Science Planned Course - College Preparatory Chemistry
Grades 11 – 12

Unit 1: **The Nature of Science and Measurement**

Content Standard: **Apply the scientific method to problem solving and analyze numerical data.**

State Curriculum Standard:
3.1.12B Apply concepts of models as a method to predict and understand science and technology.
3.1.12D Analyze scale as a way of relating concepts and ideas to one another by some measure.
3.2.12A Evaluate the nature of scientific and technological knowledge.
3.2.12B Evaluate experimental information for appropriateness and adherence to relevant science processes.
3.2.12C Apply the elements of scientific inquiry to solve multi-step problems.
3.4.1A Explain concepts about the structure and properties of matter.
3.4.12A Apply concepts about the structure and properties of matter.

Course Content	Student Performance	Resources	Assessments
A. The Scientific Method. B. Observations Versus Interpretations. C. Theories and Laws. D. Qualitative and Quantitative Observations. E. Graphing Data. F. Accuracy Versus Precision. G. Types of Error and Percent Error. H. Significant Figures. I. Scientific Notation. J. Dimensional Analysis.	• Take notes from a variety of instructional presentations • Complete all assigned reading assignments • Complete all assigned laboratory experiments and reports • Participate constructively in small and large group discussion of laboratory results • Participate constructively in group activities • Participate constructively in classroom discussions • Thoughtfully view and analyze all demonstrations and video presentations	• Modern Chemistry, (Holt, Rinehart, and Winston, 2006) – Chapter 2 • Chemistry: The Study of Matter Laboratory Manual, (Prentice Hall, Inc. 1992) • Laboratory Chemistry, (Merrill, 1990) • Chemistry: A Modern Course, (Merrill, 1987) • Textbook supplementary materials • Teacher-made notes, handouts, worksheets, and laboratory experiments • Video tapes including handouts	• Laboratory report evaluation • Teacher-generated assessments including problem solving, matching, completion, and multiple choice • Oral questioning • Teacher observations • Class work and homework • Content-related quizzes • Study guide and review problems

Science Planned Course - College Preparatory Chemistry
Grades 11 – 12

Unit 2: **Matter and Energy**

Content Standard: **Understand the physical and chemical properties of matter and their relationship to energy.**

State Curriculum Standard:
3.1.12D Analyze scale as a way of relating concepts and ideas to one another by some measure.
3.2.12A Evaluate the nature of scientific and technological knowledge.
3.2.12B Evaluate experimental information for appropriateness and adherence to relevant science processes.
3.2.12C Apply the elements of scientific inquiry to solve multi-step problems.
3.4.10A Explain concepts about the structure and properties of matter.
3.4.10B Analyze energy sources and transfers of heat.
3.4.12A Apply concepts about the structure and properties of matter.
3.4.12B Apply and analyze energy sources and conversion and their relationship to heat and temperature.

Course Content	Student Performance	Resources	Assessments
A. Classifying Matter. B. Elements and Compounds. C. Types of Mixtures. D. Chemical and Physical Properties: • Density • Solubility • Reactivity. E. Chemical and Physical Changes. F. Conservation of Mass. G. Temperature Conversions. H. Principles of Heat: • Exothermic Versus Endothermic Changes. I. Calculations Using the Equation for Heat. J. Coffee-Cup Calorimetry.	• Take notes from a variety of instructional presentations • Complete all assigned reading assignments • Complete all assigned laboratory experiments and reports • Participate constructively in small and large group discussion of laboratory results • Participate constructively in group activities • Participate constructively in classroom discussions • Thoughtfully view and analyze all demonstrations and video presentations	• Modern Chemistry, (Holt, Rinehart, and Winston, 2006) – Chapters 1.1, 1.2, and 16.1 • Chemistry: The Study of Matter Laboratory Manual, (Prentice Hall, Inc. 1992) • Laboratory Chemistry, (Merrill, 1990) • Chemistry: A Modern Course, (Merrill, 1987) • Textbook supplementary materials • Teacher-made notes, handouts, worksheets, and laboratory experiments • Video tapes including handouts	• Laboratory report evaluation • Teacher-generated assessments including problem solving, matching, completion, and multiple choice • Oral questioning • Teacher observations • Class work and homework • Content-related quizzes • Study guide and review problems

Science Planned Course - College Preparatory Chemistry
Grades 11 – 12

Unit 3: **Atomic Structure**

Content Standard: **Understand the development of atomic theory and the structure of the atom.**

State Curriculum Standard:
3.1.12B Apply concepts of models as a method to predict and understand science and technology.
3.2.12A Evaluate the nature of scientific and technological knowledge.
3.2.12B Evaluate experimental information for appropriateness and adherence to relevant science processes.
3.4.10A Explain concepts about the structure and properties of matter.
3.4.12A Apply concepts about the structure and properties of matter.

