Lowndes County Physical Science Pacing Guide 2010

MS Frameworks Pacing Guide **Grade Level: Physical Science**

Grading Period: 1st—9 weeks

Chapter/Unit	Lesson Topic	Objective Number	Approximate Days Needed	Suggested Teaching Strategies
1	Lab Equipment and Safety Methods of Science Standards of Measurement Communicating w/ Graphs	1-Apply inquiry-based and problem-solving processes and skills to scientific investigations. 1a-Use appropriate laboratory safety symbols and procedures to design and conduct a scientific investigation. (DOK 2) >safety symbols and safety rules in all laboratory activities >Proper use and care of the compound light microscope >Accuracy and precision in using graduated cylinders, balances, beakers, thermometers, and rulers 1b-Identify questions that can be answered through scientific investigations. (DOK 3) 1c-Identify and apply components of scientific methods in classroom investigations.(DOK 3) >Predicting, gathering data, drawing conclusions >Recording outcomes and organizing data from a variety of sources(e.g., scientific articles, magazines, students	10	Physical Science overview and introduction Minilab Density of a Pencil Activity of Measure Graphing Activity Paper Towel Lab Toilet Tissue Lab

		experiments, etc) >critically analyzing current investigations/problems using periodicals and scientific scenarios 1d-Interpret and generate graphs(e.g., plotting points, labeling x-and y-axis, creating appropriate titles and legends for circle, bar, and line graphs.) (DOK 2) 1e-Analyze procedures and data to draw conclusions about the validity of research. (DOK 3) 1f-Formulate and revise scientific explanations and models using logic and evidence (data analysis). (DOK 3) 1g- Communicate effectively to present and explain scientific results, using appropriate terminology and graphics. (DOK 3)		
2	Motion, Speed, and Acceleration	2-Describe and explain how forces affect motion. 2a-Demonstrate and explain the basic principles of Newton's three laws of motion including calculations of acceleration, force, and momentum. (DOK 2) >Inertia and distance-time graphs to determine average speed >Net force (accounting for gravity, friction, and air resistance) and the	10	Toy Car Activity Compute speed Compute velocity

		resulting motion of objects >Effects of the gravitational force on objects on Earth and effects on planetary and lunar motion >Simple harmonic motion (oscillation)		
3	Forces	2-Describe and explain how forces affect motion. 2a- Demonstrate and explain the basic principles of Newton's three laws of motion including calculations of acceleration, force, and momentum. (DOK 2) >Inertia and distance-time graphs to determine average speed >Net force (accounting for gravity, friction, and air resistance) and the resulting motion of objects >Effects of the gravitational force on objects on Earth and effects on planetary and lunar motion >Simple harmonic motion (oscillation) 2b-Explain the connection between force, work, and energy. (DOK 2) >Force exerted over a distance (results in work done) >Force-distance graph (to determine work) >Net work on an object which contributes to change in kinetic energy (work-to-energy theorem) 2c-Describe (with supporting details and	8	Whirlygig Activity Newton's Station Lab

		diagrams) how the kinetic energy of an object can be converted into potential energy (the energy of position) and how energy is transferred or transformed (conservation of energy). (DOK 2)		
4	Energy	2-Describe and explain how forces affect motion. 2a- Demonstrate and explain the basic principles of Newton's three laws of motion including calculations of acceleration, force, and momentum. (DOK 2) >Inertia and distance-time graphs to determine average speed >Net force (accounting for gravity, friction, and air resistance) and the resulting motion of objects >Effects of the gravitational force on objects on Earth and effects on planetary and lunar motion >Simple harmonic motion (oscillation) 2b-Explain the connection between force, work, and energy. (DOK 2) >Force exerted over a distance (results in work done) >Force-distance graph (to determine work) >Net work on an object which contributes to change in kinetic energy (work-to-energy theorem) 2c-Describe (with supporting details and	5	Marble Race

		diagrams) how the kinetic energy of an object can be converted into potential energy (the energy of position) and how energy is transferred or transformed (conservation of energy). (DOK 2)		
5	Work and Machines	2b-Explain the connection between force, work, and energy. (DOK 2) >Force exerted over a distance (results in work done) >Force-distance graph (to determine work) >Net work on an object which contributes to change in kinetic energy (work-to-energy theorem)	5	?

