

Standard	Title	Internal/external	Credit
AS90944	Demonstrate an understanding of aspects of acids and bases	Ext	4
AS90950	Investigate interactions between humans and micro-organisms	Int	4
AS90934	Demonstrate understanding of aspects of chemical reactions	Ext	4
AS90948	Demonstrate understanding of biological ideas relating to genetic variation	Ext	4
AS90930	Carry out a practical chemistry investigation, with direction	Int	4

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

**AS90944 - Demonstrate understanding of aspects of acids and bases.**

► Aspects of acids and bases will be selected from:

- Atomic structure
  - electron arrangement of atoms and monatomic ions of the first 20 elements (a periodic table will be provided)
  - isotopes
  - ionic bonding
  - names and formulae of ionic compounds using a given table of ions.
- Rates of reaction and particle theory.

► The relationship to acids and bases will be selected from:

- Properties
  - pH and effects on indicators
  - acids release hydrogen ions in water.
- Reactions of acids with bases to form salts.
- Uses
  - neutralisation
  - carbon dioxide formation
  - salt formation.

► Acids and bases are restricted to HCl, H<sub>2</sub>SO<sub>4</sub>, HNO<sub>3</sub>, metal oxides, hydroxides, carbonates and hydrogen carbonates. Other acids may be used in questions, but names and formulae will be provided.

**AS90950 - Investigate interactions between humans and micro-organisms.**

► *Micro-organisms* will be selected from bacteria, fungi and viruses.

► *How humans use and are affected by micro-organisms* could include: disposal of organic wastes, sewage treatment, composting, food production and preservation, food poisoning, microbial action on everyday materials (helpful and harmful), disease in humans and animals they are in contact with, antibiotics, resistance to antibiotics, and origins and control of pandemics.

► Biological ideas relating to how humans use and are affected by micro-organisms are likely to include:

- structure and life processes of micro-organisms
- culturing of micro-organisms
- factors that affect the life processes of micro-organisms.

► Investigation will involve collecting information about the interactions between micro-organisms and humans. The information could come from direct observations, collection of field data, tables, graphs, resource sheets, photos, videos, websites, reference texts.

**AS90934 - Demonstrate understanding of aspects of chemical reactions**

► *Aspects of chemical reactions* will be selected from the following types of reactions:

- Combination reactions. These are limited to reactions of elements with other elements.
- Exchange/precipitation reactions. These are limited to the formation of:
  - chlorides and iodides of silver and lead
  - sulfates of calcium, barium and lead
  - hydroxides of copper, iron(II), iron(III), calcium, barium and magnesium
  - carbonates of copper, iron(II), calcium, barium, magnesium, zinc, and lead ions.
- Decomposition reactions. These are limited to thermal decomposition of hydroxides, carbonates and hydrogen carbonates, and catalytic decomposition of hydrogen peroxide.
- Displacement reactions. These are limited to the displacement of metal ions in solution by other metals.

**AS90948 - Demonstrate understanding of biological ideas relating to genetic variation.**

► *Biological ideas relating to genetic variation* are limited to concepts and processes connected with:

- the continuity of life based on the inheritable nature of DNA
- links between DNA and variation in phenotypes
- variation in phenotypes as adaptive features.

► Biological concepts and processes relating to the inheritable nature of DNA will be selected from:

- roles of DNA in both carrying instructions to next generation and determining phenotype
  - relationship between DNA, alleles, genes and chromosomes
  - how genotype determines phenotype
  - the way chromosomes exist as pairs so individuals inherit two copies of each gene.
- Biological concepts and processes relating to variation in phenotype will be selected from the:
- significance of an allele as an alternative version of a gene
  - role of mutations in forming new alleles
  - role of meiosis (in generating gametes). (Note: the names of stages in meiosis are not required)
  - significance of sexual reproduction (in producing a new mix of alleles)
  - patterns of inheritance involving simple monohybrid inheritance showing complete dominance, sex determination, possible genotypes, and phenotype ratios.
- Biological concepts and processes relating to variation in phenotypes as adaptive features will be selected from:
- inheritable and non-inheritable variations that exist within a group of living organisms
  - differing rates of survival by various members of a group may depend on their phenotype
  - the importance of variation within populations (population and species survival) in a changing environment such as pest infestation, disease, drought, flood
  - advantages and disadvantages of sexual reproduction.
- The student will be expected to be familiar with the following genetic language and conventions: gene, allele, mutation, genotype, phenotype, gamete, zygote, dominant, recessive, homozygous, heterozygous, pure breeding, Punnett square, and pedigree chart.

**AS90930 - Carry out a practical chemistry investigation, with direction.**

A *practical chemistry investigation* includes collecting, processing and interpreting primary data to reach a conclusion in chemistry context using chemistry vocabulary, symbols, conventions and equations as appropriate. Suitable contexts could include: acid-metal reactions, acids and bases, rates of reaction, energy output of fuels, fermentation.

- *Carry out a practical chemistry investigation* will involve: developing a procedure for collecting quality primary data, with units, relevant to the purpose, based on the manipulation of the independent variable over a valid range of values with repetition to show reliability
- processing and representing the data in an appropriate way (graph, table, calculation etc)
- writing a conclusion based on the processed data.
- control the variable(s) that could have a significant effect on the results
- using techniques to increase the accuracy of the measured values of the dependent (and independent) variable
- processing and representing the data to enable a conclusion to be reached
- writing a conclusion based on the processed data that links to the purpose of the investigation.
- justifying the choices made to increase accuracy during the investigation
- justifying the conclusion in terms of the processed data and the purpose of the investigation
- relating their findings to the chemistry ideas.