Course Content	Student Performance	Resources	Assessments
A. Foundations of Atomic Theory. B. Dalton's Atomic Theory. C. J.J. Thomson and The Discovery of The Electron. D. Rutherford's Experiment and The Nucleus. E. Atomic Number. F. Mass Number. G. Isotopes. H. Nuclear Notation. I. Atomic Mass.	• Take notes from a variety of instructional presentations • Complete all assigned reading assignments • Complete all assigned laboratory experiments and reports • Participate constructively in small and large group discussion of laboratory results • Participate constructively in group activities • Participate constructively in classroom discussions • Thoughtfully view and analyze all demonstrations and video presentations	• Modern Chemistry, (Holt, Rinehart, and Winston, 2006) – Chapter 3 • Chemistry: The Study of Matter Laboratory Manual, (Prentice Hall, Inc. 1992) • Laboratory Chemistry, (Merrill, 1990) • Chemistry: A Modern Course, (Merrill, 1987) • Textbook supplementary materials • Teacher-made notes, handouts, worksheets, and laboratory experiments • Video tapes including handouts	• Laboratory report evaluation • Teacher-generated assessments including problem solving, matching, completion, and multiple choice • Oral questioning • Teacher observations • Class work and homework • Content-related quizzes • Study guide and review problems

Science Planned Course - College Preparatory Chemistry
Grades 11 – 12

Unit 4: **Nuclear chemistry**

Content Standard: **Analyze and explain the behavior of nuclear radiation.**

State Curriculum Standard:
3.1.10E Describe patterns of change in nature, physical and man made systems.
3.2.12A Evaluate the nature of scientific and technological knowledge.
3.2.12B Evaluate experimental information for appropriateness and adherence to relevant science processes.
3.2.12C Apply the elements of scientific inquiry to solve multi-step problems.
3.4.10A Explain concepts about the structure and properties of matter.
3.4.12A Apply concepts about the structure and properties of matter.

Course Content	Student Performance	Resources	Assessments
A. Nuclear Stability and Mass Defect. B. Types of Radioactive Decay and Detection. C. Half-Life Calculations. D. Natural and Artificial Transmutations. E. Balancing Nuclear Equations. F. Applications of Nuclear Radiation. G. Nuclear Fission and Fusion. H. Nuclear Power Plants: • Three Mile Island • Chernobyl.	• Take notes from a variety of instructional presentations • Complete all assigned reading assignments • Complete all assigned laboratory experiments and reports • Participate constructively in small and large group discussion of laboratory results • Participate constructively in group activities • Participate constructively in classroom discussions • Thoughtfully view and analyze all demonstrations and video presentations	• Modern Chemistry, (Holt, Rinehart, and Winston, 2006) – Chapter • Chemistry: The Study of Matter Laboratory Manual, (Prentice Hall, Inc. 1992) • Laboratory Chemistry, (Merrill, 1990) • Chemistry: A Modern Course, (Merrill, 1987) • Textbook supplementary materials • Teacher-made notes, handouts, worksheets, and laboratory experiments • Video tapes including handouts	• Laboratory report evaluation • Teacher-generated assessments including problem solving, matching, completion, and multiple choice • Oral questioning • Teacher observations • Class work and homework • Content-related quizzes • Study guide and review problems

Science Planned Course - College Preparatory Chemistry
Grades 11 – 12

Unit 5: **The Arrangement of Electrons in Atoms**

Content Standard**:** **Understand that the quantum mechanical model of the atom explains the properties of atoms by treating the electron as a wave and including the idea of quantized energies.**

State Curriculum Standard**:**
3.1.12B Apply concepts of models as a method to predict and understand science and technology.
3.2.12A Evaluate the nature of scientific and technological knowledge.
3.2.12B Evaluate experimental information for appropriateness and adherence to relevant science processes.
3.4.10A Explain concepts about the structure and properties of matter.
3.4.12A Apply concepts about the structure and properties of matter.

