Science Planned Course - Applied General Science: Grade 9

Unit: **Introduction to the Physical Sciences**

Content Standard: **Apply measurement skills and the scientific method to solve problems and to analyze data**

State Curriculum Standard: **3.1.10D Apply scale as a way of relating concepts and ideas to one another by some measure.**
3.1.10E Describe patterns of change in nature, physical, and man made systems
3.2.10A Apply knowledge and understanding about the nature of scientific and technological knowledge.
3.2.10B Apply process knowledge and organize scientific and technological phenomena in varied ways.
3.2.10C Apply the elements of scientific inquiry to solve problems.
3.4.10A Explain concepts about the structure and properties of matter.

Course Content	Student Performance	Resources	Assessments
A. Lab Safety and Procedures. B. Scientific Method. C. Controlled Experimentation. D. Measuring Mass, Length, and Volume to the Correct Number of Significant Digits and Use of Correct Units. E. Percent Error and Sources of Error. F. Metric Conversions. G. Density and Derived SI Units. H. Mass Percent Calculations. I. Graphing and Interpreting Raw and Analyzed Data. J. Independent and Dependent Variables.	• Take notes from a variety of instructional presentations • Actively complete all reading assignments • Complete all assigned laboratory experiments • Participate in cooperative learning activities • Contribute to class discussions • Actively view and analyze all video presentations • Create a unit portfolio	• Physical Science, (Prentice Hall, 2006) – Chapter1 • Assorted laboratory manuals • Textbook supplementary materials • Teacher-developed notes and handouts • Videos/DVDs • Primary and secondary source readings • Websites • Library services • Posters/visual aides	• Laboratory handout evaluation • Teacher-generated assessments • Oral questioning • Teacher observations • Evaluation of class work and homework • Quizzes • Unit Portfolio • Projects and Presentations

Science Planned Course - Applied General Science: Grade 9

Unit: **Motion**

Content Standard: **To apply the concepts of motion to the natural world**

State Curriculum Standard: **3.1.10 E Describe patterns of change in nature, physical, and man made systems.**
3.2.10 A Apply knowledge and understanding about the nature of scientific and technological knowledge.
3.2.10 B Apply process knowledge and organize scientific and technological phenomena in varied ways.
3.2.10 C Apply the elements of scientific inquiry to solve problems.
3.4.10 C Distinguish among the principles of force and motion.

Course Content	Student Performance	Resources	Assessments
A. Frames of Reference. B. Distance and Displacement. C. Speed and Velocity. D. Distance-Time Graphs. E. Acceleration. F. Velocity-Time Graphs.	• Take notes from a variety of instructional presentations • Actively complete all reading assignments • Complete all assigned laboratory experiments • Participate in cooperative learning activities • Contribute to class discussions • Actively view and analyze all video presentations • Create a unit portfolio	• Physical Science, (Prentice Hall, 2006) – Chapter 11 • Assorted laboratory manuals • Textbook supplementary materials • Teacher-developed notes and handouts • Videos/DVDs • Primary and secondary source readings • Websites • Library services • Posters/visual aides	• Laboratory handout evaluation • Teacher-generated assessments • Oral questioning • Teacher observations • Evaluation of class work and homework • Quizzes • Unit Portfolio • Projects and Presentations

Science Planned Course - Applied General Science: Grade 9

Unit: **Forces**

Content Standard: **To explain motion and acceleration in terms of force**

State Curriculum Standard: **3.1.10 E Describe patterns of change in nature, physical, and man made systems.**
3.2.10 A Apply knowledge and understanding about the nature of scientific and technological knowledge.
3.2.10 B Apply process knowledge and organize scientific and technological phenomena in varied ways.
3.2.10 C Apply the elements of scientific inquiry to solve problems.
3.4.10 C Distinguish among the principles of force and motion.

