

<b>Title</b>	<b>Demonstrate knowledge of bacterial genetics</b>		
<b>Level</b>	<b>5</b>	<b>Credits</b>	<b>6</b>

<b>Purpose</b>	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.
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<b>Classification</b>	Science > Microbiology
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<b>Available grade</b>	Achieved
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### Guidance Information

None.

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### 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.

<b>Planned review date</b>	31 December 2023
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**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	N/A
Rollover	4	27 January 2015	N/A
Review	5	27 September 2018	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	0113
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

**Comments on this unit standard**

Please contact NZQA National Qualifications Services [nqs@nzqa.govt.nz](mailto:nqs@nzqa.govt.nz) if you wish to suggest changes to the content of this unit standard.