

Module 2: Matter and Atomic Theory

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Overview

This module serves as an entry point for students to better understand the experimental basis and implications of atomic theory. It encourages students to think critically about the experimental evidence and also apply the concepts to better understand isotopes, the mole, and ions.

Student Learning Outcomes for the Course

- Upon successful completion of this module, students should be able to:
 - (#2) Recall the historical evidence that led to the discovery of the electronic structure of atoms and the bonding of atoms and ions in molecules.

Keywords

Atomic theory, atomic mass, isotopes, bonding, Avogadro's number, empirical formula

Teaching Tip

While teaching this module, an instructor may find that students fall into two distinct groups: those who mastered this material in high school and those who did not. When faced with this bifurcation, the instruction may want to focus the more advanced students on the experimental evidence and the development of scientific thinking. This allows time for the other students and

opportunity to create a solid foundation in understanding the implications of Atomic Theory. All students can use the practice applying the concepts in this module to calculations.

Several video clips come from [an on-line course at the University of California Irvine](#) and several other resources come from [a collection of simulations at the University of Colorado Boulder](#).

Diversity, Equity and Inclusion ([see more resources](#))

The Digital Enhancement Group encourages UNC system faculty to enhance Diversity, Equity, and Inclusion of all types in all STEM courses. Within the Chem I modules, we have included some examples with which to possibly start. Our materials are not comprehensive, but rather specific to the topics within each module.

For module 2, the discussion of elements and isotopes could include the work to discover new elements. Within this work, one finds that James Andre Harris was the first African American to co-discover an element, actually two elements, 104 Rutherfordium and 105 Dubium. Mr. Harris was a nuclear chemist at the University of California at Berkeley. There is a dearth information about him but here are a few helpful links:

[James Andrew Harris - Wikipedia](#)

[James Andrew Harris - Waco \(TX\) History](#)