Portales Municipal Schools

CURRICULUM MAP

Subject:	Physical Science	**2009**	**Grade Level 9**

ESSENTIAL QUESTIONS: **What is a compound? What is a mixture? How does a solid, liquid and a gas differ? What is necessary to determine density? Name three techniques that can be used to separate mixtures and substances.**

STRAND **II:** Content of Science	1. **BENCHMARK I:** Understand the properties, underlying structure, and reactions of matter.

STANDARD: Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

9 weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted** **I = Introduce** **R= Review AND Extend** **M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
FIRST	1. Classify matter in a variety of ways	Compound Mixture Solids Liquid gas	Students will categorize different samples of matter, and demonstrate understanding of "why" they are classified the way they are, on a "matter classification chart"	Vocabulary Classification chart quizzes	Related Vocabulary; Textbook pages 38-44 Paper, pencil Variety of samples
	2. Id., measure, and use a variety of physical and chemical properties.	viscosity conductivity malleability melting point boiling point density.	Students read pages 45-58. Student Id different physical properties, explain flammability, reactivity and the formation of a precipitate, recognize a chemical change and distinguish between chemical and physical changes in a lab.	Lab data and analysis questions Section 2.2 and 2.3 assessment questions.	Physical properties-Txtbk pg.45-51, variety of materials that display different degrees of viscosity, conductivity, malleability, hardness Chemical properties-Txbk pgs.54-58
	3. Know how to use properties to separate mixtures into pure substances	Flammability Reactivity precipitate	Students read and discuss pages36-51 Students will perform distillation, solubility, and filtering in a lab. Students will be able to define the processes of distillation, solubility, filtering and identify them as properties that can separate mixtures into pure or simpler substances in their lab report.	Lab report, vocabulary quiz, Section 2.2 assessment	Concepts in action pgs.52-53 Discovery School V.F.T "Fresh-Squeezed Water"Mixtures and appropriate lab equipment needed to separate the mixtures (filter paper, magnet, heat source, sand, salt, water)
	4. Describe trends in properties	Distillation Solubility filtering ionization energy reactivity	Read and discuss importance and behavior of electrons, valance shell, etc. Students label the ionization energy of variable elements given them on a practice page and determine their reactivity using their location on the periodic table.	Homework with ionization practice problems. Ionization Quiz	Sample problems, periodic table, examples showing how to figure number of electrons of different types of atoms. Txtbk. Chpts.5-6. (page 139)

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Subject:	Physical Science	**2009**	**Grade Level 9**

ESSENTIAL QUESTIONS: What are the smaller parts that make up an atom? What is the basic structure of an atom? How do electrons determine the properties of substances? What predictions can you make about matter using the periodic table? What details determine the properties of individual atoms? What characteristics about matter do bonds determine?

STRAND : II Content of Science | **BENCHMARK I:** Understand the properties, underlying structure, and reactions of matter.

STANDARD I: Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

1st	PERFORMANCE STANDARD	CONCEPTS/SKILLS I = Introduce R= Review & Extend M = Master	STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES	ASSESSMENTS	STUDENT MATERIALS AND RESOURCES
9 weeks	5. Understand that matter is made of atoms and that atoms are made of subatomic particles.	Atoms--building blocks of ALL matter, made of protons, neutrons, electrons. Most space occupied by electrons (2000X smaller then protons)	Build an atom model using teacher provided provisions Students define all subatomic particles in a vocabulary document.	Atom labeling diagram Atom Model Section 4.2 assessment	Txtbk pgs. 108 Model building materials and textbook examples
	6. Understand atomic structure	Nucleus contains protons and neutrons, atom held together by electrical force	Students define atomic structure and nuclear components with vocabulary assignment and referencing their atomic models	Atomic structure exam	Atomic models Textbook for reference Txtbk.Sec.4.3Pg.113
	7. Explain how electrons determine the properties of substances.	interactions between atoms through transferring or sharing valence electrons; ionic and covalent bonds; carbon diversity	Students join atom models of different types to demonstrate bonding . Read Chptr.6 sections 1-2. Define the different bonding types and relevant terms on a vocabulary document.	Bonding identification assignment Bonding quiz	Atomic bonding examples Textbook pgs.156-165
	8. Make predictions about elements using the periodic table	periodic table design	Students will study the structure of the periodic table by filling in and coloring a blank periodic table with all the appropriate information and define representative groups, periods, metals, nonmetals, metalloids in vocabulary document.	Periodic table exam Vocabulary quiz	Txtbk.Ch.5 pgs. 124-146 Periodic tables, paper, coloring pencils Discovery School V.F.T. "Elemental Friends and Foes"

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Subject:	Physical Science	**2009**	**Grade Level 9**

ESSENTIAL QUESTIONS: How is the state of matter determined by the arrangement of it's atoms? By what processes can the nuclei of an atom be changed? What are the three forms of radiation?

