



Alignment Document
State of Kentucky and Aventa Learning Environmental Science

Environmental Science
2005-2007 Benchmark Blueprint

Big Ideas	Topics	Standards	Unit Name	Course Topic Description
SC-H-ET Energy Transformations (Unifying Concepts)	SC-H-ET-U Enduring Knowledge - Understandings	SC-H-ET-U-1 transformations that occur within the nuclei of atoms release vastly greater energy than those that involve only electrons, and result in the emission of radiation and/or transformation of elements.	Mineral and Energy Resources	Nonrenewable Energy
		SC-H-ET-U-2 while the total amount of energy in the universe is constant, the amount that is available for useful transformations is always decreasing. Systems within the universe will cease to function once the energy differential becomes zero.		
		SC-H-ET-U-3 waves, including electromagnetic radiation, are an important form of energy transfer. Waves are governed by rules that can be investigated and used to predict/explain their behavior.		
		SC-H-ET-U-4 many elements and compounds are involved in continuous cyclic processes where they are stored by and/or flow between organisms and the environment. These processes require a continuous supply of energy to occur.	Ecology	How Ecosystems Work

	<p>SC-H-ET-U-5 radiant energy from the sun is stored in a chemical form in plants as a result of photosynthesis. This energy transformation allows plants to use simple molecules, such as carbon dioxide and water, to assemble the complex molecules needed to increase their mass.</p>	Ecology	How Ecosystems work
	<p>SC-H-ET-U-6 energy stored in food is released by a series of internal chemical reactions that reorganize the molecules into a form useable by the organism.</p>	Ecology	How Ecosystems work
	<p>SC-H-ET-U-7 a variety of carbon compounds are essential to the processes that occur in all organisms.</p>	Ecology	How Ecosystems work
	<p>SC-H-ET-U-8 heat is a manifestation of the random motion and vibrations of atoms or molecules within a substance. Interactions between or among atoms or molecules naturally move toward states of higher disorder.</p>		
	<p>SC-H-ET-U-9 many different sources of energy are used for a variety of purposes, including powering machines designed to do useful work. Regardless of function or energy source, the useful energy output of any machine is always less than the total energy input.</p>		
	<p>SC-H-ET-U-10 all Earth systems/processes require either an internal or external source of energy to function. Changes to any component, or to the quantity or type of energy input, may influence all components of the system.</p>		
	<p>SC-H-ET-U-11 weather and climate are the direct or indirect result of transfer of</p>		

		solar energy, and changes in one part of the system may influence all of the others. The complexity of the system and the number of variables involved requires very complex mathematical models in order to make accurate predictions.		
		SC-H-ET-U-12 technological problems often create a demand for new scientific knowledge, and new technologies make it possible for scientists to conduct their research more effectively or to conduct new lines of research. The availability of new technology often sparks scientific advances.		
		SC-H-ET-U-13 technology affects society because it solves practical problems and serves human needs. Science affects society by stimulating thought or satisfying curiosity, or by influencing views of the world, or by providing knowledge necessary for new technological advances.		
	SC-H-ET-S Skills and Concepts	SC-H-ET-S-1 classify and describe nuclear reactions and their products	Mineral and Energy Resources	Nonrenewable Energy
		SC-H-ET-S-2 investigate the forces inside the nucleus and evaluate the risk/benefits of nuclear energy	Mineral and Energy Resources	Nonrenewable Energy
		SC-H-ET-S-3 apply the law of conservation of energy and explore heat flow in real-life phenomena		
		SC-H-ET-S-4 investigate waves, the rules describing wave behavior and energy transfer via waves in real life phenomena (e.g., nuclear medicine, industrial applications)		
		SC-H-ET-S-5 investigate the flow of	Ecology	How Ecosystems work

