8.1 Chemistry Marking Period 1

Content Area: **Science**
Course(s):
Time Period: **Marking Period 1**
Length: **10 weeks**
Status: **Published**

Course Pacing Guide

Part	Marking Period	Length (weeks)
Part 1:	SI System/Measurement	3
Part 2:	Atomic Theory	3
Part 3:	Matter Chemical and Physical Properties	2
Part 4:	Mixtures, Solubility, Solutes and Solvents	2

Unit Overview

This unit is based on the New Jersey Student Learning Standards for Science. Throughout the Chemistry unit students will develop a deep understanding of the inner workings of the world around us that we cannot see by modeling, analyzing and exploring phenomena that provide students with anchors of understanding. Students will gain an understanding that can be applied to explain phenomena that they experience in their everyday lives.

The course begins with a review of methodology and measurement, leading into an in-depth investigation of the composition of matter and how matter is classified. We investigate physical and chemical properties and how they connect to the students' everyday experiences. We then use our findings to explore the creation of the Periodic Table and why the table is organized in the way that it is. Our unit comes to a close by taking the understanding of the Periodic Table and applying that to investigate Chemical bonding and Chemical reactions.

Enduring Understandings

Overarching concepts

- Chemistry is the study of matter and matter is anything that has mass and volume.
- Matter can neither be created nor destroyed, but rather combined, separated, or rearranged.

Unit 1 SI System/Measurement

- Quantitative descriptions must include units. Without units, numbers are meaningless.
- Different types of matter have unique properties. The properties of matter are described both qualitatively (qualities) and quantitatively (numbers).
- Accuracy and precision are similar, but different and scientists need to know when they are either, neither or both
- Define the measurement system before exploring a phenomena and stay consistent

Unit 2 Atomic Theory

- All matter is composed of tiny indivisible particles called atoms
- Each atom is composed of a specific number of each type of subatomic particle
- Atoms are composed of protons and neutrons in the nucleus and electrons in the electron cloud
- The model of the atom has evolved as understanding and technology has evolved
- Each type of atom is defined by the number of protons contained in its nucleus

Unit 3 Matter Chemical and Physical Properties

- All matter is composed of a finite number of building blocks known as elements
- Each element has a unique set of properties that are dictated by its atomic structure
- Physical properties are descriptions that depend on quantity, Chemical properties are quantity

independent

- The amount of energy present within a system dictates the state of matter a substance will be in
- The elements of the Periodic Table are organized using the patterns found within the properties of each element. These properties can help explain natural phenomena.

Unit 4 Mixtures, Solubility, Solutes and Solvents

- Mixtures and solutions are not formed by chemical reactions
- The components of mixtures and solutions retain their individual properties
- Mixtures can be separated because they retain their individual properties
- Solubility dictates how well a solute dissolves in a solvent

Essential Questions

Overarching concepts

- What is Chemistry?
- What is the Law of Conservation of Mass and why is that important to all aspects of Chemistry?

Unit 1 SI System/Measurement

- Why are units so important when measuring?
- What is the difference between quantitative and qualitative data? Why are both important?
- How are accuracy and precision different?
- Why is consistent measurement system use important to the accuracy of your findings?

Unit 2 Atomic Theory

- What is all matter composed of?
- Identify the subatomic particles that compose all atoms and what unique properties do each have?
- What did each scientist contribute to our understanding of modern atomic theory? How did each contribution change the model?
- What is unique about each individual atom and what are those attributes important?

Unit 3 Matter Chemical and Physical Properties

- How is each element of the periodic table different?
- What causes each element to have a unique set of properties?
- What is the difference between a chemical property and a physical property?
- Describe what an increase in energy within a closed system will do to the atoms of the material.
- How can the chemical properties of elements help us predict the properties of other elements?

Unit 4 Mixtures, Solubility, Solutes and Solvents

- How do we know that mixtures and solutions are not formed by chemical reactions?
- Identify some ways that we can tell the components of mixtures retain their individual properties?
- Why can mixtures be separated by physical means using their properties?
- What is solubility and how is it measured?

New Jersey Student Learning Standards (No CCS)

6-8.MS-PS1-1	Develop models to describe the atomic composition of simple molecules and extended structures.
6-8.MS-PS1-5	Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.
6-8.MS-PS1-6	Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.
6-8.MS-PS1-4	Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
SCI.MS-PS1-2	Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
SCI.MS-PS1-3	Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.

Interdisciplinary Connections

MA.8.EE.B.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.
MA.8.SP.A.3	Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.

Technology Standards

TECH.8.1.8.A.3	Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
TECH.8.1.8.A.4	Graph and calculate data within a spreadsheet and present a summary of the results.

