

Environmental Pacing Guide 2022-23

<u>Unit Name</u>	<u>New GSE Standards</u>	<u>Learning Targets</u>	<u>Days to teach unit</u>
Intro to Environmental	All standards	<p>LT0.1 - I can describe the seven characteristics of living organisms.</p> <p>LT0.2 - I can differentiate between biotic and abiotic organisms and their effects on an ecosystem.</p>	3 days
Unit 1 Flow of Energy and Cycling Levels of Organization Species Diversity Succession Food Chains/Webs Energy Pyramids	<p>SEV1. Obtain, evaluate, and communicate information to investigate the flow of energy and cycling of matter within an ecosystem.</p> <p>a. Develop and use a model to compare and analyze the levels of biological organization including organisms, populations, communities, ecosystems, and biosphere.</p> <p>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.)</p> <p>SEV2. Obtain, evaluate, and communicate information to construct explanations of stability and change in Earth's ecosystems.</p> <p>c. Construct an argument to predict changes in biomass, biodiversity, and complexity within ecosystems, in terms of ecological succession.</p> <p>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.</p>	<p>LT1 - I can identify and connect the biological levels of organization on Earth.</p> <p>LT2 - I can identify and explain the factors that affect biodiversity regarding ecological resilience.</p> <p>LT3 - I can use food chains and trophic pyramids to show energy flow and how their disruption can affect the stability of an ecosystem.</p> <p>LT4 - I can describe how interactions between organisms and the environment affect the distributions of species.</p> <p>LT5 -Describe how relationships among organisms (predation, parasitism, competition, commensalism, mutualism etc.) add to the complexity of biological communities.</p>	11 days

<p>Unit 2 Terrestrial Biomes and Aquatic Ecosystems</p>	<p>SEV1. Obtain, evaluate, and communicate information to investigate the flow of energy and cycling of matter within an ecosystem.</p> <p>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.</p> <p>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.)</p>	<p>LT1TB - I can evaluate claims, evidence, and reasoning of the relationship between the physical factors and organismal adaptations within terrestrial biomes.</p> <p>LT2TB - I can characterize terrestrial biomes by their climates as well as typical plant and animal life.</p> <p>LT3TB - I can explain how biomes are characterized by temperature, precipitation, flora, and fauna.</p> <p>LT4AE- I can plan and carry out an investigation of how chemical and physical properties impact aquatic biomes.</p> <p>LT5AE - I can compare the physical characteristics of different types of rivers, lakes, wetlands, and marine ecosystems.</p> <p>LT6AE - I can differentiate between the various lake and ocean life zones.</p>	<p>11 days</p>
<p>Unit 3 Biogeochemical Cycles</p>	<p>SEV1. Obtain, evaluate, and communicate information to investigate the flow of energy and cycling of matter within an ecosystem.</p> <p>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.</p>	<p>LT1- I can model the cycling of major biogeochemicals (hydrologic, nitrogen, phosphorus, oxygen, carbon, and sulfur) and explain how they affect the flow of energy in ecosystems (introduce producer and consumer vocab).</p> <p>LT2 - I can analyze and interpret</p>	<p>8 days</p>

		<p>data to construct an argument of the necessity of biogeochemical cycles (hydrologic, nitrogen, phosphorus, oxygen, carbon, and sulfur) to support a sustainable ecosystem.</p> <p>LT3 - I can compare and contrast the processes of photosynthesis and cellular respiration.</p>	
<p>Unit 4 Populations: Characteristics and Dynamics (Population Growth, Gross National Product, Age Structure Graphs, Demographics)</p>	<p>SEV5. Obtain, evaluate, and communicate information about the effects of human population growth on global ecosystems.</p> <p>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.</p> <p>b. Analyze and interpret data on global patterns of population growth (fertility and mortality rates) and demographic transitions in developing and developed countries.</p> <p>c. Construct an argument from evidence regarding the ecological effects of human innovations (Agricultural, Industrial, Medical, and Technological Revolutions) on global ecosystems.</p> <p>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.</p>	<p>LT1- I can explain the characteristics that define a population.</p> <p>LT2- I can explain the relationship between quality of life and human impact on the environment.</p> <p>LT3- I can explain the four factors that contribute to population growth and compare/contrast patterns of growth (exponential, logistic, boom and bust).</p> <p>LT4- I can analyze and interpret data and graphical representations to predict population trends (fertility and mortality rates), growth curves and age structures.</p> <p>LT5- I can identify and explain the differences between developed and developing countries.</p> <p>LT6- I can explain how human innovations during the 20th and 21st centuries impacted and</p>	7 days

