Pre-AP Chemistry Curriculum

Date		Hobbs Science Standards 10th- 12thGrade EoC Standards NMSBA Standards EoC and NMSBA	**NM Standards & Benchmarks**	**Resources** Basic texts are Chemistry in the Community, Modern Chemistry, World of Chemistry
		By being embedded throughout the curriculum, these Processing Skills will be addressed throughout the year.		
	Unit	**Students will be able to:**	Strand, Standards, Benchmarks, & Performance Standards	Supplemental books, labs, videos, projects, digital curriculum
_____ _____ _____ _____ _____ _____	**1**	**Reading Standards for Literacy** I. Key Ideas and Details A. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. B. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. C. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. II. Craft and Structure A. 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. B. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understand on the information or ideas. C. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text; identifying important		**MC- Interactive Reader**

_____ _____ _____ _____		issues that remain unresolved. III. Integration of Knowledge and Ideas A. 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. B. 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. C. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. IV. Range of Reading and Level of Text Complexity A. By the end of grade 12, read and comprehend science/technical texts in the grades 11- CCR text complexity band independently and proficiently.		
_____	**2**	**Writing Standards for Literacy** I. Text Types and Purposes A. Write arguments focused on discipline-specific content. 1. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence. 2. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline- appropriate form that anticipates the audience's knowledge level, concerns, values and possible biases. 3. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. 4. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. 5. Provide a concluding statement or section that follows from and supports the argument presented. B. Write informative/explanatory texts, including the narration of historical		**MC- Interactive Reader**
_____				

		events, scientific procedures/experiments, or technical processes. 1. Introduce a topic and organize complex ideas, concepts and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. 2. Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. 3. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. 4. Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers. 5. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).		
_____		II. Production and Distribution of Writing		
_____		A. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		
_____		B. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.		
		C. Use technology, including the Internet, to produce, publish and update individual or shared writing products in response to ongoing feedback, including new arguments or information.		
_____		III. Research to Build and Present Knowledge		
		A. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.		
_____		B. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and		

_____ _____		audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.. C. Draw evidence from informational texts to support analysis, reflection and research. IV. Range of Writing A. Write routinely over extended timeframes (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.		
_____	**3**	1. Describe the essential components of an investigation, including appropriate methodologies, proper equipment, and safety precautions.	I, I, I, 1	**MC- Interactive Reader**
_____	**MC**	2. Design and conduct scientific investigations that include: • Testable hypotheses • Controls and variables • Methods to collect, analyze, and interpret data • Results that address hypotheses being investigated • Predictions based on results • Re-evaluation of hypotheses and additional experimentation as necessary • Error analysis.	I, I, I, 2	
_____		3. Use appropriate technologies to collect, analyze, and communicate scientific data (e.g., computers, calculators, balances, microscopes).	I, I, I, 3	
_____	**MC**	4. Convey results of investigations using scientific concepts, methodologies, and expressions, including: • Scientific language and symbols • Diagrams, charts, and other data displays • Mathematical expressions and processes (e.g., mean, median, slope, proportionality) • Clear, logical, and concise communication • Reasoned arguments.	I, I, I, 4	
_____		5. Understand how scientific theories are used to explain and predict natural phenomena (e.g., plate tectonics, ocean currents, structure of atom).	I, I, I, 5	

_____	**4** **MC**	1. Understand how scientific processes produce valid, reliable results, including: • Consistency of explanations with data and observations • Openness to peer review • Full disclosure and examination of assumptions • Testability of hypotheses • Repeatability of experiments and reproducibility of results.	I, I, II, 1	**MC- Interactive Reader**
_____		2. Use scientific reasoning and valid logic to recognize: • Faulty logic • Cause and effect • The difference between observation and unsubstantiated inferences and conclusion • Potential bias	I, I, II, 2	
_____		3. Understand how new data and observations can result in new scientific knowledge.	I, I, II, 3	
_____	**MC**	4. Critically analyze an accepted explanation by reviewing current scientific knowledge.	I, I, II, 4	
_____		5. Examine investigations of current interest in science (e.g., superconductivity, molecular machines, age of the universe).	I, I, II, 5	
_____	**MC**	6. Examine the scientific processes and logic used in investigations of past events (e.g., using data from crime scenes, fossils), investigations that can be planned in advance but are only done once (e.g., expensive or time-consuming experiments such as medical clinical trials), and investigations of phenomena that can be repeated easily and frequently.	I, I, II, 6	
_____	**5**	1. Create multiple displays of data to analyze and explain the relationships in scientific investigations.	I, I, III, 1	**MC- Interactive Reader**
_____	**MC & SA**	2. Use mathematical models to describe, explain, and predict natural phenomena.	I, I, III, 2	
_____		3. Use technologies to quantify relationships in scientific hypotheses (e.g., calculators, computer spreadsheets and databases, graphing software, simulations, modeling).	I, I, III, 3	