Course Content	Student Performance	Resources	Assessments
A. Definition of Force. B. Balanced and Unbalanced Forces and Newton's First Law. C. Types of Friction. D. Calculations Involving Newton's Second Law. E. Newton's Third Law and its Applications. F. Gravity and Free Fall. G. Projectile Motion. H. Buoyancy and Archimedes' Principle.	• Take notes from a variety of instructional presentations • Actively complete all reading assignments • Complete all assigned laboratory experiments • Participate in cooperative learning activities • Contribute to class discussions • Actively view and analyze all video presentations • Create a unit portfolio	• Physical Science, (Prentice Hall, 2006) – Chapters 12 and 13.3 • Assorted laboratory manuals • Textbook supplementary materials • Teacher-developed notes and handouts • Videos/DVDs • Primary and secondary source readings • Websites • Library services • Posters/visual aides	• Laboratory handout evaluation • Teacher-generated assessments • Oral questioning • Teacher observations • Evaluation of class work and homework • Quizzes • Unit Portfolio • Projects and Presentations

Science Planned Course - Applied General Science: Grade 9

Unit: **Kinetic Molecular Theory, Phase Changes, and the Gas Laws**

Content Standard: **To explain the characteristics of solids, liquids, and gases in terms of Kinetic Molecular Theory**

State Curriculum Standard: **3.1.10E Describe patterns of change in nature, physical, and man made systems.**
3.2.10A Apply knowledge and understanding about the nature of scientific and technological knowledge.
3.2.10B Apply process knowledge and organize scientific and technological phenomena in varied ways.
3.2.10C Apply the elements of scientific inquiry to solve problems
3.4.10A Explain concepts about the structure and properties of matter.

Course Content	Student Performance	Resources	Assessments
A. Solids, Liquids, Gases, and Plasma Overview. B. Kinetic Molecular Theory. C. Temperature and Temperature Scales. D. Pressure and the Atmosphere. E. Barometers and Pressure Units F. Factors That Affect Gas Pressure. G. Calculations Involving Boyle's and Charles's Law With Pictorial Problems. H. Phase Changes and Graphing Temperature Over Time. I. Heats of Fusion and Vaporization.	• Take notes from a variety of instructional presentations • Actively complete all reading assignments • Complete all assigned laboratory experiments • Participate in cooperative learning activities • Contribute to class discussions • Actively view and analyze all video presentations • Create a unit portfolio	• Physical Science, (Prentice Hall, 2006) – Chapter 3 • Assorted laboratory manuals • Textbook supplementary materials • Teacher-developed notes and handouts • Videos/DVDs • Primary and secondary source readings • Websites • Library services • Posters/visual aides	• Laboratory handout evaluation • Teacher generated assessments • Oral questioning • Teacher observations • Evaluation of class work and homework • Quizzes • Unit Portfolio • Projects and Presentations

Science Planned Course - Applied General Science: Grade 9

Unit: **Atomic Theory and Nuclear Science**

Content Standard: **To understand the atomic nature of all matter and sources of radioactivity.**

State Curriculum Standard: **3.1.10B Describe concepts of models as a way to predict and understand science and technology.**
3.2.10A Apply knowledge and understanding about the nature of scientific and technological knowledge.
3.2.10B Apply process knowledge and organize scientific and technological phenomena in varied ways.
3.2.10C Apply the elements of scientific inquiry to solve 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. Symbols of the Elements. B. Ancient Greek Models of Atoms. C. Dalton's Atomic Theory. D. Thomson's Model. E. Rutherford's Atomic Theory. F. Bohr's Model. G. The Wave Model and Probability. H. Subatomic Particles. I. Atomic Number and Mass Number Calculations. J. Isotopes and Atomic Mass. K. Drawing Bohr Diagrams.	• Take notes from a variety of instructional presentations • Actively complete all reading assignments • Complete all assigned laboratory experiments • Participate in cooperative learning activities • Contribute to class discussions • Actively view and analyze all video presentations • Create a unit portfolio	• Physical Science, (Prentice Hall, 2006) – Chapters 4 and 10 • Assorted laboratory manuals • Textbook supplementary materials • Teacher-developed notes and handouts • Videos/DVDs • Primary and secondary source readings • Websites • Library services • Posters/visual aides	• Laboratory handout evaluation • Teacher-generated assessments • Oral questioning • Teacher observations • Evaluation of class work and homework • Quizzes • Unit Portfolio • Projects and Presentations

