IB Chemistry at Harrison Trimble High School

Teacher: Brooke Rowe
Course Duration: September 2025 – May 2026

Welcome to IB Chemistry

IB Chemistry explores the fundamental principles of matter, energy, and chemical reactions. This course emphasizes scientific inquiry, practical experimentation, and the development of critical thinking. Students will connect chemical concepts to real-world applications, preparing them for further studies and fostering an appreciation for the role of chemistry in global challenges.

Course Overview

The course is divided into key topics, grouped under structures, reactivity, and practical applications. These topics are taught over two years and integrate theory with hands-on laboratory work.

Semester 1: Foundations of Chemistry

1. **Models of the Particulate Nature of Matter**
    - Understanding atoms, isotopes, and the periodic table.
    - Investigating atomic structure, electron configurations, and chemical trends.
2. **Models of Bonding and Structure**
    - Ionic, covalent, and metallic bonding.
    - Exploring molecular geometry, intermolecular forces, and materials like alloys and polymers.
3. **Counting Particles by Mass**
    - Learning about moles, molar mass, and chemical equations.
    - Investigating reaction stoichiometry and efficiency.
4. **Reactivity: Electron Transfer and Sharing Reactions**
    - Oxidation, reduction, and chemical reaction mechanisms.
    - Building voltaic and electrolytic cells and analyzing organic reactions.
5. **Ideal Gases**
    - Understanding the ideal gas model and gas laws.

IB Chemistry at Harrison Trimble High School

6. **What Drives Chemical Change?**
    - Investigating enthalpy, energy cycles, and fuels.
    - Applying concepts like Hess's law and reaction kinetics.

Semester 2: Advanced Topics and Applications

1. **Chemical Kinetics and Equilibrium**
    - Rates of reaction and factors affecting them.
    - Studying Le Chatelier's principle and equilibrium constants.
2. **Acids and Bases**
    - Understanding pH, neutralization reactions, and titration.
    - Exploring strong and weak acids and bases.
3. **Organic Chemistry**
    - Functional groups, nomenclature, and isomerism.
    - Laboratory synthesis, including aspirin production.

Course Activities

- **Laboratory Experiments:** A core component of IB Chemistry, involving activities like titrations, spectrophotometry, and calorimetry. Labs emphasize data collection, analysis, and safety practices.
- **Interactive Simulations:** Use of PhET Labs and other online tools to visualize concepts like gas laws, molecular bonding, and reaction mechanisms.
- **Collaborative Projects:** Team-based interdisciplinary projects that address real-world problems, such as food science and environmental studies.

Assessments

1. **Internal Assessments**
    - Practical Work: Includes laboratory reports and experiments, such as percent composition of gum and reaction rates.
    - Scientific Investigation: Students will design and conduct a research-based experiment.

2. **External Assessments**
    - Online Quizzes: Short-answer and multiple-choice questions.
    - Written Tests: Evaluating theoretical understanding and problem-solving skills.
3. **Collaborative Sciences Project**
    - A group project with peers from other IB sciences, exploring interdisciplinary scientific challenges.

Resources

Students have access to:

- **Textbooks and Websites:** OpenStax Chemistry, LibreTexts, and Kognity for comprehensive content and practice.
- **Video Tutorials:** Khan Academy, Bozeman Science, and The Organic Chemistry Tutor for visual learning.
- **Laboratory Tools:** Fully equipped chemistry labs with modern facilities and safety measures.

Skill Development

IB Chemistry emphasizes the development of:

- **Critical Thinking:** Analyzing chemical data and solving complex problems.
- **Research Skills:** Designing experiments, interpreting results, and referencing credible sources.
- **Communication Skills:** Writing clear lab reports and presenting findings.
- **International Mindedness:** Exploring the global impact of chemistry, such as advancements in atomic theory from diverse cultural perspectives.

Why Study IB Chemistry?

Chemistry is a dynamic science that explains the material world and addresses global challenges like sustainability and health. This course prepares students for success in higher education and careers in science, engineering, and technology.