_____	**MC**	4. *Identify and apply measurement techniques and consider possible effects of measurement errors.*	I, I, III, 4	
_____		5. *Use mathematics to express and establish scientific relationships (e.g., scientific notation, vectors, dimensional analysis).*	I, I, III, 5	
	6	**Science and Technology**		**MC- Interactive Reader**
_____		1. Know how science enables technology but also constrains it, and recognize the difference between real technology and science fiction (e.g., rockets vs. antigravity machines; nuclear reactors vs. perpetual-motion machines; medical X-rays vs. Star-Trek tricorders).	III, I, I, 1	
_____		2. Understand how advances in technology enable further advances in science (e.g., microscopes and cellular structure; telescopes and understanding of the universe).	III, I, I, 2	
_____	**MC**	3. Evaluate the influences of technology on society (e.g., communications petroleum, transportation, nuclear energy, computers, medicine, genetic engineering) including both desired and undesired effects, and including some historical examples (e.g., the wheel, the plow, the printing press, the lightning rod).	III, I, I, 3	
_____		4. Understand the scientific foundations of common technologies (e.g., kitchen appliances, radio, television, aircraft, rockets, computers, medical X-rays, selective breeding, fertilizers and pesticides, agricultural equipment).	III, I, I, 4	
_____	**SA**	5. Analyze the impact of digital technologies on the availability, creation, and dissemination of information.	III, I, I, 6	
_____	**MC**	6. *Examine the role that New Mexico research facilities play in current space exploration (e.g., Very Large Array, Goddard Space Center).*		
_____	**MC**	7. Describe uses of radioactivity (e.g. nuclear power, nuclear medicine, radiometric dating).	III, I, I, 8	
	7	**Science and Society**		**MC- Interactive Reader**

_____	**MC**	1. Describe how human activities have affected ozone in the upper atmosphere and how it affects health and the environment.	III, I, I, 7	
_____		2. Describe how scientific knowledge helps decision makers with local, national, and global challenges (e.g., Waste Isolation Pilot Project [WIPP], mining, drought, population growth, alternative energy, climate change).	III, I, I, 9	
_____		3. Describe major historical changes in scientific perspectives (e.g., atomic theory, germs, cosmology, relativity, plate tectonics, evolution) and the experimental observations that triggered them.	III, I, I, 10	
_____	**MC**	4. Know that societal factors can promote or constrain scientific discovery (e.g., government funding, laws and regulations about human cloning and genetically modified organisms, gender and ethnic bias, AIDS research, alternative-energy research).	III, I, I, 11	
_____		5. Describe how environmental, economic, and political interests impact resource management and use in New Mexico.	III, I, I, 13	
	8	**Science and Individuals**		**MC- Interactive Reader**
_____		1. *Describe New Mexico's role in nuclear science (e.g., Manhattan Project, WIPP, national laboratories*).	III, I, I, 14	
_____		2. Identify how science has produced knowledge that is relevant to individual health and material prosperity.	III, I, I, 15	
_____		3. Understand that reasonable people may disagree about some issues that are of interest to both science and religion (e.g., the origin of life on Earth, the cause of the Big Bang, the future of Earth).	III, I, I, 16	
_____		4. Identify important questions that science cannot answer (e.g., questions that are beyond today's science, decisions that science can only help to make, questions that are inherently outside the realm of science).	III, I, I, 17	
_____	**MC**	5. Understand that scientists have characteristics in common with other individuals (e.g., employment and career needs, curiosity, desire to perform public service, greed, preconceptions and biases, temptation to be unethical,	III, I, I, 18	

		core values, including honesty and openness). 6. Know that science plays a role in many different kinds of careers and activities (e.g., public service, volunteers, public office holders, researchers, teachers, doctors, nurses, technicians, farmers, ranchers).	III, I, I, 19	

