Achievement Standard

Subject Reference	Science 1.6				
Title	Describe aspects of physics				
Level	1	**Credits**	5	**Assessment**	External
Subfield	Science				
Domain	Science – Core				
Registration date	21 October 2003	**Date version published**	21 October 2003		

This achievement standard involves describing aspects of physics.

Note: A student cannot use credit for both this achievement standard and AS90183, Physics 1.4 towards a national qualification including a National Certificate of Educational Achievement.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Describe aspects of physics.	• Explain aspects of physics.	• Discuss aspects of physics.

Explanatory Notes

1 This achievement standard is derived from *Science in the New Zealand Curriculum,* Learning Media, Ministry of Education, 1993, and relates to 'Making Sense of the Physical World': Level 6 achievement objectives 2 and 3, p. 82, and *Pūtaiao i roto i te Marautanga o Aotearoa,* Learning Media, Ministry of Education, 1996, 'Ō Ahupūngao: Te Waonui', WP 6.2, WP 6.3, and WP 6.4, p. 46–47.

2 *Aspects of physics* will be selected from:

- **Straight Line Motion and Force**
  Distance, speed, constant acceleration, motion time graphs (including gradients and simple areas), mass, force (push, pull, friction, weight, reaction).
  A net force causes acceleration. Equilibrium exists when forces are balanced.

  Formulae: $V_{average} = \frac{d}{t}$ $F = ma$

  $a = \frac{change\ in\ speed}{change\ in\ time}$

  $F_{gravity} = mg,\ (g = 10\ ms^{-2})$

- **Energy**
  Heat, kinetic, gravitational potential, elastic potential, chemical potential, sound, and solar. Power, work, conservation and transfer of energy.
  Heat transfer via conduction, convection and radiation.

  Formulae: Work $= Fd$ $P = \frac{E}{t}$ $E_P = mgh$ $E_K = ½\ mv^2$

- **DC Electricity**
  Voltage, current, resistance, power in DC circuits, circuit diagrams.
  Voltage and current behaviour in series and simple parallel circuits.

  Formulae: $V = IR$ $P = IV$ $P = \frac{E}{t}$

3 *Descriptions, explanations or discussions* of motion, energy and electrical systems may involve written statements, graphs or diagrams (including circuit diagrams), and solution of problems.

- Assessment of energy systems will emphasise the transformation or transfer of energy using a qualitative treatment.
- For achievement with excellence, discussion will include interrelating concepts, principles and formulae.

4 Describing, explaining and discussing aspects of physics will involve solving problems, using formulae, graphs or diagrams.

- For the award of achievement, the student will be able to substitute data into a given formula and solve simple problems where specific information and the approach are given. This could include using graphs to interpolate or extrapolate and drawing graphs or circuit diagrams from given data and/or simple descriptions.
- For achievement with merit, the student will select an appropriate formula from a given list to solve a problem, and solve problems involving the selection of information and/or an approach. This could include interpreting graphs or making calculations from information using graphs or diagrams.
- For achievement with excellence, a solution involves the combination, without direction, of more than one step. A step may require the use of a formula (selected from a list), or the drawing or extraction of information from a graph or diagram.

5 Circuit diagrams will involve the use of wires, voltmeters, ammeters, switches, diodes, cells and batteries, lamps, and resistors.

6 Sensible rounding is expected for achievement with excellence.

7 The student should be aware of the use of appropriate units. Both negative index (eg ms^{-2}) and slash notation (eg m/s^2) will be acceptable when writing units. Negative index notation will be used when supplying data.

8 Terms:

- *Describe* requires the student to recognise, name, draw, give characteristics of or an account of.
- *Explain* requires the student to provide a reason as to how or why something occurs.
- *Discuss* requires the student to show understanding by linking scientific ideas. It may involve students in justifying, relating, evaluating, comparing, contrasting and analysing.

Quality Assurance

1 Providers and Industry Training Organisations must be accredited by the Qualifications Authority before they can register credits from assessment against achievement standards.

2 Accredited providers and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Accreditation and Moderation Action Plan (AMAP) reference 0226