Glen Ridge Board of Education
Science
Chemistry
*Required*
*Full Year*

*New Jersey Student Learning Standards*

Written by: Sharon Tully
Science Mission Statement:
The Glen Ridge Public School’s science curriculum seeks to inspire scientifically-literate citizens who will be able to participate in a dynamic global community. Our program fosters a spirit of intellectual curiosity and collaborative problem solving that is innovative, experiential, thought-provoking, and developmentally appropriate. Our students will use scientific methodology to evaluate and critique global issues relating to Life Sciences, Physical Sciences, The Sciences of Earth & Space, and Engineering Sciences. Students will be challenged and will be encouraged to take risks and develop critical scientific thinking skills.

Course Description:
This course is designed to teach the student the basic principles of chemistry. Concepts of energy, rate and equilibrium, chemical reactions, the dimensional structure of molecules, chemical bonds as they occur in solids, liquids and gases, and the ideas of atomic structure and chemical periodicity are included within the course. Laboratory experiments are used to emphasize methods and techniques as well as to gather data and make predictions.

<table>
<thead>
<tr>
<th>Chemistry CP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit 1: Introduction to Chemistry</strong></td>
</tr>
</tbody>
</table>

**Time Allotted (days of instruction): 25 days**

**New Jersey Student Learning Standards (NJSLS)**

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

| (TO ADD MORE ROWS, RIGHT CLICK AND CHOOSE INSERT ROW BELOW) |

**Essential Questions**
- What is chemistry?
- How do we use the scientific method to solve problems?
- How is mathematics a tool for problem solving and as a means of expressing theories?
- How is matter classified?
- What are chemical and physical properties and how are they useful?
- What is the difference between a chemical and physical change?

**Student Learning Objectives**
- Use the steps of the scientific method to solve problems. (NGSS: PS1.A, NJCCC: 5.1.12.B.2, 5.1.12.A.3)
- Identify units used for scientific measurement. (NGSS: PS1.A, NJCCC: 5.1.12.A.2)
- Understand that the precision of a

**Activities**
- Identify the parts of the scientific method in an experiment.
- Carry out calculations following the rules governing significant figures in both standard and scientific notation.
- Make scientific measurements and use dimensional analysis to convert units.
- Organize data into tables and graphs.
- Classify substances based on purity and phase.
- Identify physical and chemical properties and changes.
- Use density (physical property) to identify an unknown. Identify the branches of chemistry and the careers related to each branch.
measurement will affect the precision of a calculation. (NGSS: PS1.A, NJCCC: 5.1.12.B.4)

- Understand why scientific notation is necessary for chemists. (NGSS: PS1.A, NJCCC: 5.1.12.B.4)
- Use dimensional analysis to solve various types of problems. (NGSS: PS1.a, NJCCC: 5.1.12.A.2, 5.1.12.D.1)
- Classify matter as a pure substance (element or compound) or mixture. (NGSS: PS1.a, NJCCC: 5.1.12.A.1)
- Differentiate between homogeneous and heterogeneous substances. (NGSS: PS1.A, NJCCC: 5.1.12.A.1)
- Differentiate between physical and chemical properties. (NGSS: PS1.A, NJCCC: 5.1.12.A.1)
- What is the difference between a chemical and physical change?

### Resources/Materials

- Online Textbook Information
- Teacher Webpage
- Textbook recommended internet sites
- You tube videos
  - thescienceclassroom.org/chemistry
- Chartgo.com graph creator
  - Create a graph [https://nces.ed.gov/nceskids/createagraph/](https://nces.ed.gov/nceskids/createagraph/)
- NJCTL.org
  - sciencespot.com
  - [https://www.khanacademy.org/science/chemistry](https://www.khanacademy.org/science/chemistry)

### Interdisciplinary Connections

RST.11-12.1. Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions.
21st Century Life and Careers

Standard 9.1 21st-Century Life & Career Skills
All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

Standard 9.3 - Career Awareness, Exploration, and Preparation
All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

Standard 6.3 Active Citizenship in the 21st Century
All students will acquire the skills needed to be active, informed citizens who value diversity and promote cultural understanding by working collaboratively to address the challenges that are inherent in living in an interconnected world.

