



Advanced Chemistry

Course Description:

The curriculum for this course is developed from the [Next Generation Science Standards](#), Qualitative Anion-Cation Analysis (E. J. Margolis) and the [ACT college and career readiness standards](#). This advanced and elective .5 weighted course is designed to expand on knowledge and laboratory skills gained in basic chemistry and prepare students to function in a laboratory in either an academic or industrial setting. The course covers three major areas of chemistry: Qualitative analysis (which builds on skills and concepts from the basic chemistry class and involves descriptive chemistry in an industrial laboratory setting), Organic Chemistry (includes general nomenclature and classification of organic compounds as well as basic analytical organic lab techniques), and Nuclear Chemistry (which looks at the composition and structure of the nucleus, radioactivity and the equipment used to study the various phenomena associated with those topics). The information in this course overview outlines what students should understand and be able to do by the end of the semester / year.

Mastery Standards:

College & Career Readiness Standards (QA=Qualitative Analysis, OC=Organic Chemistry, NC=Nuclear Chemistry)

ACT CCRS for science: [link to standards:](#)

Determine and/or use a complex (e.g., nonlinear) mathematical relationship that exists between data. ([NC] IOD 602)

Analyze presented information when given new, complex information. ([QA, NC] IOD 702)

Translate information into a table, graph, or diagram. ([OC] IOD 403)

Perform a complex interpolation or complex extrapolation using data in a table or graph. ([OC, NC] IOD 603)

Identify the strengths and weaknesses of models ([OC] EMI 503)

Determine which models are supported or weakened by new information. ([OC] EMI 504)

Determine which experimental results or models support or contradict a hypothesis, prediction, or conclusion. ([OC] EMI 505)

Determine whether presented information, or new information, supports or contradicts a complex hypothesis or conclusion, and why. ([QA] EMI 702)

Understand a complex experimental design. ([OC] SIN 501)

Predict the results of an additional trial or measurement in an experiment. ([NC] SIN 502)

Determine the experimental conditions that would produce specified results. ([NC] SIN 503)

Determine the hypothesis for an experiment. ([NC] SIN 601)

Determine an alternate method for testing a hypothesis. ([NC] SIN 602)

Determine which additional trial or experiment could be performed to enhance or evaluate experimental results. ([QA] SIN 703)

Next Generation Science Standards (for Nuclear Chemistry) [link to standards](#)

Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. (HS-PS1-8)

Unit	Description of Unit and Learning Targets
<p>Unit Title: Organic Chemistry</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • What are the practices needed to successfully operate in an organic lab? 	<p>Students will.....</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • Learn the basic rules for organic chemistry naming. • Perform organic lab practices.
<p>Unit Title: Nuclear Chemistry</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • How does Nuclear Chemistry affect daily life? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • Identify and predict the products of standard nuclear reactions. • Develop and perform an investigation in nuclear chemistry. • Research and share a specific (personal choice) nuclear topic.
<p>Unit Title: Qualitative Analysis</p> <p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • How do scientists determine the composition of unknown compounds? 	<p>Students will...</p> <p><u>Learning Targets:</u></p> <ul style="list-style-type: none"> • Learn and practice chemistry lab skills. • Practice a given series of chemical tests to aid in chemical identification. • Determine the identity of unknown chemicals using a series of chemical tests.