



Alignment Document
State of West Virginia
And
Aventa Learning Physical Science

Physical Science
2005-2007 Benchmark Blueprint

State Standard Number	State Standard Area / Description	Unit Name	Course Topic Description
SC.9.1	Students will: demonstrate an understanding of the history of science and the evolvement of scientific knowledge, demonstrate an understanding of science as a human endeavor encompassing the contributions of diverse cultures and scientists, and demonstrate an understanding of the nature of science.		
SC.9.1.1	formulate scientific explanations based on the student's observational and experimental evidence, accounting for variability in experimental results.		
SC.9.1.2	recognize that science has practical and theoretical limitations.		
SC.9.1.3	recognize that science is based on a set of observations in a testable framework that demonstrate basic laws that are consistent.		
SC.9.1.4	conclude that science is a blend of creativity, logic and mathematics.		
SC.9.1.5	trace the development of key historical concepts and principles describing their impact on modern thought and life by identifying the scientist's contributions.		

SC.9.2	Students will: demonstrate the abilities necessary to do scientific inquiry, demonstrate understanding about scientific inquiry, and demonstrate the ability to think and act as scientists by engaging in active inquiries, investigations and hands-on activities a minimum of 50% of the instructional time.		
SC.9.2.1	model and exhibit the skills, attitudes and/or values of scientific inquiry (e.g., curiosity, logic, objectivity, openness, skepticism, appreciation, diligence, integrity, ethical practice, fairness, creativity).		
SC.9.2.2	demonstrate ethical practices for science (e.g., established research protocol, accurate record keeping, replication of results and peer review).		
SC.9.2.3	apply scientific approaches to seek solutions for personal and societal issues.		
SC.9.2.4	properly and safely manipulate equipment, materials, chemicals, organisms and models.		
SC.9.2.5	conduct explorations in a variety of environments (e.g., laboratories, museums, libraries, parks and other outdoors locations).		
SC.9.2.6	use appropriate technology solutions (e.g., computer, CBL, probe interfaces, software) to measure and collect data; interpret data; analyze and/or report data; interact with simulations; conduct research; and to present and communicate conclusions.		
SC.9.2.7	demonstrate science processes within a problem solving setting (e.g., observing, measuring, calculating, communicating, comparing, ordering, categorizing, classifying, relating, hypothesizing, predicting, inferring, considering alternatives and applying).	Doing Science	Experimental set up

SC.9.2.8	design, conduct, evaluate and revise experiments (e.g., identify questions and concepts that guide investigations; design investigations; identify independent and dependent variables in experimental investigations; manipulate variables to extend experimental activities; use technology and mathematics to improve investigations and communications; formulate and revise scientific explanations and models using logic and evidence; recognize alternative explanations; communicate and defend a scientific argument).		
SC.9.3	Students will: demonstrate an understanding of interdependent themes present in the natural and designed world (e.g., systems, order, and organization; evidence, models, and explanation; constancy, change and measurement; equilibrium and evolution; form and function), demonstrate the ability to identify, construct, test, analyze and evaluate systems, models, and changes, and demonstrate the ability to draw conclusions about and predict changes in natural and designed systems.		
SC.9.3.1	analyze systems to understand the natural and designed world; use systems analysis to make predictions about behaviors in systems; recognize order in units of matter, objects or events.		
SC.9.3.2	apply evidence from models to make predictions about interactions and changes in systems.		
SC.9.3.3	measure changes in systems using graphs and equations relating these to rate, scale, patterns, trends and cycles.		

SC.9.3.4	understand that different characteristics, properties or relationships within a system might change as its dimensions are increased or decreased (e.g., scale up, scale down).		
SC.9.4	Students will: demonstrate knowledge, understanding and applications of scientific facts, concepts, principles, theories and models as delineated in the objectives, demonstrate an understanding of the interrelationships among physics, chemistry, biology and the earth and space sciences, and apply knowledge, understanding and skills of science subject matter/concepts to daily life experiences.		
0	Science Subject Matter/Concepts		
SC.9.4.1	demonstrate an understanding of the interconnections of biological, earth/space and physical science concepts.		
0	The Cell and Molecular Basis for Heredity		
SC.9.4.2	analyze and explain the principles of genetics (e.g., monohybrid and dihybrid crosses, mutations, genotypes, phenotypes, X and Y chromosomes, multiple alleles, DNA, probability, diversity).		
SC.9.4.3	illustrate meiosis and mitosis and relate to chromosome number and production of sperm, egg and body cells.		
0	The Interdependence of Organisms		
SC.9.4.4	mathematically illustrate changes in populations of organisms.		
SC.9.4.5	identify and describe microscopic organisms and foreign substances in the environment and their harmful effects (e.g., microorganisms, mutagens, carcinogens).		