Science Planned Course - Applied General Science: Grade 9

Unit: **Atomic Theory and Nuclear Science**

Content Standard: **To understand the atomic nature of all matter and sources of radioactivity.**

State Curriculum Standard: **3.1.10B Describe concepts of models as a way to predict and understand science and technology.**
3.2.10A Apply knowledge and understanding about the nature of scientific and technological knowledge.
3.2.10B Apply process knowledge and organize scientific and technological phenomena in varied ways.
3.2.10C Apply the elements of scientific inquiry to solve 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
L. Radioactive Isotopes. M. Types of Radiation. N. Carbon-14 Dating. O. Fission and Fusion. P. Nuclear Accidents and Weapons (i.e. Chernobyl, TMI, WWII, and the Hydrogen Bomb). Q. Positive Applications of Nuclear Radiation. R. Schematics of Nuclear Power Plants.	• Take notes from a variety of instructional presentations • Actively complete all reading assignments • Complete all assigned laboratory experiments • Participate in cooperative learning activities • Contribute to class discussions • Actively view and analyze all video presentations • Create a unit portfolio	• Physical Science, (Prentice Hall, 2006) – Chapters 4 and 10 • Assorted laboratory manuals • Textbook supplementary materials • Teacher-developed notes and handouts • Videos/DVDs • Primary and secondary source readings • Websites • Library services • Posters/visual aides	• Laboratory handout evaluation • Teacher-generated assessments • Oral questioning • Teacher observations • Evaluation of class work and homework • Quizzes • Unit Portfolio • Projects and presentations

Science Planned Course - Applied General Science: Grade 9

Unit: **Sources and Uses of the Elements and the Periodic Table.**

Content Standard: **To use the periodic table to predict properties of elements and to identify sources and uses of elements.**

State Curriculum Standard: **3.1.10E Describe patterns of change in nature, physical, and man made systems.**
3.2.10A Apply knowledge and understanding about the nature of scientific and technological knowledge.
3.2.10B Apply process knowledge and organize scientific and technological phenomena in varied ways.
3.2.10C Apply the elements of scientific inquiry to solve problems
3.4.10A Explain concepts about the structure and properties of matter.

Course Content	Student Performance	Resources	Assessments
A. Minerals (Silicates and Nonsilicates) and Ores as Sources of Elements. B. Mendeleev's Periodic Table. C. Moseley and the Periodic Law. D. Classes of Elements (Metals, Nonmetals, Metalloids) and Their Properties. E. Groups to Predict Valence Electrons. F. Periods to Predict Energy Levels G. Names and Properties of the Groups Comprising the Representative Elements. H. Transition and Inner Transition Metals.	• Take notes from a variety of instructional presentations • Actively complete all reading assignments • Complete all assigned laboratory experiments • Participate in cooperative learning activities • Contribute to class discussions • Actively view and analyze all video presentations • Create a unit portfolio	• Physical Science, (Prentice Hall, 2006) – Chapter 5 • Assorted laboratory manuals • Textbook supplementary materials • Teacher-developed notes and handouts • Videos/DVDs • Primary and secondary source readings • Websites • Library services • Posters/visual aides	• Laboratory handout evaluation • Teacher-generated assessments • Oral questioning • Teacher observations • Evaluation of class work and homework • Quizzes • Unit Portfolio • Projects and Presentations

Science Planned Course - Applied General Science: Grade 9

Unit: **Sources and Uses of the Elements and the Periodic Table.**

Content Standard: **To use the periodic table to predict properties of elements and to identify sources and uses of elements.**

State Curriculum Standard: **3.1.10E Describe patterns of change in nature, physical, and man made systems.**
3.2.10A Apply knowledge and understanding about the nature of scientific and technological knowledge.
3.2.10B Apply process knowledge and organize scientific and technological phenomena in varied ways.
3.2.10C Apply the elements of scientific inquiry to solve problems
3.4.10A Explain concepts about the structure and properties of matter.

