactions (including balanced equations)
 - solubility in water
 - melting and/or boiling points
 - separation of hydrocarbons by fractional distillation
 - production of ethanol by fermentation
 - formation of ethanoic acid from ethanol (details of oxidants and balanced equations not included)
 - formation of polymers from ethene and propene.
- Application of understanding of properties* may include:
 - use of organic compounds as fuels
 - the impact of carbon and its combustion products on human health and the environment eg global warming.
- Balanced equations for reactions may be required, where appropriate.

Achievement Standard

Subject Reference	Biology 2.1				
Title	Carry out a practical biological investigation with supervision				
Level	2	Credits	3	Assessment	Internal
Subfield	Science				
Domain	Biology				
Registration date	26 November 2004	Date version published	26 November 2004		

This achievement standard involves carrying out a practical biological investigation, with supervision, by planning the investigation, collecting and processing the data, and interpreting and reporting the findings.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Carry out a practical biological investigation. 	<ul style="list-style-type: none"> Carry out a quality practical biological investigation. 	<ul style="list-style-type: none"> Carry out and evaluate a quality practical biological investigation.

Explanatory Notes

- This achievement standard is derived from *Biology in the New Zealand Curriculum*, Learning Media, Ministry of Education, 1994, p. 38, 'Developing Scientific Investigative Skills and Attitudes in Biology'.
- Procedures outlined in *Safety and Science: a Guidance Manual for New Zealand Schools*, Learning Media, Ministry of Education, 2000, should be followed. Investigations should comply with the Animal Welfare Act 1999, as outlined in *Caring for Animals: a Guide for Teachers, Early Childhood Educators, and Students*, Learning Media, Ministry of Education, 1999.
- Investigations will be based on situations arising from content at level 7 of *Biology in the New Zealand Curriculum*, Learning Media, Ministry of Education, 1994, pp. 20-26.
- An investigation is an activity covering the complete process: to plan, carry out, process and interpret data, and report on the investigation. It will involve students in the collection of primary data. It is expected that students will have opportunity to make changes to their initial method as they work through the investigation.
- The nature of the investigation could be the manipulation of variables (fair test) or the investigation of a pattern or relationship.
- With supervision* means the teacher gives students guidelines for the investigation such as the context for the investigation, instructions giving the requirements for a quality investigation, and broad experimental conditions such as the availability of equipment or chemicals. It may also involve discussion with individual students in order to clarify their ideas. Students then develop and complete the investigation from the initial guidelines given by the teacher.

- 7 A *practical biological investigation* will involve
- a statement of the purpose – this may be an aim, testable question, prediction, or hypothesis based on a scientific idea
 - a method that describes:
 - for a fair test: the independent variable and its range, the measurement of the dependent variable and the control of some other key variables
 - or pattern seeking: the data that will be collected, range of data/samples, and consideration of some other key factors
 - collecting, recording and processing data relevant to the purpose
 - interpreting and reporting on the findings with a conclusion reached based on the processed data in relation to the purpose of the investigation.
- 8 A *quality practical biological investigation* enables a valid conclusion to be reached. This would normally involve
- a statement of the purpose – this may be an aim, testable question, prediction or hypothesis based on a scientific idea
 - a method that describes:
 - for a fair test: a valid range for the independent variable, the valid measurement of the dependent variable and the control of other variables, with consideration of factors such as sampling bias and sources of errors
 - for pattern seeking: a valid collection of data with consideration of factors such as sampling bias and sources of errors.
 - collecting, recording and processing data to enable a trend or pattern (or absence) to be determined
 - interpreting and reporting on the findings with a valid conclusion reached based on the processed data in relation to the purpose of the investigation
 - a discussion of the biological ideas relating to the investigation.
- 9 *Evaluate* means to justify the conclusion in terms of the method used. This will involve, where relevant, consideration of the:
- reliability of the data
 - validity of the method.

Achievement Standard

Subject Reference	Biology 1.2				
Title	Process information to describe a use of biology knowledge with direction				
Level	1	Credits	2	Assessment	Internal
Subfield	Science				
Domain	Biology				
Registration date	27 October 2004	Date version published	27 October 2004		

This achievement standard involves processing secondary information to describe a use of biology knowledge, with direction.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Process information to describe a use of biology knowledge. 	<ul style="list-style-type: none"> Process information to explain a use of biology knowledge. 	<ul style="list-style-type: none"> Process information to discuss a use of biology knowledge.