Technology Standards

Standard 8.1 – Computer and Information Literacy
All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate to create and communicate knowledge.

Standard 8.2 – Technology Education
All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world as they relate to the individual, society, and the environment.

Assessments

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| ● Impromptu quizzes  
● Short comparative assessments to see how pupils are performing against their peers  
● One-minute problem solving on a specific formula or topic  
● Lesson exit tickets to summarise | ● End-of-term or midterm exams  
● Cumulative work over an extended period such as a final project, creative portfolio  
● End-of-unit or chapter tests  
● Standardised tests that demonstrate school accountability are used for | ● Teacher made review games  
● Quizlet, jeopardy review games, Kahoot  
● Exit tickets  
● Homework problem check  
● Classwork group review  
● Learning scales | ● Research the connection of mathematics and chemistry  
● Contact a working chemist and discuss the duties of their job  
● Present the information to the class |
what pupils have learnt
- Ask students to create a diagram or chart to demonstrate topics learnt
- Homework
- Group problem solving

pupil admissions; SATs, New Jersey Student Learning Assessment – Science (NJSLA-S)

- Research the connection between chemistry, biology, and physics and make a concept map to show the relationships

<table>
<thead>
<tr>
<th>Modifications</th>
<th>English Language Learners</th>
<th>Special Education/504</th>
<th>Gifted and Talented</th>
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<td></td>
<td>● Provide ELL students with multiple literacy strategies.</td>
<td>● Additional Modifications as Needed:</td>
<td>● Write a research paper on the properties of matter and the relationship between matter and atoms</td>
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<td>● Collaborate with after-school programs or clubs to extend learning opportunities.</td>
<td>● Structure lessons around questions that are authentic, relate to students’ interests, social/family background and knowledge of their community.</td>
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<td>● Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</td>
<td>● Discuss the topics with AP Chemistry students to facilitate further learning</td>
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<td>● Use of Graphic Organizers; scaffolding</td>
<td>● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.</td>
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<td>● Make lessons visual.</td>
<td>● shorten assignments to focus on mastery of key concepts</td>
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<td>● Use visual representations of new vocabulary and use graphs, photographs, drawings and charts to introduce new vocabulary and concepts.</td>
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<td>● Create graphic organizers to teach students how to organize information.</td>
<td>● Substitute alternatives for written assignments (clay models, posters, panoramas, collections, etc)</td>
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<td>● Cooperative and partner activities.</td>
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<td>Content area homework and assessments need to be differentiated. Alternate assessment; oral, test modifications</td>
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<td>● Provide alternative testing site</td>
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<td></td>
<td></td>
<td>● Response Format and Procedures</td>
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**Use of preferred mode (e.g., oral testing, use of illustrations, posters, diagram)**

## New Jersey Student Learning Standards (NJSLS)

<table>
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<th>Standard</th>
<th>Description</th>
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<td>HS-PS1-1</td>
<td>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.</td>
</tr>
<tr>
<td>HS-PS1-3</td>
<td>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.</td>
</tr>
</tbody>
</table>

## Essential Questions

- What is the structure of an atom?
- What is atomic theory?
- What is the quantum mechanical model of the atom?
- How is the modern periodic table organized?
- What is the periodic law?
- How does ionic and covalent bonding occur and how do their properties vary?
- How does one name compounds and write formulas?

## Student Learning Objectives

- Identify major contributors to atomic theory. (NGSS: PS1.A, NJCCC: 5.2.12.A.1)
- Identify and compare the properties of the three main subatomic particles. (NGSS: PS1.A, NJCCC: 5.2.12.A.1, 5.2.12.A.4)
- Explain modern atomic theory and write electron configurations of the elements. (NGSS: PS1.A, NJCCC: 5.2.12.A.1)
- Summarize the development of the modern periodic table of the elements. (NGSS: PS1.A, NJCCC: 5.2.12.A.1, 5.2.12.A.3)
- Explain how the transfer or sharing of electrons allows elements to achieve stable electron configurations. (NGSS: PS1.A, NJCCC: 5.2.12.A.1, 5.2.12.A.3, 5.2.12.B.1)