Course Content	Student Performance	Resources	Assessments
I. Reactivity of the Alkali Metals. J. Carbon as the Basis of Life Nitrogen for Proteins and Nitrogen Fixation Via Microbes. K. Nitrogen for Proteins and Nitrogen Fixation Via Microbes.	• Take notes from a variety of instructional presentations • Actively complete all reading assignments • Complete all assigned laboratory experiments • Participate in cooperative learning activities • Contribute to class discussions • Actively view and analyze all video presentations • Create a unit portfolio	• Physical Science, (Prentice Hall, 2006) – Chapter 5 • Assorted laboratory manuals • Textbook supplementary materials • Teacher--developed notes and handouts • Videos/DVDs • Primary and secondary source readings • Websites • Library services • Posters/visual aides	• Laboratory handout evaluation • Teacher-generated assessments • Oral questioning • Teacher observations • Evaluation of class work and homework • Quizzes • Unit Portfolio • Projects and Presentations

Science Planned Course - Applied General Science: Grade 9

Unit: **Chemical Bonds and the Nature of Energy, Work, Power, and Machines**

Content Standard: **To explain compounds as energy sources using knowledge of chemical bonds**

State Curriculum Standard: **3.2.10 A Apply knowledge and understanding about the nature of scientific and technological knowledge.**

3.2.10B Apply process knowledge and organize scientific and technological phenomena in varied ways.
3.2.10C Apply the elements of scientific inquiry to solve problems
3.4.10A Explain concepts about the structure and properties of matter.
3.4.10B Analyze energy sources and transfers of heat.
3.4.10C Distinguish among the principles of force and motion

Course Content	Student Performance	Resources	Assessments
A. Dot Structures. B. Octet Rule. C. Ionic and Covalent Bonding. D. Counting Atoms in Compounds. E. Writing Formulas Using Oxidation Numbers for Simple Binary Ionic and Molecular Compounds. F. Potential Energy in Chemical Bonds. G. Chemical Reactions and Bond Breaking and Bond Making. H. Hydrogen and Oxygen Reaction and the Hindenberg.	• Take notes from a variety of instructional presentations • Actively complete all reading assignments • Complete all assigned laboratory experiments • Participate in cooperative learning activities • Contribute to class discussions • Actively view and analyze all video presentations • Create a unit portfolio	• Physical Science, (Prentice Hall, 2006) – Chapters 6, 15, 16, and 14 as references. • Assorted laboratory manuals • Textbook supplementary materials • Teacher-developed notes and handouts • Videos/DVDs • Primary and secondary source readings • Websites • Library services • Posters/visual aides	• Laboratory handout evaluation • Teacher-generated assessments • Oral questioning • Teacher observations • Evaluation of class work and homework • Quizzes • Unit Portfolio • Projects and Presentations

Science Planned Course - Applied General Science: Grade 9

Unit: **Chemical Bonds and the Nature of Energy, Work, Power, and Machines**

Content Standard: **To explain compounds as energy sources using knowledge of chemical bonds**

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3.2.10B Apply process knowledge and organize scientific and technological phenomena in varied ways.
3.2.10C Apply the elements of scientific inquiry to solve problems
3.4.10A Explain concepts about the structure and properties of matter.
3.4.10B Analyze energy sources and transfers of heat.
3.4.10C Distinguish among the principles of force and motion

Course Content	Student Performance	Resources	Assessments
I. Exothermic and Endothermic Reactions. J. Redox Reactions: Tarnish Removal and Batteries. K. Types of Energy and Energy Conversions; Pendulums. L. Internal Combustion Engines and Automobiles as a Compound Machine. M. Petroleum Refining and Octane Ratings. N. Work and Power Calculations. O. Mechanical Advantage and Friction as a Hindering Force.	• Take notes from a variety of instructional presentations • Actively complete all reading assignments • Complete all assigned laboratory experiments • Participate in cooperative learning activities • Contribute to class discussions • Actively view and analyze all video presentations • Create a unit portfolio	• Physical Science, (Prentice Hall, 2006) – Chapters 6, 15, 16, and 14 as references. • Assorted laboratory manuals • Textbook supplementary materials • Teacher-developed notes and handouts • Videos/DVDs • Primary and secondary source readings • Websites • Library services • Posters/visual aides	• Laboratory handout evaluation • Teacher-generated assessments • Oral questioning • Teacher observations • Evaluation of class work and homework • Quizzes • Unit Portfolio • Projects and presentations

