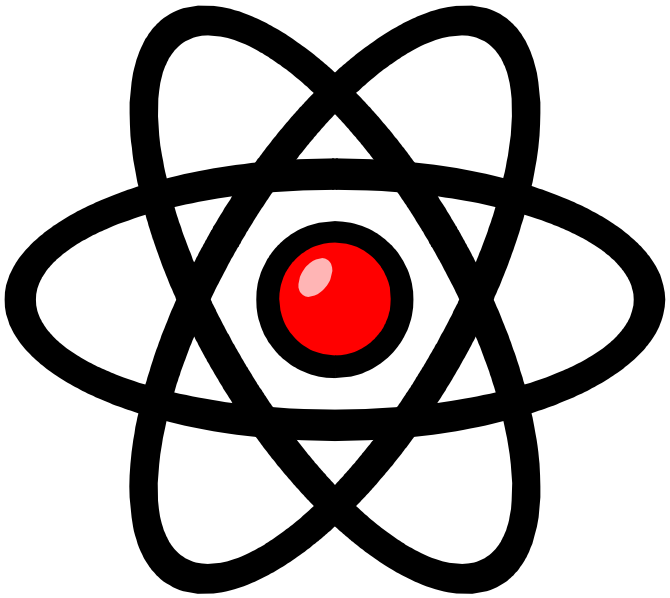
12 MĀTAI MATŪ

12 CHEMISTRY

COURSE INFORMATION



2016

KAPITI COLLEGE 12 CHEMISTRY ASSESSMENT SCHEME

In Level 2 Chemistry we will be offering 23 credits:

Internal Assessments:

AS 91162 Carry out qualitative analysis.	**3 credits**
AS 91161 Acid-base quantitative analysis and solve related problems.	**4 credits**
AS 91167 Describe an understanding of oxidation-reduction	**3 credits**

External Assessments:

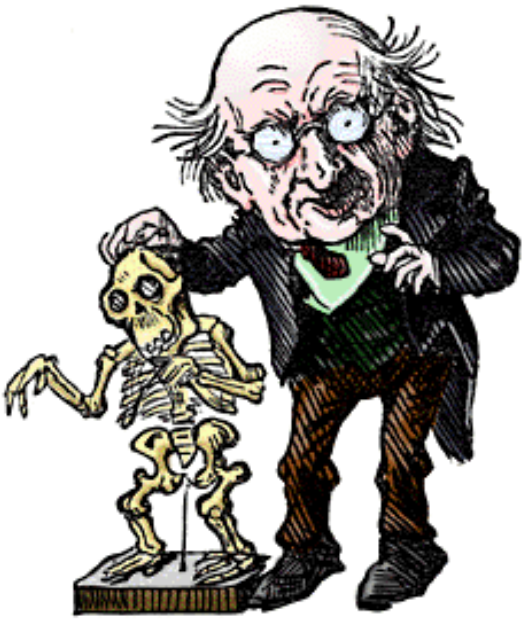
AS91164 Demonstrate understanding of bonding , structure, properties and energy changes	**5 credits**
AS 91165 Demonstrate understanding or the properties of selected organic compounds.	**4 credits**
AS91166 Describe understanding of chemical reactivity.	**4 credits**

Further Assessment Opportunities

ONE further assessment opportunity only will be made available for the class test parts of each of the internal assessments AS 91162 and AS 91161, although the practical components will not be reassessed.

NO further assessment opportunity is available for AS 91167

Please refer to the Student Guidelines to NQF assessments for details on assessment practices and policies.



BE SAFE IN A LABORATORY!!
Chemistry Achievement Objectives

Material World Level 7 (& 8)

Properties and changes of matter; (MW 7-1)
Students will:
Investigate and measure the chemical and physical properties of a range of groups of substances, for example, acids and bases, oxidants and reductants, and selected organic and inorganic compounds.

The structure of Matter; (MW 7-2)
Students will:
Relate the properties of matter to structure and bonding; Develop an understanding of and use the fundamental concepts of Chemistry (for example, equilibrium and thermochemical principles) to interpret observations.