## Activities

- Use a timeline to explain the development of atomic theory.
- Calculate protons, neutrons and electrons using the mass number and atomic number for elements and their isotopes.
- Carry out the flame test and use it to identify an unknown.
- Determine periodic trends using the periodic table.
- Compare the properties of ionic and covalent compounds.
- Name and write formulas for ionic and covalent compounds.
- Draw Lewis dot structures and construct simple models.
| 5.2.12.B.1) ● Name and write formulas for ionic and covalent compounds. (NGSS: PS1.A, NJCCC: 5.2.12.A.1) |
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| Interdisciplinary Connections |
| RST.11-12.1. Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. |
| RST.11-12.2. Determine the central ideas, themes, or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. |
| RST.11-12.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. |
| RST.11-12.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics. |
| RST.11-12.5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating an understanding of the information or ideas. |
| RST.11-12.7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. |
| RST.11-12.8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information |

| 21st Century Life and Careers |
| Standard 9.1 21st-Century Life & Career Skills |
| All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures. |
| Standard 9.3 - Career Awareness, Exploration, and Preparation |
| All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age. |
| Standard 6.3 Active Citizenship in the 21st Century |
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● Lesson exit tickets to summarise what pupils have learnt  
● Ask students to create a diagram or chart to demonstrate topics learnt  
● Homework  
● Group problem solving  | ● End-of-term or midterm exams  
● Cumulative work over an extended period such as a final project, creative portfolio,  
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● Quizlet, jeopardy review games, Kahoot  
● Exit tickets  
● Homework problem check  
● Classwork group review  
● Learning scales  | ● Research the connection of mathematics and chemistry  
● Contact a working chemist and discuss the duties of their job  
● Present the information to the class  
● Oral testing  
● Make a 3D model on one of the first 20 elements  
● Research the an element’s properties, usage and history |

**Assessments**

**Modifications**

**English Language Learners**

- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Ability to access Google translate in native language.
- Verbal testing for written assessment.
- Use of Graphic Organizers; scaffolding.
- Make lessons visual.
- Use visual representations of new vocabulary and use graphs, photographs, drawings and

**Special Education/504**

- Additional Modifications as Needed:
  - Structure lessons around questions that are authentic, relate to students’ interests, social/family background and knowledge of their community.
  - Provide students with multiple choices for how they can represent their understandings (e.g., multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
  - Provide multiple grouping opportunities for students to share their ideas and to encourage

**Gifted and Talented**

- Make a presentation of the different groups of elements and the properties that classifies them into that group.
- Provide multiple grouping opportunities for students to help other students at various levels.
- Discuss the topics with Ap Chemistry students to facilitate further learning.
- Make video on naming chemical compounds and present it to the class.
charts to introduce new vocabulary and concepts.

- Create graphic organizers to teach students how to organize information.
- Cooperative and partner activities.
- Highlighting action words within the directions.

work among various levels

- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Shorten assignments to focus on mastery of key concepts
- Verbal testing for written assessments
- Substitute alternatives for written assignments (clay models, posters, panoramas, collections, etc)
- Study guides provided
- Word bank for assessments provided
- Modify testing and homework as needed. Content area homework and assessments need to be differentiated. Alternate assessment; oral, test modifications
- Provide alternative testing site
- Response Format and Procedures
- Use of preferred mode (e.g., oral testing, use of illustrations, posters, diagram)

<table>
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<tr>
<th>Essential Questions</th>
<th>Student Learning Objectives</th>
<th>Activities</th>
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<tbody>
<tr>
<td>What is a chemical equation and why must the law of conservation of mass be obeyed?</td>
<td>To state the law of conservation of mass and how it explains why all chemical equations must be balanced. (NGSS: PS1.B, PS3.B, NJCCC: 5.2.12.B.3)</td>
<td>Carry out chemical reactions and write balanced equations.</td>
</tr>
<tr>
<td>What are the main types of chemical reactions?</td>
<td>To identify, complete, and balance the general types of chemical reactions. (NGSS: PS1.B, NJCCC: 5.2.12.B.3)</td>
<td>Determine exothermic and endothermic reactions by measuring temperature changes.</td>
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<tr>
<td>What energy changes occur during a chemical reaction?</td>
<td></td>
<td>Determine the mass of a pure substance and calculate the moles.</td>
</tr>
<tr>
<td>How is the mole central to chemical</td>
<td></td>
<td>Determine the empirical and molecular formulas from experimental data.</td>
</tr>
</tbody>
</table>

