Winslow Township School District
Laboratory Chemistry
Unit 1

Overview: In this unit of study, students use investigations, simulations, and models to makes sense of the substructure of atoms and to provide more mechanistic explanations of the properties of substances. Chemical reactions, including rates of reactions and energy changes, can be understood by students at this level in terms of the collisions of molecules and the rearrangements of atoms. Students are able to use the periodic table as a tool to explain and predict the properties of elements. Students are expected to communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials. The crosscutting concepts of *structure and function*, *patterns*, *energy and matter*, and *stability and change* are called out as the framework for understanding the disciplinary core ideas. Students use *developing and using models*, *planning and conducting investigations*, *using mathematical thinking*, and *constructing explanations and designing solutions*. Students are also expected to use the science and engineering practices to demonstrate proficiency with the core ideas.

Overview	Standards for Science	Unit Focus	Essential Questions
Unit 1	• HS-PS1-1 • HS-PS1-2 • HS-PS1-3 • HS-PS2-6 • HS-ETS1-3 • HS-ETS1-4 • WIDA 1,4	• 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. • 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. • 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. • Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials	***How can the substructures of atoms explain the observable properties of substances?*** ***How can a periodic table tell me about the subatomic structure of a substance?*** •

Winslow Township School District
Laboratory Chemistry
Unit 1

Unit 1: Enduring Understandings	• Different patterns may be observed at each of the scales at which a system is studied, and these patterns can provide evidence for causality in explanations of phenomena. • Each atom has a charged substructure. • An atom's nucleus is made of protons and neutrons and is surrounded by electrons. • The periodic table orders elements horizontally by number of protons in the nucleus of each element's atoms and places elements with similar chemical properties in columns. • The repeating patterns of this table reflect patterns of outer electron states. • Patterns of electrons in the outermost energy level of atoms can provide evidence for the relative properties of elements at different scales. Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects. • The periodic table orders elements horizontally by number of protons in the nucleus of each element's atoms and places elements with similar chemical properties in columns. • The repeating patterns of the periodic table reflect patterns of outer electron states. • The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. Different patterns may be observed at each of the scales at which a system is studied, and these patterns can provide evidence for causality in explanations of phenomena. • The structure and interactions of matter at the bulk scale are determined by electrical forces within and between atoms. • Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects. Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena.	

Winslow Township School District
Laboratory Chemistry
Unit 1

Curriculum Unit 1	Standards		Pacing	
			Days	Unit Days
Unit 1: • **Introduction to Chemistry** • **Properties of Matter** • **Scientific Measurement** • **Atomic Structure**	HS-ETS11 HS-ETS12 HS-ETS13	Introduction Chemistry and You Problem Solving Properties of Matter Mixtures Elements and Compounds Chemical Reactions	16	49
	HS-ETS11 HS-ETS12 HS-ETS13	Expressing Measurements Metric Measurements Solving Conversion Problems Atomic Structure Nuclear Atom Isotopes	22	
	HS-ETS11 HS-ETS12 HS-ETS13	Electrons in Atoms Electron Configuration Quantum Mechanical Model	9	
	Assessment, Re-teach and Extension		2	

Winslow Township School District
Laboratory Chemistry
Unit 1

Unit 1		
Disciplinary Core Ideas	**Indicator #**	**Indicator**
PS1.A: Structure and Properties of Matter • Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. **PS1.B: Chemical Reactions**	**(HS-PS1-1)** **HS-PS2-6)**	Use a model to predict the relationships between systems or between components of a system.
	(HS-PS1-2)	Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.

The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe and predict chemical reactions. **PS2.B: Types of Interactions** • Attraction and repulsion between electric charges at the atomic scale explain the structure, properties, and transformations of matter, as well as the contact forces between material objects.	**HS-PS1-3**	Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.

Winslow Township School District
Laboratory Chemistry
Unit 1

<table>
<tr><th colspan="2">Unit 1</th></tr>
<tr><th colspan="2">• Assessment Plan</th></tr>
<tr><td>• Exploratory activities
• Warm-up activities
• Individual/Group Lab report
• Class discussions
• Student Participation
• Teacher Observations</td><td>•Quizzes
• Tests
• Authentic assessments and projects
• Exploratory activities
• Presentations</td></tr>
<tr><th>Resources</th><th>Activities</th></tr>
<tr><td>• Chromebooks
• Textbook
• Reading Essentials Workbook
• Web Quests
• Virtual Field Trips
• Video Streaming
• BrainPOP
• Puzzlemaker: Game Based Learning | Discovery Education
• Diversity, Equity & Inclusion Educational Resources
https://www.nj.gov/education/standards/dei/</td><td>• Use physical models to examine the phases of the moon using a light source and a moon model to view the various shapes of the moon as it orbits the earth and keep a lunar calendar for one month and analyze the results by looking for differences and patterns.
• Measure the acceleration of the objects as they fall from various heights and determine that the objects speed up as they fall, therefore proving that a force is acting on them.
• mini-lessons
• independent reading
• films
• website exploration
• discussions, dialogues
• debates
• partner or small group work
• student presentations, reports, journals, reflections,
• in-class assessments,
• written reports, essays, research, and homework</td></tr>
</table>

