

Standard	Title	Internal/external	Credit
AS90764	Describe the nature and life cycle of stars	Ext	2 L2
AS90935	Carry out a practical physics investigation with direction that leads to a linear relationship	Int	4
AS90936	Demonstrate understanding of the physics of an application	Int	2
AS90940	Demonstrate understanding of aspects of mechanics	Ext	4
AS90941	Investigate the implication of electricity and magnetism in everyday life	Int	4
AS90946	Investigate the implications of the properties of metals to their use in society	Int	4

To be prepared for assessment to the standard, students will need to be able to:

AS90764 - Describe the nature and life cycle of stars

- The *nature* of stars includes types of stars (*protostars, main sequence, red giants, white dwarfs, pulsars, black holes*) and their characteristics (*colour, size, mass, temperature, luminosity, spectral type*).
- Relationships between the characteristics of stars as shown by the *Hertzsprung-Russell (HR)* diagram.
- *Life cycle* of stars will be based on the currently accepted scientific theories on life cycles and formation of stars.

AS90935 - Carry out a practical physics investigation with direction that leads to a linear relationship

- An investigation is an activity covering the complete process: *planning, collecting and processing data, interpreting, and reporting on the investigation. It will involve the student in the collection of primary data.*
- The investigation will be directed. This means that general instructions for the investigation will be specified in writing and direction will be given in the form of the equipment and/or chemicals from which to choose. A suitable format for planning the investigation will be provided.
- A quality physics science investigation enables a valid conclusion to be reached. This would normally involve the above plus:
 - a statement of the purpose – this may be an aim, testable question, prediction, or hypothesis based on a scientific idea
 - a method that describes: a valid range for the independent variable or sample; a description of and/or control of other variables; the collection of data with consideration of factors such as sampling, bias, and/or sources of error
 - the recording and processing of data to enable a trend or pattern (or absence) to be determined
 - a valid conclusion based on the processed data in relation to the purpose of the investigation.

Evaluate means to justify the conclusion in terms of the method used. Justification will involve, where relevant, consideration of the:

- reliability of the data
- validity of the method
- physics ideas.

AS90936 - Demonstrate understanding of the physics of an application

- *Demonstrate understanding* requires the student to provide characteristics of, or an account of, the physics related to the use of the chosen application.
- *Demonstrate in-depth understanding* requires the student to provide reasons as to how or why the physics applies to the use of the chosen application.
- *Demonstrate comprehensive understanding* requires the student to link ideas to integrate relevant physics of the chosen application with its use, and will typically involve elaborating, justifying, relating, evaluating, comparing and contrasting, or analysing.

AS90940 - Demonstrate understanding of aspects of mechanics

Motion and Force

- Distance, speed, displacement, velocity, acceleration and deceleration, motion/time graphs and the interpretation of their gradients.
- Mass, weight and the acceleration due to gravity, balanced and unbalanced forces, free body force diagrams, pressure.

Work, Energy and Power

- Work and power, gravitational potential energy, kinetic energy, and the conservation of mechanical energy in free fall situations.

Relationships:

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

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

$$F_{net} = ma$$

$$P = \frac{F}{A}$$

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

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

$$W = Fd$$

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

AS90941 - Investigate the implications of the properties of metals to their use in society

Static Electricity

- Positive and negative charge, conductors and insulators, uniform and non-uniform charge distributions, earthing, electrical discharge in air.
- Separation of charge by friction, charging by contact.

DC Electricity

- Voltage, current, resistance, power, series circuits and simple parallel circuits (no resistive component in series with the source), circuit diagrams.

Magnetism

- Magnetic field directions (including magnetic field of bar magnets, the earth's magnetic field, magnetic fields due to currents in straight wires and solenoids). Right-hand grip rule. The electromagnet.

Relationships:

$$V = IR$$

$$P = IV$$

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

$$R_T = R_1 + R_2 + R_3 \dots$$

$$1/R_T = 1/R_1 + 1/R_2 + 1/R_3 \dots$$