

INVESTIGATING OUR NATURAL AND ENGINEERED WORLD.

Environmental Science Teaching & Learning Framework					
Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
2 wks BLOCK/ 4 wks YR	3 weeks BLOCK/6 weeks YR	2 wks BLOCK/4 wks YR	4 weeks BLOCK/8 weeks YR	3 weeks BLOCK/6 weeks YR	3 weeks BLOCK/6 weeks YR
Intro to	Ecology	Biomes	Populations and Biodiversity	Water, Air & Land Pollution	Energy and Waste Populations
Environmental	SEV1a-c, SEV2c	SEV1d, e	SEV2d, SEV4c, SEV5a-c	SEV2a, b, SEV4a-c	SEV3a-d, SEV4a, SEV5b
Science SEV5a,c,d					
SEV5. Obtain, evaluate,	SEV1. Obtain, evaluate, and	SEV1. Obtain,	SEV2. Obtain, evaluate, and	SEV2. Obtain, evaluate, and	SEV3. Obtain, evaluate, and
and communicate	communicate information to	evaluate, and	communicate information to	communicate information to construct	communicate information to evaluate
information about the	investigate the flow of energy and	communicate	construct explanations of stability	explanations of stability and change in	types, availability, allocation, and
effects of human	cycling of matter within an	information to	and change in Earth's ecosystems.	Earth's ecosystems. a. Analyze and	sustainability of energy resources.
population growth on	ecosystem.	investigate the	d. Construct an argument to support a claim about the value of	interpret data related to short-term	a. Analyze and interpret data to
global ecosystems.	a. Develop and use a model to	flow of energy and	biodiversity in ecosystem resilience	and long-term natural cyclic	communicate information on the origin
a. Construct	compare and analyze the levels of	cycling of matter	including keystone, invasive, native,	fluctuations associated with climate	and consumption of renewable forms of
explanations about the	biological organization including	within an	endemic, indicator, and endangered	change.	energy (wind, solar, geothermal, biofuel,
relationship between	organisms, populations,	ecosystem.	species.	b. Analyze and interpret data to	and tidal) and non-renewable energy
the quality of life and	communities, ecosystems, and	d. Evaluate claims,	SEV4. Obtain, evaluate, and	determine how changes in atmospheric	sources (fossil fuels and nuclear energy).
human impact on the environment in terms	biosphere.	evidence, and	communicate information to analyze	chemistry (carbon dioxide and	b. Construct an argument based on data about the risks and benefits of renewable
of population growth,	 Develop and use a model based on the Laws of Thermodynamics to 	reasoning of the relationship	human impact on natural resources. c. Construct an argument to evaluate	methane) impact the greenhouse effect.	and nonrenewable energy sources.
education, and gross	predict energy transfers throughout	between the	how human population growth	enect.	c. Obtain, evaluate, and communicate
national product.	an ecosystem (food chains, food	physical factors	affects food demand and food supply	SEV4. Obtain, evaluate, and	data to predict the sustainability potential
c. Construct an	webs, and trophic levels).	(e.g., insolation,	(GMOs, monocultures,	communicate information to analyze	of renewable and non-renewable energy
argument from	(Clarification statement: The first	proximity to	desertification, Green Revolution).	human impact on natural resources.	resources.
evidence regarding the	and second law of thermodynamics	coastline,	SEV5. Obtain, evaluate, and	a. Construct and revise a claim based	d. Design and defend a sustainable energy
ecological effects of	should be used to support the	topography) and	communicate information about the	on evidence on the effects of human	plan based on scientific principles for your
human innovations	model.)	organismal	effects of human population growth	activities on natural resources.	location.
(Agricultural, Industrial,	c. Analyze and interpret data to	adaptations within	on global ecosystems. a. Construct explanations about the	b. Design, evaluate, and refine	SEV4. Obtain, evaluate, and
Medical, and	construct an argument of the	terrestrial biomes.	relationship between the quality of	solutions to reduce human impact on	communicate information to analyze
Technological	necessity of biogeochemical cycles	e. Plan and carry	life and human impact on the	the environment including, but not	human impact on natural resources.
Revolutions) on global	(hydrologic, nitrogen, phosphorus,	out an investigation	environment in terms of population	limited to, smog, ozone depletion,	a. Construct and revise a claim based on
ecosystems.	oxygen, and carbon) to support a	of how chemical	growth, education, and gross national	urbanization, and ocean acidification.	evidence on the effects of human
d. Design and defend a	sustainable ecosystem.	and physical	product.	c. Construct an argument to evaluate	activities on natural resources.
sustainability plan to		properties impact	b. Analyze and interpret data on	how human population growth affects	SEV5. Obtain, evaluate, and
reduce your individual	SEV2. Obtain, evaluate, and	aquatic biomes in	global patterns of population growth (fertility and mortality rates) and	food demand and food supply (GMOs,	communicate information about the
contribution to	communicate information to	Georgia.	demographic transitions in	monocultures, desertification, Green	effects of human population growth on
environmental impacts,	construct explanations of stability	(Clarification	developing and developed countries.	Revolution).	global ecosystems.
taking into account how	and change in Earth's ecosystems.	statement:	c. Construct an argument from		b. Analyze and interpret data on global
market forces and	c. Construct an argument to predict	Consider the	evidence regarding the ecological		patterns of population growth (fertility
societal demands	changes in biomass, biodiversity, and complexity within ecosystems,	diverse aquatic ecosystems across	effects of human innovations		and mortality rates) and demographic
(including political, legal, social, and	in terms of ecological succession.	the state such as	(Agricultural, Industrial, Medical, and		transitions in developing and developed countries.
economic) influence	ווו נפווווג טו פנטוטצונמו געננפגגוטוו.	streams, ponds,	Technological Revolutions) on global		
personal choices.		coastline, estuaries,	ecosystems.		
personal enoices.		and lakes.)			



