Title	**Demonstrate knowledge of bacterial genetics**		
Level	**5**	**Credits**	**6**

Purpose	People credited with this unit standard are able to describe: the typical components of the bacterial genome; the functional components of a typical bacterial operon; the process of gene expression in bacteria; the control of bacterial gene expression; alterations to bacterial genes; and the processes of natural gene transfer between bacteria.

Classification	Science > Microbiology

Available grade	Achieved

Guidance Information

None.

Outcomes and performance criteria

Outcome 1

Describe the typical components of the bacterial genome.

Performance criteria

1.1 The bacterial chromosome is described in terms of structure.

Range structures include – supercoiled, circular, naked deoxyribonucleic acid (DNA).

1.2 The bacterial plasmids are described in terms of function.

Range functions include – conjugation, resistance, degradation.

Outcome 2

Describe the functional components of a typical bacterial operon.

Range functional components include – transcriptional promoters, ribosome binding sites, initiation codons, open reading frames, stop codons, transcription terminators.

Performance criteria

2.1 The functional components of a bacterial operon are described in relation to transcription.

Outcome 3

Describe the process of gene expression in bacteria.

Performance criteria

3.1 Transcription of a gene is described in terms of the role of ribonucleic acid (RNA) polymerase.

Range transcription initiation, transcription termination.

3.2 Functions of bacterial RNAs are described in terms of gene expression, translation and protein synthesis.

Range RNA includes – messenger RNA, transfer RNA, ribosomal RNA.

Outcome 4

Describe the control of bacterial gene expression.

Range promotion, repression.

Performance criteria

4.1 Control of gene expression is described in terms of bacterial operons.

Outcome 5

Describe alterations to bacterial genes.

Performance criteria

5.1 Mutations are described in relation to gene transcription and translation.

Range mutations include – point, block insertions, block deletions.

5.2 Consequences of mutations are described in terms of protein synthesis.

5.3 Mutagen mode of action is described in relation to gene expression.

Range chemical, radiation.

Outcome 6

Describe the processes of natural gene transfer between bacteria.

Performance criteria

6.1 Bacterial gene diversity is described in terms of horizontal gene transfer.

Range methods of transfer include – transformation, conjugation, plasmids generalised transduction, specialised transduction, episomes.

6.2 The function of transposons is described in terms of horizontal gene transfer.

6.3 The effects of genetic material transfer between bacteria are described in relation to bacterial drug resistance.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	17 February 1998	31 December 2014
Review	2	23 November 1999	31 December 2014
Review	3	21 May 2010	31 December 2025
Rollover	4	27 January 2015	31 December 2025
Review	5	27 September 2018	31 December 2025
Review	6	30 November 2023	31 December 2025

Consent and Moderation Requirements (CMR) reference	0113

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.