Physical Science

MS Frameworks Pacing Guide

Grade Level: Physical Science
Grading Period: 2nd—9 weeks

Chapter/Unit	Lesson Topic	Objective Number	Approximate Days Needed	Suggested Teaching Strategies
6	Thermal Energy and Heat	2c-Describe (with supporting details and diagrams) how the kinetic energy of an object can be converted into potential energy (the energy of position) and how energy is transferred or transformed (conservation of energy). (DOK 2)	5	Use falling objects (lead pellets) to observe transformation of kinetic energy to thermal energy
7	Electricity	2d-Draw and assess conclusions about charges and electric current. (DOK 2) >Static/current electricity and direct current/alternating current >elements in an electric circuit that are in series or parallel >Conductors and insulators >Relationship between current flowing through a resistor and voltage flowing across a resistor	10	Build circuits
8	Magnetism	2e-Cite evidence and explain the application of electric currents and magnetic fields as they relate to their use in everyday living (e.g., the application of fields in motors and generators and the concept of electric current using Ohm's Law). (DOK 2)	8	Activity: Magnets, iron filings, metal spheres; Construct electro-magnets using battery and iron nail
11	Waves	3-Demonstrate an understanding of general properties and characteristics of waves.	10	Wave demonstrations using various materials

		3a-Differentiate among transverse, longitudinal, and surface waves as they propagate through a medium (e.g., string, air, water, steel beam). (DOK 1) 3b-Compare properties of waves (e.g., superposition, interference, refraction, reflection, diffraction, Doppler Effect) and explain the connection among the quantities (e.g., wavelength, frequency, period, amplitude, and velocity). (DOK 2) 3c-Classify the electromagnetic spectrum's regions according to frequency and/or wavelength and draw conclusions about their impact on life. (DOK 2) >The emission of light by electrons when moving from higher to lower levels >Energy (photons as quanta of light) >Additive and subtractive properties of colors >Relationship of visible light to the color spectrum 3d-Explain how sound intensity is measured and its relationship to the decibel scale.		(water, rope/string, slinky), use 'sound-ball' to observe Doppler effect
12	Sound	3d-Explain how sound intensity is measured and its relationship to the decibel scale.	7	

Physical Science

MS Frameworks Pacing Guide

Grade Level: Physical Science
Grading Period: 3rd—9 weeks

Chapter/Unit	Lesson Topic	Objective Number	Approximate Days Needed	Suggested Teaching Strategies
13	Electromagnetic Waves	3-Demonstrate an understanding of general properties and characteristics of waves. 3a-Differentiate among transverse, longitudinal, and surface waves as they propagate through a medium (e.g., string, air, water, steel beam). (DOK 1) 3b-Compare properties of waves (e.g., superposition, interference, refraction, reflection, diffraction, Doppler Effect) and explain the connection among the quantities (e.g., wavelength, frequency, period, amplitude, and velocity). (DOK 2) 3c-Classify the electromagnetic spectrum's regions according to frequency and/or wavelength and draw conclusions about their impact on life. (DOK 2) >The emission of light by electrons when moving from higher to lower levels >Energy (photons as quanta of light) >Additive and subtractive properties of colors >Relationship of visible light to the color spectrum 3d-Explain how sound intensity is measured and its relationship to the decibel scale.	5	Create model of EM spectrum

