Korea International School

Chemistry Syllabus
2022 - 2023

Teacher(s): Mr. Joo, Ms. Peng, Mr. Vogt
Room: H106 (Joo), H105 (Peng), H104 (Vogt)
Contact Times: Will vary by teacher

Course Description:

This required Grade 10 course will provide a firm foundation in chemical concepts and principles. Students will be instilled with an appreciation of the vital role chemistry plays in our lives. Students will be engaged through lectures, projects, independent research, laboratory activities and lab reports. Topics will include, but are not limited to: the nature of chemistry as a science, atomic structure, electron configuration, the periodic table of elements, chemical formulas and bonding, chemical reactions and equations, states of matter, chemical equilibrium, acids and bases, and chemical thermodynamics.

Prerequisite Course(s): Algebra I

Required and Recommended Materials:
Text: Modern Chemistry, by Holt (Online)

Calculator: Any Scientific Calculator

Major Topics of Study:
(There will be a quiz at the end of each unit with 1-2 additional quiz(zes) in between)

Unit 1: **Chemistry Foundations, Matter and the Atom** **Aug 2022 - Sep 2022**	Density, Units, Significant Figures, Uncertainty Matter Classification, Atomic Theory, Atomic Models, Atomic Structure and Computation Students will perform lab investigations to measure, collect, organize, interpret and present their findings on the above topics. Students will also utilize the Science and Engineering Practices of Modeling and Argumentation (Claim, Evidence, Reasoning) to further their understanding of the topics.
Unit 2: **Valence Electrons, Periodicity and Bonding** **Sep 2022 - Oct 2022**	Valence Electrons, Bohr Models, Periodicity (Trends), Electron Configurations, Bonding, Formulas, Lewis Structures, VSEPR Theory, Polarity, Physical Properties (Conductivity) Students will rely on simulators and models, such as the Periodic Table, to deduce the structure of an atom and how this structure affects how it interacts

	with other atoms', forms compounds and how these compounds interact with one another on the macroscopic scale. Students will also utilize the Science and Engineering Practices of Modeling and Data Analysis and Interpretation to Construct Explanations
Unit 3: **Conservations of Mass, Chemical Reactions and Stoichiometry** **Oct 2022 - Nov 2022**	Writing, Balancing and Classifying Chemical Reactions, Formula Math (Empirical / Molecular), the Mole, Mole Conversions, Stoichiometry, Limiting Reactants Students will use mathematical and diagrammatic models to understand, interpret and solve problems relating to the conservation of mass in chemical reactions. Students will also utilize the Science and Engineering Practices of Mathematical Computations and Planning and Carrying out an Investigation as a means to better understand the changes occurring at the microscopic level within chemical reactions.
Unit 4: **Thermodynamics and Energy Transfer** **Dec 2022 - Jan 2023**	Heat / Temperature, Energy (Phase, Thermal, Chemical), Phase Diagrams, Quantifying Heat ($q=mc\Delta T$), Energy Bar Charts (LOL Diagrams), Energy Conservation, Chemical Energy and Endothermic/Exothermic Reactions, Enthalpy, Calorimetry, 1st LOT, Thermal Equilibrium, Enthalpy Stoichiometry, Hess's Law Students will carry out investigations to measure, record, calculate and determine energy transfer between the system and surroundings during physical changes and chemical changes. Students will also utilize the Science and Engineering Practices of Modeling, Mathematical and Computations along with Constructing Explanations and Arguing from Evidence to support and defend their findings.
Unit 5: **Properties of Matter** **Feb 2023 - Mar 2023**	Gas Laws (Pressure, Temperature, Volume, Moles), Ideal Gas Law, Gas Law Stoichiometry, Solid / Liquid Phase Change Energy, Polarity, Intermolecular Forces, Materials Research Project Students will conduct a series of small investigations to develop both conceptual and mathematical relationships involving gas law relationships. They will also investigate properties of solids and liquids by measuring freezing points and boiling point rates to explain intermolecular forces. Students will utilize the Science and Engineering Practices of Modeling

