



# Alignment Document

## State of Connecticut And Aventa Learning Physical Science

### Physical Science 2005-2007 Benchmark Blueprint

State Standard Number	State Standard Area / Description	Unit Name	Course Topic Description
I	Energy Transformations		
I.A	What is the role of energy in our world?	Energy	Conservation of Energy
I.A.9.1	Energy cannot be created or destroyed; however, energy can be converted from one form to another.	Energy	Conservation of Energy
0	Energy enters the Earth system primarily as solar radiation, is captured by materials and photosynthetic processes, and eventually is transformed into heat.	Energy	Conservation of Energy
I.A.9.1.D 1	Describe the effects of adding energy to matter in terms of the motion of atoms and molecules, and the resulting phase changes.	Energy	Heat and Temperature
I.A.9.1.D 2	Explain how energy is transferred by conduction, convection and radiation.	Energy	Heat and Temperature
I.A.9.1.D 3	Describe energy transformations among heat, light, electricity and motion.		
I.B	What is the role of energy in our world?	Energy	Conservation of Energy
I.B.9.2	The electrical force is a universal force that exists between any two charged objects.	Electricity and Magnetism	Static Electricity
0	Moving electrical charges produce magnetic forces, and moving magnets can produce electrical force.	Electricity and Magnetism	Magnetism

0	Electrical current can be transformed into light through the excitation of electrons.	Electricity and Magnetism	Electrical Current
I.B.9.2.D 4	Explain the relationship among voltage, current and resistance in a simple series circuit.	Electricity and Magnetism	Electrical Current
I.B.9.2.D 5	Explain how electricity is used to produce heat and light in incandescent bulbs and heating elements.	Electricity and Magnetism	Electrical Current
I.B.9.2.D 6	Describe the relationship between current and magnetism.	Electricity and Magnetism	Magnetism
I.C	How do science and technology affect the quality of our lives?		
I.C.9.3	Various sources of energy are used by humans and all have advantages and disadvantages.		
0	During the burning of fossil fuels, stored chemical energy is converted to electrical energy through heat transfer processes.	Energy	Conservation of Energy
0	In nuclear fission, matter is transformed directly into energy in a process that is several million times as energetic as chemical burning.		
0	Alternative energy sources are being explored and used to address the disadvantages of using fossil and nuclear fuels.		
I.C.9.3.D 7	Explain how heat is used to generate electricity.	Energy	Conservation of Energy
I.C.9.3.D 8	Describe the availability, current uses and environmental issues related to the use of fossil and nuclear fuels to produce electricity.	Energy	Conservation of Energy
I.C.9.3.D 9	Describe the availability, current uses and environmental issues related to the use of hydrogen fuel cells, wind and solar energy to produce electricity.		
II	Chemical Structures and Properties		
II.A	How does the structure of matter affect the properties and uses of materials?	Matter	Properties of Matter
II.A.9.4	Atoms react with one another to form new molecules.	Atomic Structure	Atomic Model
		Atomic Structure	The Quantum Model of the Atom

0	Atoms have a positively charged nucleus surrounded by negatively charged electrons.	Atomic Structure	Atomic Model
		Atomic Structure	The Quantum Model of the Atom
0	The configuration of atoms and molecules determines the properties of the materials.	Atomic Structure	Atomic Model
		Atomic Structure	The Quantum Model of the Atom
II.A.9.4.D 10	Describe the general structure of the atom, and explain how the properties of the first 20 elements in the Periodic Table are related to their atomic structures.	Atomic Structure	Atomic Model
		Atomic Structure	The Quantum Model of the Atom
II.A.9.4.D 11	Describe how atoms combine to form new substances by transferring electrons (ionic bonding) or sharing electrons (covalent bonding).	Chemical Bonding	Bonding
		Chemical Bonding	Covalent Bonds
II.A.9.4.D 12	Explain the chemical composition of acids and bases, and explain the change of pH in neutralization reactions.		
II.B	How does the structure of matter affect the properties and uses of materials?		
II.B.9.5	Due to its unique chemical structure, carbon forms many organic and inorganic compounds.	Atomic Structure	Groups in the Periodic Table
0	Carbon atoms can bond to one another in chains, rings and branching networks to form a variety of structures, including fossil fuels, synthetic polymers and the large molecules of life.		
II.B.9.5.D 13	Explain how the structure of the carbon atom affects the type of bonds it forms in organic and inorganic molecules.		
II.B.9.5.D 14	Describe combustion reactions of hydrocarbons and their resulting by-products.	Chemical Reactions	Types of Reactions



