

FIELD SCIENCE**Review of *Science* unit standards**

Subfield	Domain	Id
Science	Biology	8104
	Microbiology	8022-8025, 8027, 8028, 8030, 8032-8040, 8042, 12366-12370, 12460
	Science - Core	8029, 8440, 8441, 8467, 20885, 20886

NZQA National Qualifications Services (NQS) has completed the review of the unit standards listed above.

Date new versions published

May 2010

Planned review date

December 2015

Summary of review and consultation process

Unit standards in the *Science - Core* domain relating to safety in the laboratory have been reviewed at this time due to their relevance to the practical laboratory skills used in the *Microbiology* domain.

Prior to the review, feedback from users of these unit standards indicated a need to increase the practical component of the unit standards for them to be nationally endorsed and fit for purpose.

The review panel met in March and May 2009 to consider feedback in finalising the unit standards. There were no issues identified with the reviewed standards. The review panel and consultation network included representation from secondary, tertiary and industry training organisations and all accredited providers. Changes were made to the unit standards and they were distributed for comment in July 2009 and there was no objection to the changes made through this review.

Main changes resulting from the review

- Special notes relating to legislation, references, and ISO standards were updated.
- Credit allocation for unit standards 8022, 8030, 8035, 8040, 8440, 12368-12370, and 20885 was increased to better reflect the learning, practice, and assessment time required to achieve the standards.
- Credit allocation for unit standards 8032, 8033, 8036, 12366, and 12367 was decreased to better reflect the learning, practice, and assessment time required to achieve the standards.
- Level of unit standard 8440 was increased to better reflect the outcome requirements of the standard.
- Levels of unit standards 8028 and 12367 were decreased to better reflect the outcome requirements of the standards.
- Titles of some standards were amended to better reflect the outcomes in the standards.
- The focus of unit standard 8030 was amended to include more of a practical component.

- Unit standard 12368 was reclassified from the *Microbiology* domain to the *Science - Core* domain.
- Unit standard 8034 was replaced by unit standards 26109 and 26110 as the sector required two separate unit standards to cover culture of microorganisms and control of microbial growth.
- Unit standard 8039 was replaced by unit standards 26111 and 26112 as the sector required two separate unit standards to cover the theoretical and practical aspects in relation to microorganisms in water.
- Unit standard 8104 was replaced by unit standards 26114 and 26115 as the sector required two separate unit standards to cover animal culture and tissue culture.
- New unit standards 26113, 26116, and 26117 were developed to cover microbiological sampling, processes of bioreactors, and safety practices in a science laboratory respectively.

Unit standards categorised as category C expire at the end of December 2012.

Impact on existing provider accreditations

Current Accreditation for			Accreditation extended to		
Nature of accreditation	Classification	Level	Nature of accreditation	ID	Level
Field	Sciences	5	Standard	8440	6
Subfield	Science	5	Standard	8440	6
Domain	Microbiology	6	Standard	12368	6
	Science - Core	5	Standard	8440	6

Impact on Accreditation and Moderation Action Plan (AMAP)

None.

Impact on existing qualifications

Affected	The qualification lists a reviewed classification (domain or subfield) in an elective set The qualification lists a standard that has changes to level or credits The qualification lists a C or D category standard
Not materially affected	The qualification lists a standard that has a new title The qualification lists a standard that has a new classification

The following NQS qualifications are affected by the changes. The standards that generated the status *Affected* are listed in bold. They will be updated when they are next reviewed.

Qualification title	Standard in the qualification
National Diploma in Science (Level 5) [Ref: 0234]	8029, 8467, 20885
National Diploma in Science (Level 6) with optional strands in Biology, Chemistry, Food Science, Microbiology, and Molecular Biology/Biochemistry [Ref: 0235]	8029, 8467, 20885

Review Categories and changes to classification, title, level, and credits

All changes are in **bold**.