Course Content	Student Performance	Resources	Assessments
A. The Properties of Light. B. Models of The Atom. C. E = h v. D. Photoelectric Effect. E. Probability. F. Uncertainty. G. Quantum Mechanics. H. Energy Levels. I. Quantum Numbers. J. Orbitals and Their Geometry. K. Electron Configurations. L. Electron Configuration and Orbital Diagrams. M. Electron Configuration Notation.	• Take notes from a variety of instructional presentations • Complete all assigned reading assignments • Complete all assigned laboratory experiments and reports • Complete all assigned homework • Participate constructively in small and large group discussion of laboratory results • Participate constructively in group activities • Participate constructively in classroom discussions • Thoughtfully view and analyze all demonstrations and video presentations	• Modern Chemistry, (Holt, Rinehart, and Winston, 2006)- Chapter 4 • Chemistry: The Study of Matter Laboratory Manual, (Prentice Hall, Inc. 1992) • Laboratory Chemistry, (Merrill, 1990) • Chemistry: A Modern Course, (Merrill, 1987) • Textbook supplementary materials • Teacher-made notes, handouts, worksheets, and laboratory experiments • Video tapes including handouts	• Laboratory report evaluation • Teacher-generated assessments including matching, multiple choice, problem solving, short-answer and essay • Oral questioning • Teacher observations • Class work and homework related to aforementioned concepts • Quiz on electron configuration • Study guide

Science Planned Course - College Preparatory Chemistry
Grades 11 – 12

Unit 6**: The Periodic Table and Periodic Law**

Content Standard: **Predict physical and chemical properties through the use of the periodic table.**

State Curriculum Standard**:** **3.2.12A Evaluate the nature of scientific and technological knowledge.**
3.2.12B Evaluate experimental information for appropriateness and adherence to relevant science processes.
3.4.10A Explain concepts about the structure and properties of matter.
3.4.12A Apply concepts about the structure and properties

Course Content	Student Performance	Resources	Assessments
A. History and Development of The Periodic Table. B. Periodicity. C. Periodic Properties. D. Electron Configuration and Periodic Table Arrangement. E. Periodic Table Trends. F. Valence Electrons. G. Ionization Energy. H. Electronegativity. I. Atomic and Ionic Radii.	• Take notes from a variety of instructional presentations • Complete all assigned reading assignments • Complete all assigned laboratory experiments and reports • Participate constructively in small and large group discussion of laboratory results • Participate constructively in group activities • Participate constructively in classroom discussions • Thoughtfully view and analyze all demonstrations and video presentations	• Modern Chemistry, (Holt, Rinehart, and Winston, 2006)- Chapter 5 • Chemistry: The Study of Matter Laboratory Manual, (Prentice Hall, Inc. 1992) • Laboratory Chemistry, (Merrill, 1990) • Chemistry: A Modern Course, (Merrill, 1987) • Textbook supplementary materials • Teacher-made notes, handouts, worksheets, and laboratory experiments • Video tapes including handouts	• Laboratory report evaluation • Teacher-generated assessments including matching, multiple choice, problem solving, short-answer and essay • Oral questioning • Teacher observations • Class work and homework related to aforementioned concepts • Quiz on the periodic table and related concepts. • Study guide

Science Planned Course - College Preparatory Chemistry
Grades 11 – 12

Unit 7: **Chemical Bonding**

Content Standard**: All chemical compounds are held together by chemical bonds.**

State Curriculum Standard**:**
3.1.12B Apply concepts of models as a method to predict and understand science and technology.
3.2.12A Evaluate the nature of scientific and technological knowledge.
3.2.12B Evaluate experimental information for appropriateness and adherence to relevant science processes.
3.4.10A Explain concepts about the structure and properties of matter.
3.4.12A Apply concepts about the structure and properties of matter.