SCIENCE

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Environmental Science Standards

The Georgia Standards of Excellence are designed to provide foundational knowledge and skills for all students to develop proficiency in science. The Project 2061's *Benchmarks for Science Literacy* and the follow up work, *A Framework for K-12 Science Education* were used as the core of the standards to determine appropriate content and process skills for students. The Georgia Standards of Excellence focus on a limited number of core disciplinary ideas and crosscutting concepts which build from Kindergarten to high school. The standards are written with the core knowledge to be mastered integrated with the science and engineering practices needed to engage in scientific inquiry and engineering design. Crosscutting concepts are used to make connections across different science disciplines.

The Georgia Standards of Excellence for Science drive instruction. Hands-on, student-centered, and inquiry-based approaches should be the emphasis of instruction. The standards are a required minimum set of expectations that show proficiency in science. However, instruction can extend beyond these minimum expectations to meet student needs.

Science consists of a way of thinking and investigating, as well a growing body of knowledge about the natural world. To become literate in science, students need to possess sufficient understanding of fundamental science content knowledge, the ability to engage in the science and engineering practices, and to use scientific and technological information correctly. Technology should be infused into the curriculum and the safety of the student should always be foremost in instruction.

The Georgia Excellence for Environmental Science are designed to continue the student investigations that began in grades K-8. These standards integrate the study of many components of our environment, including the human impact on our planet. Students investigate the flow of energy and cycling of matter within ecosystems, and evaluate types, availability, allocation, and sustainability of energy resources. Instruction should focus on student data collection and analysis from field and laboratory experiences. Some concepts are global; in those cases, interpretation of global data sets from scientific sources is strongly recommended. Chemistry, physics, mathematical, and technological concepts should be integrated throughout the course. Whenever possible, careers related to environmental science should be emphasized.