Winslow Township School District
Laboratory Chemistry
Unit 1

Instructional Best Practices and Exemplars	
1. Identifying similarities and differences 2. Summarizing and note taking 3. Reinforcing effort and providing recognition 4. Homework and practice 5. Nonlinguistic representations	6. Cooperative learning 7. Setting objectives and providing feedback 8. Generating and testing hypotheses 9. Cues, questions, and advance organizers 10. Manage response rates

9.1 Personal Financial Literacy, 9.2 Career Awareness, Exploration, Preparation and Training & 9.4 Life Literacies and Key Skills

9.2.12.CAP.2: Develop college and career readiness skills by participating in opportunities such as structured learning experiences, apprenticeships, and dual enrollment programs.
9.2.12.CAP.6: Identify transferable skills in career choices and design alternative career plans based on those skills.
9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas.
9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice.
9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task.
9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.
9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments.
9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

The implementation of the 21st Century skills and standards for students of the Winslow Township District is infused in an interdisciplinary format in a variety of curriculum areas that include, English language Arts, Mathematics, School Guidance, Social Studies, Technology, Visual and Performing Arts, Science, Physical Education and Health, and World Language.

Additional opportunities to address 9.1, 9.2 & 9.4:

Philadelphia Mint

https://www.usmint.gov/learn/kids/resources/educational-standards

Different ways to teach Financial Literacy.

https://www.makeuseof.com/tag/10-interactive-financial-websites-teach-kids-money-management-skills/

Winslow Township School District
Laboratory Chemistry
Unit 1

Modifications for Special Education/504
Students with special needs: The students' needs will be addressed on an individual and grade level using a variety of modalities. Accommodations will be made for those students who need extra time to complete assignment. Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Physical expectations and modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered. • Small group instruction • Audio books/ Text-to-speech platforms • Leveled texts/Vocabulary Readers • Leveled informational texts via online • Modeling and guided practice • Read directions aloud • Repeat, rephrase and clarify directions • Extended time as needed • Break down assignments into smaller units • Provide shortened assignments • Modify testing format • Repeat directions as needed • Graphic organizers • Study Guides, Study Aids and Re teaching as needed

Winslow Township School District
Laboratory Chemistry
Unit 1

Modifications for At-Risk Students
Formative and summative data will be used to monitor student success. At first signs of failure, student work will be reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations • Restructure lessons using Universal Design for Learning (UDL) principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA) • 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 opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies). • Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple representation and multimodal experiences). • Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable phenomena. • Structure the learning around explaining or solving a social or community-based issue. • Provide English Language Learners students with multiple literacy strategies. Collaborate with after-school programs or clubs to extend learning opportunities.

Winslow Township School District
Laboratory Chemistry
Unit 1

English Language Learners	Modifications for Gifted Students
All WIDA Can Do Descriptors can be found at this link: https://wida.wisc.edu/teach/can-do/descriptors ☐ Grades 9-12 WIDA Can Do Descriptors: ☐ Listening ☐ Speaking ☐ Reading ☐ Writing ☐ Oral Language Students will be provided with accommodations and modifications that may include: • Relate to and identify commonalities in science studies in student's home country • Assist with organization • Use of computer • Emphasize/highlight key concepts • Teacher Modeling • Peer Modeling • Label Classroom Materials - Word Walls	Students excelling in mastery of standards will be challenged with complex, high level challenges related to the topic. ● Raise levels of intellectual demands ● Require higher order thinking, communication, and leadership skills ● Differentiate content, process, or product according to student's readiness, interests, and/or learning styles ● Provide higher level texts ● Expand use of open-ended, abstract questions ● Critical and creative thinking activities that provide an emphasis on research and in-depth study ● Enrichment Activities/Project-Based Learning/ Independent Study ● Variety of Repertoire: 3- 5 extra song selections ● above and beyond expectation for non- auditioned class., high school level selection Additional Strategies may be located at the links: ❖ Gifted Programming Standards ❖ Webb's Depth of Knowledge Levels and/or Revised Bloom's Taxonomy REVISED Bloom's Taxonomy Action Verbs

Winslow Township School District
Laboratory Chemistry
Unit 1

Interdisciplinary Connections
ELA: **RST.6-8.1** Cite specific textual evidence to support analysis of science and technical texts. **RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). **SL.8.5** Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. **Math:** **MP.2** Reason abstractly and quantitatively. **MP.4** Model with mathematics. **6.RP.A.1** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. **7.RP.A.2** Recognize and represent proportional relationships between quantities. **6.EE.B.6** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. **7.EE.B.6** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. their context.
Integration of Computer Science and Design Thinking NJSLS 8
8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources. 8.1.12.DA.1: Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.