

Course Title:	Chemistry in the Community
Grade(s):	11-12

Course Description
This co-taught course emphasizes practical applications, which is crucial for students who benefit from tangible learning experiences that connect to everyday life. The course ensures that students will gain a comprehensive understanding of these scientific fields in a manner that is both accessible and relatable. Connections to the real world are important in helping students see the relevance of chemistry in their daily lives, motivating them to engage with the material and understand its broader implications. The curriculum employs a need-to-know teaching strategy, where students acquire and apply knowledge progressively. This method is well-suited for students with diverse learning needs, as it builds their understanding step by step. By focusing on data evaluation and decision-making, the course also helps students develop critical thinking skills that they can apply beyond the classroom. Labs and activities offer students the opportunity to learn by doing, which is an effective strategy for reinforcing theoretical knowledge through hands-on experience. Culminating unit activities are project-based, encouraging students to collaboratively problem solve while also developing social skills.
Approved Curricular Materials/Textbook(s)

Unit Title	Unit Description (Include Unit Objectives)	Unit Pacing
Unit 1: Water	- Students will use the concepts of polarity, hydrogen bonding, and solubility to explain how substances dissolve in water. - Students will perform and interpret water quality tests (pH, turbidity, dissolved oxygen, and heavy metals) to identify contaminants in a local water source. - Students will evaluate various water purification methods and argue for the most cost-effective and safe solution for a community "fish kill" scenario.	September - November

Unit 2: Materials	- Students will use the Periodic Table to predict the physical and chemical properties of metals, nonmetals, and metalloids based on their atomic structure. - Students will demonstrate the law of conservation of matter by performing a "copper cycle" lab, recovering the original amount of metal through a series of reactions. - Students will analyze the life cycle of a coin or a common consumer product to determine the environmental and economic impact of mining versus recycling.	November - January
Unit 3: Petroleum	- Students will describe the relationship between molecular size (hydrocarbons) and boiling points, and explain the process of fractional distillation. - Students will model the "cracking" of large molecules and calculate the energy released during the combustion of various fuels using calorimetry. - Students will weigh the benefits of petroleum as a fuel source against its use as a raw material for life-saving plastics and medicines. - Students will select a petroleum-based product and develop a sustainable substitute.	January - early March
Unit 4: Food: Matter & Energy	- Students will describe how calorimetry is used to determine the energy stored in a particular food. - Students will calculate how much energy is in a particular food based on temperature changes. - Students will test common foods for the presence of specific macromolecules and determine the caloric content through combustion. - Students will describe the structures and functions of macromolecules. - Students will investigate the decomposition of organic matter and evaluate the benefits of composting.	March - April
Unit 5: Nuclear Reactions	Students will distinguish between alpha, beta, and gamma radiation and use half-life equations to determine the age or	April - May

	decay rate of a radioactive isotope. • Students will simulate nuclear decay and shielding to understand how different materials block radiation. • Students will debate the societal "trade-offs" of using nuclear energy for power versus the challenges of long-term radioactive waste storage.	
Unit 6: Air	• Students will apply gas laws (P, V, T, n relationships) and the Kinetic Molecular Theory to explain atmospheric pressure and the behavior of air pollutants. • Students will investigate air pollution, smog, and emissions. • Students will explain the purpose and function of a catalytic converter and evaluate its role in reducing harmful vehicle emissions. • Students will investigate the environmental impacts of school bus idling and propose strategies to reduce unnecessary emissions.	May - June