



National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TĀEA

Exemplar for Internal Achievement Standard Technology Level 3

This exemplar supports assessment against:

Achievement Standard 91622

Implement complex procedures to make a specified product using a
Computer Numerical Controlled (CNC) machine

An annotated exemplar is an extract of student evidence, with a commentary, to explain key aspects of the standard. It assists teachers to make assessment judgements at the grade boundaries.

New Zealand Qualifications Authority

To support internal assessment

	Grade: Excellence
1.	<p>For Excellence, the student needs to efficiently implement complex procedures to make a specified product using a Computer Numerical Controlled (CNC) machine.</p> <p>This involves undertaking procedures in a manner that economises time, effort, tooling and materials.</p> <p>There is no student work currently available at this grade.</p> <p>The student would typically show independence and accuracy in undertaking the procedures in a manner that economises time, effort, tooling, and materials.</p> <p>The student would produce their graphic representation and calibrated the machine in a straightforward manner. They would book ahead for their time on the machine, and understand how to maximise time on it by using the most efficient tool paths.</p> <p>The student's final evaluation of the final outcome against the graphic representation would show that it was an accurate representation of the design and the student had understood the capabilities and limitations of the software and machine.</p>

	Grade: Merit
2.	<p>For Merit, the student needs to skillfully implement complex procedures to make a specified product using a Computer Numerical Controlled (CNC) machine.</p> <p>This involves showing independence and accuracy in undertaking the procedures.</p> <p>There is no student work currently available at this grade.</p> <p>The student would enter the design into the computer software, for example, dimensions, order of actions, tool selection (to give the desired finish). The design instructions would typically all be accurate and the student would do the majority of the procedures with minimal support.</p>

	Grade Boundary: Achieved
4.	<p>For Achieved, the student needs to implement complex procedures to make a specified product using a Computer Numerical Controlled (CNC) machine.</p> <p>This involves:</p> <ul style="list-style-type: none"> • integrating the limits of a CNC machine into a graphic representation of the desired product in a computer design setting that demonstrates an understanding of CNC programming language • setting up and calibrating a CNC machine to software and manufacturer requirements • operating a CNC machine to make a product in compliance with relevant health and safety regulations • evaluating a CNC machine made product against its graphic representation <p>There is no student work currently available at this grade.</p> <p>The student would produce a graphic representation of the outcome. This could include a study of appropriate tool paths or the order in which the outcome is produced.</p> <p>The student would set up the CNC machine (laser cutter, 3D printer, lathe, CNC sewing machine or milling machine), for example establishing the zero/starting position, speed, finish, etc., and tooling and materials such as thread that may be needed.</p> <p>The student would send the job to the CNC machine and follow classroom safety practices. For example, they would have reset the machine and remedied issues such as broken threads or problems with tooling.</p> <p>The student would typically evaluate their final outcome against their graphic representation. They will typically comment on accuracy of shape and size, whether the finish was as specified, any particular product problems that had arisen due to the limitations of the machine.</p>