21st Century Themes/Careers

CRP.K-12.CRP4	Communicate clearly and effectively and with reason.

Instructional Strategies & Learning Activities

- Atomic Theory Modeling
- Classification of Matter (Hands On)
- Atomic Structure Tour Video
- Density Lab
- Crime Scene
- Quiz quiz trade
- Gallery Walk
- S'mores
- Balancing Equations
- Chemical Bonding
- Amazing Race
- Escape Room
- Alpha-block
- Olympic Pennies
- Heating Curve of Water
- Periodic Table
- Adopt and Element
- Elemental License Plates
- Metric System
- Scientific Method

- States of Matter
- Solubility
- Acids/Bases
- Science Carnival
- Warm-ups/Science Starters
- Group and classroom discussion
- Hands-on activities
- Inquiry-based Learning Activities
- Atomic Structure Modeling
- Periodic Table Construction Activities
- Group Demonstrations
- Internet Technology (visual aids, videos, and interactive websites)
- Class Surveys/Debates

Differentiated Instruction

Examples may include:

Inquiry/Problem-Based Learning
Learning preferences integration (visual, auditory, kinesthetic)
Sentence & Discussion Stems
Tiered Learning Targets
Meaningful Student Voice & Choice
Relationship-Building & Team-Building
Self-Directed Learning
LMS use
Student Data Inventories
Mastery Learning (feedback toward goal)
Grouping
Rubrics
Jigsaws
Assessment Design & Backwards Planning
Student Interest & Inventory Data

Formative Assessments

Classwork on various topics

Homework Assignments

Science Notebook entries

Differentiated Projects

Teacher observations

Discussion/Class participation

Exit Tickest

Summative Assessment

End of Unit Test
Differentiated Projects

Benchmark Assessments

Fall/Winter LinkIt Assessments

Alternate Assessments

Modifications to assessments based on IEP/504; alternate assessments may include oral explanations, scaffolded templates, digital choice for final model representations

Resources & Technology

Simulations include:

https://phet.colorado.edu/en/simulations/category/new

http://www.chemcollective.org/vlab/vlab.php

BOE Approved Texts

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Closure

Individual classes and lessons will end with a closure activity that reinforces what students figured out during class, and helps navigate toward next steps.

Closure activities may include:

- Scientists' Circle
- Post-it reflection
- Google form exit ticket
- Group performance reflection
- Science notebook jot

ELL

- Alternate Responses
- Extended Time
- Teacher Modeling
- Simplified Written and Verbal Instructions
- Frequent Breaks
- Google Translate

Special Education

Accommodations will be made in accordance with students' IEPs. The following list provides examples:

- Shorten assignments to focus on mastery of key concepts.
- Substitute alternatives for written assignments (clay models, posters, panoramas, collections, etc.)
- Keep workspaces clear of unrelated materials.
- Provide a computer for written work.
- Seat the student close to the teacher or a positive role model.
- Provide an unobstructed view of the chalkboard, teacher, movie screen, etc.
- Keep extra supplies of classroom materials (pencils, books) on hand.
- Maintain adequate space between desks.
- Give directions in small steps and in as few words as possible.
- Number and sequence the steps in a task.
- Have students repeat the directions for a task.
- Provide visual aids.
- Go over directions orally.
- Allow the student to complete an independent project as an alternative test.
- Show a model of the end product of directions (e.g., a completed math problem or finished quiz).
- Stand near the student when giving directions or presenting a lesson.
- Mark the correct answers rather than the incorrect ones.
- Use a pass-fail or an alternative grading system when the student is assessed on his or her own growth.

504

Examples of accommodations in 504 plans include but are not limited to:

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids

- modified textbooks or audio-video materials
- behavior management support
- verbal testing
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits

At Risk

Examples may include:

- Have students restate information
- Provision of notes or outlines
- Concrete examples
- Assistance in maintaining uncluttered space
- Weekly home-school communication tools (notebook, daily log, phone calls or email messages)
- Peer or scribe note-taking
- Use of manipulatives
- No penalty for spelling errors or sloppy handwriting
- Follow a routine/schedule
- Teach time management skills
- Verbal and visual cues regarding directions and staying on task
- Adjusted assignment timelines
- Visual daily schedule
- Immediate feedback
- Work-in-progress check
- Pace long-term projects
- Preview test procedures
- Film or video supplements in place of reading text

- Pass/no pass option
- Cue/model expected behavior
- Use de-escalation strategies
- Use peer support and mentoring
- Have parent(s) sign homework/behavior chart

Gifted and Talented

Examples may include:

- Offer choice
- Speak to Student Interests
- Allow G/T students to work together
- Tiered learning
- Focus on effort and practice
- Encourage risk taking