



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

# **National Qualifications Framework Levels 1–3, 2006**

## **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**

Most assessment materials specify the latest version of the achievement standards. However, some do not reflect changes to the standards and have used materials that relate more closely to the older version than the new version. It is recommended that assessors ensure their assessment materials have been appropriately amended when a task that was written for an older version is used to assess the new version of a standard.

It is of concern that many assessors of achievement standards are still using unmodified versions of the TKI website activities. As students become more knowledgeable about the system, they are recognising that these resources provide excellent revision material. Assessors must be aware that, if they use unmodified TKI activities for assessment purposes, a significant number of their students will have familiarised themselves with the assessment task prior to the event. It is difficult to justify confidence in the grade awarded if this happens.

It is recognised that the considerable time needed to develop quality assessment tasks is often not available to assessors. However, the New Zealand Institute of Physics provides such tasks on an annual basis. All NZIP tasks are available on a secure website.

Of equal concern is the number of assessors of achievement standards who continue to use assessment schedules that relate only vaguely to the specifics of the task. It is a requirement of the moderation system that specific examples of the required evidence are given along with the details of how this evidence will be judged when deciding on the grade to be awarded. Unless this is done, it is difficult to understand how accuracy or consistency of judgements can be achieved.

Many assessors of both achievement and unit standards are taking advantage of the commercial materials that are available. However, it should be noted that it is not part of the responsibility of NZQA's moderators to moderate such tasks and so assessors must be aware that they should check them before using them.

**90774: Carry out a practical physics investigation with guidance that leads to a mathematical relationship**

As this standard effectively incorporates the expired standard 90519, which was the standard that assessed a student's knowledge of the handling of uncertainties in data, it is expected that this aspect of the student's report be judged more rigorously than was the situation for 90518. Frequently, this was neither evident in assessors' judgement statements nor carried out when judgements were being made. It is appreciated that the practical physics achievement standard is now more difficult to achieve, but this is reflected in the increased credit value.

There are still a number of assessors who are awarding the achievement grade to students who have not been able to demonstrate knowledge of how a mathematical relationship can be obtained from a straight-line graph. This is the fundamental aspect of this standard and it is not sufficient for students to give a level 1 response that refers to proportionality without any supporting mathematical calculations.

When developing an assessment task, the experiment that the students are expected to carry out should be chosen with care. If the experimental procedure is too simple, such as an investigation of how the period of a pendulum changes with its length, it may not provide the student with sufficient opportunities to show the excellence requirement of critical thinking. It is also important that the resource information given provides the student with the excellence opportunity to discuss relevant physics theory. This is probably most easily achieved by supplying the theoretical equation of the relationship so that theoretical values can be compared with experimental values (including their uncertainties).

Unless the experiment is carried out individually by each student, it is difficult to understand how an assessor can be confident that the evidence provided by a student has not been influenced by the thinking of others. Some assessors stated in the student instructions that the work should be carried out individually but the terminology used by the students in their method and discussion clearly showed that they worked in groups when gathering data. If the experiment requires group work while gathering data other procedures **must** be put in place to ensure each individual student has given evidence that they understand all aspects of the standard.

Apart from the issue discussed above, assessor judgements for the achieved and merit grades are reasonably accurate. However, many assessors are finding it difficult to judge the grade of a discussion. Assessors are awarding Excellence to discussions that accurately and clearly **describe** the issues / problems encountered during the experiment. Critical thinking and ability to analyse should be evidenced by the student going on to suggest how these issues / problems might impact on the conclusion drawn from the results.

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

An issue that has been noted this year is the tendency of some assessors to accept the gradient of the graph line when it has clearly been calculated from the data table, not from the graph line. Although it is recognised that in many cases it is impossible to tell which has been used because the graph line passes **exactly** through the data points used, there have been some situations where an invalid “near enough” approach has been used.

The Achievement and Merit grades for this standard are mostly being judged accurately. However the Excellence grade remains an issue. When justifying accuracy, techniques learners use must be specific to the particular measurement being made. General statements such as “to increase accuracy” / “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.

**90258: Demonstrate understanding of physics in an integrated context**

Although most providers have used assessment schedules that relate to the single criterion of this standard, there are a significant number that are still distinguishing between mathematical solutions and descriptive solutions.

As the explanatory notes for this standard state that student responses must be both mathematical and descriptive, it is important when designing a task that the numbers of the two types of question is not such that a student can gain achievement by answering only one type.

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

No issues arose.

**90181: Process information to describe a use of physics knowledge with direction**

No issues arose.