Science Planned Course - Applied General Science: Grade 9

Unit: **Classification of Matter and Its Changes**

Content Standard: **To classify matter according to composition and characteristics, separate mixtures, and differentiate between physical and chemical changes.**

State Curriculum Standard: **3.2.10A Apply knowledge and understanding about the nature of scientific and technological knowledge.**
3.2.10B Apply process knowledge and organize scientific and technological phenomena in varied ways.
3.2.10C Apply the elements of scientific inquiry to solve problems
3.4.10A Explain concepts about the structure and properties of matter.

Course Content	Student Performance	Resources	Assessments
A. Pure Substances. B. Law of Definite Proportions (CO versus CO_2) Carbon Monoxide Poisoning. C. Heterogeneous Versus. D. Homogeneous Mixtures. E. Solutions, Colloids, and Suspensions. F. Tyndall Effect. G. Freezing Point Depression in Solutions: Ice Cream. H. Separation Techniques (Filtration, Solubility, Distillation). I. Polar and Non-polar Bonds and Molecules: Soaps and Emulsifying Agents. J. Types of Polymers and their Characteristics.	• Take notes from a variety of instructional presentations • Actively complete all reading assignments • Complete all assigned laboratory experiments • Participate in cooperative learning activities • Contribute to class discussions • Actively view and analyze all video presentations • Create a unit portfolio	• Physical Science, (Prentice Hall, 2006) – Chapters 2, 7.1, 9.3 • Assorted laboratory manuals • Textbook supplementary materials • Teacher-developed notes and handouts • Videos/DVDs • Primary and secondary source readings • Websites • Library services • Posters/visual aides	• Laboratory handout evaluation • Teacher-generated assessments • Oral questioning • Teacher observations • Evaluation of class work and homework • Quizzes • Unit Portfolio • Projects and Presentations

Science Planned Course - Applied General Science: Grade 9

Unit: **Classification of Matter and Its Changes**

Content Standard: **To classify matter according to composition and characteristics, separate mixtures, and differentiate between physical and chemical changes.**

State Curriculum Standard: **3.2.10A Apply knowledge and understanding about the nature of scientific and technological knowledge.**
3.2.10B Apply process knowledge and organize scientific and technological phenomena in varied ways.
3.2.10C Apply the elements of scientific inquiry to solve problems
3.4.10A Explain concepts about the structure and properties of matter.

Course Content	Student Performance	Resources	Assessments
J. Synthesizing a Polymer. K. Pigments and Dyes: Tie Dye Tee Shirts. L. Indicators of Chemical Change. M. Interpreting Chemical Equations. N. Lavoisier and Conservation of Mass. O. Distinguishing Between Chemical and Physical Changes.	• Take notes from a variety of instructional presentations • Actively complete all reading assignments • Complete all assigned laboratory experiments • Participate in cooperative learning activities • Contribute to class discussions • Actively view and analyze all video presentations • Create a unit portfolio	• Physical Science, (Prentice Hall, 2006) – Chapters 2, 7.1, 9.3 • Assorted laboratory manuals • Textbook supplementary materials • Teacher-developed notes and handouts • Videos/DVDs • Primary and secondary source readings • Websites • Library services • Posters/visual aides	• Laboratory handout evaluation • Teacher-generated assessments • Oral questioning • Teacher observations • Evaluation of class work and homework • Quizzes • Unit Portfolio • Projects and Presentations

Science Planned Course - Applied General Science: Grade 9

Unit: **Special Needs Modifications**

Course Content	Student Performance	Resources	Assessments
A. Applied General Science Curriculum with Special Needs Modification.	• See preceding curriculum information	• Physical Science – A.G.S. American Guidance Services, 1997	• Applied General Science assessments • Teacher observation • Cooperative learning projects • Group presentation and reports • Individual presentations and reports • Daily assignments • Participation • Modifications of other Applied General Science assessments • Word banks • Small grouping for matching columns • Formulas given for mathematical calculations • Extended testing time • Tests may be read or paraphrased • Student's IEP objectives and outcomes