AVENTA LEARNING

Alignment Document

State of Colorado
And
Aventa Learning Chemistry

Chemistry
2005-2007 Benchmark Blueprint

State Standard Number	State Standard Area / Description	Unit Name	Course Topic Description
1	Students apply the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.		
1.1	ask questions and state hypotheses using prior scientific knowledge to help design and guide their development and implementation of a scientific investigation		
1.2	select and use appropriate technologies to gather, process, and analyze data and to report information related to an investigation		
1.3	identify major sources of error or uncertainty within an investigation (for example: particular measuring devices and experimental procedures)		
1.4	recognize and analyze alternative explanations and models		
1.5	construct and revise scientific explanations and models, using evidence, logic, and experiments that include identifying and controlling variables		
1.6	communicate and evaluate scientific thinking that leads to particular conclusions		
2	Students know and understand common properties, forms, and changes in matter and energy.		
2.1	elements can be organized by their physical and chemical properties (Periodic Table)	Atoms	The Periodic Table

2.2	the spatial configuration of atoms and the structure of the atoms in a molecule determine the chemical properties of the substance		
2.3	there are observable and measurable physical and chemical properties that allow you to compare, contrast, and separate substances (for example: pH, melting point, conductivity, magnetic attraction)	Acids and Bases	The pH Scale
2.4	word and chemical equations are used to relate observed changes in matter to its composition and structure (for example: conservation of matter)	Matter	Equation Balancing
2.5	quantitative relationships involved with thermal energy can be identified, measured, calculated and analyzed (for example: heat transfer in a system involving mass, specific heat, and change in temperature of matter)	Thermodynamics	Heat Flow and Physical Changes
2.6	energy can be transferred through a variety of mechanisms and in any change some energy is lost as heat (for example: conduction, convection, radiation, motion, electricity, chemical bonding changes)	Thermodynamics	Heat Flow
2.7	light and sound waves have distinct properties; frequency, wavelengths and amplitude		
2.8	quantities that demonstrate conservation of mass and conservation of energy in physical interactions can be measured and calculated		
2.9	Newton's Three Laws of Motion explain the relationship between the forces acting on an object, the object's mass, and changes in its motion		
3	Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment.		
3.1	the pattern/process of reproduction and development is specific to different organisms		
3.2	there is a relationship between the processes of photosynthesis and cellular respiration (for example: in terms of energy and products)		

3.3	there is a purpose of synthesis and breakdown of macromolecules in an organism (for example: carbohydrates, lipids, amino acids serve as building blocks of proteins; carbon dioxide and water are the basic materials for building sugars through photosynthesis)		
3.4	energy is used in the maintenance, repair, growth, and production of tissues		
3.5	the human body functions in terms of interacting organ systems composed of specialized structures that maintain or restore health (for example: mechanisms involved in homeostasis [balance], such as feedback in the endocrine system)		
3.6	changes in an ecosystem can affect biodiversity and biodiversity contributes to an ecosystem's dynamic equilibrium		
3.7	there is a cycling of matter (for example: carbon, nitrogen) and the movement and change of energy through the ecosystem (for example: some energy dissipates as heat as it is transferred through a food web)		
3.8	certain properties of water sustain life (for example: polarity, cohesion, solubility)		
3.9	cellular organelles have specific functions (for example: the relationship of ribosomes to protein, and the relationship of mitochondria to energy transformation)		
3.10	cell reproduction/division has various processes and purposes (mitosis, meiosis, binary fission)		
3.11	DNA has a general structure and function and a role in heredity and protein synthesis (for example: replication of DNA and the role of RNA in protein synthesis)		
3.12	genes serve as the vehicle for genetic continuity and the source of genetic diversity upon which natural selection can act		
3.13	some traits can be inherited while others are due to the interaction of genes and the environment (for example: skin cancer triggered by over- exposure to sunlight or contact with chemical carcinogens)		

3.14	organisms are classified into a hierarchy of groups and subgroups based on similarities which reflect their evolutionary relationships		
3.15	mutation, natural selection, and reproductive isolation can lead to new species and affect biodiversity		
3.16	an organism's adaptations (for example, structure, behavior) determine its niche (role) in the environment		
3.17	variation within a population improves the chances that the species will survive under new environmental conditions		
3.18	organisms change over time in terms of biological evolution and genetics		
4	Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space.		
4.1	the Earth's interior has a composition and structure		
4.2	the theory of plate tectonics helps to explain relationships among earthquakes, volcanoes, mid- ocean ridges, and deep-sea trenches		
4.3	the feasibility of predicting and controlling natural events can be evaluated (for example: earthquakes, floods, landslides)		
4.4	there are costs, benefits, and consequences of natural resource exploration, development, and consumption (for example: geosphere, biosphere, hydrosphere, atmosphere and greenhouse gas)		
4.5	there are consequences for the use of renewable and nonrenewable resources		
4.6	evidence is used (for example: fossils, rock layers, ice cores, radiometric dating) to investigate how Earth has changed or remained constant over short and long periods of time (for example: Mount St. Helen's' eruption Pangaea, and geologic time)		
4.7	the atmosphere has a current structure and composition and has evolved over geologic time (for example: effects of volcanic activity and the change of life forms)		

4.8	energy transferred within the atmosphere influences weather (for example: the role of conduction, radiation, convection, and heat of condensation in clouds, precipitation, winds, storms)		
4.9	weather is caused by differential heating, the spin of the Earth and changes in humidity (air pressure, wind patterns, coriolis effect)		
4.10	there are interrelationships between the circulation of oceans and weather and climate		
4.11	there are factors that may influence weather patterns and climate and their effects within ecosystems (for example: elevation, proximity to oceans, prevailing winds, fossil fuel burning, volcanic eruptions)		
4.12	water and other Earth systems interact (for example: the biosphere, lithosphere, and atmosphere)		
4.13	continental water resources are replenished and purified through the hydrologic cycle		
4.14	gravity governs the motions observed in the solar system and beyond		
4.15	there is electromagnetic radiation produced by the Sun and other stars (for example: X-ray, ultraviolet, visible light, infrared, radio)		
4.16	stars differ from each other in mass, color, temperature and age		
4.17	the scales of size and separation of components of the solar system are complex		
5	Students understand that the nature of science involves a particular way of building knowledge and making meaning of the natural world.		
5.1	print and visual media can be evaluated for scientific evidence, bias, or opinion		
5.2	the scientific way of knowing uses a critique and consensus process (for example: peer review, openness to criticism, logical arguments, skepticism)		

5.3	graphs, equations or other models are used to analyze systems involving change and constancy (for example: comparing the geologic time scale to shorter time frame, exponential growth, a mathematical expression for gas behavior; constructing a closed ecosystem such as an aquarium)		
5.4	there are cause-effect relationships within systems (for example: the effect of temperature on gas volume, effect of carbon dioxide level on the greenhouse effect, effects of changing nutrients at the base of a food pyramid)		
5.5	scientific knowledge changes and accumulates over time; usually the changes that take place are small modifications of prior knowledge but major shifts in the scientific view of how the world works do occur		
5.6	interrelationships among science, technology and human activity lead to further discoveries that impact the world in positive and negative ways		
5.7	there is a difference between a scientific theory and a scientific hypothesis	Measurement	Scientific Method