Name of Course

Unit 3: Chemical Reactions & Quantities

Time Allotted (days of instruction): 40 days

New Jersey Student Learning Standards (NJSLS)

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

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.
<table>
<thead>
<tr>
<th>Calculations?</th>
<th>How does one convert between mass, representative particles, and volumes of gases using the mole?</th>
<th>To explain what happens to energy during chemical reactions. (NGSS: PS1.b, PS3.B, NJCC: 5.2.12.B.3, 5.2.12.D.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How does one determine the quantities of reactants and products needed in chemical reactions using a balanced chemical equation?</td>
<td>Resources/Materials</td>
<td>Interdisciplinary Connections</td>
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<tr>
<td>Online Textbook Information</td>
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● -quizlet, jeopardy review games, Kahoot  
● Exit tickets  
● Homework problem check  
● Classroom group review  
● Learning scales | ● Oral testing  
● Research types of chemical reactions and examples of each  
● Perform each type of chemical reaction and describe how to see if the reaction represented the law of conservation of mass and the idea of balancing chemical equations |

### Modifications

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- Study guides provided.
- Word bank for assessments provided.
- Modify testing and homework as needed. Content area homework and assessments need to be differentiated.
- Provide alternative testing site.
- Use of preferred mode (e.g., oral testing, use of illustrations, posters, diagram).

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<tr>
<td><strong>Unit 4: Solids, Liquids &amp; Gases</strong></td>
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</table>

**Time Allotted (days of instruction): 15 days**

**New Jersey Student Learning Standards (NJSLS)**

<table>
<thead>
<tr>
<th>HS-PS1-8</th>
<th>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.</th>
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<tr>
<td>HS-PS1-4</td>
<td>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.</td>
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<tr>
<td>HS-PS1-2</td>
<td>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.</td>
</tr>
<tr>
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<td>Student Learning Objectives</td>
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</table>
| ● What are the phases of matter and how does the kinetic theory explain their behavior?  
● How do substances change phase?  
● How do the gas laws allow one to deal with situations involving multiple variables? | ● Describe the motion of particles in solids, liquids and gases according to the kinetic theory. (NGSS: PS1.A, NJCCC: 5.2.12.C.1)  
● Define and calculate the quantitative effects of changes in pressure, volume and temperature on contained gases. (NGSS: PS2.A, PS2.B, NJCCC: 5.2.12.C.1)  
● Carry out Boyle’s and Charles’ law  
● Calculate pressure, temperature or volume from given data.  
● Calculate the moles and mass of a gas in a contained cylinder from given data  
● Calculate the total pressure of a gaseous mixture or the partial pressure of a gas in a mixture from given data. |

**Resources/Materials**

- Online Textbook Information
- Teacher Webpage
- Textbook recommended internet sites
- You tube videos
- thescienceclassroom.org/chemistry
- Chartgo.com graph creator
- Create a graph [https://nces.ed.gov/nceskids/createagraph/](https://nces.ed.gov/nceskids/createagraph/)
- NJCTL.org
- sciencespot.com
### Interdisciplinary Connections

| RST.11-12.1 | Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions. |
| RST.11-12.2 | Determine the central ideas, themes, or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. |
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| RST.11-12.4 | Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11-12 texts and topics*. |
| RST.11-12.5 | Analyze how the text structures information or ideas into categories or hierarchies, demonstrating an understanding of the information or ideas. |
| RST.11-12.7 | Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. |
| RST.11-12.8 | Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. |

### 21st Century Life and Careers

**Standard 9.1 21st-Century Life & Career Skills**
All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

**Standard 9.3 - Career Awareness, Exploration, and Preparation**
All students will apply knowledge about and engage in the process of career awareness, exploration, and preparation in order to navigate the globally competitive work environment of the information age.

