Achievement Standard

Subject Reference	Digital Technologies 1.47				
Title	Demonstrate understanding of basic concepts used in the design and construction of electronic environments				
Level	1	**Credits**	3	**Assessment**	Internal
Subfield	Technology				
Domain	Digital Technologies				
Status	Registered	**Status date**		20 January 2011	
Planned review date	31 December 2014	**Date version published**		20 January 2011	

This achievement standard involves demonstrating understanding of basic concepts used in the design and construction of electronic environments.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Demonstrate understanding of basic concepts used in the design and construction of electronic environments.	• Demonstrate in-depth understanding of basic concepts used in the design and construction of electronic environments.	• Demonstrate comprehensive understanding of basic concepts used in the design and construction of electronic environments.

Explanatory Notes

1 This achievement standard is derived from the Level 6 achievement objectives 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, 2010 at http://seniorsecondary.tki.org.nz.

Appropriate reference information is available in *Safety and Technology Education: A Guidance Manual for New Zealand Schools*, Learning Media, Ministry of Education, 1998; and The Health and Safety in Employment Act 1992.

Further information can be found at http://www.techlink.org.nz.

2 *Demonstrate understanding of basic concepts used in the design and construction of electronic environments* involves:
- describing concepts of electronics in practical contexts
- describing the operational function of electronic components in a practical context (eg in a transistor switch sub-system).

Demonstrate in-depth understanding of basic concepts used in the design and construction of electronic environments involves:
- explaining the behaviour of electronic circuits
- explaining the operational function of electronic components in a practical context.

Demonstrate comprehensive understanding of basic concepts used in the design and construction of electronic environments involves:
- explaining the behaviour of electronic systems (eg the effect of voltage levels on the operation of a transistor switch sub-system)
- discussing the operational function of electronic components in a practical context (eg the effect of swapping the fixed resistor and the LDR in a voltage divider circuit).

3 *Electronic environments* refer to functional combinations of hardware and embedded software.

4 *Basic concepts* will include understanding of the function of electronic components, as well as at least five of the following:
- a circuit as a complete path
- voltage as an energy level
- current as rate of flow of charge
- conduction (limited to the macroscopic behaviour of conductors, insulators and semiconductors)
- circuit sub-systems
- symbolic conventions and schematics
- hardware (eg components and combinations of components)
- embedded systems as software subject to hardware constraints.

Electronic components include:
- microcontroller (one example)
- cell
- switch (one or more of – SPST, SPDT, reed, relay)
- resistor (one or more of – fixed, variable, light-dependent (LDR), thermistor), light-emitting diode (LED)
- motor
- voltage divider and transistor switch sub-systems.

5 Conditions of Assessment related to this achievement standard can be found at http://www.tki.org.nz/e/community/ncea/conditions-assessment.php.

Quality Assurance

1 Providers and Industry Training Organisations must be accredited by NZQA before they can register credits from assessment against achievement standards.

2 Accredited providers and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Accreditation and Moderation Action Plan (AMAP) reference 0233