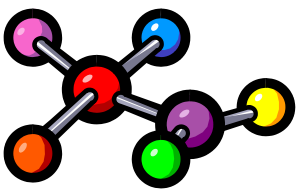
Chemistry and society; (MW 7-3)
Students will:
Apply the knowlegde of chemistry to explain aspects of the natural world and how chemistry is used in society to meet needs, resolve issues, and develop new technologies.

Nature of Science Level 7
Understanding about Science; (NOS 7-1)
Students will:
Understanding that scientists have an obligation to connect their new ideas to current and historical scientific knowledge and to present their findings for peer review and debate.

Investigating in science; (NOS 7.2)
Students will:
Develop and carry out investigations that extend their scientific knowledge, including developing their understanding of the relationship between investigations and scientific theories and models.

Communicating in science; (NOS7-3)
Students will:
Use accepted scientific knowledge, vocabulary, symbols, and conventions when evaluating accounts of the natural world and consider the wider implications of the method s of communication and/or representation employed.

Participating and contributing; (NOS 7-4)
Students will:
Use relevant information to develop a coherent understanding of socio-scientific issues that concern them, to identify possible responses at both personal and societal levels.



Values and key competencies in Chemistry

The key values we seek to develop in chemistry are;

- Excellence – by aiming high and percevering in the face of difficulties.
- Innovation enquiry and curiosity – by thinking critically, creatively and reflectively.
- Community and participation – for the common good.
- Ecological sustainabilty – including care for the environment.

The key competencies we wish to develop in our students of chemistry are;

- Developing competent thinkers and problem solvers who actively seek use and create knowledge.
- Develop the ability to competently use symbols, language and texts to express ideas in various contexts, and confidently use ICT to access information.
- Develop self managment, with a can – do attitude, showing the ability to make plans, set goals and maintain high standards.
- Participate and contribute to community, and develop the confidence to participate within new concepts.

In every aspect of the study of chemistry we will relate the observations from the world around us to our knowledge and understanding of the particles involved, and describe this using appropriate terms, symbols and language.

Students should use appropriate terms, chemical formulae and equations to describe their investigations. They should continue to develop an understanding of chemical concepts and the ability to describe and communicate their ideas accurately.

KAPITI COLLEGE ASSESSMENT STATEMENT 2016

SUBJECT Chemistry 201 **YEAR** 2016

One week before each assessment you will be told
* what learning outcomes will be assessed
* how they will be assessed
* how the assessment contributes towards your report.

Student to enter Achieved (A), Merit (M), Excellence (E) or Not Achieved (N)

Term	Week	Date	Achievement / Unit Task	Int/Ext	Credits	N, A, M, E
1	1		***Introduction/ Skills***			
	2					
	3					
	4					
	5					
	6		**The mole/molar mass concentration**			
	7		**AS 91164 2.4 V2 Atomic Structure etc**	**Ext**	**5**	
	8					
	9					
	10					
	11		***AS 91162 2.3 V2 Qualitative Analysis***	***Int***	**3**	
2	1					
	2					
	3					
	4					
	5		**AS 91166 2.6V2 Chemical Reactivity**	**Ext**	**4**	
	6					
	7					
	8					
	9		***AS 91161 2.1 V2 Quantitative***	***Int***	**4**	
	10					
3	1					
	2					
	3					
	4		**School Exams**			
	5					
	6		***Tourney week***			
	7		**AS 91165 2.5 V2 Organic Chemistry**	**Ext**	**4**	
	8					
	9					
4	1		***AS 91167 2.7 V2 Redox***	***Int***	**3**	
	2					
	3					
	4		***Revision***			

Subject Reference		Chemistry 2.1			
Title		Carry out quantitative analysis			
Level	2	**Credits**	4	**Assessment**	Internal
Subfield	Science				
Domain	Chemistry				
Status		Registered	**Status date**		17 November 2011
Planned review date		31 December 2018	**Date version published**		20 November 2014

This standard involves carrying out quantitative analysis.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Carry out quantitative analysis.	• Carry out in-depth quantitative analysis.	• Carry out comprehensive quantitative analysis.

Explanatory Notes

1 Procedures outlined in *Safety and Science: a Guidance Manual for New Zealand Schools*, Learning Media, Ministry of Education, 2000, should be followed.