Key to review category	
A	Dates changed, but no other changes are made - the new version of the standard carries the same Id and a new version number
B	Changes made, but the overall outcome remains the same - the new version of the standard carries the same Id and a new version number
C	Major changes that necessitate the registration of a replacement standard with a new Id
D	Standard will expire and not be replaced

Subfield Science
 Domain Microbiology
Science - Core

Id	Title	Level	Credit	Review Category
12368	Demonstrate knowledge of the hazard analysis critical point (HACCP) system Demonstrate knowledge of the hazard analysis critical control point (HACCP) system	6	2 4	B

Domain Microbiology

Id	Title	Level	Credit	Review Category
8022	Demonstrate knowledge of microbial-animal interactions	6	4 6	B
8023	Demonstrate knowledge of microbial metabolism Demonstrate and apply knowledge of microorganism biochemical pathways	5	6	B
8024	Demonstrate knowledge of bacterial structure	5	3	B
8025	Describe plant microbiology	6	3	B
8027	Discuss microbial biodeterioration and biodegradation Describe microbial biodeterioration, biodegradation, and bioremediation	6	4	B
8028	Describe soil microbiology and apply enrichment techniques Describe soil microbiology	6 5	4	B
8030	Demonstrate knowledge of food spoilage and food preservation Test food for spoilage organisms and pathogens	6	5 6	B
8032	Grow and infect indicator cells and detect viruses Perform viral detection techniques	6	5 4	B
8033	Culture and identify fungi to five groups Culture and identify fungi to division level	5	4 3	B
8034	Culture microorganisms and control microbial growth	5	6	C
26109	Culture microorganisms	5	4	
26110	Control microbial growth	5	3	

Id	Title	Level	Credit	Review Category
8035	Carry out visualisation of microorganisms Carry out visualisation and measurement of microorganisms	4	3 4	B
8036	Describe the role of microorganisms in industrial processes	6	7 4	B
8037	Describe and identify protozoa to four groups Describe and identify major groups of protozoa	5	2	B
8038	Perform microorganism counting techniques Perform viable microbiological counting methods	5	3	B
8039	Explain and demonstrate the role of microorganisms in water treatment	6	4	C
26111	Describe and explain the role and treatment of microorganisms in wastewater	5	3	
26112	Demonstrate microbiological analysis of water quality	6	4	
8040	Perform aseptic laboratory techniques	4	3 4	B
8042	Apply principles of bacterial identification	5	6	B
12366	Demonstrate knowledge of the structure, mode of action and detection of viruses Describe viral impact on host cells	5	6 5	B
12367	Demonstrate knowledge of cleaning and sanitation for microbiology Demonstrate knowledge of minimising contamination risk in a microbiological laboratory	5 4	4 3	B
12369	Demonstrate knowledge of bacterial genetics	5	4 6	B
12370	Isolate a plant pathogen	6	3 4	B
12460	Demonstrate knowledge of the microbiology of air	6	2	B
26113	Design and perform microbiological sampling for laboratory analysis	6	4	New
26116	Explain cultivation of microorganisms in bioreactor systems	6	4	New

Domain Science - Core

Id	Title	Level	Credit	Review Category
8029	Demonstrate knowledge and ability to work safely in a microbiological laboratory Work safely in a microbiological laboratory	4	2	B
8440	Comply with laboratory quality management systems Comply with quality management procedures in an accredited laboratory	5 6	4 10	B
8441	Describe laboratory quality systems	5	4	B

Id	Title	Level	Credit	Review Category
8467	Demonstrate knowledge and ability to work safely in a chemical laboratory Work safely in a chemical laboratory	4	3	B
20885	Manage hazardous substances compliance in a science laboratory	6	4 8	B
20886	Demonstrate knowledge of hazardous substances in science laboratories and related legislation	6	5	B
26117	Work safely in a science laboratory	3	2	New

Id	Domain	Title	Level	Credit	Review Category
8104	Biology	Culture cells and tissues	6	3	C
26114	Microbiology	Perform methods for animal tissue culture	6	5	
26115	Microbiology	Perform methods for plant tissue culture	6	3	