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Environmental Science

SEV1. Obtain, evaluate, and communicate information to investigate the flow of energy and cycling of matter within an ecosystem.

a. Develop and use a model to compare and analyze the levels of biological organization including organisms, populations, communities, ecosystems, and biosphere.

b. Develop and use a model based on the Laws of Thermodynamics to predict energy transfers throughout an ecosystem (food chains, food webs, and trophic levels).

(Clarification statement: The first and second law of thermodynamics should be used to support the model.)

c. Analyze and interpret data to construct an argument of the necessity of biogeochemical cycles (hydrologic, nitrogen, phosphorus, oxygen, and carbon) to support a sustainable ecosystem.

d. Evaluate claims, evidence, and reasoning of the relationship between the physical factors (e.g., insolation, proximity to coastline, topography) and organismal adaptations within terrestrial biomes.

e. Plan and carry out an investigation of how chemical and physical properties impact aquatic biomes in Georgia.

(Clarification statement: Consider the diverse aquatic ecosystems across the state such as streams, ponds, coastline, estuaries, and lakes.)

SEV2. Obtain, evaluate, and communicate information to construct explanations of stability and change in Earth's ecosystems.

a. Analyze and interpret data related to short-term and long-term natural cyclic fluctuations associated with climate change.

(*Clarification statement:* Short-term examples include but are not limited to El Niño and volcanism. Long-term examples include but are not limited to variations in Earth's orbit such as Milankovitch cycles.)

b. Analyze and interpret data to determine how changes in atmospheric chemistry (carbon dioxide and methane) impact the greenhouse effect.

c. Construct an argument to predict changes in biomass, biodiversity, and complexity within ecosystems, in terms of ecological succession.

d. Construct an argument to support a claim about the value of biodiversity in ecosystem resilience including keystone, invasive, native, endemic, indicator, and endangered species.



SCIENCE

INVESTIGATING OUR NATURAL AND ENGINEERED WORLD.

SEV3. Obtain, evaluate, and communicate information to evaluate types, availability, allocation, and sustainability of energy resources.

a. Analyze and interpret data to communicate information on the origin and consumption of renewable forms of energy (wind, solar, geothermal, biofuel, and tidal) and non-renewable energy sources (fossil fuels and nuclear energy).

b. Construct an argument based on data about the risks and benefits of renewable and nonrenewable energy sources.

(Clarification statement: This may include, but is not limited to, the environmental, social, and economic risks and benefits.)

c. Obtain, evaluate, and communicate data to predict the sustainability potential of renewable and non-renewable energy resources.

d. Design and defend a sustainable energy plan based on scientific principles for your location.

SEV4. Obtain, evaluate, and communicate information to analyze human impact on natural resources.

a. Construct and revise a claim based on evidence on the effects of human activities on natural resources.

Human Activities	Natural Resources		
Agriculture	Land		
Forestry	Water		
Ranching	Air		
Mining	Organisms		
Urbanization			
Fishing			
Water use			
Pollution			
Desalination			
Waste water			
treatment			

b. Design, evaluate, and refine solutions to reduce human impact on the environment including, but not limited to, smog, ozone depletion, urbanization, and ocean acidification.

c. Construct an argument to evaluate how human population growth affects food demand and food supply (GMOs, monocultures, desertification, Green Revolution).





INVESTIGATING OUR NATURAL AND ENGINEERED WORLD.

SEV5. Obtain, evaluate, and communicate information about the effects of human population growth on global ecosystems.

a. Construct explanations about the relationship between the quality of life and human impact on the environment in terms of population growth, education, and gross national product.

b. Analyze and interpret data on global patterns of population growth (fertility and mortality rates) and demographic transitions in developing and developed countries.

c. Construct an argument from evidence regarding the ecological effects of human innovations (Agricultural, Industrial, Medical, and Technological Revolutions) on global ecosystems.

d. Design and defend a sustainability plan to reduce your individual contribution to environmental impacts, taking into account how market forces and societal demands (including political, legal, social, and economic) influence personal choices.