Pre-AP Chemistry Curriculum

(1st 9 weeks- 1st 4 ½ weeks)

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	Unit	**Students will be able to:**	Strand, Standards, Benchmarks, & Performance Standards	Supplemental books, labs, videos, projects, digital curriculum
	9	**Laboratory Safety**		Safety Test
_____		1. Demonstrate the importance of lab safety during experiments.	I, I, I, 1	Safety Contract
_____		2. Locate safety equipment (i.e., fire extinguisher, fire blanket, eye wash, shower).	I, I, I, 3	Lab Safety Video
_____		3. Become familiar selection and use of laboratory equipment.		
	10	**Measurement and Calculations**		WC- Ch. 5 MC- Ch. 2
_____		1. Describe the purpose of the scientific method. • Experimental design • Inference vs. Observation • Data collection • Evaluation & Conclusion	I, I, I, 1-5 I, I, II, 1-6 I, I, III, 1-5	**MC- Interactive Reader** The World of Chemistry DVD- 3, 4 & Mole
_____		2. Distinguish between qualitative and quantitative observations.		Measurement and the SI System Lab
_____		3. List and define common SI prefixes.		Measurement and Density Lab
_____		4. Distinguish between mass and weight.		

_____ _____ _____ _____ _____ _____ _____		5. Perform density calculations. 6. Distinguish between accuracy and precision. 7. Transform a statement of equality to a conversion factor. • Dimensional analysis 8. Determine the number of significant figures in measurements. 9. Perform mathematical operations involving significant figures. 10. Convert measurements into scientific notation. 11. Distinguish between inversely and directly proportional relationships. • D= m/V		Oreo Lab
_____ _____ _____	**11** **MC** **SA**	**States (Properties) of Matter** 1. Classify matter in a variety of ways (e.g., element, compound, mixture; solid, liquid, gas, plasma; acidic, basic, neutral). • Classify changes of matter as physical or chemical. • Know that states of matter (i.e., solid, liquid, gas) depend on the arrangement of atoms and molecules and on their freedom of motion. 2. Identify, measure, and use a variety of physical and chemical properties (e.g., *electrical conductivity*, density, viscosity, chemical reactivity, pH, melting point). • Distinguish between the physical properties and chemical properties of matter. 3. Know how to use properties to separate mixtures into pure substances (e.g., distillation, *chromatography*, solubility). • Distinguish between a mixture and a pure substance. • Evaporation. 4. Discuss the physical properties of water. • Solutions	II, I, I, 1 II, I, I, 10 II, I, I, 2 II, I, I, 3	**APEX** Core Chemistry Sem. 1- Unit 2 Honors Chemistry Sem. 1- Unit 2 WC- Ch. 2, 3 & 16 MC- Ch. 1, 10, 15 **MC- Interactive Reader** The World of Chemistry DVD- 5 Physical and Chemical Changes Lab Ziploc Reaction Lab

		○ Dilute, concentrate ○ Unsaturated, saturated, supersaturated • Factors that affect solubility ○ Particle size ○ Pressure ○ Temperature _____ 5. Explain how the physical properties are determined by the structure of water. _____ 6. Interpret phase change graphs.		
	12	**Historical Perspective of Atomic Theory/ Structure** _____ 1. Explain the law of conservation of mass. _____ 2. Summarize the five essential points of Dalton's atomic theory. _____ 3. Summarize the observed properties of cathode rays that led to the discovery of the electron (Thomson). _____ 4. Summarize Rutherford's Gold Foil experiment (discovery of the nucleus). _____ 5. PES Data	II, I, I, 14 III, I, I, 10	**APEX** Core Chemistry Sem. 1- Unit 2 Honors Chemistry Sem. 1- Unit 2 WC- Ch. 3, 6 & 11 MC- Ch. 3 & 4 **MC- Interactive Reader** World of Chemistry DVD- #6
	13 **MC**	**Structure of Matter** _____ 1. Understand that matter is made of atoms and that atoms are made of subatomic particles. • List the properties of protons, neutrons and electrons.	II, I, I, 5	**APEX** Core Chemistry Sem. 1- Unit 2 Honors Chemistry Sem. 1- Unit 2
	MC	_____ 2. Understand atomic structure, including: • Most space occupied by electrons • Nucleus made of protons and neutrons • *Isotopes and ions of an element* • Given the identity of an atom, determine its number of protons, neutrons and electrons	II, I, I, 6	WC- Ch. 3, 4, 12, 13, 14, 15, 19 & 20 MC- Ch. 1, 3, 5, 6, 21 & 22 **MC- Interactive Reader**