2 *Quantitative analysis* involves collecting primary data from an acid-base titration, and processing both primary and secondary data to solve quantitative problems.
- The standard solution to be used in the titration may be provided. The titration procedure and balanced equations will be provided.
- Student selected data will be used in determining the accuracy of the titration.

Carry out quantitative analysis involves:
- collecting titration data that contains at least three titre values that fall within a range of 0.4 mL; the average titre value must be within 0.8 mL of the expected outcome
- solving quantitative problems that use the relationships $n=m/M$ and $c=n/V$ to calculate one variable given the other two (the relationships are not given). Molar masses for substances may be provided. Calculations must be carried out using appropriate procedures (not provided).

Carry out in-depth quantitative analysis involves:
- collecting titration data that contains at least three titre values that fall within a range of 0.4 mL; the average titre value must be within 0.5 mL of the expected outcome
- solving quantitative problems that involve at least two steps and require application of relationships such as $n=m/M$ and $c=n/V$. Titration calculations must be carried out correctly using only concordant titre values.

Carry out comprehensive quantitative analysis involves:
- collecting titration data that contains at least three titre values that fall within a range of 0.2 mL; the average titre value must be within 0.2 mL of the expected outcome
- solving quantitative problems that involve more than two steps, and the use of stoichiometric principles. Answers to calculations must demonstrate correct units and appropriate use of significant figures.

Achievement Standard

Subject Reference		Chemistry 2.2			
Title		Carry out procedures to identify ions present in solution			
Level	2	**Credits**	3	**Assessment**	Internal
Subfield	Science				
Domain	Chemistry				
Status		Registered	**Status date**		17 November 2011
Planned review date		31 December 2018	**Date version published**		20 November 2014

This achievement standard involves carrying out procedures to identify ions present in solution.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Carry out procedures to identify ions present in solution.	• Carry out procedures to justify the identification of ions present in solution.	• Carry out procedures to comprehensively justify the identification of ions present in solution.

Explanatory Notes

1. Procedures outlined in *Safety and Science: a Guidance Manual for New Zealand Schools*, Learning Media, Ministry of Education, 2000, should be followed.

2. *Carry out procedures to identify ions* involves collecting primary data and using these observations to identify ions in solution using a procedure provided.

3. *Carry out procedures to justify the identification of ions* involves writing balanced equations for all the reactions where precipitates are formed.

4. *Carry out procedures to comprehensively justify the identification of ions* involves interpreting observations by recognising the formation of complex ions and writing balanced equations for these reactions.

5. Identification of ions must be supported by experimental observations and identification of all precipitates formed.

6. Ions to be identified will be limited to: Ag^{+}, Al^{3+}, Ba^{2+}, Cu^{2+}, Fe^{2+}, Fe^{3+}, Mg^{2+}, Pb^{2+}, Na^{+}, Zn^{2+}, Cl^{-}, CO_3^{2-}, I^{-}, NO_3^{-}, OH^{-}, SO_4^{2-}. Na^{+} and NO_3^{-} are identified by a process of elimination.

7. Complex ions are limited to $[FeSCN]^{2+}$ and those formed when $OH^{-}(aq)$ or $NH_3(aq)$ react with cations listed in EN 5 above, ie $[Ag(NH_3)_2]^{+}$, $[Al(OH)_4]^{-}$, $[Pb(OH)_4]^{2-}$, $[Zn(OH)_4]^{2-}$, $[Zn(NH_3)_4]^{2+}$, $[Cu(NH_3)_4]^{2+}$.

Achievement Standard

Achievement Standard

Subject Reference		Chemistry 2.4			
Title		Demonstrate understanding of bonding, structure, properties and energy changes			
Level	2	**Credits**	5	**Assessment**	External

Subfield	Science		
Domain	Chemistry		
Status	Registered	**Status date**	17 November 2011
Planned review date	31 December 2018	**Date version published**	20 November 2014

This achievement standard involves demonstrating understanding of bonding, structure, properties and energy changes.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Demonstrate understanding of bonding, structure, properties and energy changes.	• Demonstrate in-depth understanding of bonding, structure, properties and energy changes.	• Demonstrate comprehensive understanding of bonding, structure, properties and energy changes.