STRAND II: The Content of Science | **BENCHMARK:** I Understand the properties, underlying structure, and reactions of matter.

STANDARD I Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

9 wks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS** **I = Introduce R= Review & Extend** **M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
Second	9. Understand how the type and arrangement of atoms and their bonds determine macroscopic properties	boiling point electrical conductivity hardness of minerals	Students will experiment with boiling point and electrical conductivity in a lab experiment	Lab data and analysis Sec. quiz	Vernier "Properties of Materials" Lab Txtbk. Pgs. 176 V.F.T. "Chipping In"
	10. Know that states of matter depend on the arrangement of atoms and molecules and on their freedom of motion.	Arrangement of atoms in a solid, liquid and gas	Student constructs data table that includes the classifying information about atom arrangement in a solid, liquid and gas. Students draw a picture representing each state of matter and gives common/everyday examples of each type.	Vocabulary exam Data table Pictures and examples	Paper, pencil, teacher instructional examples. Ch. 3 sec.1 Pg.68
	11. Know that some atomic nuclei can change	spontaneous decay, half-life of isotopes, fission, fusion, alpha, beta, gamma radiation	Students will define spontaneous decay, half-life, isotopes, fusion, fusion, alpha, beta, gamma radiation in a vocabulary document. Students will experiment with Radioactivity in a decay lab.	Nuclear Chemistry Vocabulary quiz Lab report	Txtbk. Ch.10. Pgs.290-308. D.V.F.T."Nuclear Medicine" Geiger counters, vernier probware and tech. set up. Bill Nye "Nuclear Chemistry" video

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CURRICULUM MAP

Subject:	Physical Science	**2009**	**Grade Level 9**

ESSENTIAL QUESTIONS: How may atoms be rearranged during chemical reactions? What is a synthesis reaction? What is a decomposition reaction? What element must be present in order for a combustion reaction to occur? How does endothermic differ from exothermic? What does conservation of mass mean? What factors effect the rate of a chemical reaction?

STRAND II: The Content of Science | **BENCHMARK:** I Understand the properties, underlying structure, and reactions of matter.

STANDARD I Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

2nd	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS** I = Introduce R= Review & Extend M = Master	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
9 weeks	12. Know that chemical reactions involve the rearrangement of atoms, and that they occur on many timescales.	Molecule shapes Polar Nonpolar Rapid reactions Slow reactions	Students will explore polar and nonpolar molecular arrangement in a lab. Students will be able to compare and contrast reaction types in a venn diagram.	Lab write-up and paper assessment	Tstbk.8.2 pg.237 Txtbk.7.4 pg.212 lab materials
	13. Understand types of chemical reactions	synthesis, decomposition, combustion, redox, neutralization and identify them as exothermic or endothermic	Look at samples of each type of reaction and practice identifying examples on an assignment. Students will predict then determine exothermic and endothermic reactions in lab activity.	Reactions Exam Lab Report	Sample reactions and equation types. Vernier Lab program
	14. Know how to express chemical reactions with balanced equations	conservation of mass products of common reactions.	Students will balance equations given to them on the board and on paper.	Balancing equations exam	Paper, pencil, equations that need balanced

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Subject:	Physical Science	**2009**	**Grade Level 9**

ESSENTIAL QUESTIONS: What are five factors that affect the rate of chemical reactions?					
STRAND : II Content of Science		**BENCHMARK:** I Understand the properties, underlying structure, and reactions of matter.			
STANDARD 1. Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.					
2nd	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS** **I = Introduce R= Review & Extend** **M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
9 weeks	15. Describe how the rate of chemical reactions depends on many factors.	Temperature Surface area Stirring Concentration Catalysts	Students will construct a web diagram including 5 factors that affect the rate of chemical reactions and the diagram will extend to include an example or explanation of each factor.	Web diagram	Txtbk.Sec.7.4 Pgs.212-215

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Subject:	Physical Science	**2009**	**Grade Level 9**

ESSENTIAL QUESTIONS: How does mass and the distance between objects affect gravity? How are Boyle's and Charles's Law different? Similar? Explain what a vector is and what is required to be a vector? What is Newton's Third Law of Motion.

