Title	**Demonstrate understanding of building and construction science**		
Level	**4**	**Credits**	**7**

Purpose	This unit standard aligns with the *New Zealand Certificate in Carpentry – Specifications*, developed on behalf of the construction industry to specify the skills and knowledge required to achieve the New Zealand Certificate in Carpentry (Level 4) [Ref: 2738]. This unit standard is intended for those working in the construction industry. People credited with this unit standard are able to demonstrate understanding of building and construction science to the level required of a commercially competent carpenter.

Classification	Construction Trades > Carpentry

Available grade	Achieved

Guidance Information

This unit standard is one of a family of standards that align with the *New Zealand Certificate in Carpentry – Specifications* and should be read, interpreted and assessed in the context of those *Specifications* and the New Zealand Certificate in Carpentry (Level 4) [Ref: 2738].

The overarching level of performance for the family of unit standards is commercial competence.

Commercial competence requires a candidate to be capable of consistently performing the requirements of the skill specification:

- to current regulatory, industry and commercial standards;
- within a commercially viable timeframe;
- in commercial environments;
- without supervision;
- in different and unfamiliar contexts.

The sufficiency of evidence required to demonstrate commercial competence against this unit standard is determined within the context of the family of unit standards aligned to the *Specifications*.

The assessor must be confident that the candidate is capable of applying the skills and knowledge included in this skill specification to the level, scope and complexity required to support the achievement of related skills included in the *Specifications*.

Commercial competence can only be demonstrated, and must be assessed, in the workplace.

The assessment of commercial competence must be corroborated and confirmed by a person who has current expertise in the carpentry trade and has had the opportunity to regularly observe the candidate in the workplace.

Reference
New Zealand Certificate in Carpentry – Specifications, BCITO, April 2018, available from www.waihangaararau.nz.

Skill specification and performance level guidance

Skill specification

Demonstrate understanding of building and construction science.

Know How loads work on and within a structure.

How design and construction compensate for loads.

The impact of subterranean conditions on structural and construction requirements.

The principles of water penetration and methods used to manage weathertightness.

Materials physics.

Materials chemistry.

The principles of energy efficiency in buildings.

The principles of sound transmission in buildings.

Performance level guidance

Methods of compensating for loads include size and configuration of foundations and members, and types and configurations of fixings and bracing elements.

Subterranean conditions include sub strata and soil composition and compaction, the proximity of the water table and the potential for earthquake and geothermal activity.

Water penetration principles are capillary action, hydrostatic pressure, gravity, wind pressure and surface tension.

Methods used to manage weathertightness are deflection, drying, drainage and durability of materials.

Materials physics includes strength, deflection and expansion of materials. It also includes how materials perform under compression and tension or when subject to friction, wear or extreme temperatures.

Materials chemistry includes composition, form, treatments, malleability, flammability and volatility of materials. It also includes the compatibility of different materials due to their chemical composition; the manner in which they are used; their susceptibility to deterioration over time; their effects on building performance, the environment and people.

Energy efficiency principles include design, building placement, heat transfer, thermal mass and insulation.

Sound transmission principles include design, material selection and sound control systems.

The level of building science knowledge required is that of a trade professional rather than that of an engineer, designer or scientist.

Planned review date	31 December 2023

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	1 March 2018	N/A
Rollover and Revision	2	15 December 2022	N/A

Consent and Moderation Requirements (CMR) reference	0048

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact Waihanga Ara Rau Construction and Infrastructure Workforce Development Council qualifications@waihanga.nz if you wish to suggest changes to the content of this unit standard.