



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

National Qualifications Framework Levels 1-3, 2003

Chemistry

National Moderator's Report

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General Guidance for Assessors of Achievement and Unit Standards

The purpose of external moderation is to provide reassurance that assessor judgements are at the national standard and are made on the basis of assessment activities 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 judgements 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

The moderation of internally assessed achievement standards and unit standards in Chemistry has proven to be effective in establishing national consistency of assessment materials and assessor judgements. The majority of assessors assessing against level 2 achievement standards have used the exemplars from the TKI website or have modified these to suit their learners.

Level One

90169 *Carry out a practical chemistry investigation with direction*

The first criterion of this achievement standard requires a distinction to be made between Achievement, Achievement with Merit and Achievement with Excellence based on the plan provided. In order to allow opportunity to gain merit or excellence, the assessment task needs to allow learners to be able to make decisions related to the measurement of the dependent variable and range of values for the independent variable, when planning their investigation.

The second criterion is the same for Achievement and Achievement with Merit but requires a distinction to be made for Achievement with Excellence. This distinction is based on sufficiency of data collected and recorded.

The third criterion requires a distinction to be made between Achievement, Achievement with Merit and Achievement with Excellence based on the interpretations/conclusions made in the written report. While an interpretation must relate to the investigation in some way, a conclusion must link to the *purpose* of the investigation. It is the *comprehensive evaluation or discussion* required for excellence that learners find more difficult. This must provide evidence of critical thinking rather than comments just related to possible changes to the experiment that has been designed and carried out.

Assessment schedules need to provide examples of expected evidence to clearly differentiate between achievement, merit and excellence. These examples need to be specific to the investigation carried out.

The *Generic Template* on the TKI website was updated early in 2003 and this provides a good basis for writing an activity to assess against this achievement standard.

90170 Research, with direction, how chemistry and technology are related

The first criterion requires a distinction to be made between Achievement, Achievement with Merit and Achievement with Excellence based on processing/integrating information as well as the range of referenced sources used. The range of referenced sources may not necessarily be measured by a number of sources alone, but also the quality of the information.

The second criterion requires a distinction to be made between Achievement, Achievement with Merit and Achievement with Excellence based on the way the information is used. *Relate, describe links and discuss links* are the basis of this distinction.

Assessment schedules need to provide examples of expected evidence to clearly differentiate between achievement, merit and excellence. These examples need to be specific to the aspect of research carried out.

Level Two**90305 Carry out qualitative analysis**

The first criterion requires a distinction to be made between Achievement, Achievement with Merit and Achievement with Excellence based on the difficulty of *writing equations for reactions* involving *precipitation* and *complex ion formation*.

The second criterion requires a distinction to be made between Achievement, Achievement with Merit and Achievement with Excellence based on the ability of the learner to *identify unknown ions in solutions*.

The assessor is advised to test *solutions* before learners carry out the activity because there may be conflict between the *cation* and *anion* of a substance when following the *procedure to identify the ions*, as well as unexpected difficulty due to the concentration of a *solution*.

As the two criteria of the achievement standard may be assessed independently, the assessor may choose to allow learners to do the two parts of the activity at different times. It is not a requirement that learners *write equations* that occur in identifying unknown *ions in solution* but this provides further opportunity to provide evidence for ability to *write equations*.

Assessment schedules need to provide examples of expected evidence specific to the actual unknown *solutions* used.

90306 Perform an acid-base volumetric analysis

The first criterion requires a distinction to be made between Achievement, Achievement with Merit and Achievement with Excellence based on the degree of *accuracy* in *carrying out a titration*.

The second criterion requires a distinction to be made between Achievement, Achievement with Merit and Achievement with Excellence based on the ability of the learner to *solve problems* related to *volumetric analysis*. Achievement with Merit requires a learner to understand the *data* collected during the *titration* so that the values selected lead to a valid calculation. Achievement with Excellence requires a learner to determine concentrations using *data* from a reaction of more complex stoichiometry as well as present values with *accuracy*.

Assessment schedules need to provide examples of expected evidence specific to the actual unknown solution used. In particular, the expected titre for the *titration* as determined by the assessor.

Learners able to read a burette to a *higher* level of *accuracy*, eg to 0.05 mL or 0.02 mL rather than just 0.1 mL, generally obtain an average titre of *greater accuracy*.

90307 Carry out a gravimetric or colorimetric analysis and solve related problems

The first criterion requires a distinction to be made between Achievement, Achievement with Merit and Achievement with Excellence based on the degree of *accuracy* in carrying out the *analysis*. For merit and excellence it is expected that data be recorded in a systematic format.

The second criterion requires a distinction to be made between Achievement, Achievement with Merit and Achievement with Excellence based on the learner's ability to *solve problems* involving varying number of *steps*. It is expected that for excellence learners are able to present their answers *accurately* and with appropriate units.

It is advisable that the assessor carries out the *analysis* prior to the learners to ensure that the substance produces the expected *result*. This may be limited due to lack of purity of the substance used.

As the two criteria of the achievement standard may be assessed independently, the assessor may choose to allow learners to do the two parts of the activity at different times.