STRAND II The Content of Science	1. **BENCHMARK III** Understand the motion of objects and waves, and the forces that cause them.

STANDARD I Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

9 weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted I = Introduce R= Review AND Extend M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
Third	2. Know that every object exerts gravitational force on every other object, and how this force depends on the masses of the objects and the distance between them.	Matter, Mass, weight, distance (length), gravity Use triple beam balance and meter sticks to measure mass and length.	Students will be able to distinguish between mass and weight by running lab trials. Students will explain how the mass of an object and the distance between objects affects gravitational force by dropping several different objects at the same time and comparing rates.	Labs reports will be used to assess understanding.	Lab Manual, workbook, paper, pencil or pen, triple beam balance, electronic balances, metersticks
	4. 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.	Forces, pressure, Boyle's Law, Charles's Law, temperature, and concentration Must distinguish how the factors affect the 2 gas laws.	Student will be able to determine what factors affect the gas laws by running a lab. Students will be able to define and distinguish between the two gas laws by application of factors into the lab.	Lab reports will be written to display results and to assess understanding	Lab manual, ovens, microwaves, refrigerators, markers, string, charts, pencil and paper
	6. Represent the magnitude and direction of forces by vector diagrams	Displacement, vectors, vector addition, magnitude Math skills will be applied to interpret a vector diagram and use vector addition.	Student will be able to interpret and read a vector diagram. Student will be able to apply vector addition to a vector diagram. Students must understand that a vector includes both magnitude and direction.	Vector diagrams will be included on homework, tests, and quizzes in order for students to practice using and interpreting these diagrams.	Overhead projectors, diagram handouts, transparencies, examples of vector diagrams, pencil and paper
	7. Know that when one object exerts a force on a second object, the second object exerts a force of equal magnitude and in the opposite direction on the first object (i.e., Newton 's Third Law)	Newton's Third Law of Motion, forces, Law of Conservation of Momentum Understanding and application of both Newton's Third Law and the Conservation of Momentum.	Students will understand Newton's Third Law of Motion by using Vernier Program. Students will be able to apply the concepts tied to the Law of Conservation of Momentum by coming up with examples of objects that can have high momentum.	Lab report will be used to assess the student's understanding.	Computer (powerpoint), projector screen, Vernier Lab Program, Lab Handout, pencil and paper

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CURRICULUM MAP

Subject:	Physical Science	**2009**	**Grade Level 9**

ESSENTIAL QUESTIONS: What are Newton's Laws of Motion? What is frame of reference?

STRAND II: Content of Science | **BENCHMARK III:** Understand the motion of objects and waves, and the forces that cause them.

STANDARD Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

9 weeks	PERFORMANCE STANDARD	CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted I = Introduce R= Review AND Extend M = Master	STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES	ASSESSMENTS	STUDENT MATERIALS AND RESOURCES
Third	8. Apply Newton 's Laws to describe and analyze the behavior of moving objects.	Newton's Laws of Motion, displacement, velocity, acceleration, momentum, gravity Newton 's Second Law, F = ma (e.g., momentum and its conservation, the motion of an object falling under gravity, the independence of a falling object's motion on mass) circular motion and centripetal force.	Students will be able to distinguish between the 3 laws of motion by applying all three laws in a lab by using the Vernier Lab program. Students will learn the related vocabulary by taking weekly quizzes on vocabulary that was introduced for this concept.	Lab Reports Quizzes, homework (worksheets and vocabulary)	Vernier Lab program, Lab Manual, Lab Handout, pencil and paper, quizzes, worksheets, textbook
	9. Describe relative motion using frames of reference.	Motion, Frame of Reference Visual sense must be used to identify different frames of reference.	Students will be able to identify a frame of reference from different aspects or points of view (stationary position, moving, or stationary position in a moving object), when given different scenerios	Discussions, homework, use of visual pictures and identifying the different frames of reference, tests, homework	Worksheets, tests, transparencies, visual examples of Frames of References, pencil, paper

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CURRICULUM MAP

Subject:	Physical Science	**2009**	**Grade Level 9**

ESSENTIAL QUESTIONS: How does energy transform and transfer itself? How do energy and matter interact with each other?

