Accelerated Chemistry - MP1

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

Course Pacing Guide

Unit	MP/Trimester	Weeks
Unit 0: Lab Safety	**1**	**1**
Unit 1: Essential Ideas	**1**	**2**
Unit 2: Atoms, Molecules, Ions	**1**	**2**
Unit 3: Origin of the Elements and Nuclear Chemistry	**1**	**2**
Unit 4: Electronic Structure	**1**	**2**
Unit 5: Periodic Properties	2	2
Unit 6: Chemical Bonding and Molecular Geometry	2	2
Unit 7: Composition of Substances and Solutions	2	2
Unit 8: Chemical Reactions	2	2
Unit 9: Reaction Stoichiometry	2 / 3	3
Unit 10: Thermochemistry	3	2
Unit 11: Gases	3	2
Unit 12: Solids and Liquids	3	2
Unit 13: Solutions	3	2
Unit 14: Equilibrium	4	2
Unit 15: Acids and Bases	4	2
Unit 16: Solubility Equilibria	4	2
Unit 17: Kinetics and Thermodynamics	4	3

Enduring Understandings

Laboratory safety; scientific inquiry; structure and properties of matter; atomic theory; scientific measurements

Essential Questions

How do we use the tools of chemistry? How do we represent quantitative measurements and calculations in chemistry? What is the structure of atoms? How is matter classified? How is a weighted average used to calculate average atomic mass? What is the strong nuclear force and how does it affect nuclear stability? How does the sun evolve and how does it produce energy? What is the evidence for the Big Bang Theory? What are the origins of the chemical elements? What is radioactivity and how are nuclear reactions classified? How does Coulomb's Law describe and predict the forces between protons and electrons, between protons, between ions, and how do these relate to atomic structure? How does the nucleus change during nuclear reactions?

What is the current model of the atom and how has it evolved? What is the nature of electromagnetic radiation and how does it relate to atomic structure? What is the electron configuration of an atom and how does it affect reactivity?

New Jersey Student Learning Standards (No CCS)

SCI.HS-ESS1-3	Communicate scientific ideas about the way stars, over their life cycle, produce elements.
SCI.HS-ESS1-1	Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.
SCI.HS-ESS1-2	Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.
SCI.HS-PS4-3	Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.
SCI.HS-PS3-2	Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects).
SCI.HS-PS2-4	Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.
SCI.HS-PS4-1	Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.
SCI.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.
SCI.HS-PS4-4	Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.
SCI.HS-PS3-5	Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.
SCI.HS-PS4-2	Evaluate questions about the advantages of using a digital transmission and storage of information.
SCI.HS-PS4-5	Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.

Amistad Integration

The Amistad Bill (A1301), which became law in 2002, calls on New Jersey schools to incorporate African-American history into their social studies curriculum. (https://nj.gov/education/amistad/about.htm)

Holocaust/Genocide Education

Ideas relevant to the Holocaust incorporated into Unit 2 (Atoms, Molecules, Ions) and Unit 14 (Equilibria).

Interdisciplinary Connections

MA.A-SSE.A.1	Interpret expressions that represent a quantity in terms of its context.
MA.A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.
LA.RH.9-10.4	Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history and the social sciences; analyze the cumulative impact of specific word choices on meaning and tone.
MA.A-SSE.B	Write expressions in equivalent forms to solve problems
LA.RH.9-10.7	Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text, to analyze information presented via different mediums.
LA.RH.9-10.8	Assess the extent to which the reasoning and evidence in a text support the author's claims.
MA.A-CED	Creating Equations
MA.A-CED.A	Create equations that describe numbers or relationships

Technology Standards

TECH.8.1.12	Educational Technology: 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.
TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.B	Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
TECH.8.1.12.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.12.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.12.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.1.12.F.CS2	Plan and manage activities to develop a solution or complete a project.
TECH.8.1.12.F.CS3	Collect and analyze data to identify solutions and/or make informed decisions.
TECH.8.1.12.F.CS4	Use multiple processes and diverse perspectives to explore alternative solutions.

21st Century Themes/Careers

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.

CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP11	Use technology to enhance productivity.

Financial Literacy Integration

Financial considerations incorporated into labs and related topics, such as discussing cost-benefits when evaluating chemical processes.

