

SCIENCE AS AS90944

Demonstrate understanding of aspects of acids and bases

Level 1, 4 Credits

This achievement standard involves demonstrating understanding of atomic structure, particle theory and rates of reaction relating to acids and base properties, uses and reactions.

Atomic structure

- periodic table; groups and periods
- periodic table; metals & non metals
- structure of the atom – particle location, charge and relative mass
 - protons, neutrons & electrons
- electron arrangement of atoms of the first 20 elements (periodic table provided)
- relating the electron arrangement of atoms to their location in the periodic table
- isotopes
 - definition
 - comparing isotopes in terms of p, n & e and mass
- ions
 - definition
 - electron arrangement of monatomic ions
 - explanation of formation of ions (in terms of stability associated with a full valence shell)
- ionic bonding
- ionic compounds (a table of ions will be provided)
 - names
 - formulae
 - explanation of formation of compounds (in terms of being electrically neutral)

Acids and bases

- acids
 - HCl, H₂SO₄ & HNO₃
 - other acids may be included (names & formulae will be given in the question)
 - release hydrogen ions in water
 - pH of acids
 -

- effects on indicators, including colour changes
- neutralisation; $H^+ + OH^- \rightarrow H_2O$
- reactions of acids with bases to form salts
- visual sign of reaction with carbonates; test for CO₂ gas
- uses of acids
- bases
 - metal oxides, hydroxides
 - carbonates and hydrogen carbonates
 - reactions of bases with acids to form salts
 - difference between bases and alkalis
 - pH of alkalis
 - effects on indicators, including colour changes
 - neutralisation
 - carbon dioxide formation
 - uses of bases

Rates of reaction and particle theory

- measurement of rate
 - volume of gas produced
 - loss of mass
 - time for a colour to appear/disappear
 - time for a given mass of solid to completely react
- collision theory
- explanation of rate in terms of
 - particle collisions per unit time
 - frequency of particle collisions
- effect of
 - surface area
 - concentration
 - temperature
 - catalysts
- explaining why reactions slow down & stop
- interpretation of graphs involving rates of reaction experiments

☐ **Chemistry vocabulary**

- symbols and conventions (including names and formulae)
- completing word equations
- completing given symbol equations
- writing balanced symbol equations
- graphical interpretations

Table of ions

+1	+2	+3	-3	-2	-1
NH ₄ ⁺	Ca ²⁺	Al ³⁺		O ²⁻	OH ⁻
Na ⁺	Mg ²⁺	Fe ³⁺		S ²⁻	Cl ⁻
K ⁺	Cu ²⁺			CO ₃ ²⁻	NO ₃ ⁻
Ag ⁺	Pb ²⁺			SO ₄ ²⁻	HCO ₃ ⁻
H ⁺	Fe ²⁺				
Li ⁺	Ba ²⁺				
	Zn ²⁺				

Periodic Table

Will show group numbers, atomic number and element symbol only – as shown in the *sample* below

Atomic Number							
1	2						
3 Li	4 Be						
11 Na	12 Mg						
		3	4	5	6	7	
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44