Marietta City Schools

2025–2026 District Unit Planner

IB Chemistry Year 2 HL		**Subject Group and Course**	Group 4 - Chemistry		
Course Part and Topic	**UNIT 1 - MEASUREMENT IN CHEMISTRY** Tool 1 - Experimental Techniques Tool 2 - Technology Tool 3 - Mathematics	**SL or HL / Year 1 or 2**	HL / Year 2	**Dates**	08/01 - 09/05
Text(s)		**DP Assessment(s) for Unit**			
• Chemistry for the IB Diploma Third Edition, Hodder Education		• Internal Assessment (IA) Proposal • Unit 01 Summative Assessment - *Paper 1B questions modeled after the real IB Exam Papers (2025 syllabus)*			

INQUIRY: establishing the purpose of the unit

Transfer Goals

List here one to three big, overarching, long-term goals for this unit. Transfer goals are the major goals that ask students to "transfer" or apply their knowledge, skills, and concepts at the end of the unit under new/different circumstances, and on their own without scaffolding from the teacher.

Phenomenon: When determining the concentration of iron(II) ions in a sample, results obtained from spectrophotometry, redox titration, and atomic absorption spectroscopy (AAS) often differ slightly, even under controlled conditions. These discrepancies raise questions about the limitations of each method, the role of instrumental and human error, and the propagation of uncertainty through complex calculations. Investigating this reveals how scientific measurements are inherently estimations, bounded by uncertainty — and how method selection and error analysis are crucial for drawing reliable chemical conclusions.

Statement of Inquiry: Accurate and precise measurement in chemistry is essential for ensuring safety, quality, and innovation in real-world contexts such as medicine, environmental monitoring, and industrial manufacturing.

Goals:

1. **Students can** address the safety of self, others, and the environment.
2. **Students can** measure variables.
3. **Students can** apply techniques.
4. **Students can** apply technology to collect data.
5. **Students can** apply technology to process data.
6. **Students can** process uncertainties.

ACTION: teaching and learning through inquiry

Content / Skills / Concepts - Essential Understandings	**Learning Process** *Check the boxes for any pedagogical approaches used during the unit. Aim for a variety of approaches to help facilitate learning.*
Highlighted content/skills/concepts indicate HL extensions **<u>Tool 1: Experimental techniques</u>** ● **Addressing safety of self, others, and the environment** *Recognize and address relevant safety, ethical, or environmental issues in an investigation* ● **Measuring variables** *Understand how to accurately measure the following to an appropriate level of precision* ○ Mass ○ Volume ○ Time ○ Temperature ○ Length ○ pH of a solution ○ Electric current ○ Electric potential difference ● **Applying techniques** *Show awareness of the purpose and practice of:* ○ Preparing a standard solution ○ Carrying out dilutions ○ Drying to constant mass ○ Distillation and reflux ○ Paper of thin layer chromatography ○ Separation of mixtures ○ Calorimetry ○ Acid-base and redox titration ○ Electrochemical cells ○ Colorimetry or spectrophotometry ○ Physical and digital molecular modelling ○ Recrystallization ○ Melting point determination	Learning experiences and strategies/planning for self-supporting learning: ☒ Lecture □ Socratic seminar ☒ Small group/pair work ☒ PowerPoint lecture/notes ☒ Individual presentations ☒ Group presentations ☒ Student lecture/leading ☒ Interdisciplinary learning Details: *Students will learn through a combination of presentations, small group work, practice problems, and lab work.* ☒ Other(s): *practice problems, lab work* **Formative assessments:** ● *Daily formative checks through practice problems, openers, and closers* ● Laboratory Assignments - *assessing Tools and Inquiries practiced in the Unit*

