

IB Chemistry Year 2 - MHS Subject Group Overview

Unit Name	Energetics	Kinetics and Equilibrium	The Internal Assessment	Applications of Organic Chemistry	Exam Review & Exams
Time Frame	6 weeks (Aug-Sep)	9 weeks (Oct-Nov)	9 weeks (Dec-Feb)	6 weeks (Feb-Apr)	6 weeks (Apr-May)
Standards/ IB Topics	R1.3, R1.1, R1.2	R3.1, R2.2, R2.3	IB Requirement	R3.3, R3.4	REVIEW ALL TOPICS
Content Specific Information (texts, documents, methods)	<p>Statement of Inquiry Energetics allows us to investigate the exchange and transformation of energy within chemical reactions, leading to a deeper understanding of the factors influencing enthalpy changes and their applications in real-world processes.</p> <p>Phenomenon: Utilizing bioethanol in internal combustion engines showcases the renewable and carbon-neutral nature of biofuels, providing a cleaner and more sustainable alternative to fossil fuels.</p> <p style="text-align: center;">Crosscutting Concepts</p> <ul style="list-style-type: none"> ● Energy and Matter ● Systems and System Models ● Stability and Change <p style="text-align: center;">CORE IDEAS</p> <ul style="list-style-type: none"> ● Complete and incomplete combustion ● Fossil fuels and the greenhouse effect ● Biofuels and fuel cells ● Heat and temperature ● Endothermic and exothermic ● Calorimetry ● Bond enthalpy ● Hess's Law and energy cycles 	<p>Statement of Inquiry Chemical kinetics and equilibrium allow us to answer the questions "how fast" and "how far?" in a chemical reaction.</p> <p>Phenomenon: Strong acids such as sulfuric acid react with bases such as hydroxides or carbonates faster than weak acids such as carbonic acid do.</p> <p style="text-align: center;">Crosscutting Concepts</p> <ul style="list-style-type: none"> ● Systems and system models ● Stability and change ● Patterns <p style="text-align: center;">CORE IDEAS</p> <ul style="list-style-type: none"> ● Rate of reaction ● Collision theory ● Factors affecting rate of reaction ● Activation energy ● Maxwell-Boltzmann energy distribution curves ● Catalysts ● Dynamic equilibrium ● Equilibrium constant ● Le Chatelier's principle ● Bronsted-Lowry acids/bases ● Conjugate acid-base pair ● Amphiprotic species ● pH scale ● Ion product constant of water, K_w ● Strong/weak acids/bases ● Neutralization reactions ● pH curves 	<p>Scientific Investigation The internal assessment, worth 20% of the final IB grade, consists of an individual investigation that will cover a topic from IB Chemistry Standard Level.</p> <p>Student work is internally marked by the teacher and externally moderated by the IB.</p> <ul style="list-style-type: none"> ● Duration: 10 hours ● Weighting: 20% ● Individual investigation <p style="text-align: center;">Internal Assessment Criteria</p> <p>Research design 25% Data analysis 25% Conclusion 25% Evaluation 25%</p> <p>**Note: The Collaborative Sciences Project (CSP) will be completed during the first semester of this course.</p>	<p>Statement of Inquiry Organic molecules react in a predictable manner based on their structures and functional groups present.</p> <p>Phenomenon: Alkanes and alkenes react differently with halogens; alkanes undergo substitution reactions while alkenes undergo addition reactions.</p> <p style="text-align: center;">Crosscutting Concepts</p> <ul style="list-style-type: none"> ● Energy and Matter ● Systems and System Models ● Stability and Change <p style="text-align: center;">CORE IDEAS</p> <ul style="list-style-type: none"> ● Electron sharing reactions ● Radicals ● Homolytic fission ● Substitution reactions of alkanes ● Electron-pair sharing reactions ● Nucleophiles ● Nucleophilic substitution reactions ● Heterolytic fission ● Electrophiles ● Electrophilic addition reactions of alkenes 	<p>Comprehensive review of all IB Chemistry SL content.</p> <p>Other reviews, including that of content from IB Chemistry Year 1, will be built into the preceding units.</p>

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Common Assessments/ Major Projects	<p>SEP</p> <ul style="list-style-type: none"> ● Asking Questions and Defining Problems ● Developing & Using Models ● Carry out Investigations ● Constructing Explanations ● Planning and Carrying out investigations ● Analyzing & interpreting data ● Use mathematics and computational thinking ● Engage in Argument from Evidence ● Obtaining, evaluating and communicating information <p>Assessments/Projects</p> <ul style="list-style-type: none"> ● Formative assessment on each subtopic ● Tool and Inquiry assessment ● Summative assessment using questions from IB Papers 1 & 2 	<p>SEP</p> <ul style="list-style-type: none"> ● Asking Questions and Defining Problems ● Developing & Using Models ● Carry out Investigations ● Constructing Explanations ● Planning and Carrying out investigations ● Analyzing & interpreting data ● Use mathematics and computational thinking ● Engage in Argument from Evidence ● Obtaining, evaluating and communicating information <p>Assessments/Projects</p> <ul style="list-style-type: none"> ● Formative assessment on each subtopic ● Tool and Inquiry assessment ● Summative assessment using questions from IB Papers 1 & 2 	<p>SEP</p> <ul style="list-style-type: none"> ● Asking Questions and Defining Problems ● Developing & Using Models ● Carry out Investigations ● Constructing Explanations ● Planning and Carrying out investigations ● Analyzing & interpreting data ● Use mathematics and computational thinking ● Engage in Argument from Evidence ● Obtaining, evaluating and communicating information <p>Assessments/Projects</p> <ul style="list-style-type: none"> ● Internal Assessment <ul style="list-style-type: none"> ● Proposal ● Rough Draft ● Final Draft 	<p>SEP</p> <ul style="list-style-type: none"> ● Asking Questions and Defining Problems ● Developing & Using Models ● Carry out Investigations ● Constructing Explanations ● Planning and Carrying out investigations ● Analyzing & interpreting data ● Use mathematics and computational thinking ● Engage in Argument from Evidence ● Obtaining, evaluating and communicating information <p>Assessments/Projects</p> <ul style="list-style-type: none"> ● Formative assessment on each subtopic ● Tool and Inquiry assessment ● Summative assessment using questions from IB Papers 1 & 2 	
Level Specific Differentiation	Marietta City Schools teachers provide specific differentiation of learning experiences for all students. Details for differentiation for learning experiences are included on the district unit planners.				
Resources	<p>Resources for 2025 "New" Syllabus</p> <ul style="list-style-type: none"> ● Brown et al. <i>Pearson Baccaulaureate Standard Level Chemistry</i>, 3rd edition ● Bylikin et al. <i>Oxford IB Diploma Programme: Chemistry Course Companion</i>, 2023 edition. ● Talbot et al. <i>Chemistry for the IB Diploma Programme</i>, 3rd edition. ● IB Chemistry Guide First Assessment 2025 ● InThinking IB subject site for Chemistry ● IB Chemistry Schoology Course <p>Resources for 2016 "Old" Syllabus</p> <ul style="list-style-type: none"> ● Murphy et al. <i>Oxford IB Diploma Programme: Chemistry Course Companion</i>, 2014 edition. ● Brown and Ford. <i>Pearson Baccaulaureate Standard Level Chemistry</i>, 2nd edition. ● Hodder Study and Revision Guide for the IB Diploma ● Hodder IA Internal Assessment for Chemistry 				