



Alignment Document
State of Illinois and Aventa Learning Physics

Physics
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.	Physics and the Laws of Motion	Free-Fall Acceleration Lab
			Physics and the Laws of Motion	Projectile Motion Lab
			Physics and the Laws of Motion	Forces and Friction Lab
			Energy and Motion	Conservation of Mechanical Energy Lab
			Energy and Motion	Momentum Lab
			Energy and Motion	Machines and Efficiency Lab
			Heat and Thermodynamics	Thermal Equilibrium Lab
			Heat and Thermodynamics	Piston Lab
			Waves	Simple Harmonic Motion Lab
Waves	Wave Lab			



			Waves	Sound Lab
			Waves	Converging Lenses Lab
			Electricity	Electrostatics Lab
			Electricity	Current and Resistance Lab
			Electricity	Resistors in Series and Parallel Lab
			Magnetism and Atomic Physics	Magnetic Field of a Solenoid Lab
			Magnetism and Atomic Physics	Electromagnetic Induction Lab
			Magnetism and Atomic Physics	Photoelectric Effect Lab
		11.A.5b Design procedures to test the selected hypotheses.	Physics and the Laws of Motion	Free-Fall Acceleration Lab
			Physics and the Laws of Motion	Projectile Motion Lab
			Physics and the Laws of Motion	Forces and Friction Lab
			Energy and Motion	Conservation of Mechanical Energy Lab
			Energy and Motion	Momentum Lab
			Energy and Motion	Machines and Efficiency Lab
			Heat and	Thermal Equilibrium Lab



			Thermodynamics	
			Heat and Thermodynamics	Piston Lab
			Waves	Simple Harmonic Motion Lab
			Waves	Wave Lab
			Waves	Sound Lab
			Waves	Converging Lenses Lab
			Electricity	Electrostatics Lab
			Electricity	Current and Resistance Lab
			Electricity	Resistors in Series and Parallel Lab
			Magnetism and Atomic Physics	Magnetic Field of a Solenoid Lab
			Magnetism and Atomic Physics	Electromagnetic Induction Lab
			Magnetism and Atomic Physics	Photoelectric Effect Lab
		11.A.5c Conduct systematic controlled experiments to test the selected hypotheses.	Physics and the Laws of Motion	Free-Fall Acceleration Lab
			Physics and the Laws of Motion	Projectile Motion Lab
			Physics and the Laws of Motion	Forces and Friction Lab



			Energy and Motion	Conservation of Mechanical Energy Lab
			Energy and Motion	Momentum Lab
			Energy and Motion	Machines and Efficiency Lab
			Heat and Thermodynamics	Thermal Equilibrium Lab
			Heat and Thermodynamics	Piston Lab
			Waves	Simple Harmonic Motion Lab
			Waves	Wave Lab
			Waves	Sound Lab
			Waves	Converging Lenses Lab
			Electricity	Electrostatics Lab
			Electricity	Current and Resistance Lab
			Electricity	Resistors in Series and Parallel Lab
			Magnetism and Atomic Physics	Magnetic Field of a Solenoid Lab
			Magnetism and Atomic Physics	Electromagnetic Induction Lab
			Magnetism and Atomic Physics	Photoelectric Effect Lab
		11.A.5d	Apply statistical methods to make	

		predictions and to test the accuracy of results.		
		11.A.5e Report, display and defend the results of investigations to audiences that may include professionals and technical experts.		
11.B Know and apply the concepts, principles and processes of technological design.		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.		
		11.B.5b Select criteria for a successful design solution to the identified problem.		
		11.B.5c Build and test different models or simulations of the design solution using suitable materials, tools and technology.		
		11.B.5d Choose a model and refine its design based on the test results.		
		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.		
		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.		
		12 Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.	12.A Know and apply concepts that explain how living things function, adapt and change.	12.A.5a Explain changes within cells and organisms in response to stimuli and changing environmental conditions (e.g., homeostasis, dormancy).
12.A.5b Analyze the transmission of genetic traits, diseases and defects.				
12.B Know and apply concepts that	12.B.5a Analyze and explain biodiversity			

	describe how living things interact with each other and with their environment.	issues and the causes and effects of extinction. 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. 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.		
	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).	Physics and the Laws of Motion	Forces and the Laws of Motion
Physics and the Laws of Motion			Projectile Motion Lab	
	12.D Know and apply concepts that describe force and motion and the principles that explain them.	12.D.5b Analyze the effects of gravitational, electromagnetic and nuclear forces on a physical system.	Physics and the Laws of Motion	Forces and Friction Lab
Physics and the Laws of Motion			Forces and the Laws of Motion	
	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).	Magnetism and Atomic Physics	Electromagnetic Induction
Magnetism and Atomic Physics			Atomic Physics	

	<p>12.F Know and apply concepts that explain the composition and structure of the universe and Earth's place in it.</p>	<p>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.</p>		
<p>13 Understand the relationships among science, technology and society in historical and contemporary contexts.</p>	<p>13.A Know and apply the accepted practices of science.</p>	<p>12.F.5b Describe the size and age of the universe and evaluate the supporting evidence (e.g., red-shift, Hubble's constant).</p>		
		<p>13.A.5a Design procedures and policies to eliminate or reduce risk in potentially hazardous science activities.</p>		
		<p>13.A.5b Explain criteria that scientists use to evaluate the validity of scientific claims and theories.</p>		
		<p>13.A.5c Explain the strengths, weaknesses and uses of research methodologies including observational studies, controlled laboratory experiments, computer modeling and statistical studies.</p>		
	<p>13.B Know and apply concepts that describe the interaction between science, technology and society.</p>	<p>13.A.5d Explain, using a practical example (e.g., cold fusion), why experimental replication and peer review are essential to scientific claims.</p>		
		<p>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).</p>		
<p>13.B.5b Analyze and describe the processes and effects of scientific and technological breakthroughs.</p>				
<p>13.B.5c Design and conduct an environmental impact study, analyze findings and justify recommendations.</p>				
<p>13.B.5d Analyze the costs, benefits and</p>	Electricity	Circuits and Circuit Elements		



		effects of scientific and technological policies at the local, state, national and global levels (e.g., genetic research, Internet access).	Electricity	Electrical Energy and Current
		13.B.5e Assess how scientific and technological progress has affected other fields of study, careers and job markets and aspects of everyday life.		