STRAND II: Content of Science	**BENCHMARK II: Understand the transformation and transmission of energy and how energy and matter interact.**

STANDARD Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

9 weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted** **I = Introduce** **R= Review AND Extend** **M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
Third	1. Identify different forms of energy, including kinetic, gravitational (potential), chemical, thermal, nuclear, and electromagnetic.	Kinetic vs. Potential, gravitational, chemical, thermal, nuclear, and electromagnetic. Compare and contrast the different forms of energy.	Students will be able to explain the difference in forms of energy. Students will be able to compare one form of energy to another and find similarities and differences (charts, graphs, Venn diagrams).	Vocabulary, quizzes, tests, discussions (participation)	Vocabulary Lists, quizzes, examples of all types of energy, discussion questions
	2. Explain how thermal energy (heat) consists of the random motion and vibrations of atoms and molecules and is measured by temperature.	Thermal energy, particle motion, atoms, molecules, temperature Review how temperature has an affect on particle motion.	Students will be able to give examples of how temperature effects particle movement by tying concepts to the lab work. Students will use thermometers to measure a variety of temperatures for different substances in a lab setting.	Participation in discussions, homework, quizzes, Lab reports, lab participation, tests	Lab Manual (Handout), quizzes, tests, workbook, pencil and paper
	3. Understand that energy can change from one form to another (e.g., changes in kinetic and potential energy in a gravitational field, heats of reaction, hydroelectric dams) and know that energy is conserved in these changes.	Energy conversion, review kinetic and potential, heats of reaction, hydroelectric energy, conservation of energy Describe how one form of energy changes to another form.	Students will be able to explain the process of what happens when one energy form changes to another by class discussions (question/answer) and by summarizing information that was watched on video.	Daily assignments, Lab, video summary, tests, quizzes, lab report	Lab Handout, lab materials and tools, pencil and paper, TV, VCR, DVD
	4. Understand how heat can be transferred by conduction, convection, and radiation, and how heat conduction differs in conductors and insulators.	Conduction, convection, radiation, conductors and insulators Compare and contrast convection and conduction.	Student will be able to retain vocabulary pertaining to the standard by using quizzes, vocabulary lists, and class discussions. Student will be able to achieve understanding of conduction and convection by coming up with real life situations that are examples of where conduction and convection can be observed.	Vocabulary, video summary, homework, quizzes, tests	Audio/Visual Equipment, tests, quizzes, workbook, pencil and paper

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Subject:	Physical Science	**2009**	**Grade Level 9**

ESSENTIAL QUESTIONS: How does heat flow from hotter to colder regions? How and why does work input differ from work output? How do electromagnetic waves carry energy and transfer it to matter? What are common characteristics of any type of wave?

STRAND II: Content of Science

BENCHMARK II: Understand the transformation and transmission of energy and how energy and matter interact.

