

CHEMISTRY 12 (ONLINE)

INSTRUCTOR: Marg Koetsier
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SCHEDULE: Monday/Wednesday/Friday 10:00am-2:00pm
Tuesday/Thursday 4:00pm-9:00pm
LEARNING CENTRE HOURS: Monday-Friday 10:00am-2:00pm
Monday-Thursday 4:00pm-9:00pm
The Learning Centre is closed all statutory and school holidays.

INTRODUCTION

Chemistry 12 is designed to prepare students for post-secondary programs that involve science disciplines and applied sciences. The following **big ideas** are emphasized:

- *Reactants must collide to react, and the reaction rate is dependent on the surrounding conditions.*
- *Dynamic equilibrium can be shifted by changes to the surrounding conditions.*
- *Saturated solutions are systems in equilibrium.*
- *Acid or base strength depends on the degree of ion dissociation.*
- *Oxidation and reduction are complementary processes that involve the gain or loss of electrons.*

CURRICULAR COMPETENCIES

Students are expected to do the following:

Questioning and Predicting

- *demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal, local, or global interest*
- *make observations aimed at identifying their own questions, including increasingly abstract ones, about the natural world*
- *formulate multiple hypotheses and predict multiple outcomes*

Planning and Conducting

- *collaboratively and individually plan, select, and use appropriate investigation methods, including field work and lab experiments, to collect reliable data (qualitative and quantitative)*
- *assess risks and address ethical, cultural, and/or environmental issues associated with their proposed methods*
- *use appropriate SI units and appropriate equipment, including digital technologies, to systematically and accurately collect and record data*
- *apply the concepts of accuracy and precision to experimental procedures and data: significant figures, uncertainty, scientific notation*

Processing and Analyzing Data and Information

- *experience and interpret the local environment*
- *apply First Peoples perspectives and knowledge, other ways of knowing, and local knowledge as sources of information*
- *seek and analyze patterns, trends, and connections in data, including describing relationships between variables, performing calculations, and identifying inconsistencies*
- *construct, analyze, and interpret graphs, models, and diagrams*
- *use knowledge of scientific concepts to draw conclusions that are consistent with evidence*
- *analyze cause-and-effect relationships*

Evaluating

- *evaluate their methods and experimental conditions, including identifying sources of error or uncertainty, confounding variables, and possible alternative explanations and conclusions*
- *describe specific ways to improve their investigation methods and the quality of their data*
- *evaluate the validity and limitations of a model or analogy in relation to the phenomenon modelled*
- *demonstrate an awareness of assumptions, question information given, and identify bias in their own work and in primary and secondary sources*
- *consider the changes in knowledge over time as tools and technologies have developed*
- *connect scientific explorations to careers in science*
- *exercise a healthy, informed skepticism and use scientific knowledge and findings to form their own investigations to evaluate claims in primary and secondary sources*
- *consider social, ethical, and environmental implications of the findings from their own and others' investigations*
- *critically analyze the validity of information in primary and secondary sources and evaluate the approaches used to solve problems*
- *assess risks in the context of personal safety and social responsibility*

Applying and Innovating

- *contribute to care for self, others, community, and world through individual or collaborative processes*
- *cooperatively design projects with local and/or global connections and applications*
- *contribute to finding solutions to problems at a local and/or global level through inquiry*
- *implement multiple strategies to solve problems in real-life, applied, and conceptual situations*
- *consider the role of scientists in innovation*

Communicating

- *formulate physical and mental theoretical models to describe a phenomenon*
- *communicate scientific ideas and information, and perhaps suggest a course of action, for a specific purpose and audience, constructing evidence-based arguments and using appropriate scientific language, conventions, and representations*
- *express and reflect on a variety of experiences, perspectives, and worldviews through place*

CONTENT

Students are expected to know the following:

- *reaction rate*
- *collision theory*
- *energy change during a chemical reaction*
- *reaction mechanism*
- *catalysts*
- *dynamic nature of chemical equilibrium*
- *Le Chatelier's principle and equilibrium shift*
- *equilibrium constant (K_{eq})*
- *saturated solutions and solubility product (K_{sp})*
- *relative strengths of acids and bases in solution*
- *water as an equilibrium system*
- *weak acids and weak bases*
- *titration*
- *hydrolysis of ions in salt solutions*
- *applications of acid-base reactions*
- *the oxidation-reduction process*
- *electrochemical cells*
- *electrolytic cells*
- *quantitative relationships*

LEARNING RESOURCES

CHEMISTRY 12 – A Workbook for Students (Hebden)
online lessons, videos, notes, practice questions, etc.

CHEMISTRY 12 at Coquitlam Learning Opportunity Centre

Chemistry 12 at CLOC 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. 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 | 15 |
| Unit 4 | Acids–Bases–Salts | 20 |
| Unit 5 | Oxidation–Reduction | 15 |
| Final Exam | Units 1–5 | 25 |
| | | <hr/> 100 |