**Standard 6.3 Active Citizenship in the 21st Century**
All students will acquire the skills needed to be active, informed citizens who value diversity and promote cultural understanding by working collaboratively to address the challenges that are inherent in living in an interconnected world.

### Technology Standards

**Standard 8.1 – Computer and Information Literacy**
All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

**Standard 8.2 – Technology Education**
All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world as they relate to the individual, society, and the environment.

### Assessments

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- Short comparative assessments to see how pupils are performing against their peers
- One-minute problem solving on a specific formula or topic
- Lesson exit tickets to summarise what pupils have learnt
- Ask students to create a diagram or chart to demonstrate topics learnt
- Homework
- Group problem solving

- Cumulative work over an extended period such as a final project, creative portfolio,
- End-of-unit or chapter tests
- Standardised tests that demonstrate school accountability are used for pupil admissions; SATs, New Jersey Student Learning Assessment – Science (NJSLA-S)

- -quizlet, jeopardy review games, Kahoot
- Exit tickets
- Homework problem check
- Classwork group review
- Learning scales

- Research the gas laws of chemical reactions and develop a presentation with video links of video representations of each gas law
- Perform experiments for at least 3 gas laws and how the gas laws are related to everyday activities.

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<tr>
<th>Modifications</th>
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<th>Special Education/504</th>
<th>Gifted and Talented</th>
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<td><strong>Additional Modifications as Needed:</strong></td>
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<td>• Write a research paper on the gas laws and the relationship between the movement of atoms and pressure, temperature and volume.</td>
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<td>• Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</td>
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<td>• Discuss the topics with AP Chemistry students to facilitate further learning</td>
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<td>• Provide multiple grouping opportunities for students to share their ideas and to encourage work among various levels</td>
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<td>• Identify where sublimation occurs</td>
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<td>• Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.</td>
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be differentiated. Alternate assessment; oral, test modifications
- Provide alternative testing site
- Response Format and Procedures
- Use of preferred mode (e.g., oral testing, use of illustrations, posters, diagram)

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<td>How is a solution formed?</td>
<td>1. Explain how a solution forms and identify the factors that determine the rate. (NGSS: PS1.B, NJCCC: 5.2.12.A.5)</td>
<td>Change the rate of solution by adjusting individual factors.</td>
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<td>How is energy converted from starting materials to products?</td>
<td>Interpret and express the meaning of the rate of a chemical reaction. (NGSS: PS1.B, NJCCC: 5.2.12.A.5)</td>
<td>Change the rate of reaction by adjusting individual factors</td>
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<tr>
<td>How does Le Chatelier’s principle predict the changes in the equilibrium position?</td>
<td>Identify the factors affecting reaction rates. (NGSS: PS1.B, NJCCC: 5.2.12.A.5)</td>
<td>Test and classify common substances as acids, bases or neutral substances based on their pH</td>
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<tr>
<td>What is a neutralization reaction?</td>
<td>Compare and contrast acids and bases as defined by various theories. (NGSS: PS1.B, NJCCC: 5.2.12.A.6)</td>
<td>Carry out an acid-base titration</td>
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Chemistry CP

Unit 5: Solutions, Equilibrium, & Acids and Bases

Time Allotted (days of instruction): 30 days

New Jersey Student Learning Standards (NJSLS)

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-PS1-5 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.

(TO ADD MORE ROWS, RIGHT CLICK AND CHOOSE INSERT ROW BELOW)
according to their dissociation constants. (NGSS: PS1.B, NJCCC: 5.2.12.A.6)
- Explain why some aqueous salt solutions are acidic, basic or neutral using hydrolysis. (NGSS: PS1.B, NJCCC: 5.2.12.A.6)

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<td>● Oral testing &lt;br&gt; ● Create various solutions with different pH by changing the concentration of the solution &lt;br&gt; ● Perform a neutralization reaction and use indicators to so a color change</td>
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### Modifications

#### English Language Learners
- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities.

#### Special Education/504
- Additional Modifications as Needed:
  - Structure lessons around questions that are authentic, relate to students’ interests, social/family background and knowledge of their community.

