



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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Science

National Moderator's Report

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NATIONAL MODERATOR'S REPORT

General Guidance for Assessors of Achievement and Unit Standards

The purpose of external moderation is to provide reassurance that assessor judgments are at the national standard and are made on the basis of assessment materials that are fair and valid.

All assessment materials are expected to:

- give the learner the opportunity to meet the requirements of the standard
- have an assessment schedule that gives evidence of appropriate learner responses and clear judgments at all levels.

The Ministry of Education contracted subject experts to write assessment resources for achievement standards. These are not pre-moderated. The intention is that they are modified to suit teaching programmes and learner needs. They do not provide “rules” but suggest different ways of assessing to the nationally registered standard.

General Overall Comment

Generally assessors are following the required criteria and carry out valid assessment against the science achievement and unit standards. The one standard still causing concern is 90186 – see comments on this standard below.

Unit standards are generally being well assessed, especially the 189xx series. The latest versions of assessment tasks on the TKI site for these standards are valid. These can be used as they are, or as a guideline for modification.

AS 90186: Carry out a practical investigation with direction

The investigation is *with direction*; often, however, too much direction is being given. The assessment material entitled Generic Template - an Investigation (generic 7), available on the TKI website, clearly outlines the requirements of an activity that meets the standard, and in particular the level of direction that should be given. Too much direction makes the assessment invalid; explanatory note 3 (EN 3) of the achievement standard describes what is meant by "direction."

Version 3 of 90186 has new criteria for achievement, merit and excellence. The requirement for achievement is described in explanatory note 6; for merit in explanatory note 7; and for excellence in explanatory note 8.

Learners are required to identify the independent variable for themselves (EN 6). If the independent variable is specified in the task then the learners cannot demonstrate the requirements for this standard. For example, in an investigation on the effect of concentration change on reaction rate, learners must make decisions on concentrations to use given only one solution to start with. The learners must work out how to change the concentrations themselves. Even giving a range of 5 concentrations and choosing three concentrations will not satisfy EN 6.

Note that a correct graph is not a requirement of this standard as long as a trend shown by the data can be seen.

For achievement the conclusion may be an interpretation based on the processed data while for merit and excellence the conclusion must be valid and relate to the purpose.

Excellence is based on the level of the evaluation of the investigation. EN 8 requires a positive comment from the students as to why their conclusion can be justified. Evaluation cannot be limited to such things as 'lack of careful use of equipment or measurement'. An evaluation, providing details of mistakes could preclude merit or excellence: for example, "I did not record the time accurately" or "I did not have the pieces of Mg the same size" destroys the reliability of the method, or the data, and hence prevents the learner getting excellence and possibly even merit, as the investigation has been shown to be invalid.

Version 3 of 90186 does not require comment on improvements that can be made to the investigation.

Old TKI tasks such as, Bubble Trouble and All Fizzed Up have been removed as they give too much direction and are invalid.

AS 90187: Process information to describe a use of science knowledge with direction

The requirements for achievement are given in explanatory note 6. Note that the key concept is "processing scientific information" and this has been interpreted by the moderation team to mean that summarising must be mostly in "their (learners) own words."

Material submitted for moderation needs to supply evidence of "processing data" as required by the achievement standard.

AS 90312: Carry out a practical scientific investigation with supervision

The attention of assessors is drawn to the information contained in the Explanatory Notes which gives clear guidance on the requirements for this standard. In particular:

EN 3 describes the meaning of supervision.

EN 4 describes what is meant by an investigation and states that there are two types; fair testing (hypothesis testing) or pattern seeking.

EN 5 describes what is required for achievement.

EN 6 describes what is required for merit. Note that for merit the investigation needs to be a valid investigation with a valid conclusion.

EN 7 describes what is required for excellence. This requires a positive comment from the learners as to why their conclusion can be justified in terms of the reliability of their data and the validity of their method. What they did wrong does not satisfy the requirements of this explanatory note, and can invalidate their method, making the investigation achieve at best.

AS 90771: Research information to present a scientific report

Note that the version for this standard is version 1. The attention of assessors is drawn to the information contained in the Explanatory Notes which gives clear guidance on the requirements for this standard. In particular:

EN 3 & 4 describe what is required for achievement.

EN 5 describes the additional requirements for merit.
EN 6 describes the additional requirements for excellence.

AS 90727: Carry out a practical scientific investigation with guidance

Few issues have been identified with the assessment of the standard. The task and assessment schedules on TKI web sites are a good resource.

AS 90728: research a current scientific controversy

Few issues have been identified with the assessment of the standard. The task and assessment schedules on TKI web sites are a good resource. There is however some difficulty with the selection of the topic for the controversy. Topics that do not have science on both sides of the argument or are not a controversy mean candidates cannot achieve the standard. Attention is drawn to the requirements specified in EN2, and that the primary focus of the research and reporting must be the scientific aspect(s) of the controversy.

AS 90733: Report is a recent astronomical event or discovery

Note that EN2 states that the astronomical event or discovery must have occurred in the last five years; tasks on the TKI website now have resources outside of the last 5 years. Assessors need to make sure learners are provided with, and use resources, gained within the last 5 years. For 2008 this means events or discoveries since, and including, 2003.

189XX series Unit Standards

Few issues were identified in the standards of the 189XX series used by schools in their Certificate Science classes. Attention is drawn to the updated versions of the assessment tasks available on the TKI website.

SCIENCE UNIT STANDARDS

Note that the science and earth science (not chemistry, biology and physics) unit standards were reviewed in 2005.