		matter and energy between organisms and the environment and model the cyclic nature of this process		
		SC-H-ET-S-6 explain the metabolic process of photosynthesis and describe the molecules it assembles to store solar energy	Ecology	How Ecosystems work
		SC-H-ET-S-7 describe the metabolic processes that allow energy stored in food to be made available to the organism	Ecology	How Ecosystems work
		SC-H-ET-S-8 explore the composition and function of the carbon compounds involved in metabolism	Ecology	How Ecosystems work
		SC-H-ET-S-9 apply the concept of entropy to molecular interactions and to interactions within the universe		
		SC-H-ET-S-10 analyze a variety of energy sources, their potential uses and their relative costs/benefits	Mineral and Energy Resources	Nonrenewable Energy, Renewable Energy
		SC-H-ET-S-11 investigate the relationship of energy input vs. useful energy output in mechanical systems		
		SC-H-ET-S-12 model and explain the relationships and energy flow existing in various Earth systems	Ecology	How Ecosystems work
		SC-H-ET-S-13 use weather data to model the complex interactions responsible for weather and climate		
		SC-H-ET-S-14 describe how science and technology interact. Research and investigate the impact of technology on society and how technological advances have driven scientific research		
SC-H-I Interdependence (Unifying Concepts)	SC-H-I-U Enduring Knowledge - Understandings	SC-H-I-U-1 human beings are part of the Earth's ecosystems. Human activities can, deliberately or inadvertently, alter the	Ecology	How Ecosystems work

	equilibrium in ecosystems.		
	SC-H-I-U-2 unique among organisms, humans have the capability to impact other species on a global scale both directly (e.g. selective breeding, genetic engineering, foreign species introductions) and indirectly (e.g. habitat crowding, pollution, climate change).	Ecology	How Ecosystems work
	SC-H-I-U-3 the appearance of new species always impacts the environment. In some cases this impact can have global and profound significance (e.g. when ancient bacteria transformed the atmosphere to an oxygen-rich environment).	Ecology	The Organization of Life
	SC-H-I-U-4 every ecosystem contains natural checks and balances, both biotic and abiotic, that serve to limit the size and range of the populations contained within it.	Ecology	The Organization of Life
	SC-H-I-U-5 human creativity, inventiveness and ingenuity have brought new risks as well as improvements to human existence. People control technology and are ultimately responsible for its effects.		
	SC-H-I-U-6 science/technology occasionally provides the means to do questionable things. Decisions about doing these things require exercising a sense of responsibility. Just because something can be done does not mean it should be done.		
	SC-H-I-U-7 the critical assumptions behind any line of reasoning must be made explicit, so that the validity of the		

		position being taken can be judged.		
	SC-H-I-S Skills and Concepts	SC-H-I-S-1 explore ways to eradicate or lessen environmental problems caused by human interaction (e.g., examine programs for habitat restoration or wildlife protection, automotive/industrial emissions standards)		
		SC-H-I-S-2 investigate changes in ecosystems and propose potential solutions to problems by documenting and communicating solutions to others through multi-media presentations		
		SC-H-I-S-3 analyze and describe the effects of events (e.g., fires, hurricanes, deforestation, mining, population growth and municipal development) on environments from a variety of perspectives. Use data to propose ways of lessening impacts perceived as negative		
		SC-H-I-S-4 examine existing models of global population growth and the factors affecting population change (e.g., geography, diseases, natural events, birth/death rates). Propose and defend solutions to identified problems of population change	Populations	The Human Population
		SC-H-I-S-5 analyze examples of environmental changes resulting from the introduction, removal, or reintroductions of indigenous or non-indigenous species to an ecosystem. Use information to predict future impacts of similar changes in other ecosystems		
		SC-H-I-S-6 analyze and synthesize research, for questions about, theories		



		and related technologies that have advanced our understanding of interdependence		
		SC-H-I-S-7 explore the causes, consequences and possible solutions to persistent, contemporary and emerging global issues relating to environmental quality	Our Health and Our Future	Economics, Policy and the Future
		SC-H-I-S-8 Investigate controversial scientific proposals (e.g., human cloning, genetic modification of crops, nuclear waste storage), use scientific evidence/data to support or defend a position and debate the ethical merits of implementing the proposed actions		