SC.9.4.6	design an environment that demonstrates the interdependence of plants and animals (e.g., energy and chemical cycles, adaptations of structures and behaviors).		
0	Matter, Energy, and Organization in Living Systems		
SC.9.4.7	explain how excretory, digestive systems work together in the human body.		
SC.9.4.8	identify and compare the structure and function of cell, tissues and systems of different organisms.		
SC.9.4.9	identify the organisms and the chemical processes involved in the decay of materials.		
SC.9.4.10	trace the transfer of matter and energy in the chemical/molecular processes of photosynthesis, respiration and fermentation.		
0	Structure and Properties of Matter		
SC.9.4.11	using the element's position on the Periodic Table, predict physical and chemical properties.	Matter	Changes in Matter
		Matter	Elements and Compounds
SC.9.4.12	describe the characteristics of radioactivity substances including alpha particles, beta particles and gamma rays; the half life of a radioactive isotope; a chain reaction; and differentiate between fission and fusion.	Atomic Structure	Nuclear Process
		Atomic Structure	Electromagnetic Radiation
		Atomic Structure	Protons, Neutrons, and Electrons
		Waves	Electromagnetic Radiation
SC.9.4.13	investigate the relationship between the density of an object, its mass, and its volume.		
SC.9.4.14	investigate physical states of matter including descriptions of the behavior of atoms and molecules in terms of the Kinetic Molecular Theory.	Energy and Motion	Potential Energy

0	Chemical Reaction		
SC.9.4.15	write formulas and name compounds given oxidation numbers of monatomic and polyatomic ions.	Matter	Elements and Compounds
SC.9.4.16	identify the various types of chemical bonds and the resulting compounds that are formed (e.g., ionic, nonpolar covalent, polar covalent).	Chemical Bonds	Ionic Bonds
		Chemical Bonds	Covalent Bonds
SC.9.4.17	experimentally determine the products of chemical reactions; write balanced chemical equations; classify type of reaction; and describe energy changes.		
0	Energy		
SC.9.4.18	identify, describe and differentiate various forms of energy and energy transformations.		
SC.9.4.19	relate absorption and dissipation of heat to the composition of a material.		
SC.9.4.20	demonstrate and diagram a magnetic field using bar magnets.	Atomic Structure	Electromagnetic Radiation
		Electricity and Magnetism	Magnetism
SC.9.4.21	hypothesize and experiment when different components are substituted in an electrical circuit; define and solve electrical problems involving potential difference, Ohm's Law and power.	Electricity and Magnetism	Electrical Current
		Electricity and Magnetism	Ohm's law
0	Motions and Forces		
SC.9.4.22	relate the forces between charged objects to the charge on the objects and the distance between them.	Energy and Motion	Newton's First Law of Motion
SC.9.4.23	review foundational concepts of kinematics (e.g., speed-distance-time relationships, graphs) and dynamics (e.g., Newton's Laws, simple machines).	Energy and Motion	Newton's First Law of Motion
		Energy and Motion	Newton's Second Law of Motion
		Forces	Newton's Third Law

SC.9.4.24	experiment with a pendulum to determine which variables (amplitude, mass, length) will affect the motion of the pendulum.		
SC.9.4.25	investigate types of waves and their properties including interference, diffraction, refraction, resonance; differences and similarities between transverse and longitudinal waves; wave equation to determine the relationships among speed, wavelength and frequency.	Waves	Waves
		Waves	Wave Properties of Light
0	Energy in the Earth System		
SC.9.4.26	investigate formation and destruction of landforms.		
SC.9.4.27	demonstrate the relationships of temperature, air pressure, wind speed, wind direction and humidity as elements of weather.		
SC.9.4.28	compare and analyze the characteristics of oceans, including their lateral and vertical motions.		
0	Geochemical Cycles		
SC.9.4.29	employ a variety of tests to identify common rock-forming minerals.		
SC.9.4.30	analyze and describe common rock samples using grain size and shape, and mineral composition.		
SC.9.4.31	use models to describe interactive cycles such as the water, the nitrogen and the carbon dioxide cycles.		
0	Origin and Changes in the Earth Systems and Universe		
SC.9.4.32	examine how scientists use seismographic evidence in determining structure and composition of the Earth's interior.		
SC.9.4.33	determine the relative age of materials using time-stratigraphic and bio-stratigraphic relationships.		
SC.9.4.34	estimate the absolute age of materials using existing radio isotopic data.		



SC.9.4.35	describe the effects of the movement of subsurface water.		
SC.9.4.36	relate changes in the Earth's surface to the motion of lithospheric plates.		
SC.9.4.37	summarize and discuss the evidentiary basis for the Theory of Plate Tectonics.		
SC.9.4.38	research and describe the life cycles of various stellar types.		
SC.9.4.39	interpret topographic maps, weather maps and charts, and astronomical models such as solar systems, galaxies, constellations, stellar types and stellar evolution.		
SC.9.5	Students will: demonstrate an understanding of the interdependence between science and technology, demonstrate the ability to distinguish between natural and man-made objects, demonstrate abilities of technological design, and demonstrate the ability to utilize technology to gather data and communicate designs, results and conclusions.		
SC.9.5.1	identify the scientific concepts underlying simple technological innovations.		
SC.9.5.2	cite examples of the interdependence of science and technology (e.g., new technologies have lead to development of new scientific knowledge).		
SC.9.5.3	apply scientific skills and technological tools to design a solution that addresses a personal or societal need.		
SC.9.5.4	analyze the consequences of imposed constraints on an engineering solution.		



SC.9.6	Students will: demonstrate the ability to evaluate personal and societal benefits when examining health, population, resource and environmental issues, demonstrate the ability to evaluate the impact of different points of view on health, population, resource and environmental practices, predict the long-term societal impact of specific health, population, resource and environmental practices, and demonstrate an understanding of public policy decisions as related to health, population, resource and environmental issues.		
SC.9.6.1	research uses and values of natural resources.		
SC.9.6.2	research current environmental issues (e.g., effects of pollution, solid waste management, local, national, and global issues).		
SC.9.6.3	describe the impact of cultural, technological, and economic influences on the evolving nature of scientific thought and knowledge.		
SC.9.6.4	explore occupational opportunities in science and technology including the academic preparation necessary.		
SC.9.6.5	engage in decision making activities and actions to resolve science-technology-society issues.		