

Bridge Year Chemistry

Instructor:

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This course is designed to help students see how chemical principles are developed from experimental observations. Students will learn how these principles may be used to explain daily life observations. Some topics studied include the periodic table, chemical reactions, gas laws, phases of matter, and acids and bases. This is a lab-based course that will form an important background for all students to be further developed at the college level. Emphasis is placed on classroom participation, laboratory techniques, technical writing and problem solving.

Graduation Standards (the number of the standard is referenced in the performance indicators listed in each unit):

PHYSICAL SCIENCES STANDARD:**1: STRUCTURE, PROPERTIES AND INTERACTIONS OF MATTER****Unit 1 Chapter 1 THE AIR WE BREATHE**

- Summary
- Explain the connection between your health and what you breathe
 - List the major air pollutants and describe the health effects of each
 - Apply what you know about air pollution to ways of living that result in cleaner air

Performance Indicators Assessed in Unit 1A. Understand various patterns of the periodic table and use knowledge of these patterns to predict chemical and physical properties.

Unit 2 Chapter 2 PROTECTING THE OZONE LAYER

- Summary
- Differentiate between harmful ground level ozone and beneficial stratospheric ozone layer
 - Describe the ozone layer, characterizing it in several different ways
 - Apply the basics of atomic structure to atoms of certain elements

Performance Indicators Assessed in Unit 1E. Demonstrate that the kinetic molecular theory describes the motion of atoms and molecules, and explains the properties of gases.

Unit 3 Chapter 3: The Chemistry of Global Climate Change

- Summary
- Understand the different processes that take part in Earth's energy balance
 - Understand the major role that certain atmospheric gases play in the greenhouse effect

- Analyze, interpret, evaluate, and critique news stories on climate changes

Performance Indicators Assessed in Unit 1C. Use atomic and molecular models to explain common chemical reactions.

Unit 4

Chapter 4: Energy From Combustion

- Summary
- Name the fossil fuels, describe the characteristics of each, and compare them in terms of how cleanly they burn and how much energy they produce.
 - Evaluate fossil fuels as a sustainable source of energy

Performance Indicators Assessed in Unit 1F. Understand energy is exchanged or transformed in all chemical reactions and physical changes of matter.

Unit 5

Chapter 5: Water for Life

- Summary
- Describe how water is linked to life on this planet
 - Write the names and chemical formulas for ionic compounds, including those with common polyatomic ions

Performance Indicators Assessed in Unit 1B. Understand that chemical and physical properties of matter result from the ability of atoms to form bonds due to electrostatic forces between electrons and protons and intermolecular forces between molecules.

Unit 6

Chapter 6: Neutralizing the threat of acid rain

- Summary
- Define the term acid and base and know how to use these definitions to distinguish acids from bases
 - Represent the dissociation (ionization) of acids and bases using chemical equations

Performance Indicators Assessed in Unit 1 I. Understand solutions are homogeneous mixtures of two or more substances and categorize acids, bases, and salts as three classes of compounds that form ions in water solutions.

Unit 7

Chapter 7: The Fires of Nuclear Fission

- Summary
- Give an overview of the past and current use of nuclear power in the US or another country of your choice
 - Compare the processes of alpha, beta, and gamma decay in terms of the changes that occur in the nucleus of the radioactive atom

Performance Indicators Assessed 1H. Model nuclear processes in which an atomic nucleus changes, including radioactive decay of naturally occurring and human-made isotopes, nuclear fission, and nuclear

in Unit fusion.

Unit 8

Chapter 8: Energy from Electron transfer

- Summary
- Discuss the principles governing the transfer of electrons in galvanic cells, including the processes of oxidation and reduction.
 - Identify oxidation and reduction half reactions and be able to distinguish which chemical species is oxidized and which is reduced.

Performance Indicators Assessed in Unit 1D. Balance chemical equations and predict the products of chemical reactions.