#### Gifted and Talented
- Write a research paper on acids and bases in the foods we eat
- Make a video presentation of calculation of pH and pOH problem solving for the class.
- Provide multiple grouping opportunities for students
- Ability to access Google translate in native language
- Verbal testing for written assessment
- Use of Graphic Organizers; scaffolding
- Make lessons visual.
- Use visual representations of new vocabulary and use graphs, photographs, drawings and charts to introduce new vocabulary and concepts.
- Create graphic organizers to teach students how to organize information.
- Cooperative and partner activities.
- Highlighting action words within the directions.

- Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).
- Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.
- Shorten assignments to focus on mastery of key concepts.
- Verbal testing for written assessments
- Substitute alternatives for written assignments (clay models, posters, panoramas, collections, etc)
- Study guides provided
- Word bank for assessments provided
- Modify testing and homework as needed.
- Content area homework and assessments need to be differentiated. Alternate assessment; oral, test modifications
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- to share their ideas and to encourage work among various levels
- To measure the effectiveness of antacids at neutralizing excess stomach acid.
- To make an indicator from natural sources and test common substances.
- Discuss the topics with Ap Chemistry students to facilitate further learning
- Research the acidification in lakes and streams and the effects on wildlife and make a video presentation of gas laws problem solving for the class

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**Chemistry CP**

**Unit 6: Organic Chemistry**

**Time Allotted (days of instruction): 15 days**

**New Jersey Student Learning Standards (NJSLS)**

**HS-PS1.** 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-PS1-8.** 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.

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<tr>
<td>What are substituted hydrocarbons and what are their physical and chemical properties?</td>
<td>Write the structural formula for a hydrocarbon given its IUPAC name and vice versa. (NGSS: PS1.A, NJCCC: 5.2.12.A.1)</td>
<td>Draw and name substituted hydrocarbons.</td>
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<td>Identify a hydrocarbon's functional group and describe its properties. (PS1.A, NJCCC: 5.2.12.A.1)</td>
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<tr>
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<td>Name and draw structural formulas for simple substituted hydrocarbons. (NGSS: PS1.A, NJCCC: 5.2.12.A.1)</td>
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<td>their peers</td>
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<td>Make a simple 3D model of a hydrocarbon, alkane, alken, and alkyne</td>
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### Modifications

| English Language Learners | Special Education/504 | Gifted and Talented |
|--------------------------|------------------------|---------------------|---------------------|

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- Provide ELL students with multiple literacy strategies.
- Collaborate with after-school programs or clubs to extend learning opportunities.
- Ability to access Google translate in native language
- Verbal testing for written assessment
- Use of Graphic Organizers; scaffolding
- Make lessons visual.
- Use visual representations of new vocabulary and use graphs, photographs, drawings and charts to introduce new vocabulary and concepts.
- Create graphic organizers to teach students how to organize information.
- Cooperative and partner activities.
- Highlighting action words within the directions.

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- Study guides provided
- Word bank for assessments provided
- Modify testing and homework as needed.
- Content area homework and assessments need to be differentiated. Alternate assessment; oral, test modifications
- Provide alternative testing site
- Response Format and Procedures
- Use of preferred mode (e.g., oral testing, use of illustrations, posters, diagram)

### To observe the three dimensional shapes of molecules.
- To model substituted hydrocarbons.
- Show chemical reactions using 3D models of organic molecules
- Research common hydrocarbons and how they affect the environment

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**Chemistry CP**

**Unit 7: Oxidation & Reduction Reactions**

**Time Allotted (days of instruction):** 15 days

**New Jersey Student Learning Standards (NJSL)**

**HS-PS1.** 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-PS1-8.** 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-PS1-2
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-PS1-4
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.

### Essential Questions
1. What are oxidation and reduction reactions?
2. How are oxidation numbers assigned and how does one use them to balance equations?