		• Masses of proton and neutron 2000 times greater than mass of electron • Atom held together by proton-electron electrical forces • Solve for average atomic mass and percent isotope questions. 3. Know that materials containing equal amounts of positive and negative charges are electrically neutral, but that a small excess or deficit of negative charges produces significant electrical forces.	II, I, III, 3	The World of Chemistry DVD- 6, 9, 15 & 16
	14	**Periodic Table and Periodicity** 1. Compare and contrast the Bohr model and the Quantum model of the atom. 2. Explain how wavelengths of electromagnetic radiation can be used to identify atoms, molecules, and the composition of stars. 3. List the total number of electrons needed to fully occupy each main energy level. 4. State the Aufbau Principle, the Pauli Exclusion Principle, and Hund's Rule. 5. Describe the electron configurations for the atoms of any element using orbital notations, electron configuration notation, and, when appropriate, noble-gas notation. 6. Explain the roles of Mendeleev in the development of the periodic table. 7. Describe the modern periodic table. 8. Explain how the periodic law can be used to predict the physical and chemical properties. 9. Locate and name the four blocks of the periodic table (s, p, d, f). 10. Describe the locations in the periodic table and the general properties of the alkali metals, the alkaline earth metals, the halogens, and the noble gases. 11. State how many valence electrons are present in atoms of each main group/	II, I, II, 10 II, I, I, 8 II, I, I, 8 II, I, I, 8 II, I, I, 8 II, I, I, 4-8 II, I, I, 8 II, I, I, 8 II, I, I, 8 II, I, I, 8	**APEX** Core Chemistry Sem. 1- Unit 3 Honors Chemistry Sem. 1- Unit 3 WC- Ch. 2, 3, & 11 MC- Ch. 3, 4 & 5 **MC- Interactive Reader** Flame Tests The World of Chemistry DVD- 7, 10 & 19 Chem. Quizzes PHET Sim- "Models of the Hydrogen Atom"

		representative element.		
_____		12. Discuss the relationship between group configurations and group numbers.	II, I, I, 8	
_____		13. Identify trends on the periodic table. • Atomic radii • Electronegativity • Ionization energy • Electron affinity	II, I, I, 4	
_____		14. Describe trends in properties (e.g., ionization energy or reactivity as a function of location on the periodic table, boiling point of organic liquids as a function of molecular weight).	II, I, I, 4	
_____		15. Make predictions about elements using the periodic table (e.g., number of valence electrons, metallic character, reactivity, conductivity, type of bond between elements).	II, I, I, 8	

Pre-AP Chemistry Curriculum

(1st 9 weeks- 2nd 4 ½ weeks)

Date		Hobbs Science Standards 10th- 12thGrade EoC Standards NMSBA Standards EoC and NMSBA	NM Standards & Benchmarks	Resources Basic text is Chemistry in the Community, Modern Chemistry, World of Chemistry
	Unit	**Students will be able to:**	Strand, Standards, Benchmarks, & Performance Standards	Supplemental books, labs, videos, projects, digital curriculum
	15	**Nomenclature/Chemical Formulas**		**APEX** Core Chemistry Sem. 1- Unit 3 Honors Chemistry Sem. 1- Unit 3 WC- Ch. 4 MC- Ch. 6 & 7 **MC- Interactive Reader** The World of Chemistry DVD- 8
_____		1. Explain the significance of a chemical formula.	II, I, I, 12	
_____		2. Differentiate between the electron configurations for cations and anions.	II, I, I, 12	
_____		3. Identify the diatomic atoms.		
_____		4. Describe rules for naming oxyanions.	II, I, I, 12	
_____		5. Name and determine oxidation numbers for polyatomic ions (ternary compounds).	II, I, I, 8	
_____		6. Determine the formula of an ionic compound formed between two given ions.	II, I, I, 8	
_____		7. Name an ionic compound given its formula.	II, I, I, 7, 8	
_____		8. Using prefixes, name a binary molecular compound from its formula.	II, I, I, 7, 8	
_____		9. Write the formula of a binary molecular compound given its name.	II, I, I, 7, 8	
_____		10. List the rules for assigning oxidation numbers (charges).	II, I, I, 7, 8	

