

Name	School	Grade	Course/Subject	Number of Students	Interval of Instruction
	Orange High School	9-12	Chemistry Content		September 2018 to March 2019

Standards, Rationale, and Assessment Method

NEW JERSEY CORE CURRICULUM CONTENT STANDARDS – SCIENCE K-12

Rationale

Chemistry investigates matter and energy and ways in which these two quantities interact. Over a course of study in chemistry, students should be able to recognize how both matter and energy are both quantified (measured) and qualified (observed) in a variety of contexts.

The units are presented so that students have multiple opportunities to explore matter and energy. In each unit, students will develop and explain models and theoretical frameworks that have evolved over time. They will also have opportunities to explain emergent theories and/or use modern and original data to investigate novel explanations for historical positions. The units are designed so that there are conceptual "bridges" that tie ideas from one unit to the next.

A lab-based/inquiry chemistry course is structured so that students actively engage in scientific and engineering practices and apply crosscutting concepts to deepen their understanding of the core ideas. The learning experiences provided for students should engage them with fundamental questions about the world and with how scientists have investigated and found answers to those questions. Students should have the opportunity to carry out scientific investigations and engineering design projects related to the disciplinary core ideas in physical sciences ([pp. 8-9, NRC, 2012](#)).

Standards

Unit I: Structure and Properties of Matter

HS-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

HS-PS1-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

HS-PS1-3 Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles

HS-PS1-4 Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

HS-PS1-7 Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

HS-PS3-1 Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system is known.

HS-PS4-1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

Unit II: Periodic Table and Chemical Bonding

HS-PS1-1 Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

HS-PS1-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

HS-PS1-3 Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles

HS-PS1-4 Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

HS-PS2-6 Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

Unit III: Reaction rates and Chemical Equilibrium

HS-PS1-4: Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy

HS-PS1-5. Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

HS-PS1-6: Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium

HS-PS1-7 Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

Assessment Method

Authentic Assessments throughout the year will be used to measure students' growth (including Discovery Education assessments and other NGSS-aligned assessments). The assessments will consist of selected content understanding tasks and performance tasks that reflect higher levels of cognitive complexity.

Starting Points and Preparedness Groupings

Students will be tiered as determined by a data point systems the uses 3 points of data. Each tier group will be assigned a target level.

Data Measures used to Establish Baselines

[2017-2018 Final Grade; weight \(.35\)](#)

[Science Pre-Assessment; weight \(.35\)](#)

[Unit 1 Lab; weight \(.30\)](#)

Preparedness Group	Baseline Score
Tier 1	< 0.35
Tier 2	0.35 – 0.55
Tier 3	0.55 – 0.75

Tier 4	> 0.75
Student Growth Objective	
By March 2019, 70% of students in each preparedness group will meet their assigned target command level for full attainment of the objective as shown in the scoring plan.	

Preparedness Group (e.g. 1,2,3)	Number of Students in Each Group	Target Command Level on SGO Assessment Portfolio
Tier 1		2
Tier 2		3
Tier 3		4
Tier 4		4 or 5 ¹

Scoring Plan
 State the projected scores for each group and what percentage/number of students will meet this target at each attainment level. Modify the table as needed.

Preparedness Group	Student Target Command Level	Teacher SGO Score Based on Percent of Students Achieving Target Score			
		Exceptional (4) >80%	Full (3) 70-80%	Partial (2) 50-69%	Insufficient (1) <50%
Tier 1	2				
Tier 2	3				
Tier 3	4				
Tier 4	4 or 5				

Approval of Student Growth Objective
 Administrator approves scoring plan and assessment used to measure student learning.

Teacher _____	Signature _____	Date Submitted _____
Evaluator _____	Signature _____	Date Approved _____

¹ It is expected that students in Tier 4 maintain a level of strong command or grow to distinguished command.

Results of Student Growth Objective

Summarize results using weighted average as appropriate. Delete and add columns and rows as needed.

Preparedness Group	Students at Target Score	Teacher SGO Score	Weight (based on students per group)	Weighted Score	Total Teacher SGO Score
Tier 1					
Tier 2					
Tier 3					
Tier 4					

Notes

Describe any changes made to SGO after initial approval, e.g. because of changes in student population, other unforeseen circumstances, etc.

Review SGO at Annual Conference

Describe successes and challenges, lessons learned from SGO about teaching and student learning, and steps to improve SGOs for next year.

Teacher _____ Signature _____ Date _____

Evaluator _____ Signature _____ Date _____