Explanatory Notes

- This achievement standard is derived from *Science in the New Zealand Curriculum*, Learning Media, Ministry of Education, 1993, 'Making Sense of the Nature of Science and its Relationship to Technology', p. 24; *Biology in the New Zealand Curriculum*, Learning Media, Ministry of Education, 1994, Level 6, pp. 38-39; and from *Pūtaiao i roto i te Marautanga o Aotearoa*, Learning Media, Ministry of Education, 1996, 'Ngā Pūkenga Ngā Waiaro ki te Pūtaiao', p. 87.
- With direction means the context for the study will be provided and general instructions for processing will be specified in writing.
- A use of biology knowledge should be based on situations in keeping with content drawn from up to and including science/pūtaiao curriculum Level 6 or from Level 6 of *Biology in the New Zealand Curriculum*. Possible contexts are given in the curriculum documents and could be based on a technological application or a management practice, resolving an issue, or the development of a theory or model.
- Information for processing is to be selected from a range of sources that may be provided, which may include secondary information, ie information that has been previously collected and processed by another person. Sources of information are to be recorded in a way that can be accessed by others.
- Processing information could involve listing, sorting, collating, highlighting, or summarising relevant information on science knowledge and its related use.
- Terms:
 - Describe* means provide characteristics of, or an account of, the scientific knowledge related to its use.
 - Explain* means provide reasons as to how or why the scientific knowledge applies to the use.
 - Discuss* means link ideas to integrate relevant biology knowledge with its use, and will involve elaborating, justifying, relating, evaluating, comparing and contrasting, or analysing.

Achievement Standard

Subject Reference	Biology 1.3				
Title	Describe the transfer of genetic information				
Level	1	Credits	3	Assessment	External
Subfield	Science				
Domain	Biology				
Status	Registered	Status date	5 November 2007		
Planned review date	28 February 2009	Date version published	5 November 2007		

This achievement standard involves the description of the transfer of genetic information.

Note: Students cannot use credit for both this achievement standard and AS90188, Science 1.3, towards a national qualification including a National Certificate of Educational Achievement.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Describe biological ideas relating to transfer of genetic information. 	<ul style="list-style-type: none"> Explain biological ideas relating to transfer of genetic information. 	<ul style="list-style-type: none"> Discuss biological ideas relating to transfer of genetic information.

Explanatory Notes

- This achievement standard is derived from *Science in the New Zealand Curriculum*, Learning Media, Ministry of Education, 1993, p. 64; *Biology in the New Zealand Curriculum*, Learning Media, Ministry of Education, 1994, p. 14; and *Pūtaiao i roto i te Marautanga o Aotearoa*, Learning Media, Ministry of Education, 1996, p. 28.
- Biological ideas* relating to the transfer of genetic information will be selected from:
 - roles of, and relationships between, chromosomes, genes, alleles and DNA
 - structure and replication of DNA and its role in the transfer of genetic information. The structure is limited to double helix, molecular groups (sugar, base, phosphate), base pairing
 - cell division through mitosis and meiosis. Biological ideas relating to mitosis and meiosis are limited to purpose, where they occur, sequence of events (the names of stages are not required), reasons for maintenance or change of chromosome number, significance of the number of cells produced
 - solution of genetic problems limited to sex determination, simple monohybrid inheritance patterns for alleles showing complete dominance
 - applications of genetics, eg selective breeding, breeding techniques, genetic modification, cloning.
- The student will be expected to be familiar with the following terms: variation, gamete, zygote, fertilisation, chromosome, karyotype, gene, allele, dominant, recessive, homozygous, heterozygous, pure breeding, genotype, phenotype, trait, characteristic, phenotype ratio, Punnett square, pedigree chart and semi-conservative.
- Terms:
 - Describe* requires the student to define, use annotated diagrams, give characteristics of, or an account of.
 - Explain* requires the student to provide a reason as to how or why something occurs.
 - Discuss* requires the student to show understanding by linking biological ideas. It may involve students in elaborating, applying, justifying, relating, evaluating, comparing and contrasting, and analysing.

Achievement Standard

Subject Reference	Biology 1.7				
Title	Describe plant processes				
Level	1	Credits	4	Assessment	External
Subfield	Science				
Domain	Biology				
Registration date	21 November 2003	Date version published	7 December 2005		

This achievement standard involves the description of biological ideas relating to the functioning of plant processes.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Describe biological ideas relating to the functioning of plant processes. 	<ul style="list-style-type: none"> Explain biological ideas relating to the functioning of a plant process. 	<ul style="list-style-type: none"> Discuss biological ideas relating to the functioning of a plant process.

Explanatory Notes

- This achievement standard is derived from *Biology in the New Zealand Curriculum*, Learning Media, Ministry of Education, 1994, p. 14, achievement objective 6.1 (c).
- Plant processes* will be selected from asexual and sexual reproduction of flowering plants (including dispersal), germination and growth (including primary and secondary) and photosynthesis.
- Biological ideas* relating to these plant processes will be selected from:
 - structural components involved with the process(es)
 - the functioning of the structural components
 - the overall functioning of the plant process(es)
 - products or outcomes of the plant processes (including raw materials and requirements)
 - effects of environmental factors, such as light intensity, temperature, wind, moisture and oxygen, on a plant process.
- Terms:
 - Describe* requires the student to define, give characteristics of, or an account of.
 - Explain* requires the student to provide a reason as to how or why something occurs.
 - Discuss* requires the student to show understanding by linking biological ideas. It may involve students in elaborating, applying, justifying, relating, evaluating, comparing and contrasting, analysing.