14	Light	3-Demonstrate an understanding of general properties and characteristics of waves. 3a-Differentiate among transverse, longitudinal, and surface waves as they propagate through a medium (e.g., string, air, water, steel beam). (DOK 1) 3b-Compare properties of waves (e.g., superposition, interference, refraction, reflection, diffraction, Doppler Effect) and explain the connection among the quantities (e.g., wavelength, frequency, period, amplitude, and velocity). (DOK 2) 3c-Classify the electromagnetic spectrum's regions according to frequency and/or wavelength and draw conclusions about their impact on life. (DOK 2) >The emission of light by electrons when moving from higher to lower levels >Energy (photons as quanta of light) >Additive and subtractive properties of colors >Relationship of visible light to the color spectrum	7	Flame test lab
18	Properties of Atoms and Periodic Table	4-Develop an understanding of the atom. 4a-Cite evidence to summarize the atomic theory. (DOK 1) >Models for atoms >Hund's rule and Aufbau process to specify the electron configuration of elements >Building blocks of matter (e.g., proton, neutron, and electron) and elementary particles	10	Periodic table activities; coloring, element research, element poster, electron configuration art

		(e.g., positron, mesons, neutrons, etc.) >atomic orbitals (s,p,d,f) and their basic shapes 4d-Utilize the periodic table to predict and explain patterns and draw conclusions about the structure, properties, and organization of matter. (DOK 2) >Atomic composition and valence electron configuration (e.g., atomic number, mass number of protons, neutrons, electrons, isotopes, and ions) >Periodic trends using the periodic table (e.g., valence, reactivity, atomic radius) >Average atomic mass from isotopic abundance >Solids, liquids, and gases >Periodic properties of elements (e.g., metal/nonmetal/metalloid behavior, electrical/heat conductivity, electronegativity, electron affinity, ionization energy, atomic/covalent/ionic radius) and how they relate to position in the periodic table		
16	Solids, Liquids, Gases	4d-Utilize the periodic table to predict and explain patterns and draw conclusions about the structure, properties, and organization of matter. (DOK 2) >Atomic composition and valence electron configuration (e.g., atomic number, mass number of protons, neutrons, electrons, isotopes, and ions) >Periodic trends using the periodic table (e.g., valence, reactivity, atomic radius) >Average atomic mass from isotopic abundance	7	States of matter posters

		>Solids, liquids, and gases >Periodic properties of elements (e.g., metal/nonmetal/metalloid behavior, electrical/heat conductivity, electronegativity, electron affinity, ionization energy, atomic/covalent/ionic radius) and how they relate to position in the periodic table		
17	Classification of Matter	4-Develop an understanding of the atom. 4a-Cite evidence to summarize the atomic theory. (DOK 1) >Models for atoms >Hund's rule and Aufbau process to specify the electron configuration of elements >Building blocks of matter (e.g., proton, neutron, and electron) and elementary particles (e.g., positron, mesons, neutrons, etc.) >atomic orbitals (s,p,d,f) and their basic shapes 4b-Explain the difference between chemical and physical changes and demonstrate how these changes can be used to separate mixtures and compounds into their components. (DOK 2) 4d-Utilize the periodic table to predict and explain patterns and draw conclusions about the structure, properties, and organization of matter. (DOK 2) >Atomic composition and valence electron configuration (e.g., atomic number, mass number of protons, neutrons, electrons, isotopes, and ions) >Periodic trends using the periodic table (e.g.,	5	Classification of matter posters

		valence, reactivity, atomic radius) >Average atomic mass from isotopic abundance >Solids, liquids, and gases >Periodic properties of elements (e.g., metal/nonmetal/metalloid behavior, electrical/heat conductivity, electronegativity, electron affinity, ionization energy, atomic/covalent/ionic radius) and how they relate to position in the periodic table		
19	Chemical Bonds	5-Investigate and apply principles of physical and chemical changes in matter. 5a-Write chemical formulas for compounds comprising monatomic and polyatomic ions. (DOK 1) 5b-Balance chemical equations. (DOK 2) 5c-classify types of chemical reactions (e.g., composition, decomposition, single displacement, double displacement, combustion, acid/base reaction). (DOK 2)	6	'Reaction in a bag' lab; 'gluep' lab