Tool 2: Technology

- **Applying technology to collect data**
  - Use sensors
  - Identify and extract data from databases
  - Generate data from models and simulations
- **Applying technology to process data**
  - Use spreadsheets to manipulate data
  - Represent data in a graphical form
  - Use computer modelling
- **Interpreting data obtained from technology**
  - Mass spectra (MS)
  - Infrared (IR) spectra
  - Proton nuclear magnetic resonance (^{1}H NMR) spectra

Tool 3: Mathematics

- **Processing uncertainties**
  - Understand the significance of uncertainties in raw and processed data
  - Record uncertainties in measurements as a range (+/-) to an appropriate level of precision
  - Propagate uncertainties in processed data, in calculations involving addition, subtraction, multiplication, division, and exponents.
  - Express measurement and processed uncertainties - absolute, fractional (relative), percentage - to an appropriate number of significant figures or level of precision.
  - Apply the coefficient of determination (R^2) to evaluate the fit of a trend line or curve

Summative assessments:

- Internal Assessment (IA) Proposal
- DP Assessment - *Paper 1B questions modeled after the real IB Exam Papers (2025 syllabus) - using as many previous IB exam questions as possible*

Differentiation:

☒ Affirm identity - build self-esteem

☒ Value prior knowledge

☒ Scaffold learning

☒ Extend learning

Details:

- *SWD/504 – Accommodations Provided*
- *ELL – Reading & Vocabulary Support*
- *Intervention Support*
- *Extensions – Enrichment Tasks and Project*

Tools and Inquiries:

- Tool 1, Tool 2, and Tool 3 will be explicitly taught and assessed in this unit. More details are provided at left.

Approaches to Learning (ATL)

Check the boxes for any explicit approaches to learning connections made during the unit. For more information on ATL, please see the guide.

☒ Thinking ☒ Communication ☒ Research

☒ Social ☒ Self-management

Details:

- *Students will be continuously challenged to develop higher-order thinking skills as they take prior knowledge, combine it with new content, and synthesize new understandings and connections.*
- *Students will build social groups through group work and intentional reflection activities.*
- *Students will communicate their findings to their peers in the form of small-group presentations.*
- *Students will continue to work on self-management and organization skills.*
- *Students will complete background research to develop and extend their learning.*

Language and Learning *Check the boxes for any explicit language and learning connections made during the unit. For more information on the IB's approach to language and learning, please see the guide.*	**TOK Connections** *Check the boxes for any explicit TOK connections made during the unit*	**CAS Connections** *Check the boxes for any explicit CAS connections. If you check any of the boxes, provide a brief note in the "details" section explaining how students engaged in CAS for this unit.*
☒ Activating background knowledge ☒ Scaffolding for new learning ☒ Acquisition of new learning through practice ☒ Demonstrating proficiency Details: ● *Content and vocabulary introduced in previous science courses will be used in this unit.* ● *Students will use many of the concepts from this unit in future units throughout the two-year course.* ● *Students will acquire new vocabulary.* ● *Students will continually demonstrate proficiency with chemistry vocabulary in class discussions and group work.*	□ Personal and shared knowledge ☒ Ways of knowing □ Areas of knowledge □ The knowledge framework Details: ● *TOK knowledge questions will be included as discussion options for each lesson.*	☒ Creativity □ Activity □ Service Details: ● *Students will be encouraged to consider the creativity involved in scientific experimentation. Students can explore alternative ways (visual, for example) to express and explain this creativity to others.*

Resources *List and attach (if applicable) any resources used in this unit*
Resources for 2025 Syllabus: ● Chemistry for the IB Diploma Third Edition, Hodder Education ● IB Chemistry Guide First Assessment 2025 ● InThinking IB subject site for Chemistry ● IB Chemistry Schoology Course

REFLECTION: considering the planning, process, and impact of the inquiry

What worked well *List the portions of the unit (content, assessment, planning) that were successful*	**What didn't work well** *List the portions of the unit (content, assessment, planning) that were not as successful as hoped*	**Notes / Changes / Suggestions** *List any notes, suggestions, or considerations for the future teaching of this unit*