Explanatory Notes

1 Procedures outlined in *Safety and Science*: *a Guidance Manual for New Zealand Schools,* Learning Media, Ministry of Education, 2000 should be followed.

2 *Demonstrate understanding* involves describing, identifying, naming, drawing, calculating, or giving an account of bonding, structure and properties of different substances and the energy involved in physical and chemical changes. This requires the use of chemistry vocabulary, symbols and conventions.

Demonstrate in-depth understanding involves making and explaining links between the bonding, structure and properties of different substances and the energy involved in physical and chemical changes. This requires explanations that use chemistry vocabulary, symbols and conventions.

Demonstrate comprehensive understanding involves elaborating, justifying, relating, evaluating, comparing and contrasting, or analysing links between bonding, structure and properties of different substances and the energy involved in physical and chemical changes. This requires the consistent use of chemistry vocabulary, symbols and conventions.

3 *Bonding, structure and energy changes* are limited to:

- ionic, covalent and metallic bonding
- intermolecular forces (the distinction between the different types of intermolecular forces is not required)
- Lewis structures, shape and polarity of simple molecules. Simple molecules have no more than four electron pairs about any atom (including multiple-bonded species)
- molecular, ionic, metallic and covalent network substances
- exothermic and endothermic reactions including energy (enthalpy) changes associated with differing amounts of substances and changes of state and enthalpy changes associated with the making and breaking of chemical bonds
- calculations of energy changes using $\Delta_r H$ and reaction stoichiometry, and bond enthalpy.

4 *Properties* are limited to hardness, malleability, ductility, electrical conductivity, melting and boiling points and solubility.

Achievement Standard

Subject Reference		Chemistry 2.5			
Title		Demonstrate understanding of the properties of selected organic compounds			
Level	2	**Credits**	4	**Assessment**	External
Subfield	Science				
Domain	Chemistry				
Status	Registered	**Status date**	17 November 2011		

This achievement standard involves demonstrating understanding of the properties of selected organic compounds.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Demonstrate understanding of the properties of selected organic compounds.	• Demonstrate in-depth understanding of the properties of selected organic compounds.	• Demonstrate comprehensive understanding of the properties of selected organic compounds.

Explanatory Notes

1 Procedures outlined in *Safety and Science*: *a Guidance Manual for New Zealand Schools,* Learning Media, Ministry of Education, 2000 should be followed.

2 *Demonstrate understanding* involves naming and/or drawing structural formulae of selected organic compounds (no more than eight carbons in the longest chain) and giving an account of their chemical and physical properties. This requires the use of chemistry vocabulary, symbols and conventions.

Demonstrate in-depth understanding involves making and explaining links between structure, functional groups and the chemical properties of selected organic compounds. This requires explanations that use chemistry vocabulary, symbols and conventions.

Demonstrate comprehensive understanding involves elaborating, justifying, relating, evaluating, comparing and contrasting, or using links between the structure, functional groups and the chemical properties of selected organic compounds. This requires the consistent use of chemistry vocabulary, symbols and conventions.

Selected organic compounds are limited to: alkanes, alkenes, alkynes, haloalkanes, primary amines, alcohols, and carboxylic acids.

Properties are limited to:

- constitutional and geometric (*cis and trans*) isomers
- classification of alcohols and haloalkanes as primary, secondary or tertiary
- solubility, melting and boiling points
- chemical reactions.

3 Chemical reactions are limited to:

- addition reactions of alkenes with H_2/Pt, Cl_2, Br_2, H_2O/H^+ (conc. H_2SO_4/H_2O) and hydrogen halides (including identification of major and minor products on addition to asymmetric alkenes), polymerisation
- substitution reactions of:
  - alkanes with halogens (limited to monosubstitution)
  - alcohols with hydrogen halides, PCl_3, PCl_5, $SOCl_2$
  - haloalkanes with ammonia and aqueous potassium hydroxide
- oxidation of:
  - primary alcohols to form carboxylic acids with MnO_4^-/H^+ or $Cr_2O_7^{2-}/H^+$
  - alkenes with MnO_4^-
- elimination of (including identification of major and minor products for asymmetric reactants):
  - water from alcohols
  - hydrogen halides from haloalkanes
- acid–base reactions of carboxylic acids and amines.