	(both mathematically and conceptually), Planning and Carrying Out Investigations and Arguments through Claim, Evidence and Reasoning methods.
Unit 6: **Solution Chemistry, Reaction Rates and Equilibrium** **Apr 2023 - May 2023**	Solution Properties, Colligative Properties, Molarity, Molality, Dilutions, Reaction Rates, Factors, Collision Theory, Rate Laws, Differential Rates Method, Rate Constant, Dynamic Equilibrium, Law of Mass Action, Reaction Quotient, Le Chatelier's Principle Students will use observation, simulation, reading and group dialogue to discover changes in solution composition and mathematics. Additionally, investigation of rates of reactions will be deduced through investigation of color change and mathematical computation. Lastly, students will explore equilibrium and changes to a system through observation, discussion and reasoning using scientific principles as support for their claims. Students will utilize the Science and Engineering Practices of Modeling, Designing and Carrying Out Investigations, Analyzing and Interpreting Data, Obtaining and Evaluating Information and Arguing from Evidence.
Unit 7: **Reaction Types** **(Acid / Base, Redox, Precipitation,)** **if Time Allows** **May 20223 - Jun 2023**	Will be added later in Semester II if applicable.

You will be assessed in the following four broad learning categories (BLCs) which make up your final grade:

	Broad Learning Category	BLC Description	Percentage of Term Grade
• Your teacher will collect and track evidence of your learning through observations of your work; conversations with you; and by evaluating the work you produce. • Your teacher will provide feedback to help you with	Argumentation (ARG)	- Find, Use, and Effectively Communicate Valid Scientific Information through Writing and/or Verbally - Make Predictions Based on Structured, Well-Reasoned Arguments that are Supported with Evidence - Use Mathematical, Computational, and/or Algorithmic Representations	25%

further study and improvement ● Your work will be returned for your review and reflection.		of Phenomena to Describe and/or Support Claims and/or Explanations - Claim, Evidence, Reasoning (CER) Models	
	Experimental Design (ED)	- Define Problems - Develop Testable Research Questions - Make Predictions - Develop / Create Hypotheses - Develop Procedure (Equipment Lists) - Collect Appropriate Data - Identify of Variables (IV, DV, CV) - Make Appropriate Measurements - Analyze Experimental Data - Align Methodology - Create / Set up Data Tables - Identify and Analyze Errors - Improve the Accuracy of Results	25%
	Mathematical Routines (MATH)	- Make Calculations Involving Mathematical Routines - Identify and Explain Relevant Scientific Theories / Concepts -Explain the relationship between variables within an equation when one variable changes. -Identify information presented graphically to solve a problem. -Determine a balanced chemical equation for a given chemical phenomenon. - Demonstrate Foundational Mathematical Concepts (Through MCQ format, short answer, etc)	25%
	Modeling (MOD)	- Develop and/or Use Visual / Graphical Evidence (Graphs, Charts, Tables, Diagrams, etc) - Develop and/or Use Molecular and/or Mathematical Models -Analyze Experimental Data to Create (Mathematical) Models to Make Predictions about the Behavior of Systems -Apply (Mathematical) Models to Find Relationships Between Variables in a System -Apply (Mathematical) Models to Perform Computations	25%
Categories will be assessed through daily work, lab work, and quizzes.			

Term Work Total:	**100%**

*The instructor reserves the right to make individual exceptions to the above when, in the department's professional opinion, such exception is warranted and justifiable based upon individual student needs and situations.

Reassessment Policy:

Quiz:

Students who score below a proficient level have the option to reassess one quiz per unit after reviewing/revising their original quiz.

It must be completed within a reasonable amount of time (determined by the instructor).

Lab Write-up:

Students will have the option to turn in a rough draft. After submitting the rough draft, students will receive feedback and will have an opportunity to revise their work before their final submission.

Learning Skills & Work Habits:

Learning skills and work habits are an important part of your growth, both in this course and as a well-rounded student. The below skills will be promoted and modeled in your chemistry class and will provide valuable feedback around your learning. This gives you and your parents/guardians valuable information about your learning.

Responsibility	Collaboration	Adaptability
Integrity	Organization	Work Completion

Demonstrating Academic Integrity:

Korea International School expects and requires that students will uphold the highest standards of ethics and academic excellence. The Academic Integrity Policy represents our effort to guarantee that students are committed to building and maintaining a learning community of the highest integrity by carrying out academic tasks with honesty in all situations.

All academic honesty violations will be reported to the associate principal who may then report the incident to the principal and counseling office. A record of the violation will be put in the student's KIS file.

KIS High School Resources:

For more information regarding what you need to know about…

1) Link to Academic Integrity Policy in High School and KIS Assessment Manual

2) Link to KIS 2022-2023 Curriculum Course Guide and the KIS 2022-2023 Advanced Level Course Guide

3) Link to KIS Academics and Learning page