Course Content	Student Performance	Resources	Assessments
A. Chemical Bonds. B. Covalent and Ionic Bonding. C. Polarity. D. Bond Energy. E. Octet Rule. F. Lewis Structures. G. Multiple Bonds. H. Resonance. I. Covalent-Network Bonds. J. Ionic Compounds. K. Polyatomic Ions. L. Metallic Bonds. M. VSEPR Theory. N. Intermolecular Forces. O. Polarity. P. Hydrogen Bonding.	• Take notes from a variety of instructional presentations • Complete all assigned reading assignments • Complete all assigned laboratory experiments and reports • Participate constructively in small and large group discussion of laboratory results • Participate constructively in group activities • Participate constructively in classroom discussions • Thoughtfully view and analyze all demonstrations and video presentations	• Modern Chemistry, (Holt, Rinehart, and Winston, 2006)- Chapter 6 • Chemistry: The Study of Matter Laboratory Manual, (Prentice Hall, Inc. 1992) • Laboratory Chemistry, (Merrill, 1990) • Chemistry: A Modern Course, (Merrill, 1987) • Textbook supplementary materials • Teacher-made notes, handouts, worksheets, and laboratory experiments • Video tapes including handouts	• Laboratory report evaluation • Teacher-generated assessments including matching, multiple choice, problem solving, short-answer and essay • Oral questioning • Teacher observations • Class work and homework related to aforementioned concepts • Quiz on bonding and related concepts • Study guide

Science Planned Course - College Preparatory Chemistry
Grades 11 – 12

Unit 8: **Chemical Formulas and Nomenclature**

Content Standard**:** **Analyze compounds by their chemical formulas.**
Identify acids and bases as two classes of chemical compounds that are used in many different applications.

State Curriculum Standard**:** **3.2.12A Evaluate the nature of scientific and technological knowledge.**
3.2.12B Evaluate experimental information for appropriateness and adherence to relevant science processes.
3.4.10A Explain concepts about the structure and properties of matter.
3.4.12A Apply concepts about the structure and properties of matter.

Course Content	Student Performance	Resources	Assessments
A. Significance of Chemical Formulas. B. Symbols. C. Types of Compounds. D. Ionic Compound Nomenclature. E. Formula Units. F. Stock System Naming. G. Molecular Compound Nomenclature. H. Acid Naming. I. Assigning Oxidation Numbers. J. Oxidation Numbers In Naming. K. Compounds In Solution. L. Dissociation. M. Ionization. N. The Hydronium Ion.	• Take notes from a variety of instructional presentations • Complete all assigned reading assignments • Complete all assigned laboratory experiments and reports • Participate constructively in small and large group discussion of laboratory results • Participate constructively in group activities • Participate constructively in classroom discussions • Thoughtfully view and analyze all demonstrations and video presentations	• Modern Chemistry, (Holt, Rinehart, and Winston, 2006)- Chapter 7.1-7.2 and Ch 14.1 • Chemistry: The Study of Matter Laboratory Manual, (Prentice Hall, Inc. 1992) • Laboratory Chemistry, (Merrill, 1990) • Chemistry: A Modern Course, (Merrill, 1987) • Textbook supplementary materials • Teacher-made notes, handouts, worksheets, and laboratory experiments • Video tapes including handouts	• Laboratory report evaluation • Teacher-generated assessments including matching, multiple choice, problem solving, short-answer and essay • Oral questioning • Teacher observations • Class work and homework related to aforementioned concepts • Quiz on chemical formulas and related concepts • Study guide

Science Planned Course - College Preparatory Chemistry
Grades 11 – 12

Unit 9: **The Mathematics of Chemical Formulas and the Mole**

Content Standard: **The mole is the central unit in converting from one type of measurement to another.**

State Curriculum Standard:
3.1.12B **Apply concepts of models as a method to predict and understand science and technology**.
3.1.12D **Analyze scale as a way of relating concepts and ideas to one another by some measure**.
3.2.12A **Evaluate the nature of scientific and technological knowledge**.
3.2.12B **Evaluate experimental information for appropriateness and adherence to relevant science processes**.
3.2.12C **Apply the elements of scientific inquiry to solve multi-step problems**.
3.4.12A **Quantify the properties of matter (e.g., density, solubility coefficients) by applying mathematical formulas.**

