

**Number** AS90252 **Version** 2

### Achievement Standard

**Subject Reference** Physics 2.1

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

**Level** 2 **Credits** 4 **Assessment** Internal

**Subfield** Science

**Domain** Physics

**Registration date** 20 October 2004 **Date version published** 20 October 2004

This achievement standard requires the use of instruments to take measurements of physical quantities and the use of graphical techniques in analysing data to determine the relationship between two variables.

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**Number** AS90258 **Version** 2

### Achievement Standard

**Subject Reference** Physics 2.7

**Title** Demonstrate understanding of physics in an integrated context

**Level** 2 **Credits** 3 **Assessment** Internal

**Subfield** Science

**Domain** Physics

**Registration date** 20 October 2004 **Date version published** 20 October 2004

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**Number** AS90256 **Version** 2

### Achievement Standard

**Subject Reference** Physics 2.5

**Title** Demonstrate understanding of atoms and radioactivity

**Level** 2 **Credits** 2 **Assessment** External

**Subfield** Science

**Domain** Physics

**Registration date** 20 October 2004 **Date version published** 20 October 2004

- Models of the atom (Dalton, Thomson and Rutherford)
  - Gold foil experiment
  - Radioactive decay
  - Half life
  - Conservation of atomic and mass number in alpha
  - Beta and gamma emission reactions
  - Ionising ability
  - Penetration ability and behaviour in a magnetic field
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Number AS90254

Version 2

### Achievement Standard

Subject Reference

Physics 2.3

Title

Demonstrate understanding of waves

Level

2

Credits

4

Assessment

External

Subfield

Science

Domain

Physics

Registration date

20 October 2004

Date version published

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#### Light

- Qualitative and quantitative treatment of reflection in curved mirrors
- Refraction through lenses
- Refraction
- Total internal reflection and critical angle at a plane boundary

#### Waves

- Reflection and refraction at a plane boundary including phase and wave parameter changes if applicable
- Superposition of pulses
- Diffraction, 2-point source interference (qualitative)
- Properties of electromagnetic waves

#### Relationships:

$$\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i} \quad \text{or} \quad s_i s_o = f^2$$

$$m = \frac{d_i}{d_o} = \frac{h_i}{h_o} \quad \text{or} \quad m = \frac{f}{s_o} = \frac{s_i}{f}$$

$$n_1 \sin \theta_1 = n_2 \sin \theta_2 \qquad \frac{n_1}{n_2} = \frac{v_2}{v_1} = \frac{\lambda_2}{\lambda_1}$$

$$v = f\lambda \qquad f = \frac{1}{T} \qquad v = \frac{d}{t}$$

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Number AS90255

Version 2

### Achievement Standard

Subject Reference

Physics 2.4

Title

Demonstrate understanding of mechanics

Level

2

Credits

6

Assessment

External

Subfield

Science

Domain

Physics

Registration date

20 October 2004

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#### Motion

- Relative motion
- Change in velocity
- Velocity vector components
- Constant acceleration in a straight line
- Free fall under gravity
- Projectile motion; circular motion (constant speed with one force only providing centripetal force)

#### Force

- Force components
- Vector addition of forces
- Unbalanced force and acceleration
- Equilibrium (balanced forces and torques)
- Centripetal force
- Force and extension of a spring

#### Momentum and Energy

- Momentum
- Change in momentum in one dimension and impulse
- Impulse and force
- conservation of momentum in one dimension
- Elastic and inelastic collisions
- Work
- Power and conservation of energy
- Elastic potential energy.

#### Relationships:

$$v = \frac{\Delta d}{\Delta t}$$

$$a = \frac{\Delta v}{\Delta t}$$

$$F = -kx$$

$$F_c = \frac{mv^2}{r}$$

$$v_f = v_i + at$$

$$d = v_i t + \frac{1}{2} at^2$$

$$d = \frac{v_i + v_f}{2} t$$

$$v_f^2 = v_i^2 + 2ad$$

$$a_c = \frac{v^2}{r}$$

$$p = mv$$

$$\Delta p = F \Delta t$$

$$E_p = \frac{1}{2} kx^2$$

$$E_k = \frac{1}{2} mv^2$$

$$\Delta E_p = mg \Delta h$$

$$W = Fd$$

$$P = \frac{W}{t}$$

$$F = ma$$

$$\tau = Fd$$

Number AS90257

Version 2

## Achievement Standard

Subject Reference

Physics 2.6

Title

Demonstrate understanding of electricity and electromagnetism

Level

2

Credits

5

Assessment

External

Subfield

Science

Domain

Physics

Registration date

20 October 2004

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### Static Electricity

- Uniform electric field
- Electric field strength
- Force on a charge in an electric field
- Electric potential energy
- Work done on a charge moving in an electric field.

### DC Electricity

- Parallel circuits with resistive component(s) in series with the source
- Circuit diagrams
- Voltage
- Current
- Resistance
- Energy
- Power
- Voltage or current characteristics of diodes

### Electromagnetism

- Force on a current carrying conductor in a magnetic field
- Force on charged particles moving in a magnetic field
- DC motor
- Induced voltage generated across a straight conductor moving in a uniform magnetic field
- A simple generator

### Relationships:

$$E = \frac{V}{d} \quad F = Eq \quad \Delta E_p = Eqd \quad E_k = \frac{1}{2} mv^2$$

$$F = BIL \quad F = Bqv \quad V = BvL$$

$$I = \frac{q}{t} \quad V = \frac{\Delta E}{q} \quad V = IR \quad P = IV \quad P = \frac{\Delta E}{t}$$

$$R_T = R_1 + R_2 + \dots \quad \frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \dots$$

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