		<p>affected global ecosystems.</p> <p>LT7- I can evaluate effects of population growth trends on resources (food, energy) and the environment.</p> <p>LT8-I can design and defend a sustainability plan and identify how I impact the environment.</p>	
<p>Unit 5 Human Impact LAND (Forestry, Agriculture, Mining, Urbanization)</p>	<p>SEV4. Obtain, evaluate, and communicate information to analyze human impact on natural resources.</p> <p>a. Construct and revise a claim based on evidence on the effects of human activities on natural resources. Human Activities: Agriculture, Forestry, Ranching, Mining, Urbanization, Fishing, Water Use, Pollution, Desalination, Wastewater Treatment. Natural Resources : Land, Water, Air, Organisms</p> <p>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.</p> <p>c. Construct an argument to evaluate how human population growth affects food demand and food supply (GMOs, monocultures, desertification, Green Revolution).</p>	<p>LT1 - I can describe the tragedy of the commons, and evaluate public policies related to resource use (consider the impacts of such policies on the resource and short- and long-term economic effects).</p> <p>LT2F - I can compare and contrast the different tree harvesting strategies and argue their sustainability.</p> <p>LT3AG - I can assess the efficacy and sustainability of different agricultural strategies.</p> <p>LT4GR - I can describe the change to modern, large-scale agricultural methods and recognize the economic benefits and environmental drawbacks for these methods.</p> <p>LT5GM - I can communicate beneficial uses and controversial topics of biotechnology (GMOs) in forensics, medicine, and agriculture.</p>	12 days

		<p>LT6M - I can identify and explain how humans extract elements and minerals from the earth and evaluate the social and environmental consequences of mining activities.</p> <p>LT7S - I can identify soil structure and calculate the percent composition of sand, silt, and clay in a soil sample.</p> <p>LT8U - I can explain the effects of urbanization on the environment and formulate environmentally sound responses to urban sprawl.</p>	
<p>Unit 6 Human Impact WATER (Waste, Sewage, Aquatic Ecosystems, Wetland and Mangrove)</p>	<p>SEV4. Obtain, evaluate, and communicate information to analyze human impact on natural resources.</p> <p>a. Construct and revise a claim based on evidence on the effects of human activities on natural resources. Human Activities: Agriculture, Forestry, Ranching, Mining, Urbanization, Fishing, Water Use, Pollution, Desalination, Wastewater Treatment. Natural Resources : Land, Water, Air, Organisms</p> <p>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.</p>	<p>LT1SW - I can identify solid waste and explain how and where it is generated.</p> <p>LT2LF - I can evaluate the impacts of landfill design on the environment and describe factors in landfill decomposition rates.</p> <p>LT3WR - I can evaluate the impacts of alternative methods of waste removal and reduction.</p> <p>LT4R - I can identify ways in which resources can be recycled and reused while evaluating the viability of recycling based on economic and technological factors, spatial variables such as distance from recycling facility to markets, and possible future developments.</p>	13 days

		<p>LT5P - I can differentiate between point source pollution and non-point source pollution.</p> <p>LT6WQ - I can assess problems of water quality and propose solutions to address water pollution.</p> <p>LT7WW - I can explain how we treat wastewater and drinking water.</p>	
<p>Unit 7 Human Impact AIR (Air pollution, Ozone loss)</p>	<p>SEV4. Obtain, evaluate, and communicate information to analyze human impact on natural resources.</p> <p>a. Construct and revise a claim based on evidence on the effects of human activities on natural resources. Human Activities: Agriculture, Forestry, Ranching, Mining, Urbanization, Fishing, Water Use, Pollution, Desalination, Wastewater Treatment. Natural Resources : Land, Water, Air, Organisms</p> <p>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.</p> <p>SEV2. Obtain, evaluate, and communicate information to construct explanations of stability and change in Earth's ecosystems.</p> <p>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.)</p> <p>b. Analyze and interpret data to determine how changes in atmospheric chemistry (carbon dioxide and methane) impact the greenhouse effect.</p>	<p>LT1AW- I can describe the structure and composition of the atmosphere and explain how weather and climate in the troposphere are affected by atmospheric circulation.</p> <p>LT2GC- I can describe how geographic factors affect weather, climate, and watersheds.</p> <p>LT3S- I can explain the phenomenon of seasons in terms of Earth's rotation around the sun.</p> <p>LT4EL- I can compare and contrast El Nino and La Nina and evaluate their effects on different regions of the world.</p> <p>LT5AP- I can describe the sources and effects of 6 major air pollutants.</p> <p>LT6PS- I can explain the causes and effects of photochemical smog (including greenhouse gas</p>	<p>7 days</p>

		<p>production), acid rain, and noise pollution and propose potential solutions.</p> <p>LT7IAP- I can correlate indoor air pollutants with their effects and feasible solutions.</p> <p>LT8GE- I can compare and contrast the effects of greenhouse gasses and ozone depleting gasses and propose reduction solutions.</p>	
<p>Unit 8 Energy Sources and Sustainability</p>	<p>SEV3. Obtain, evaluate, and communicate information to evaluate types, availability, allocation, and sustainability of energy resources.</p> <p>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).</p> <p>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.)</p> <p>c. Obtain, evaluate, and communicate data to predict the sustainability potential of renewable and non-renewable energy resources.</p> <p>d. Design and defend a sustainable energy plan based on scientific principles for your location.</p>	<p>LT1 - I can describe factors that limit the ecosystem's capacity to support particular types of human activity, using the concepts of carrying capacity and ecological footprint.</p> <p>LT2 - I can describe and evaluate the connection between unsustainable resource use and each of the following: population growth, overconsumption, poverty, poor environmental accounting and environmental ignorance.</p> <p>LT3 - I can identify and evaluate various renewable and non-renewable resources, and describe ways in which natural resources can become degraded, depleted or economically depleted.</p>	12 day
REVIEW	All Standards		5 days
FINALS Testing	All Standards		1 day