Course Content	Student Performance	Resources	Assessments
A. The Mole. B. Molar Mass. C. Moles To Molecules. D. Molar Volume of A Gas. E. Percent Composition. F. Empirical Formulas. G. Molecular Formulas.	• Take notes from a variety of instructional presentations • Complete all assigned reading assignments • Complete all assigned laboratory experiments and reports • Participate constructively in small and large group discussion of laboratory results • Participate constructively in group activities • Participate constructively in classroom discussions • Thoughtfully view and analyze all demonstrations and video presentations	• Modern Chemistry, (Holt, Rinehart, and Winston, 2006)- Chapter 7 • Chemistry: The Study of Matter Laboratory Manual, (Prentice Hall, Inc. 1992) • Laboratory Chemistry, (Merrill, 1990) • Chemistry: A Modern Course, (Merrill, 1987) • Textbook supplementary materials • Teacher-made notes, handouts, worksheets, and laboratory experiments • Video tapes including handouts	• Laboratory report evaluation • Teacher-generated assessments including multiple choice, problem solving and matching • Oral questioning • Teacher observations • Class work and homework • Quizzes • Study guide

Science Planned Course - College Preparatory Chemistry
Grades 11 – 12

Unit 10: **Chemical Equations and Reactions**

Content Standard: **Describe the various types of chemical reactions that verify the law of conservation and energy**.

State Curriculum Standard:
3.4.10A **Describe various types of chemical reactions by applying the laws of conservation of mass and energy.**
3.1.12D **Analyze scale as a way of relating concepts and ideas to one another by some measure**.
3.2.12A **Evaluate the nature of scientific and technological knowledge**.
3.2.12B **Evaluate experimental information for appropriateness and adherence to relevant science processes**.
3.2.12C **Apply the elements of scientific inquiry to solve multi-step problems**.

Course Content	Student Performance	Resources	Assessments
A. Indications of A Chemical Reaction. B. Writing and Balancing Equations. C. Synthesis Reactions. D. Decomposition Reactions. E. Single-Replacement Reactions. F. Double-Replacement Reactions. G. Combustion Reactions. H. Activity Series of The Elements. I. Rate-Influencing Factors. J. Activation Energy.	• Take notes from a variety of instructional presentations • Complete all assigned reading assignments • Complete all assigned laboratory experiments and reports • Participate constructively in small and large group discussion of laboratory results • Participate constructively in group activities • Participate constructively in classroom discussions • Thoughtfully view and analyze all demonstrations and video presentations	• Modern Chemistry, (Holt, Rinehart, and Winston, 2006)- Chapters 8 and 17 • Textbook supplementary materials • Teacher-made notes, handouts, worksheets, and laboratory experiments • Video tapes including handouts	• Laboratory report evaluation • Teacher-generated assessments including multiple choice, listing, classification, short answer, completion, and identification • Oral questioning • Teacher observations • Class work and homework involving balancing, classifying reactions, and predicting products • Quiz on balancing • Quiz on classifying reactions and predicting products • Study guide

Science Planned Course - College Preparatory Chemistry
Grades 11 – 12

Unit 11: **The Mathematics of Chemical Equations**

Content Standard: **Understand quantitative information in a balanced equation.**

State Curriculum Standard:
3.1.12D **Analyze scale as a way of relating concepts and ideas to one another by some measure.**
3.2.12A **Evaluate the nature of scientific and technological knowledge**.
3.2.12B **Evaluate experimental information for appropriateness and adherence to relevant science processes**.
3.2.12C **Apply the elements of scientific inquiry to solve multi-step problems**.
3.4.12A **Quantify the properties of matter (e.g., density, solubility coefficients) by applying mathematical formulas.**
3.4.12B **Determine the heat involved in illustrative chemical reactions**.

Course Content	Student Performance	Resources	Assessments
A. Mole-Heat Conversions. B. Mole-Mole Conversions. C. Mole-Mass Conversions. D. Mass-Mass Conversions. E. Coefficients and Volumes of Gases.	• Take notes from a variety of instructional presentations • Complete all assigned reading assignments • Complete all assigned laboratory experiments and reports • Participate constructively in small and large group discussion of laboratory results • Participate constructively in group activities • Participate constructively in classroom discussions • Thoughtfully view and analyze all demonstrations and video presentations	• Modern Chemistry (Holt, Rinehart, and Winston, 2006) – Chapter 9 • Modern Chemistry: Laboratory Experiments (Holt, Rinehart, and Winston, 1990) • Textbook supplementary materials • Teacher-made notes, handouts, worksheets, and laboratory experiments • Video tapes including handouts	• Laboratory report evaluation • Teacher-generated assessments including multiple choice, completion and problem solving • Oral questioning • Teacher observations • Class work and homework involving mole-mole, mass-mass, and mole-mass relationships • Quiz on quantitative relationships • Study guide

Science Planned Course - College Preparatory Chemistry
Grades 11 – 12

Unit 12: **Solutions, Acids and Bases**

Content Standard**: Many factors contribute to the solubility of one substance into another.**
Identify acids and bases as two classes of chemical compounds that are used in many different applications.