STANDARD I: Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

9 weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted** **I = Introduce** **R= Review AND Extend** **M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
Third	5. Explain how heat flows in terms of the transfer of vibrational motion of atoms and molecules from hotter to colder regions.	Heat flow, vibrational motion, atoms, molecules, temperature Describe the affects of temperature on particle movement. Relate the affects of temperature on particle movement to atoms and molecules moving from hotter to colder regions.	The student will be able to give an explanation for particle movement in relation to temperature by application of concepts in lab setting.	Lab, Lab report, Rubric, quizzes, tests, homework	Lab Manual, worksheets, quizzes, tests, lab equipment, pencil and paper, Ch. 3 p. 75-82
	6. Understand that the ability of energy to do something useful (work) tends to decrease (and never increases) as energy is converted from one form to another.	Energy, work, energy conversions, work input, work output, mechanical advantage Explain how work put in is never equal to the work put out. Clarify the difference in work input to work output.	The students will be able to define and apply vocabulary in a lab setting. The students will be able to explain how work input is never more than work output by understanding simple machines that will be used and worked with in the lab.	Lab participation, Lab Reports, vocabulary quizzes, tests, homework	Ch. 14- p. 410-442, Lab Manual, quizzes, tests, workbook, pencil and paper, lab equipment
	7. Understand that electromagnetic waves carry energy that can be transferred when they interact with matter. 8. Describe the characteristics of electromagnetic waves and other waves	Electromagnetic waves, electric field, magnetic field, Electromagnetic spectrum, conservation of energy, energy transfer Clarify how electromagnetic waves can carry energy may be transferred when it interacts with matter.	The student will be able to interpret the electromagnetic spectrum by looking at a transparency of the spectrum to understand how a variety of waves, rays, and light fall into the spectrum. The student will be able to explain how wavelength and frequency affect electromagnetic waves by working with these factors in a lab.	Lab, lab report, quizzes, tests, homework, charts, graphs	Ch. 18 p. 532-542, Lab Manual, workbook, quizzes, transparencies, tests, pencil and paper
		Visible light, radio, microwave, X-ray, ultraviolet, gamma Compare and contrast the different forms of electromagnetic waves.	The students will be able to distinguish between the different varieties of electromagnetic waves by using a visual aid of the electromagnetic spectrum in the classroom (transparency).	Electromagnetic spectrum quiz, tests, homework	Ch. 18 p. 532-542, transparency of electromagnetic spectrum, workbook, test, pencil and paper

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CURRICULUM MAP

Subject:	Physical Science	**2009**	**Grade Level 9**

ESSENTIAL QUESTIONS: How to atoms and molecules gain and lose energy? How is wavelength used to identify different forms of matter? What is equilibrium and what are the different forms?

STRAND II: Content of Science

BENCHMARK II: Understand the transformation and transmission of energy and how energy and matter interact.

STANDARD I: Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

9 weeks	PERFORMANCE STANDARD	CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted I = Introduce R= Review AND Extend M = Master	STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES	ASSESSMENTS	STUDENT MATERIALS AND RESOURCES
Fourth	9. Know that each kind of atom or molecule can gain or lose energy only in discrete amounts.	Atoms, molecules, gain and loss of energy Explain how atoms or molecules can gain or lose energy.	The student will be able to give examples of how different forms of matter can gain or lose energy by working with different examples of matter in the lab.	Lab, discussions (participation), homework, tests, Lab report	Lab manual, discussion questions and examples, workbook, tests, lab samples
	10. Explain how wavelengths of electromagnetic radiation can be used to identify atoms, molecules, and the composition of stars.	Electromagnetic radiation Explain how electromagnetic radiation is used to identify atoms, molecules and the composition of the stars.	The students will be able to see how scientists use electromagnetic radiation to assist in the identification of atoms, molecules, and the stars composition by watching a video over this form of identification.	Video summary, video quiz, homework, quizzes, tests	Video (Electromagnetic radiation), workbook, quiz, test
	11. Understand the concept of equilibrium (i.e., thermal, mechanical, and chemical).	Thermal equilibrium, Mechanical equilibrium, and chemical equilibrium Clarify the differences and similarities in the different types of equilibrium.	The students will be able to apply mechanical equilibrium by using balances in a lab setting. The students will be able to take this example and relate it to thermal and chemical equilibrium by applying the concepts in the lab.	Lab, discussion (participation), homework, test, lab report	Lab manual, workbook, tests, pencil and paper, workbook, Ch. 7 p. 216-224

ESSENTIAL QUESTIONS: How does electric current cause magnetism? How does changing magnetic fields produce electricity? What are the factors that affect wave propagation? What is wave amplitude? What is wavelength? What is wave frequency? How does wave interference occur? How do wave reflection and refraction differ? What is seismic data based on?

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Subject:	Physical Science	**2009**	**Grade Level 9**

