College Preparatory Chemistry - MP4

Content Area: **Science**
Course(s):
Time Period: **Marking Period 4**
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: Matter	1	2
Unit 3: Atomic Structure	1	3
Unit 4: Nuclear Chemistry	2	2
Unit 5: Origin of the Elements	2	2
Unit 6:Electrons and EMR	2	2
Unit 7: Electron Configuration	2	3
Unit 8: Periodic Trends	3	3
Unit 9: Ionic Bonding	3	3
Unit 10: Covalent Bonding and IMAF	3	3
Unit 11: Chemical Reactions and Equations	**3/4**	**2**
Unit 12: Stoichiometry	**4**	**3**
Unit 13: Molecules in Action	**4**	**3**
Unit 14: Acids/Bases and Gases	**4**	**2**

Enduring Understandings

Limiting reactants, percent yield, reactions involving heat (exothermic/endothermic), enthalpy, enthalpy changes, kinetic molecular theory and behavior of gases, solids, and liquids, gas laws, Reversible reactions, chemical equilibrium, equilibrium constant, factors that shift equilibrium (Le Chatelier's Principle), acids and bases (definitions, properties, pH), kinetics (reaction rates), activation energy, energy diagrams, factors that affect reaction rate, spontaneous processes, entropy

Essential Questions

What limits the amount that a reaction can produce? How is percent yield determined? What are the heat effects in chemical reactions (thermochemistry) and how can they be measured? How does the kinetic molecular theory account for the behavior of gases? How are pressure, temperature, volume, and the number of moles of a gas related? How is solution concentration represented? How is solubility determined? What is a reversible reaction and how is chemical equilibrium characterized? How are acids and bases defined? What is pH and how is it determined? What affects the rate of a reaction? What is entropy? How are changes in entropy and enthalpy related to reaction spontaneity?

New Jersey Student Learning Standards (No CCS)

SCI.HS-PS3-4	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).
SCI.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.
SCI.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 are known.
SCI.HS-PS1-7	Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.
SCI.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.
SCI.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.
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).

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

Guided inquiry activities, student whiteboard presentations of calculations,

Iron-copper chloride reaction lab,

Make 1.00 gram of a Compound lab,

Specific heat of an Unknown Metal lab,

Properties of gases lab,

LeChatelier Exploration Lab

Identifying Unknown Solutions using Solubility lab,

Properties of Acids and Bases 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

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

MP4 optional assignment

Resources & Technology

On-line textbook: https://openstax.org/details/books/chemistry-atoms-first-2e . Computers/Lab Probe-ware/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.