Instructional Strategies & Learning Activities

Safety Scavenger Hunt

Guided inquiry activities

Student whiteboard presentations of dimensional analysis conversions

Chemical and Physical changes lab

Classification of matter lab

Density lab

Separating components of a mixture lab

Drawing particle-level diagrams

“Build an Atom”, “Alpha Decay” and “Beta Decay” PhET simulations

Photoelectric Effect simulation

U-238 decay series card game

Radioactivity and Half-life Lab

Atomic Mass and Isotopes lab

Flame test lab with Geissler tubes

Electron probability lab/Orbital Model Lab

Differentiated Instruction

- Curriculum Map
- Inquiry/Problem-Based Learning
- Learning preferences integration (visual, auditory, kinesthetic)
- Sentence & Discussion Stems -- Claim-evidence-reasoning model
- Tiered Learning Targets
- Meaningful Student Voice & Choice
- Relationship-Building & Team-Building
- Self-Directed Learning
- LMS use
- Mastery Learning (feedback toward goal) -- Canvas online HW
- Learning Through Workstations
- Concept Attainment
- Assessment Design & Backwards Planning
- Packets/Study Guides to aid organization and note-taking
- Practice test and test-taking strategy discussions

Formative Assessments

Exit Tickets

Daily check-ins on Packet work

Informal questioning (oral and written) to monitor student understanding

Online HW

Practice tests

Student whiteboards

Canvas discussion groups

Summative Assessment

Safety quiz

Quizzes

Tests

Lab/simulation reports

Writing assignments

Online HW

Portfolio

Benchmark Assessments

Midterm and final exams -- based on American Chemical Society National HS Chemistry Exam.

Midterm and final exams histograms compared to historical data from prior cohorts.

Alternate Assessments

MP1 optional assignment

Resources & Technology

On-line textbook: https://openstax.org/details/books/chemistry-atoms-first-2e . Computers/Lab Probeware/MS Word and Excel, Google docs; Textbook technology resources: simulation software (PhET, Concord Consortium), laserdiscs, videos etc. Internet resources – videos, data, simulations, on-line homework program (Canvas)

BOE Approved Texts

https://openstax.org/details/books/chemistry-atoms-first-2e

Closure

Strategies utilized may include:

- Gallery Walk - On whiteboard, small groups of students write and draw what they learned.
- Sequence It - create timelines of major events discussed
- Low-Stakes Quizzes - Give a short quiz using technologies like Kahoot or a Google form.
- Have students submit quiz questions.
- Kids answer the following prompts: "What takeaways from the lesson will be important to know three years from now? Why?

- Have students demonstrate and/or discuss a real-life application of a skill.
- Ask a question. Give students ten seconds to confer with peers before you call on a random student to answer. Repeat.
- Have kids orally describe a concept, procedure, or skill in simple terms.
- Direct kids to raise their hands if they can answer your questions. Classmates agree (thumbs up) or disagree (thumbs down) with the response.
- Have kids create a cheat sheet of information that would be useful for a quiz on the day's topic.
- Ask students to summarize the main idea.
- Exit Ticket

ELL

Strategies may include:

- Alternate Responses
- Advance Notes
- Extended Time
- Teacher Modeling
- Simplified Written and Verbal Instructions
- Frequent Breaks
- Chemistry-specific Bilingual Dictionaries in the following languages, Albanian, Arabic, Bengali, Burmese, Chinese (simplified), Chinese (traditional), Dutch, Farsi, French, Fulani, Greek, Haitian, Hindi, Italian, Karen, Kinyarwanda, Korean, Malay, Mandinka, Nepali, Pashto, Polish, Portuguese, Punjabi, Russian, Slovak, Spanish, Swahili, Tag alog, Thai, Tibetan, Turkish, Twi, Ukrainian, Urdu, Uzbek, Vietnamese, Wolof
- Google Translate

Special Education

Special education accommodations, modifications, and strategies are implemented in accordance with students' IEP plans.

Strategies utilized may include any or all of the following:

- Modify assignments.
- Evaluate the classroom structure against the student’s needs.
- Keep workspaces clear of unrelated materials.
- Keep the classroom quiet during intense learning times.
- Reduce visual distractions in the classroom.
- Provide a computer for written work.
- Seat the student close to the teacher or a positive role model.
- Use a study carrel or special area of room. (Provide extras so that the student is not singled out.)
- 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 student repeat the directions for a task.
- Provide visual aids.
- Go over directions orally.
- Permit extended time as required to finish tests.
- Allow tests to be taken in a room with few distractions (e.g., the library).
- Divide tests into small sections of similar questions or problems.
- 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.

504

Accommodations, modifications, and strategies are implemented in accordance with students' 504 plans.

Strategies utilized may include any or all of the following:

- 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
- adjusted class schedules or grading
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits.

At Risk

Strategies may include:

- Use of mnemonics
- Have student restate information
- Provision of notes or outlines
- Concrete examples
- Use of a study carrel
- Assistance in maintaining uncluttered space
- Class notes available online.
- Lab and math sheets with highlighted instructions
- Graph paper to assist in organizing or lining up math problems

- 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
- Cue/model expected behavior
- Use de-escalating strategies
- Use peer supports and mentoring
- Chart progress and maintain data

Gifted and Talented

Foster student interest in science, promote development of critical thinking and problem-solving skills, model and encourage transparency in thinking, and encourage risk-taking.