How are waves related to acoustics? What is the relation between waves and the Doppler effect?					
STRAND II: Content of Science			**BENCHMARK III: Understand the motion of objects and waves, and the forces that cause them.**		
STANDARD I: Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.					
9 weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted** **I = Introduce** **R= Review AND Extend** **M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
4th	5. Explain how electric currents cause magnetism and how changing magnetic fields produce electricity.	Electric currents, magnetism, magnetic fields, electricity Analyze electric current and show the relationship to magnetism and vice versa.	The students will be able to explain how magnetism and electric current are related by using a variety of magnets and forms of static electricity in a lab setting.	Lab report, test, quizzes, homework, lab participation	Lab manual, workbook, quizzes, test, pencil and paper
	10. Describe wave propagation using amplitude, wavelength, frequency, and speed.	Wave propagation, amplitude, wavelength, frequency, and speed. Predict how all of these factors(amplitude, wavelength, frequency, and speed) affect wave propagation.	Students will read textbook pages 504-507. Students will label and define "Wave" related terminology: amplitude, wavelength, frequency, and speed, in the lab using a print-out from Veirner program.	Lab participation, lab report and quiz.	Vernier wave program and equipment, Textbook Ch.17.2 (pg.504)
	11. Explain the results of interactions of waves.	Wave, interference, reflection, and refraction	Students will read 17.3 (pgs. 598-512) in the textbook. Students will describe wave interactions in homework assignment. Students will identify factors that affect the amount of refraction, diffraction, or interference by charting a variety of wave bearing mediums.	Vocabulary quiz, wave medium chart.	Teacher demo with different wave mediums. Textbook. Quiz.
	12. Describe how waves are used for practical purposes.	seismic data, acoustic effects, **Doppler effect**	Students will research the connection of waves to use in seismic data, acoustic effects, and Doppler effect using the internet and then chart their research results.	Research data chart, research participation	Computers with internet connection, paper, pencil, charting template with example.

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ESSENTIAL QUESTIONS: What are the four fundamental forces in nature? What two factors affect the strength gravitational force? What is potentially generated when there is an excess or deficit of negative charges? What is the relationship between force and pressure? What affect does temperature and volume have on the pressure of a gas?

STRAND II: Content of Science	**BENCHMARK I: Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.**

STANDARD I: Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

9 weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted** **I = Introduce** **R= Review AND Extend** **M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
4th	1. Know that there are four fundamental forces in nature	Gravitation, electromagnetism, weak nuclear force, and strong nuclear force	Students will chart the 4 fundamental forces in nature including a scientific definition, a personal description, and an example that demonstrates each type of force	chart quiz	Textbook, examples, paper, pencil
	2. Know that every object exerts gravitational force on every other object.	Gravitational force depends on the masses of the objects and the distance between them.	Students will be able to identify comparison examples of stronger and weaker gravitational force given to them orally and/or on a quiz	Concept quiz	Textbook pg.380-381. Gravitational examples
	3. Know that materials containing equal amounts of positive and negative charges are electrically neutral.	a small excess or deficit of negative charges produces significant electrical forces.	Students will gain understanding of electric charges by reading Ch.20 in the textbook. Students will identify probable charges when given examples of matter with variable potential charges.	Section assessment Pg.(603)	Teacher instruction and Samples, textbook pgs. 600-603
	4. 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.	Unit of force = Newton Pressure=force/area The gas laws	Students will gain general knowledge of the gas laws by reading Ch.3 section 2 of the textbook. Students will calculate force, pressure on given problems on an assignment and will predict the behavior of gas given particular temperatures and volumes.	Lesson practice assignment Quiz, test,	Textbook Pages 75-79. Formulas for force and pressure.

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Subject:	Physical Science	**2009**	**Grade Level 9**

ESSENTIAL QUESTIONS: What is a vector? What does Newton's first Law state? What does Newton's second Law state? What does Newton's third Law state? What is necessary to accurately describe motion?

STRAND II: Content of Science	**BENCHMARK I: Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.**

STANDARD I Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

9 weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted I = Introduce R= Review AND Extend M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
	6. Represent the magnitude and direction of forces using vector diagrams.	Vector is a quantity that has a direction associated with it	Students will practice identifying magnitude and direction and will be able to accurately identify direction and forces on vector diagrams.	Vector diagram id. Quiz	Vector diagrams.
	7. Know that when one object exerts a force on a second object, the second object exerts a force of equal magnitude and in the opposite direction on the first object	Newton's 3rd Law = whenever one object exerts a force on a second object, the second object exerts an equal and opposite force on the first object	Students will demonstrate understanding of Newton's Third Law by practicing word problems during concept review and during concept quiz.	Concept review assignment and quiz.	Notes and lecture explaining Newton's 3 Laws. Concept questions Concept quiz
	8. Apply Newton 's Laws to describe and analyze the behavior of moving objects.	Newton's Laws of motion. 1st- the state of motion of an object does not change as long as the net force acting on the object is zero 2nd- acceleration= net force/ mass 3rd- as written above	Students will practice analyzing and describing motion when given a variety of pictures and examples. Students will construct a chart that includes Newton's laws and there meanings.	Classroom practice assignment. Chart about Newton's 3 laws. Concept quiz.	Notes and lecture explaining Newton's 3 Laws. Concept questions Concept quiz
	9. Describe relative motion using frames of reference.	An applicable frame of reference is necessary to accurately describe relative motion.	Students will describe relative motion and identify proper frames of reference to describe different scenarios of motion.	Class problems and example identification. quiz	Textbook Chapter 11