Achievement Standard

Subject Reference		Chemistry 2.6			
Title		Demonstrate understanding of chemical reactivity			
Level	2	**Credits**	4	**Assessment**	External

Subfield	Science		
Domain	Chemistry		
Status	Registered	**Status date**	17 November 2011
Planned review date	31 December 2018	**Date version published**	20 November 2014

This achievement standard involves demonstrating understanding of chemical reactivity.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Demonstrate understanding of chemical reactivity.	• Demonstrate in-depth understanding of chemical reactivity.	• Demonstrate comprehensive understanding of chemical reactivity.

Explanatory Notes

1 Procedures outlined in *Safety and Science*: *a Guidance Manual for New Zealand Schools,* Learning Media, Ministry of Education, 2000 should be followed.

2 *Demonstrate understanding* involves describing, identifying, naming, drawing, calculating, or giving an account of chemical reactivity. This requires the use of chemistry vocabulary, symbols and conventions.

Demonstrate in-depth understanding involves explaining chemical reactivity. This requires explanations that use chemistry vocabulary, symbols and conventions.

Demonstrate comprehensive understanding involves elaborating, justifying, relating, evaluating, comparing and contrasting, or analysing chemical reactivity. This requires the consistent use of chemistry vocabulary, symbols and conventions.

Chemical reactivity is limited to rates of reaction and equilibrium principles.

3 Rates of reaction involve:
- factors affecting rates of reaction – restricted to changes in concentration, temperature, surface area, and the presence of a catalyst
- using collision theory to explain the factors (includes activation energy).

4 *Equilibrium principles* are limited to:
- the dynamic nature of equilibrium
- the effect of changes in temperature, concentration, pressure, or addition of a catalyst on equilibrium systems
- the significance of the equilibrium constant (K_c) for homogeneous systems. This may involve calculations
- the nature of acids and bases in terms of proton transfer
- properties of aqueous solutions of strong and weak acids and bases including ionic species. The properties are restricted to conductivity, rate of reaction, and pH
- calculations involving K_w and pH (restricted to strong acids and bases).

Achievement Standard

Subject Reference		Chemistry 2.7			
Title		Demonstrate understanding of oxidation-reduction			
Level	2	**Credits**	3	**Assessment**	Internal
Subfield	Science				
Domain	Chemistry				

Status	Registered	**Status date**	17 November 2011
Planned review date	31 December 2018	**Date version published**	20 November 2014

This achievement standard involves demonstrating understanding of oxidation-reduction.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Demonstrate understanding of oxidation-reduction.	• Demonstrate in-depth understanding of oxidation-reduction.	• Demonstrate comprehensive understanding of oxidation-reduction.

Explanatory Notes

1 Procedures outlined in *Safety and Science*: *a Guidance Manual for New Zealand Schools,* Learning Media, Ministry of Education, 2000 should be followed.

2 *Demonstrate understanding* involves describing, identifying, naming, giving an account of oxidation-reduction and describing oxidation-reduction reactions. This requires the use of chemistry vocabulary, symbols and conventions.

Demonstrate in-depth understanding involves making and explaining links between oxidation-reduction reactions, observations and equations. This requires explanations that use chemistry vocabulary, symbols and conventions.

Demonstrate comprehensive understanding involves justifying, evaluating, comparing and contrasting, or analysing links between oxidation-reduction reactions, observations and equations. This requires the consistent use of chemistry vocabulary, symbols and conventions.

3 *Oxidation-reduction* is limited to:

- oxidation numbers
- electron transfer in reactions
- oxidants and/or reductants
- observations for reactions
- balanced oxidation-reduction half equations
- overall balanced oxidation-reduction equations.

4 Knowledge of the appearance of redox reactants and their products includes a selection from, but is not limited to:

- oxidants include a selection from, but not limited to: O_2, I_2, Br_2, Cl_2, OCl^- H^+,Fe^{3+}, Cu^{2+}, H_2O_2, MnO_4^-/H^+, $Cr_2O_7^{2-}/H^+$, concentrated HNO_3, IO_3^-
- reductants include a selection from, but not limited to, metals, C, H_2, Fe^{2+}, Br^-, I^-, H_2S, SO_2 ,SO_3^{2-}, HSO_3^-, H_2O_2