_____ _____ _____		11. Give the oxidation number for each element in the formula of a chemical compound. 12. Name binary ionic compounds using oxidation numbers and the Stock System. 13. Differentiate between the types of bonding. • Type I- Binary Ionic- metal and non-metal • Type II- Binary ionic- transition metals • Ternary- Polyatomic ions • Type III- Binary molecular- covalent- uses prefixes	II, I, I, 4, 7, 8 II, I, I, 4, 7 II, I, I, 7	
_____ _____ _____ _____	**16**	**Bonding** 1. Describe the octet rule. 2. Explain how electrons determine the properties of substances by: • Interactions between atoms through transferring or sharing valence electrons • Ionic and covalent bonds • The ability of carbon to form a diverse array or organic structures 3. Describe the properties of ionic compounds. • Conductivity (good when melted) • Crystalline solids (of ions) • High melting and boiling points • Many are soluble in water, but not in a nonpolar liquid 4. Describe the properties of covalent compounds. • Gases, liquids or solids • Made of molecules • Low melting points and boiling points • Poor electrical conductors • Many soluble in nonpolar liquids, but not in water	II, I, I, 7-8	**MC- Interactive Reader**

_____ _____ _____ _____ _____ _____ _____		5. Water is the universal solvent. 6. Differentiate between single, double and triple bonds. 7. Explain and predict the molecular shape of molecules (VESPR). 8. Describe the structure of a water molecule and hydrogen bonding. 9. Polar vs. nonpolar • Electronegativity • Geometric shape 10. Determine bond energy. 11. Determine bond length.		BL & BE Student Demo Activity PHET sim- "Molecule Shape"

Pre-AP Chemistry Curriculum

(2nd 9 weeks- 3rd 4 ½ weeks)

Date		Hobbs Science Standards 10th- 12thGrade EoC Standards NMSBA Standards EoC and NMSBA	NM Standards & Benchmarks	Resources Basic text is Chemistry in the Community, Modern Chemistry, World of Chemistry
	Unit	**Students will be able to:**	Strand, Standards, Benchmarks, & Performance Standards	Supplemental books, labs, videos, projects, digital curriculum
	17	**Chemical Equations/Reactions**		**APEX** Core Chemistry Sem. 1- Unit 5 Honors Chemistry Sem. 1- Unit 5 WC- Ch. 4, 7 & 8 MC- Ch. 7, 8 & 12 **MC- Interactive Reader** Chemical Reaction Video World of Chemistry DVD- 16 Unknown Solutions Lab Penny Lab DD or Precipitation Lab
_____		1. Know that chemical reactions involve the rearrangement of atoms, and that they occur on many timescales (e.g., picoseconds to millennia).	II, I, I, 12	
_____		2. List 3 of 5 observations that suggest that a chemical reaction has taken place. • Change of color • Odor change • Temperature change • Gas formation • Precipitate formation	II, I, I, 12	
_____		3. Write a word equation and a formula (skeletal) equation for a given chemical reaction.	II, I, I, 12, 14	
_____		4. Differentiate between subscript placement and coefficient placement.		
_____		5. Know how to express chemical reactions with balanced equations that show the following: • Conservation of matter/ mass • Products of common reactions	II, I, I, 14	

_____	**MC**	6. Give general equations and classify a reaction as synthesis, decomposition, combustion, redox, acid-base, single-replacement and double-replacement reactions. • Identify oxidizing and reducing agents.	II, I, II, 11	
_____		7. Understand types of chemical reactions and identify them as exothermic or endothermic. (Examples: synthesis, decomposition, combustion, redox, neutralization)	II, I, I, 13	
_____	**OE**	8. Predict the products of simple reactions given the reactants.	II, I, I, 13	
		9. Explain the significance of an activity series.	II, I, I, 12-14	
_____		10. Use an activity series to predict whether a given reaction will occur and what the products will be.	II, I, I, 12-14	
_____		11. Interpret, and use solubility rules.	II, I, I, 12-14	
_____		12. Predict whether a precipitate will form when solutions of soluble ionic compounds are combined, and write net ionic equations for precipitation reactions.	II, I, I, 13	

Pre-AP Chemistry Curriculum

(2nd 9 weeks- 4th 4 ½ weeks)