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II.B.9.5.D 15	Explain the general formation and structure of carbon-based polymers, including synthetic polymers, such as polyethylene, and biopolymers, such as carbohydrate.		
II.C	How do science and technology affect the quality of our lives?		
II.C.9.6	Chemical technologies present both risks and benefits to the health and well-being of humans, plants and animals.	Atomic Structure	Nuclear Medicine Discussion
0	Materials produced from the cracking of petroleum are the starting points for the production of many synthetic compounds.		
0	The products of chemical technologies include synthetic fibers, pharmaceuticals, plastics and fuels.		
II.C.9.6.D 16	Explain how simple chemical monomers can be combined to create linear, branched and/or cross-linked polymers.		
II.C.9.6.D 17	Explain how the chemical structure of polymers affects their physical properties.		
II.C.9.6.D 18	Explain the short- and long-term impacts of landfills and incineration of waste materials on the quality of the environment.		
III	Global Interdependence		
III.A	How do materials cycle through the Earth's systems?		
III.A.9.7	Elements on Earth move among reservoirs in the solid earth, oceans, atmosphere and organisms as part of biogeochemical cycles.		
0	Elements on Earth exist in essentially fixed amounts and are located in various chemical reservoirs.		
0	The cyclical movement of matter between reservoirs is driven by the Earth's internal and external sources of energy.		
III.A.9.7.D 19	Explain how chemical and physical processes cause carbon to cycle through the major earth reservoirs.		



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III.A.9.7.D 20	Explain how solar energy causes water to cycle through the major earth reservoirs.		
III.A.9.7.D 21	Explain how internal energy of the Earth causes matter to cycle through the magma and the solid earth.		
III.B	How do science and technology affect the quality of our lives?		
III.B.9.8	The use of resources by human populations may affect the quality of the environment.		
0	Emission of combustion by-products, such as SO <sub>2</sub> , CO <sub>2</sub> and NO <sub>x</sub> by industries and vehicles is a major source of air pollution.		
0	Accumulation of metal and non-metal ions used to increase agricultural productivity is a major source of water pollution.		
III.B.9.8.D 22	Explain how the release of sulfur dioxide (SO <sub>2</sub> ) into the atmosphere can form acid rain, and how acid rain affects water sources, organisms and human-made structures.		
III.B.9.8.D 23	Explain how the accumulation of carbon dioxide (CO <sub>2</sub> ) in the atmosphere increases Earth's "greenhouse" effect and may cause climate changes.		
III.B.9.8.D 24	Explain how the accumulation of mercury, phosphates and nitrates affects the quality of water and the organisms that live in rivers, lakes and oceans.		
III.C	How do science and technology affect the quality of our lives?		
III.C.9.9	Some materials can be recycled, but others accumulate in the environment and may affect the balance of the Earth systems.		
0	New technologies and changes in lifestyle can have positive and/or negative effects on the environment.		



III.C.9.9.D 25	Explain how land development, transportation options and consumption of resources may affect the environment.		
III.C.9.9.D 26	Describe human efforts to reduce the consumption of raw materials and improve air and water quality.		
0	How is scientific knowledge created and communicated?	Doing Science	Scientific Laws
0	Scientific Inquiry	Doing Science	Scientific Laws
0	Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena	Doing Science	Scientific Laws
0	Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation.	Doing Science	Scientific Laws
0	Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists.	Doing Science	Scientific Laws
0	Scientific Literacy	Doing Science	Scientific Laws
0	Scientific literacy includes the ability to read, write, discuss and present coherent ideas about science.	Doing Science	Scientific Laws
0	Scientific literacy also includes the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media.	Doing Science	Scientific Laws
0	Scientific Numeracy	Matter	Measurements in Chemistry
		Matter	Using Units in Calculations
		Matter	Working with Numbers
0	Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas.	Matter	Measurements in Chemistry
		Matter	Using Units in Calculations
		Matter	Working with Numbers
D INQ.1	Identify questions that can be answered through scientific investigation.	Doing Science	Scientific Laws
D INQ.2	Read, interpret and examine the credibility and validity of scientific claims in different sources of information.	Doing Science	Scientific Laws



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D INQ.3	Formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.	Doing Science	Scientific Laws
D INQ.4	Design and conduct appropriate types of scientific investigations to answer different questions.	Doing Science	Scientific Laws
D INQ.5	Identify independent and dependent variables, including those that are kept constant and those used as controls.		
D INQ.6	Use appropriate tools and techniques to make observations and gather data.	Doing Science	Scientific Laws
D INQ.7	Assess the reliability of the data that was generated in the investigation.	Doing Science	Scientific Laws
D INQ.8	Use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.	Matter	Measurements in Chemistry
		Matter	Using Units in Calculations
		Matter	Working with Numbers
D INQ.9	Articulate conclusions and explanations based on research data, and assess results based on the design of the investigation.	Doing Science	Scientific Laws
D INQ.10	Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.	Doing Science	Scientific Laws