Achievement Standard

Subject Reference	Biology 1.8		
Title	Describe biological ideas relating to how humans use and are affected by micro-organisms		
Level	1	Credits	2
		Assessment	External
Subfield	Science		
Domain	Biology		
Status	Registered	Status date	5 November 2007
Planned review date	28 February 2009	Date version published	5 November 2007

This achievement standard involves the description of biological ideas relating to how humans use and are affected by micro-organisms.

Note: Students cannot use credit for both this achievement standard and AS90188, Science 1.3, towards a national qualification including a National Certificate of Educational Achievement.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Describe biological ideas relating to how humans use and are affected by micro-organisms. 	<ul style="list-style-type: none"> Explain biological ideas relating to how humans use and are affected by micro-organisms. 	<ul style="list-style-type: none"> Discuss biological ideas relating to how humans use and are affected by micro-organisms.

Explanatory Notes

- This achievement standard is derived from *Science in the New Zealand Curriculum*, Learning Media, Ministry of Education, 1993, p. 64; *Biology in the New Zealand Curriculum*, Learning Media, Ministry of Education, 1994, p. 14; and *Pūtaiao i roto i te Marautanga o Aotearoa*, Learning Media, Ministry of Education, 1996, p. 28.
- Micro-organisms* will be selected from bacteria, fungi and viruses.
- How humans use and are affected by micro-organisms* could include: nutrient cycling, food production, sewage treatment, food poisoning, disease in living things, microbial attack on everyday materials (helpful and harmful), antibiotics, and resistance to antibiotics.
- Biological ideas* relating to how humans use and are affected by micro-organisms will be selected from:
 - structure of micro-organisms
 - culturing micro-organisms
 - life processes of micro-organisms
 - factors that affect the life processes of micro-organisms.
- Life processes* of micro-organisms will be selected from: nutrition, growth, respiration, reproduction and excretion by bacteria and fungi, and the reproduction of viruses.
- The student will be expected to be familiar with the following terms: inoculate, extracellular digestion, enzyme, parasite, pathogen, saprophyte, decomposer, aerobic, anaerobic, hyphae, binary fission, spores, sporangium, and toxin.
- Terms:
 - Describe* requires the student to define, use annotated diagrams, give characteristics of, or an account of.
 - Explain* requires the student to provide a reason as to how or why something occurs.
 - Discuss* requires the student to show understanding by linking biological ideas. It may involve students in elaborating, applying, justifying, relating, evaluating, comparing and contrasting, and analysing.

Year 11 BioChem Course Overview 2008

Term 1 Feb 4-Apr 18	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8 Bio 2.1 DUE	Week 9	Week 10	Week 11
11Bch 21	Bio 2.1 Snail Study SD					Chem 1.4 Metals, Acids and Bases SD				C 1.7 SD	
11Bch 22	Bio 2.1 Snail Study BT					Bio 1.7 Plant Processes BT					
11Bch 33	Bio 2.1 Snail Study MD					Bio 1.7 Plant Processes MD					

Term 2 May 5-Jul 4	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6 EXAMS	Week 7	Week 8	Week 9	
11Bch 21	Chem 1.7 Carbon Cont SD		Bio 1.3 Genetics BT		Bio 1.2 Information gathering	Bio 1.2 Information processing in 2hr exam slot	Bio 1.3 Cont. BT			
11Bch 22	Bio 1.7 Plants Cont. BT		Chem 1.4 Metals SD				Chem 1.4 Acids and Bases SD		C 1.7 Start	
11Bch 33	B1.7 MD	Bio 1.3 Genetics MD					Bio 1.3 Cont. MD		B 1.8 MD	

Term 3 Jul 21-Sep 26	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	
11Bch 21	Bio 1.8 Microbes BT		Bio 1.7 Plant processes MD				EXAMS (Each class tested on standards covered)	B 1.7 MD			
11Bch 22	Chem 1.7 Carbon SD		Bio 1.3 Genetics BT					B 1.3 BT			
11Bch 33	Bio 1.8 Microbes MD		Chem 1.4 Metals, Acids and Bases SD					C 1.7 SD			

Term 4 Oct 13-Dec 17	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	
11Bch 22	Bio 1.7 Plant Processes Cont. MD			Revision		NZQA Exams					
11Bch 22	Bio 1.8 Microbes BT					NCEA Level 1 Biology Mon 17 th Nov					
11Bch 33	Chem 1.7 Carbon and Compounds SD					NCEA Level 1 Chemistry Fri 28 th Nov					