



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

National Qualifications Framework Levels 1–3, 2005

Physics

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 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

Assessors of achievement standards continue to use exemplars from the TKI website although more are now modifying the tasks to suit their own teaching programmes. It is hoped that, as confidence increases, assessors will develop their own tasks. The tasks on the website provide very good guidance for the structure of the tasks, and the generic assessment schedules define the expected standard for each grade level.

Many assessors are still not providing adequate examples of expected student evidence. This is affecting their ability to make accurate and consistent judgments on the evidence learners produce.

The generic schedules provided on the TKI website are too broad to ensure accurate and consistent judgments on learner evidence. Their purpose is to give guidance to assessors when they are developing their own, specific schedules for the task. Assessors **must** carry out this customisation process.

When deciding which grade a student has achieved, assessors must refer to the achievement criteria, supported by explanatory notes, for that grade. It is clear that, when checking whether learners have provided the required evidence, assessors prefer to use a 'tick the box' method, however it is important that assessors using this method do not make sufficiency judgments on a minimum number of ticks. Sufficiency of evidence must be made from a holistic point of view.

When further evidence is collected, it is important learners are not given more guidance than they were given in the task.

AS 90518: Carry out a practical physics experiment that leads to a mathematical relationship

The evidence and judgment statements prepared for this standard must be detailed and specific. For example, the following should all be stated:

- the actual values of the upper and lower limits for the range of independent variable values
- the expected uncertainty in the raw data
- the actual accuracy improving techniques that would be relevant in the context of the specific experiment
- the variables that should be controlled.

It is not adequate to give evidence or judgment statements that state: a reasonable range, uncertainty given, standard accuracy improving techniques used, other variables controlled, etc. It is valid to incorporate some of the evidence statements into the judgment statements, but not all. The main evidence statements that must be given separately from the judgment statements are those that relate to the discussion at the Excellence level. It is not adequate to use a judgment statement that simply states, “Evidence of critical thinking and depth of understanding shown”, unless there is a range of example evidence statements that clearly show what type of evidence can be accepted.

It is clear there is a wide range of opinion among assessors about what constitutes critical thinking and depth of understanding. It is not sufficient for students to **describe** limitations, unforeseen variables, difficulties, etc. They must make an attempt to **explain** how the results/conclusion have been affected by these factors. Critical thinking will always be specific to the actual experiment being carried out. It will not be evidenced by general statements that could relate to any experiment.

At the Achievement level, the conclusion is not valid unless it relates to a calculation from the straight-line graph. If the aim of the experiment was to find the mathematical relationship it is not sufficient for learners to state that the y-axis variable is proportional to the x-axis variable unless they make it clear that the constant of proportionality is the value that they have calculated to be the gradient of the graph line.

At the Merit level, there is a requirement for the transformed graph to have its axes correctly labelled.

This standard has been revised for 2006. It will incorporate the current standard 3.2. This means the uncertainty aspects of the revised standard will have greater importance than in the current standard. Assessors must ensure this is reflected in their schedules.

AS 90519: *Process uncertainties in data and graphs*

Assessors should ensure a minor computational or transcription error does not prevent a student from achieving, provided knowledge of the correct method has been clearly shown.

This standard has been discontinued in 2006. The learning involved in this standard will be assessed through the revised standard AS 90774 (Physics 3.1).

AS 90252: *Take measurements of physical quantities and analyse data graphically to determine a relationship*

The evidence and judgement statements prepared for this standard must be detailed and specific. For example, for the measurement activity:

- the actual values that are expected for each measurement (plus any allowable tolerances) should be stated
- the expected accuracy improving techniques should be indicated
- the correct number of significant figures expected in processed measurements should be stated
- examples of acceptable justification statements should be given.

For the relationships task:

- the graphs should be drawn
- the tolerance limits for the gradient should be indicated
- the expected relationships must be stated

- the values of the physical quantities (including acceptable units) should be given.

When justifying accuracy improving techniques, learners must be specific to the particular measurement being made. General statements such as, “to increase accuracy” or “to reduce random error” are not acceptable. For a technique to be validly justified, the explanation must state why the particular measurement needed this technique and how the technique increased accuracy in this particular measurement.

The relationships task must include opportunities for learners to determine a physical quantity from both the linear and non-linear graphs.

Assessors must be clear about the differences between Version 1 and Version 2 of this standard. An assessment schedule that relates to Version 1 of the standard is not valid for Version 2.

When developing or selecting tasks and schedules, it is essential that assessors use the most up to date versions of the materials on the TKI website. It is recommended that providers use these tasks as a guide for developing their own secure tasks.

AS 90258: *Demonstrate understanding of the integrated nature of physics*

This standard has only one assessment criterion. Assessment schedules should reflect this change.

When grading learner evidence, assessors are advised to use the same coding method that is used in external marking, ie one code per learner response. Assessors who use multiple coding, assigning the grades below as well as the highest grade awarded, and then use the sufficiency statements provided on the web, which assume the single coding system used in external exams, are awarding grades incorrectly.

AS 90180: *Carry out a practical physics investigation with direction*

Assessors should note that consideration of factors such as sources of error and sufficiency of data includes the uses of a large number of data points over a wide range of values.

AS 90181: *Process information and describe a use of science knowledge with direction*

Assessors should note the change in title for the latest version of this standard.

They should also note that in the latest version of this standard there is no requirement to make a link with technology.