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Amherst County Public Schools Grade 8 Science (Physical Science) Pacing Guide Revised 2010		
Nine Weeks 1	Strikethrough Version SOL	Duration
PS.1	<p>The student will plan and conduct <u>demonstrate an understanding of scientific reasoning, logic and the nature of science by planning and conducting</u> investigations in which</p> <ul style="list-style-type: none"> a) chemicals and equipment are used safely; b) length, mass, volume, density, temperature, weight, and force are accurately measured and reported using metric units (SI—International System of Units); c) conversions are made among metric units, applying appropriate prefixes; d) triple beam and electronic balances, thermometers, metric rulers, graduated cylinders, <u>probeware</u>, and spring scales are used to gather data; e) numbers are expressed in scientific notation where appropriate; f) research skills are utilized using a variety of resources; g) f) independent and dependent variables, constants, controls, and repeated trials are identified; h) g) data tables showing the independent and dependent variables, derived quantities, and the number of trials are constructed and interpreted; i) h) data tables for descriptive statistics showing specific measures of central tendency, the range of the data set, and the number of repeated trials are constructed and interpreted; j) i) frequency distributions, scattergrams, <u>scatterplots</u>, line plots, and histograms are constructed and interpreted; k) j) valid conclusions are made after analyzing data; l) k) research methods are used to investigate practical problems and questions; m) l) experimental results are presented in appropriate written form; and n) an understanding of the nature of science is developed and reinforced. [Move to SOL PS.1] <u>m) models and simulations are constructed and used to illustrate and explain phenomena; and</u> <u>n) current applications of physical science concepts are used.</u> 	<p>15 days</p> <p>Integrate with PS.2 – PS.11 as appropriate throughout the year</p>

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PS.2	The student will investigate and understand the basic nature of matter. Key concepts include <ul style="list-style-type: none"> a) the particle theory of matter; b) elements, compounds, mixtures, acids, bases, and salts; c) solids, liquids, and gases; d) characteristics of types of matter based on physical and chemical properties; [Move to SOL PS.2f] e) <u>d)</u> physical properties (shape, density, solubility, odor, melting point, boiling point, color); and [Move to Curriculum Framework] f) <u>e)</u> chemical properties (acidity, basicity, combustibility, reactivity); and [Move to Curriculum Framework] f) <u>characteristics of types of matter based on physical and chemical properties.</u> 	20 days
PS.3	The student will investigate and understand the modern and historical models of atomic structure. Key concepts include <ul style="list-style-type: none"> a) the contributions of Dalton, Thomson, Rutherford, and Bohr in understanding the atom; and b) the modern model of atomic structure. 	10 days

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Nine Weeks 2	Strikethrough Version SOL	Duration
PS.4	The student will investigate and understand the organization and use of the periodic table of elements to obtain information. Key concepts include <ul style="list-style-type: none"> a) symbols, atomic number, <u>atomic mass</u> atomic mass mass number, chemical families (groups), and periods; b) classification of elements as metals, metalloids, and nonmetals; and c) simple compounds (formulas and the nature of bonding) <u>formation of compounds through ionic and covalent bonding.</u> 	22 days
PS.5a and 5b	The student will investigate and understand changes in matter and the relationship of these changes to the Law of Conservation of Matter and Energy. Key concepts include <ul style="list-style-type: none"> a) physical changes; b) nuclear reactions (products of fusion and fission and the effect of these products on humans and the environment); and [Move to SOL PS.5c] e) b) chemical changes (types of reactions, reactants, and products; and balanced equations); [Move to Curriculum Framework] 	22 days

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Nine Weeks 3	Strikethrough Version SOL	Duration
PS.5c	The student will investigate and understand changes in matter and the relationship of these changes to the Law of Conservation of Matter and Energy. Key concepts include <ul style="list-style-type: none"> c) <u>nuclear reactions.</u> (products of fusion and fission and the effect of these products on humans and the environment); and [Move to Curriculum Framework] 	5 days
PS.6	The student will investigate and understand states and forms of energy and how energy is transferred and transformed. Key concepts include <ul style="list-style-type: none"> a) potential and kinetic energy; <u>and</u> b) mechanical, chemical, <u>and electrical energy</u>; <u>and</u> e) heat, light, and sound, <u>thermal, radiant and nuclear energy.</u> 	10 days
PS.7	The student will investigate and understand temperature scales, heat, and heat <u>thermal energy transfer</u> transfer . Key concepts include <ul style="list-style-type: none"> a) Celsius and Kelvin temperature scales and absolute zero; b) phase change, freezing point, melting point, boiling point, vaporization, and condensation; c) conduction, convection, and radiation; and d) applications of <u>heat thermal energy transfer</u> (heat engines, thermostats, refrigeration, and heat pumps). [Move to Curriculum Framework] 	10 days
PS.10	The student will investigate and understand <u>the</u> scientific principles and technological applications of work, force, and motion. Key concepts include <ul style="list-style-type: none"> a) speed, velocity, and acceleration; b) Newton's laws of motion; c) work, force, mechanical advantage, efficiency, and power; and d) <u>technological applications of work, force, and motion</u> (simple machines, compound machines, powered vehicles, rockets, and restraining devices). [Move to Curriculum Framework] 	20 days

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Nine Weeks 4	Strikethrough Version SOL	Duration
PS.11	The student will investigate and understand basic principles of electricity and magnetism. Key concepts include <ol style="list-style-type: none"> static electricity, current electricity, and circuits; <u>relationship between a magnetic fields and electromagnets an electric current;</u> <u>electromagnets, motors, and generators and their uses;</u> and <u>conductors, semiconductors, and insulators.</u> 	8 days
PS.8	The student will investigate and understand <u>the characteristics of sound waves and technological applications of sound waves.</u> Key concepts include <ol style="list-style-type: none"> wavelength, frequency, speed, <u>and amplitude, rarefaction, and compression;</u> resonance; the nature of mechanical <u>compression</u> waves; and technological applications of sound. 	7 days
PS.9	The student will investigate and understand <u>the nature characteristics of transverse waves and technological applications of light.</u> Key concepts include <ol style="list-style-type: none"> <u>wavelength, frequency, speed, amplitude, crest, and trough;</u> a) b) the wave behavior of light (reflection, refraction, diffraction, and interference); [Move to Curriculum Framework] b) c) images formed by lenses and mirrors; and e) d) the electromagnetic spectrum; and <u>e) technological applications of light.</u> 	7 days
	Review and SOL Testing	Remaining days to and through SOL testing
	Enrichment activities	Post SOL Testing