Date		Hobbs Science Standards 10th- 12thGrade EoC Standards NMSBA Standards EoC and NMSBA	NM Standards & Benchmarks	Resources Basic text is Chemistry in the Community, Modern Chemistry, World of Chemistry
	Unit	**Students will be able to:**	Strand, Standards, Benchmarks, & Performance Standards	Supplemental books, labs, videos, projects, digital curriculum
_____ _____ _____ _____ _____ _____	**18**	**Moles** 1. Calculate the formula mass or molar mass of any given compound and convert between mass in grams and amount in moles. 2. Use molar mass to convert between mass in grams and amount in moles of a chemical compound. 3. Calculate the number of molecules, formula units, or ions in a given molar amount of a chemical compound using Avogadro's Number. 4. Calculate the percentage composition of a given chemical compound. 5. Explain how the term empirical formula applies to ionic and molecular compounds. 6. Determine an empirical formula from either a percent or a mass composition.	I, I, III, 1-5 II, I, I, 14 II, I, I, 15	**APEX** Core Chemistry Sem. 1- Unit 4 Honors Chemistry Sem. 1- Unit 4 WC- Ch. 6 & 9 MC- Ch. 3 & 9 **MC- Interactive Reader** The World of Chemistry DVD- 11 Mole Day Projects (10-23) % Water in Popcorn % Carbon in marshmallows

Pre-AP Chemistry Curriculum

(3rd 9 weeks- 5th 4 ½ weeks)

Date		Hobbs Science Standards 10th- 12thGrade EoC Standards NMSBA Standards EoC and NMSBA	**NM Standards & Benchmarks**	**Resources** Basic text is Chemistry in the Community, Modern Chemistry, World of Chemistry
	Unit	**Students will be able to:**	Strand, Standards, Benchmarks, & Performance Standards	Supplemental books, labs, videos, projects, digital curriculum
	19	**Stoichiometry** **Molar Relationships** 1. Describe the importance of the mole ratio in stoichiometric calculations. 2. Write a mole ratio relating two substances in a chemical equation. 3. Calculate the amount in moles of a reactant or product from the amount in moles of a different reactant or product. 4. Calculate the amount in mass of a reactant or product from the amount in moles of a different reactant or product. 5. Calculate the amount in moles of a reactant or product from the amount in mass of a different reactant or product. 6. Calculate the amount in mass of a reactant or product from the amount in mass of a different reactant or product. 7. Determine which of two reactants a limiting reactant is.	I, I, III, 1-5 II, I, I, 14 II, I, I, 15	**APEX** Core Chemistry Sem. 1- Unit 4 Honors Chemistry Sem. 1- Unit 4 WC- Ch. 6 & 9 MC- Ch. 9 **MC- Interactive Reader** Stoichiometry Lab Flinn- Can you Make 2g of Product? Limiting Reactant Lab Nuts & Bolts Lab Sandwiches

_____ _____ _____ _____ _____ _____		8. Calculate the amount in moles or mass in grams of a product, given the amounts in moles or masses in grams of two reactants (theoretical yield). 9. Utilize the Law of Conservation of Mass to solve stoichiometry problems. 10. Distinguish between theoretical yield, actual yield and percent yield. 11. Calculate percent yield. 12. Calculate molarity of solutions. 13. Calculate molality of solutions.		

Pre-AP Chemistry Curriculum

(3rd 9 weeks- 6th 4 ½ weeks)

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	Unit	**Students will be able to:**	Strand, Standards, Benchmarks, & Performance Standards	Supplemental books, labs, videos, projects, digital curriculum
	20 **MC&SA**	**Gas Laws**		**APEX** Core Chemistry Sem. 2- Unit 1 Honors Chemistry Sem. 2- Unit 1
_____		1. Understand the relationship between force and pressure, and how the pressure of a volume of gas depends on the temperature and the amount of gas.	II, I, III, 4	
_____		2. State the Kinetic-Molecular Theory of matter and describe how it explains certain properties of matter.	II, I, II, 2 II, I, III, 4	WC- Ch. 10 & 13 MC- Ch. 10 & 11
_____		3. Describe how pressure is measured (kPa, mmHg, torr, atm).		**MC- Interactive Reader**
_____		4. Convert units of pressure.		
_____		5. State the standard conditions of temperature and pressure (STP) (˚C & 1 atm).		PHET Lab
_____		6. Use Boyle's Law in calculating volume-pressure changes at constant temperature.		Cyber Ed- Gas Laws
_____		7. Use Charles's Law in calculating volume-temperature changes at constant pressure.		
_____		8. Use Gay-Lussac's Law in calculating pressure-temperature changes at constant volume.		

