



Alignment Document
State of Illinois and Aventa Learning Chemistry

Chemistry
2005-2007 Benchmark Blueprint

State Goals	Learning Standards	Benchmarks	Unit Name	Course Topic Description
11 Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.	11.A Know and apply the concepts, principles and processes of scientific inquiry.	11.A.5a Formulate hypotheses referencing prior research and knowledge.	The Scientific Method The Scientific Method	The Scientific Method Significant Figures and Energy: Introduction
		11.A.5b Design procedures to test the selected hypotheses.	The Scientific Method The Scientific Method	The Scientific Method Significant Figures and Energy: Introduction
		11.A.5c Conduct systematic controlled experiments to test the selected hypotheses.	The Scientific Method The Scientific Method Labs throughout course	The Scientific Method Significant Figures and Energy: Introduction
		11.A.5d Apply statistical methods to make predictions and to test the accuracy of results.	The Scientific Method	Accuracy and Precision
		11.A.5e Report, display and defend the results of investigations to audiences that may include professionals and technical experts.	Labs throughout the course	

	<p>11.B Know and apply the concepts, principles and processes of technological design.</p>	<p>11.B.5a Identify a design problem that has practical applications and propose possible solutions, considering such constraints as available tools, materials, time and costs.</p>		
		<p>11.B.5b Select criteria for a successful design solution to the identified problem.</p>		
		<p>11.B.5c Build and test different models or simulations of the design solution using suitable materials, tools and technology.</p>		
		<p>11.B.5d Choose a model and refine its design based on the test results.</p>		
		<p>11.B.5e Apply established criteria to evaluate the suitability, acceptability, benefits, drawbacks and consequences for the tested design solution and recommend modifications and refinements.</p>		
		<p>11.B.5f Using available technology, prepare and present findings of the tested design solution to an audience that may include professional and technical experts.</p>		
<p>12 Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.</p>	<p>12.A Know and apply concepts that explain how living things function, adapt and change.</p>	<p>12.A.5a Explain changes within cells and organisms in response to stimuli and changing environmental conditions (e.g., homeostasis, dormancy).</p>		
		<p>12.A.5b Analyze the transmission of genetic traits, diseases and defects.</p>		
	<p>12.B Know and apply concepts that describe how living things interact with each other and with their</p>	<p>12.B.5a Analyze and explain biodiversity issues and the causes and effects of extinction.</p>		

	environment.	12.B.5b Compare and predict how life forms can adapt to changes in the environment by applying concepts of change and constancy (e.g., variations within a population increase the likelihood of survival under new conditions).		
	12.C Know and apply concepts that describe properties of matter and energy and the interactions between them.	12.C.5a Analyze reactions (e.g., nuclear reactions, burning of fuel, decomposition of waste) in natural and man-made energy systems.	Chemical Reactions	What is a Chemical Reaction?
			Chemical Reactions	Physical Change: Intro
			Chemical Reactions	Types of Chemical Reactions
		Nuclear Chemistry	Nuclear Reactions	
		12.C.5b Analyze the properties of materials (e.g., mass, boiling point, melting point, hardness) in relation to their physical and/or chemical structures.	Chemistry Fundamentals	Physical Change
			Chemistry Fundamentals	Classification of Matter
	12.D Know and apply concepts that describe force and motion and the principles that explain them.	12.D.5a Analyze factors that influence the relative motion of an object (e.g., friction, wind shear, cross currents, potential differences).		
			12.D.5b Analyze the effects of gravitational, electromagnetic and nuclear forces on a physical system.	
	12.E Know and apply concepts that describe the features and processes of the Earth and its resources.	12.E.5 Analyze the processes involved in naturally occurring short-term and long-term Earth events (e.g., floods, ice ages, temperature, sea-level fluctuations).		
	12.F Know and apply concepts that explain the composition and structure of the universe and Earth's place in it.	12.F.5a Compare the processes involved in the life cycle of stars (e.g., gravitational collapse, thermonuclear fusion, nova) and evaluate the supporting evidence.		

		12.F.5b Describe the size and age of the universe and evaluate the supporting evidence (e.g., red-shift, Hubble's constant).		
13 Understand the relationships among science, technology and society in historical and contemporary contexts.	13.A Know and apply the accepted practices of science.	13.A.5a Design procedures and policies to eliminate or reduce risk in potentially hazardous science activities.		
		13.A.5b Explain criteria that scientists use to evaluate the validity of scientific claims and theories.		
		13.A.5c Explain the strengths, weaknesses and uses of research methodologies including observational studies, controlled laboratory experiments, computer modeling and statistical studies.		
		13.A.5d Explain, using a practical example (e.g., cold fusion), why experimental replication and peer review are essential to scientific claims.		
	13.B Know and apply concepts that describe the interaction between science, technology and society.	13.B.5a Analyze challenges created by international competition for increases in scientific knowledge and technological capabilities (e.g., patent issues, industrial espionage, technology obsolescence).		
		13.B.5b Analyze and describe the processes and effects of scientific and technological breakthroughs.	Atoms/PeriodTable	Atoms
		13.B.5c Design and conduct an environmental impact study, analyze findings and justify recommendations.		
		13.B.5d Analyze the costs, benefits and effects of scientific and technological policies at the local, state, national and global levels (e.g., genetic research, Internet access).		



		13.B.5e Assess how scientific and technological progress has affected other fields of study, careers and job markets and aspects of everyday life.		
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