

## Achievement Standard

<b>Subject Reference</b>	Digital Technologies 3.5		
<b>Title</b>	Use complex techniques to develop an electronics outcome		
<b>Level</b>	3	<b>Credits</b>	6
		<b>Assessment</b>	Internal
<b>Subfield</b>	Technology		
<b>Domain</b>	Digital Technologies		
<b>Status</b>	XX	<b>Status date</b>	XX
<b>Planned review date</b>	XX	<b>Date version published</b>	XX

This achievement standard involves using complex techniques to develop an electronics outcome.

### Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
Use complex techniques to develop an electronics outcome.	Use complex techniques to develop an informed electronics outcome.	Use complex techniques to develop a refined electronics outcome.

### Explanatory Notes

- This achievement standard is derived from the Technology learning area in *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007; and is related to the material in the *Teaching and Learning Guide for Technology*, Ministry of Education at <http://seniorsecondary.tki.org.nz>.

Further information can be found at <http://www.technology.tki.org.nz/>.

Appropriate reference information is available in *Safety and Technology Education: A Guidance Manual for New Zealand Schools*, Ministry of Education at <http://technology.tki.org.nz/Technology-in-the-NZC/Safety-in-Technology-Education-revised-2017>, and the Health and Safety at Work Act 2015.

This standard is also derived from *Te Marautanga o Aotearoa*. For details of *Te Marautanga o Aotearoa* outcomes to which this standard relates, see the [Papa Whakaako](#) for the relevant learning area.

2. *Use complex techniques to develop an electronics outcome* involves:
- using appropriate resources and techniques to develop a functional outcome that performs to complex specifications
  - constructing, testing, and analysing functional circuits
  - testing, modifying, debugging the outcome to ensure it performs to specifications
  - explaining the behaviour and function
  - explaining relevant communication protocols
  - addressing relevant implications.

*Use complex techniques to develop an informed electronics outcome* involves:

- constructing, testing, analysing and modifying reliable circuits.

*Use complex techniques to develop a refined electronics outcome* involves:

- undertaking iterative improvement throughout the design, development and testing process
- justifying the choice of communication protocols
- justifying the choice of components and subsystems used.

3. Examples of *complex techniques* include:
- communication protocols e.g. I2C, serial communications
  - wireless transfer of information
  - feedback control
  - software flags and interrupts
  - CAD design, 3D printing, PCB
  - filtering, noise suppression and EMI.
4. Communications protocols refer to using serial, parallel or I2C to interface subsystems within the electronic system or using devices with UART communications to communicate between devices.
5. Appropriate resources and techniques refer to outcomes that provide sufficient rigour.
6. Examples of relevant implications include:
- social
  - cultural
  - legal
  - ethical
  - intellectual property
  - sustainability
  - privacy
  - accessibility
  - usability
  - functionality
  - aesthetics

- sustainability and future proofing
- end user requirements
- health and safety.

Conditions of Assessment related to this achievement standard can be found at <http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards>.

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## Replacement Information

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### Quality Assurance

- 1 Providers and Industry Training Organisations must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.
- 2 Organisations with consent to assess and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Consent and Moderation Requirements (CMR) reference

0233