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ESSENTIAL QUESTIONS:					
STRAND III:			**BENCHMARK**		
STANDARD					
9 weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted** **I = Introduce** **R= Review AND Extend** **M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
	The following pages 17 thu 28 address Strands 1 and 3 of Science. The performance standards that belong to these strands 1 and 3 are lessons and skills that are engaged and practiced within and throughout strand 2, which is the "Content" of science this course is credited for.				

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ESSENTIAL QUESTIONS:					
STRAND : III. Science and Society		**BENCHMARK:** 1. Examine and analyze how scientific discoveries and their applications affect the world, and explain how societies influence scientific investigations and applications.			
STANDARD I. Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.					
	PERFORMANCE STANDARD	**CONCEPTS/SKILLS** **I = Introduce R= Review & Extend** **M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
	1. Know how science enables technology but also constrains it, and recognize the difference between real technology and science fiction 2. Understand how advances in technology enable further advances in science 3. Evaluate the influences of technology on society	e.g…rockets vs. antigravity machines nuclear reactors vs. perpetual-motion machines medical X-rays vs. Star-Trek tricorders e.g.,.microscopes and cellular structure; telescopes and understanding of the universe. e.g., communications, petroleum, transportation, nuclear energy, computers, medicine, genetic engineering. desired and undesired effects, historical examples (e.g., the wheel, the plow, the printing press, the lightning rod).			

Portales Municipal Schools

CURRICULUM MAP

Subject:	Physical Science	**2009**	**Grade Level 9**

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9 weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted I = Introduce R= Review AND Extend M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
	4. Understand the scientific foundations of common technologies 5. Understand that applications of genetics can meet human needs and can create new problems 6. Analyze the impact of digital technologies on the availability, creation, and dissemination of information.	e.g., kitchen appliances, radio, television, aircraft, rockets, computers, medical X-rays, selective breeding, fertilizers and pesticides, agricultural equipment. (e.g., agriculture, medicine, cloning).			

Portales Municipal Schools

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	7. Describe how human activities have affected ozone in the upper atmosphere and how it affects health and the environment. 8. Describe uses of radioactivity 9. Describe how scientific knowledge helps decision makers with local, national, and global challenges	e.g., nuclear power, nuclear medicine, radiometric dating. e.g., Waste Isolation Pilot Project [WIPP], mining, drought, population growth, alternative energy, climate change.			

Portales Municipal Schools

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	10. Describe major historical changes in scientific perspectives and the experimental observations that triggered them. 11. Know that societal factors can promote or constrain scientific discovery 12. Explain how societies can change ecosystems and how these changes can be reversible or irreversible.	(e.g., atomic theory, germs, cosmology, relativity, plate tectonics, evolution) e.g., government funding, laws and regulations about human cloning and genetically modified organisms, gender and ethnic bias, AIDS research, alternative-energy research.			

Portales Municipal Schools

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STRAND : III. Science and Society	**BENCHMARK:** 1. Examine and analyze how scientific discoveries and their applications affect the world, and explain how societies influence scientific investigations and applications.				
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	13. Describe how environmental, economic, and political interests impact resource management and use in New Mexico. 14. Describe New Mexico 's role in nuclear science *Science and Individuals* 15. Identify how science has produced knowledge that is relevant to individual health and material prosperity.	e.g., Manhattan Project, WIPP, national laboratories.			

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	16. Understand that reasonable people may disagree about some issues that are of interest to both science and religion 17. Identify important questions that science cannot answer 18. Understand that scientists have characteristics in common with other individuals.	e.g., the origin of life on Earth, the cause of the Big Bang, the future of Earth. e.g., questions that are beyond today's science, decisions that science can only help to make, questions that are inherently outside of the realm of science. e.g., employment and career needs, curiosity, desire to perform public service, greed, preconceptions and biases, temptation to be unethical, core values including honesty and openness.			