State Curriculum Standard:
3.1.12B Apply concepts of models as a method to predict and understand science and technology.
3.2.12A Evaluate the nature of scientific and technological knowledge.
3.4.12A Characterize and identify important classes of compounds (e.g., acids, bases, salts).
3.2.12B Evaluate experimental information for appropriateness and adherence to relevant science processes.
3.4.12A Quantify the properties of matter (e.g., density, solubility coefficients) by applying mathematical formulas.

Course Content	Student Performance	Resources	Assessments
A. Types of Solutions. B. Solubility. C. Factors Affecting The Rate of Dissolution. D. Solubility Curves. E. Molarity. F. General Properties of Acids And Bases. G. Arrhenius Theory. H. Bronsted-Lowry Theory. I. Conjugate Acids and Bases. J. Amphoteric Compounds. K. Neutralization Reactions. L. Titration.	• Take notes from a variety of instructional presentations • Complete all assigned reading assignments • Complete all assigned laboratory experiments and reports • Participate constructively in small and large group discussion of laboratory results • Participate constructively in group activities • Participate constructively in classroom discussions • Thoughtfully view and analyze all demonstrations and video presentations	• Modern Chemistry (Holt, Rinehart, and Winston, 2006) – Chapters 12, 14, and 15 • Modern Chemistry: Laboratory Experiments (Holt, Rinehart, and Winston, 1990) • Chemistry: The Study of Matter, Lab Manual (Prentice Hall, 1992) • Textbook supplementary materials • Teacher-made notes, handouts, worksheets, and laboratory experiments • Video tapes including handouts	• Laboratory report evaluation • Teacher-generated assessments including, multiple choice, listing, classification, short answer, completion, and identification • Oral questioning • Teacher observations • Class work and homework Quizzes • Study guide

Science Planned Course - College Preparatory Chemistry
Grades 11 – 12

Unit 13: **Gases**

Content Standard: **Understand that the quantitative relationships expressed by the gas laws describe the pattern of change that exists among the variables.**

State Curriculum Standard:
3.1.12B **Apply concepts of models as a method to predict and understand science and technology.**
3.1.12D **Analyze scale as a way of relating concepts and ideas to one another by some measure.**
3.2.12A **Evaluate the nature of scientific and technological knowledge.**
3.2.12B **Evaluate experimental information for appropriateness and adherence to relevant science processes.**
3.2.12C **Apply the elements of scientific inquiry to solve multi-step problems.**
3.4.10A **Predict the behavior of gases through the use of Boyle's, Charles' or the ideal gas law, in everyday situations**
3.4.12A **Quantify the properties of matter (e.g., density, solubility coefficients) by applying mathematical formulas**

Course Content	Student Performance	Resources	Assessments
A. Kinetic Molecular Theory of Gases, Liquids, and Solids. B. Graham's Law of Diffusion. C. Pressure and Force. D. Dalton's Law Of Partial Pressure. E. Boyle's Law. F. Charles's Law. G. Gay-Lussac's Law. H. Measuring and Comparing The Volumes of Reacting Gases. I. Avogadro's Law. J. The Ideal Gas Law. K. The Ideal Gas Constant.	• Take notes from a variety of instructional presentations • Complete all assigned reading assignments • Complete all assigned laboratory experiments and reports • Participate constructively in small and large group discussion of laboratory results • Participate constructively in group activities • Participate constructively in classroom discussions • Thoughtfully view and analyze all demonstrations and video presentations	• Modern Chemistry, (Holt, Rinehart, and Winston, 2006)- Chapter 11 • Modern Chemistry: Lab Experiments (Holt, Rinehart, and Winston, 1990) • Textbook supplementary materials • Teacher-made notes, handouts, worksheets, and laboratory experiments • Video tapes including handouts	• Laboratory report evaluation • Teacher-generated assessments including problem solving, short answer, multiple choice, and essay • Oral questioning • Teacher observations • Class work and homework • Quiz on the mathematical relationships of the gas laws • Study guide