

## Themes in Chemistry - Pacing Guide - 2021-2022

Chemistry is the study of matter and its interactions. In this course students will explore and answer the following questions as they learn about key ideas in chemistry:

- How can one explain the structure and properties of matter?
- How do substances combine or change (react) to make new substances? How does one characterize and explain these reactions and make predictions about them?
- What role does energy play in chemical reactions?

Participants will explore three different levels of chemistry understanding: macroscopic (observation based), particulate (what is going on at the level of atoms), and symbolic (written representations).

There is no reference text\* for this course.

| Quarter | Unit  | Primary Focus / Topics  | Options for Further Related Studies              |
|---------|---|---|--|
| 1       | ChemMysteries - Identifying and Describing Matter using Properties. | Intro to Chem<br>Matter and Change<br>Scientific Measurement                  | States of Matter<br>Behavior of Gases            |
| 1       | Atomic Structure, Periodic Table, and Bonding                       | Atomic Structure<br>Electrons in Atoms<br>The Periodic Table                  |  |
| 2       | Chemical Interactions   | Ionic and Metallic Bonding<br>Covalent Bonding<br>Chemical Names and Formulas | Acids, Bases, and Salts<br>Hydrocarbon Compounds |
| 3       | Quantifying Chemistry   | Chemical Quantities - the mole<br>Chemical Reactions                          | Stoichiometry                                    |
| 4       | The Role of Energy in Chemical Reactions                            | Energy in Chemical Reactions  | Enthalpy and Entropy                             |
| 4       | Taking a Closer Look - Acid / Base / Salt Chemistry                 | Acids, Bases and Salts  | Titrations                                       |
| 4       | Taking a Closer Look - Nuclear Chemistry                            | Nuclear Chemistry   | Nuclear Reactions                                |

**Notes:** The thematic units are always being refined and updated and are subject to change. This document will be updated periodically. If you have questions, comments, or concerns, please contact Ms. Sandy ([sjsmith@d49.org](mailto:sjsmith@d49.org))

More information on other side of this page...

## **FHAP - Themes in Science Courses**

This FHAP Themes in Chemistry class is delivered twice per week (Tuesday AND Thursday) in a unit-studies format. During class, students will have the opportunity to explore and discover science in an active, collaborative and creative way. In addition to the classroom activities, students are expected to complete related homework assignments generally due each Tuesday or Thursday before (8am) or at the beginning of the science class. Students who are actively participating in both classwork and homework can be considered this course as a full year of science study and parents may assign a full credit to their student's transcript as desired.

The content of all FHAP science courses will be drawn from key ideas in science that have broad importance within or across multiple science disciplines, including Physical Science, Life science, and Earth and Space Science. Themes in Chemistry is classified as a physical science course. In addition to the science content, the science classes will integrate crosscutting science principles as opportunities arise. Students will engage in science practices to build, deepen, and apply their knowledge of key ideas and crosscutting concepts. The graphic on the next page gives an overview of this information.

**Re: KEY IDEAS:** Students in the Themes in Chemistry course will learn about the following key ideas found in the Colorado 2020 Science Standards:

1. The sub-atomic structural model and interactions between electric charges at the atomic scale can be used to explain the structure and interactions of matter.
2. Chemical processes, their rates, their outcomes, and whether or not energy is stored or released can be understood in terms of collisions of molecules, rearrangement of atoms, and changes in energy as determined by properties of elements involved.
3. The strong nuclear interaction provides the primary force that holds nuclei together. Nuclear processes including fusion, fission, and radioactive decays of unstable nuclei involve changes in nuclear binding energies.

**Re: CROSS CUTTING SCIENCE PRINCIPLES :**

Patterns, Causation, Scale, Systems, Energy, Structure & Function, Stability & Change

**Re: SCIENCE PRACTICES :**

Asking Questions, Using Models, Conducting Investigations, Analyzing Data, Using Mathematics, Constructing Explanations, Arguing from Evidence, Communicating Information

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