

Achievement Standard

Subject Reference	Digital Technologies 1.49		
Title	Implement basic techniques in constructing a specified electronic and embedded system		
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 implementing basic techniques in constructing a specified electronic and embedded system.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> Implement basic techniques in constructing a specified electronic and embedded system. 	<ul style="list-style-type: none"> Skilfully implement basic techniques in constructing a specified electronic and embedded system. 	<ul style="list-style-type: none"> Efficiently implement basic techniques in constructing a specified electronic and embedded system.

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 *Implement basic techniques in constructing a specified electronic and embedded system* involves:
- constructing and testing functional systems
 - writing and debugging embedded software.

Skilfully implement basic techniques in constructing a specified electronic and embedded system involves:

- constructing and testing reliable functional systems with well-soldered joints
- writing, debugging and annotating embedded software so that the programme is logical.

Efficiently implement basic techniques in constructing a specified electronic and embedded system involves:

- constructing and testing reliable functional systems with well-soldered joints, optimised track and component layout and secure, reliable, well-organised connections to any components that are mounted off the board
- writing and debugging embedded software so that the programme is logical, efficient and clearly annotated.

3 An *electronic and embedded system* describes hardware and software contained within physical components and therefore subject to reactive, real-time and physical size constraints.

4 A *specified electronic and embedded system* refers to an electronic and embedded system with specifications that define the functional qualities required of the system. The specifications must be of sufficient rigour to allow the student to meet the standard. The specifications need to be agreed prior to the construction of the system. They may be teacher-given or developed in negotiation with the student.

5 *Basic techniques* will include:

- laying out and constructing functional circuits eg on PCB, or breadboard, or similar prototyping system and soldering components together to make a functional circuit
- writing annotated programmes based on commands and supplied programme structures
- testing and debugging programmes and circuits to ensure they meet specifications
- employing safe workshop practice.

6 Practical contexts suitable for this achievement standard may include, but are not limited to, the following:

- wind-powered electricity generator
- water level detector for use in rain water tanks
- simple barrier arm system
- traffic-light controlled pedestrian crossing.

7 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