Lowndes County Physical Science Pacing Guide

MS Frameworks Pacing Guide **Grade Level: Physical Science**

Grading Period: 4th—9 weeks

Chapter/Unit	Lesson Topic	Objective Number	Approximate Days Needed	Suggested Teaching Strategies
20	Elements and Their Properties	4-Develop an understanding of the atom. 4a-Cite evidence to summarize the atomic theory. (DOK 1) >Models for atoms >Hund's rule and Aufbau process to specify the electron configuration of elements >Building blocks of matter (e.g., proton, neutron, and electron) and elementary particles (e.g., positron, mesons, neutrons, etc.) >atomic orbitals (s,p,d,f) and their basic shapes 4b-Explain the difference between chemical and physical changes and demonstrate how these changes can be used to separate mixtures and compounds into their components. (DOK 2) 4c-Research the history of the periodic table of the elements and summarize the contributions which led to the atomic theory. (DOK 2) .Contributions of scientists (e.g., John Dalton, J>J> Thomson, Ernest Rutherford, Newton, Einstein, Neils, Bohr, Louis de Broglie, Erwin Schrodinger, etc.) >Technology (e.g., e-rays, cathode-ray, etc.) >Experiments (e.g., gold-foil, cathode-ray, etc.) 4d-Utilize the periodic table to predict and explain patterns and draw conclusions about the	4	

		structure, properties, and organization of matter. (DOK 2) >Atomic composition and valence electron configuration (e.g., atomic number, mass number of protons, neutrons, electrons, isotopes, and ions) >Periodic trends using the periodic table (e.g., valence, reactivity, atomic radius) >Average atomic mass from isotopic abundance >Solids, liquids, and gases >Periodic properties of elements (e.g., metal/nonmetal/metalloid behavior, electrical/heat conductivity, electronegativity, electron affinity, ionization energy, atomic/covalent/ionic radius) and how they relate to position in the periodic table		
23	Solutions	4-Develop an understanding of the atom. 4a-Cite evidence to summarize the atomic theory. (DOK 1) >Models for atoms >Hund's rule and Aufbau process to specify the electron configuration of elements >Building blocks of matter (e.g., proton, neutron, and electron) and elementary particles (e.g., positron, mesons, neutrons, etc.) >atomic orbitals (s,p,d,f) and their basic shapes 4b-Explain the difference between chemical and physical changes and demonstrate how these changes can be used to separate mixtures and compounds into their components. (DOK 2) 4c-Research the history of the periodic table of	4	

		the elements and summarize the contributions which led to the atomic theory. (DOK 2) .Contributions of scientists (e.g., John Dalton, J>J> Thomson, Ernest Rutherford, Newton, Einstein, Neils, Bohr, Louis de Broglie, Erwin Schrodinger, etc.) >Technology (e.g., e-rays, cathode-ray, etc.) >Experiments (e.g., gold-foil, cathode-ray, etc.) 4d-Utilize the periodic table to predict and explain patterns and draw conclusions about the structure, properties, and organization of matter. (DOK 2) >Atomic composition and valence electron configuration (e.g., atomic number, mass number of protons, neutrons, electrons, isotopes, and ions) >Periodic trends using the periodic table (e.g., valence, reactivity, atomic radius) >Average atomic mass from isotopic abundance >Solids, liquids, and gases >Periodic properties of elements (e.g., metal/nonmetal/metalloid behavior, electrical/heat conductivity, electronegativity, electron affinity, ionization energy, atomic/covalent/ionic radius) and how they relate to position in the periodic table		
24	Chemical Reactions	5-Investigate and apply principles of physical and chemical changes in matter. 5a-Write chemical formulas for compounds comprising monatomic and polyatomic ions. (DOK 1)	8	

		5b-Balance chemical equations. (DOK 2) 5c-classify types of chemical reactions (e.g., composition, decomposition, single displacement, double displacement, combustion, acid/base reaction). (DOK 2)		
21	Organic Compounds		4	
22	New Materials through Chemistry		3	
25	Acids, Bases, and Salts	5-Investigate and apply principles of physical and chemical changes in matter. 5a-Write chemical formulas for compounds comprising monatomic and polyatomic ions. (DOK 1) 5b-Balance chemical equations. (DOK 2) 5c-classify types of chemical reactions (e.g., composition, decomposition, single displacement, double displacement, combustion, acid/base reaction). (DOK 2)	5	
Review for Final Exam			1 week	