_____		9. Use the combined gas law in calculating volume-temperature-pressure changes.		
_____		10. State the Ideal Gas Law and recognize its units and the constant.		
_____		11. Use the Ideal Gas Law to calculate pressure, volume, temperature or amount of gas when the other three quantities are known.		
_____		12. Use Dalton's Law of Partial Pressures to calculate partial pressures and total pressures.		
_____		13. Use standard molar volume of a gas to calculate gas masses and volumes (22.4 L = mol).		
_____		14. Use a chemical equation to specify volume ratios for gaseous reactants or products or both.		
_____		15. Use volume ratios and the gas laws to calculate volumes, masses, or molar amounts of gaseous reactants or products.		
_____		16. Interpret phase graphs (triple point, critical point).		

Pre-AP Chemistry Curriculum

(4th 9 weeks- 7th 4 ½ weeks)

Date		Hobbs Science Standards 10th – 12th Grade EoC Standards NMSBA Standards EoC and NMSBA	**NM Standards & Benchmarks**	**Resources** Basic text is Chemistry in the Community, Modern Chemistry, World of Chemistry
	Unit	**Students will be able to:**	Strand, Standards, Benchmarks, & Performance Standards	Supplemental books, labs, videos, projects, digital curriculum
	21	**Nuclear Chemistry**		PHET Lab
_____		1. Describe New Mexico's role- past, present, future.	II, I, I, 11	Bill Nye "Nuclear Energy"
_____		2. Know that some atomic nuclei can change, including: • Spontaneous decay • Half-life of isotopes • Fission • Fusion (e.g., the sun) • Alpha, beta, and gamma radiation		**MC- Interactive Reader**
_____		3. Describe the characteristics of electromagnetic waves (e.g., visible light, radio, microwave, X-ray, ultraviolet, gamma) and other waves (e.g. sound, seismic waves, water waves), including: • Origin and potential hazards of various forms of electromagnetic radiation • Energy of electromagnetic waves carried in discrete energy packets (photons) whose energy is inversely proportional to wavelength.	II, I, II, 8	
	22	**Rates of Reaction- Kinetics**		
_____		1. Describe how the rate of chemical reactions depends on many factors that include temperature, concentration, and the presence of catalysts.	II, I, I,15	Fade to Black Lab

_____ _____ _____		2. Explain the conditions necessary for chemical reactions to occur. 3. Discuss the factors that influence reaction rate. 4. Understand the concept of equilibrium (i.e., thermal, mechanical and chemical).		**MC- Interactive Reader**

Pre-AP Chemistry Curriculum

(4th 9 weeks- 8th 4 ½ weeks)

Date		Hobbs Science Standards 10th – 12th Grade EoC Standards NMSBA Standards EoC and NMSBA	**NM Standards & Benchmarks**	**Resources** Basic text is Chemistry in the Community, Modern Chemistry, World of Chemistry
	Unit	**Students will be able to:**	Strand, Standards, Benchmarks, & Performance Standards	Supplemental books, labs, videos, projects, digital curriculum
_____ _____ _____ _____ _____ _____	**23**	**Acids and Bases** 1. List general properties of aqueous acids and bases. 2. Explain the differences between strong and weak acids and bases/ electrolytes. 3. Explain that an amphoteric compound acts as an acid or a base. 4. Describe the self-ionization of water. 5. Give the pH of a neutral solution at 25˚C. 6. Explain and use the pH scale.	II, I, I, 1, 2 II, I, I, 13	**APEX** Core Chemistry Sem. 2- Unit 2 Honors Chemistry Sem. 2- Unit 2 WC- Ch. 8 & 16 MC- Ch. 14, 15 & 19 **MC- Interactive Reader** "Acids, Bases, Salts" DVD Acids & Bases Lab Quantitative Titration
_____	**24**	**Colligative Properties** 1. List colligative properties (boiling point elevation, freezing point depression, osmotic pressure).	II, I, I, 2, 9	Ice Cream Lab **MC- Interactive Reader**