

CHEMISTRY 12

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SCHEDULE: Monday/Wednesday 10:00am-2:00pm
 Tuesday/Wednesday 5:00pm-9:00pm
LEARNING CENTRE HOURS: Monday-Thursday 10:00am-2:00pm
 Monday-Thursday 5:00pm-9:00pm
 The Learning Centre is closed all statutory and school holidays.

INTRODUCTION

Chemistry is the science which deals with the properties and reactions of materials. It is concerned with the identification, characterization, and transformation of matter, and with the energy changes accompanying these transformations. Chemical science focuses on the structure and interaction of matter at the atomic and molecular levels.

In common with other scientific disciplines, chemistry is both a body of knowledge (facts, concepts, laws, theories) and a process for obtaining this knowledge. Furthermore, a core of fundamental chemical knowledge is central to an understanding of other science disciplines and applied sciences (e.g., biology, geology, physics, medicine, pharmacy).

PRESCRIBED LEARNING OUTCOMES**Reaction Kinetics:**

- A1 *demonstrate awareness that reactions occur at differing rates*
- A2 *experimentally determine rate of a reaction*
- A3 *demonstrate knowledge of collision theory*
- A4 *describe the energies associated with reactants becoming products*
- A5 *apply collision theory to explain how reaction rates can be changed*
- A6 *analyse the reaction mechanism for a reacting system*
- A7 *represent graphically the energy changes associated with catalyzed and uncatalyzed reactions*
- A8 *describe the uses of specific catalysts in a variety of situations*

Dynamic Equilibrium:

- B1 *explain the concept of chemical equilibrium with reference to reacting systems*
- B2 *predict, with reference to entropy and enthalpy, whether a reacting system will reach equilibrium*
- B3 *apply Le Chatelier's principle to the shifting of equilibrium*
- B4 *apply the concept of equilibrium to a commercial or industrial process*
- B5 *draw conclusions from the equilibrium constant expression*
- B6 *perform calculations to evaluate the changes in the value of K_{eq} and in concentrations of substances within an equilibrium system*

Solubility Equilibria:

- C1 *determine the solubility of a compound in aqueous solution*
- C2 *describe a saturated solution as an equilibrium system*
- C3 *determine the concentration of ions in a solution*
- C4 *determine the relative solubility of a substance, given solubility tables*
- C5 *apply solubility rules to analyse the composition of solutions*
- C6 *formulate equilibrium constant expressions for various saturated solutions*
- C7 *perform calculations involving solubility equilibrium concepts*
- C8 *devise a method for determining the concentration of a specific ion*

Acids–Bases–Salts:

- D1 *identify acids and bases through experimentation*
- D2 *identify various models for representing acids and bases*
- D3 *analyse balanced equations representing the reaction of acids or bases with water*
- D4 *classify an acid or base in solution as either weak or strong, with reference to its electrical conductivity*
- D5 *analyse the equilibria that exist in weak acid or weak base systems*
- D6 *identify chemical species that are amphiprotic*
- E1 *analyse the equilibrium that exists in water*
- E2 *perform calculations relating pH, pOH, $[H_3O^+]$, and $[OH^-]$*
- E3 *explain the significance of the K_a and K_b equilibrium expressions*
- E4 *perform calculations involving K_a and K_b*
- F1 *demonstrate an ability to design, perform, and analyse a titration experiment involving the following: primary standards, standardized solutions, titration curves, and appropriate indicators*
- F2 *describe an indicator as an equilibrium system*
- F3 *perform and interpret calculations involving the pH in a solution and K_a for an indicator*
- F4 *describe the hydrolysis of ions in salt solutions*
- F5 *analyse the extent of hydrolysis in salt solutions*
- F6 *describe buffers as equilibrium systems*
- F7 *describe the preparation of buffer systems*
- F8 *predict what will happen when oxides dissolve in rain water*

Oxidation–Reduction:

- G1 *describe oxidation and reduction processes*
- G2 *analyse the relative strengths of reducing and oxidizing agents*
- G3 *balance equations for redox reactions*
- G4 *determine the concentration of a species by performing a redox titration*
- H1 *analyse an electrochemical cell in terms of its components and their functions*
- H2 *describe how electrochemical concepts can be used in various practical applications*
- H3 *analyse the process of metal corrosion in electrochemical terms*
- H4 *analyse an electrolytic cell in terms of its components and their functions*
- H5 *describe how electrolytic concepts can be used in various practical applications*

LEARNING RESOURCES

CHEMISTRY 12 – A Workbook for Students (Hebden)

online lessons, videos, notes, practice questions, etc.

UNITS OF STUDY

<u>UNIT</u>	<u>CONTENT</u>
1	Reaction Kinetics
2	Dynamic Equilibrium
3	Solubility Equilibria
4	Acids–Bases–Salts
5	Oxidation–Reduction

CHEMISTRY 12 at Coquitlam Learning Opportunity Centre

Chemistry 12 at Coquitlam Learning Opportunity Centre is a self-paced, self-directed course. You will be expected to work independently and to manage your time productively. If needed, individual help is available online or face-to-face at CLOC.

Chemistry 12 includes five units which correspond to the five units in the Hebden Chemistry 12 workbook. The online course includes lessons, videos, notes, etc. to help you master the skills in each unit. The practice questions provided will be very useful to you in focusing your study and determining your readiness for the individual unit tests.

An important element for success in Chemistry 12 will be your study skills. Successful students establish a study schedule and stick to it.

EVALUATION

Evaluation in Chemistry 12 includes five unit tests and a final exam. All tests include both multiple-choice and written-response questions. The unit tests are not cumulative, and one rewrite is available for each unit test. There is no rewrite for the final exam. The tests will be weighted as follows:

<u>TEST</u>	<u>CONTENT</u>	<u>PERCENT</u>
Unit 1	Reaction Kinetics	10
Unit 2	Dynamic Equilibrium	15
Unit 3	Solubility Equilibria	10
Unit 4	Acids–Bases–Salts	20
Unit 5	Oxidation–Reduction	15
Final Exam	Units 1–5	30
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