### Student Learning Objectives
1. Define oxidation and reduction in terms of loss or gain of electrons. (NGSS: PS1.B, NJCCC: 5.2.12.B.2)
2. Identify the species being oxidized and reduced, and the oxidizing and reducing agents. (NGSS: PS1.B, NJCCC: 5.2.12.B.2)

### Activities
- Assign oxidation numbers to elements in a pure substance.
- Determine redox reactions using oxidation numbers.
- Identify the species within a redox reaction.
- Using a sketch of a voltaic cell, identify the anode, cathode, and the direction of electron flow.

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**Technology Standards**

**Standard 8.1 – Computer and Information Literacy**
All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

**Standard 8.2 – Technology Education**
All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world as they relate to the individual, society, and the environment.

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<tr>
<th>Assessments</th>
<th>Formative</th>
<th>Summative</th>
<th>Benchmarks</th>
<th>Alternative</th>
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<tbody>
<tr>
<td>● Impromptu quizzes</td>
<td>● End-of-term or midterm exams</td>
<td>● Teacher made review games</td>
<td>● Oral testing</td>
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<td>● Short comparative assessments to see how pupils are performing against their peers</td>
<td>● Cumulative work over an extended period such as a final project, creative portfolio</td>
<td>● -quizlet, jeopardy review games, Kahoot</td>
<td>● Complete oxidation and reduction activity</td>
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<td>● One-minute problem solving on a specific formula or topic</td>
<td>● End-of-unit or chapter tests</td>
<td>● Exit tickets</td>
<td><a href="https://www.scienceinschool.org/content/colourful-chemistry-red-ox-reactions-lollipops">https://www.scienceinschool.org/content/colourful-chemistry-red-ox-reactions-lollipops</a></td>
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<td>● Lesson exit tickets to summarise what pupils have learnt</td>
<td>● Standardised tests that demonstrate school accountability are used for pupil admissions; SATs, New Jersey Student Learning Assessment – Science (NJSLA-S)</td>
<td>● Homework problem check</td>
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<td>● Ask students to create a diagram or chart to demonstrate topics learnt</td>
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<td>● Classwork group review</td>
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<td>● Homework</td>
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<td>● Learning scales</td>
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<td>● Group problem solving</td>
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<tr>
<td>Modifications</td>
<td>English Language Learners</td>
<td>Special Education/504</td>
<td>Gifted and Talented</td>
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<td>● Provide ELL students with multiple literacy strategies.</td>
<td>● Additional Modifications as Needed:</td>
<td>● Provide multiple grouping opportunities for students to share their ideas and to encourage work among various levels</td>
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<td>● Collaborate with after-school programs or clubs to extend learning opportunities.</td>
<td>● Structure lessons around questions that are authentic, relate to students’ interests, social/family background and knowledge of their community.</td>
<td>● Discuss the topics with Ap Chemistry students to facilitate further learning</td>
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<td>● Ability to access Google translate in native language</td>
<td>● Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).</td>
<td>● Understands a chemical reaction occurs when one or more substances (reactants) react to form a different chemical substance(s) (products). There are different types of chemical reactions all of which demonstrate the Law of Conservation of Matter and Energy.</td>
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<td>● Verbal testing for written assessment</td>
<td>● Provide multiple grouping opportunities for students to share their ideas and to encourage work among various levels</td>
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<td>● Use of Graphic Organizers; scaffolding</td>
<td>● Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.</td>
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<td>● Make lessons visual.</td>
<td>● shorten assignments to focus on mastery of key concepts</td>
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<td>● Use visual representations of new vocabulary and use graphs, photographs, drawings and charts to introduce new vocabulary and concepts.</td>
<td>● Verbal testing for written assessments</td>
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<td>● Create graphic organizers to teach students how to organize information.</td>
<td>● Substitute alternatives for written assignments (clay models, posters, panoramas, collections, etc)</td>
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<td>● Cooperative and partner activities.</td>
<td>● Study guides provided</td>
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<td>● Highlighting action words within the directions.</td>
<td>● Word bank for assessments provided</td>
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<td>● Modify testing and homework as needed. Content area homework and assessments need to be differentiated. Alternate assessment; oral, test modifications</td>
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<td>● Provide alternative testing site</td>
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<td>● Response Format and Procedures</td>
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<td>● Use of preferred mode (e.g., oral testing, use of illustrations, posters, diagram)</td>
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