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STRAND III. Science and Society	**BENCHMARK:** 1. Examine and analyze how scientific discoveries and their applications affect the world, and explain how societies influence scientific investigations and applications.				
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9 weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted I = Introduce R= Review AND Extend M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
	19. 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.			

Portales Municipal Schools

CURRICULUM MAP

Subject:	Physical Science	**2009**	**Grade Level 9**

ESSENTIAL QUESTIONS:	
STRAND I: Scientific Thinking and Practice	**BENCHMARK I:** Use accepted scientific methods to collect, analyze, and interpret data and observations and to design and conduct scientific investigations and communicate results.
STANDARD I: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.	

9 weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted** **I = Introduce** **R= Review AND Extend** **M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
	1. Describe the essential components of an investigation, including appropriate methodologies, proper equipment, and safety precautions. 2. Design and conduct scientific investigations that include necessary components. 3. Use appropriate technologies to collect, analyze, and communicate scientific data	*Scientific method *equipment use *human error *Lab Safty *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. Computers calculators balances microscopes			

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CURRICULUM MAP

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ESSENTIAL QUESTIONS:					
STRAND I: Scientific Thinking and Practice			**BENCHMARK**		
STANDARD					
9 weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted I = Introduce R= Review AND Extend M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
	4. Convey results of investigations using scientific concepts, methodologies, and expressions.	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			
	5. Understand how scientific theories are used to explain and predict natural phenomena	e.g., plate tectonics, ocean currents, structure			

Portales Municipal Schools

CURRICULUM MAP

Subject:	Physical Science	**2009**	**Grade Level 9**

ESSENTIAL QUESTIONS:	
STRAND I: Scientific Thinking and Practice	**BENCHMARK II.**Understand that scientific processes produce scientific knowledge that is continually evaluated, validated, revised, or rejected.
STANDARD I: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.	

Weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted** **I = Introduce** **R= Review AND Extend** **M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
	1. Understand how scientific processes produce valid, reliable results.	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.			
	2. Use scientific reasoning and valid logic to recognize:	faulty logic cause and effect the difference between observation and unsubstantiated inferences and conclusions potential bias			

Portales Municipal Schools

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9 weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted** **I = Introduce** **R= Review AND Extend** **M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
	3. Understand how new data and observations can result in new scientific knowledge. 4. Critically analyze an accepted explanation by reviewing current scientific knowledge. 5. Examine investigations of current interest in science 6. Examine the scientific processes and logic used in investigations of past events. Investigations that can be planned in advance but are only done once and investigations of phenomena that can be repeated easily and frequently.	e.g., superconductivity, molecular machines, age of the universe (e.g., using data from crime scenes, fossils), (e.g., expensive or time-consuming experiments such as medical clinical trials),			

Portales Municipal Schools

CURRICULUM MAP

Subject:	Physical Science	**2009**	**Grade Level 9**

ESSENTIAL QUESTIONS:	
STRAND I: Scientific Thinking and Practice	**BENCHMARK III:** Use mathematical concepts, principles, and expressions to analyze data, develop models, understand patterns and relationships, evaluate findings, and draw conclusions.

STANDARD I: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.

9 weeks	**PERFORMANCE STANDARD**	**CONCEPTS/SKILLS Review/Extend previously introduced skill unless noted** **I = Introduce** **R= Review AND Extend** **M = Master**	**STUDENT ACTIVITIES AND INSTRUCTIONAL STRATEGIES**	**ASSESSMENTS**	**STUDENT MATERIALS AND RESOURCES**
	1. Create multiple displays of data to analyze and explain the relationships in scientific investigations. 2. Use mathematical models to describe, explain, and predict natural phenomena. 3. Use technologies to quantify relationships in scientific hypotheses 4. Identify and apply measurement techniques and consider possible effects of measurement errors. 5. Use mathematics to express and establish scientific relationships	(e.g., calculators, computer spreadsheets and databases, graphing software, simulations, modeling). (e.g., scientific notation, vectors, dimensional analysis).			

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STRAND III:			**BENCHMARK**		
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STRAND III:			**BENCHMARK**		
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