Environmental Science (Revised August 2011)

Ongoing Student Learning Expectations				
Strand: Nature of Science **Standard 4: Students shall use mathematics, science equipment, and technology as tools to communicate and solve environmental science problems.** **Essential Question: What is the appropriate tool that I need to use to communicate my solution to environmental science problems?**				
Student Learning Expectation	**Task Analysis**	**Vocabulary/ Text Structure**	**Strategies/ Activities/Resources**	**Assessment**
NS.4.ES.1 Collect and analyze scientific data using appropriate mathematical calculations, figures and tables	• Collect data • Analyze data • Determine appropriate mathematical calculation, figures, and table	Analyze Scientific data	Collect student data – carousel	
NS.4.ES.2 Use appropriate equipment and technology as tools for solving problems (e.g., microscopes, centrifuges, flexible arm cameras, computer software and hardware)	• Identify equipment • Identify usage for equipment	Centrifuge		
NS.4.ES.3 Utilize technology to communicate research findings	• Identify available technology • Use technology to communicate research findings			

Strand: Nature of Science
Standard 5: Students shall describe the connections between pure and applied science.
Essential Question: How does my perspective about science change when I take a pure science view as opposed to an applied science view?

Student Learning Expectation	Task Analysis	Vocabulary/ Text Structure	Strategies/ Activities/Resources	Assessment
NS.5.ES.1 Compare and contrast environmental concepts in pure science and applied science	• Identify the concepts in pure science • Identify the concepts in applied science • Identify the similarities and differences between pure and applied science	Pure science Applied science	Venn diagram	
NS.5.ES.2 Explain why scientists should work within ethical parameters	• Define the term ethical parameter • Identify why scientists should work within ethical parameters	Ethical parameter	Class discussion	
NS.5.ES.3 Evaluate long-range plans concerning resource use and by-product disposal for environmental, economical and political impact		Long-range plan By-product		
NS.5.ES.4 Explain how the cyclical relationship between science and technology results in reciprocal advancements in science and technology		Cyclical relationship Reciprocal		

Strand: Nature of Science **Standard 6: Students shall describe various environmental science careers and the training required for the selected career.** **Essential Question: What would be my career path if I chose an environmental science career?**				
Student Learning Expectation	**Task Analysis**	**Vocabulary/ Text Structure**	**Strategies/ Activities/Resources**	**Assessment**
NS.6.ES.1 Research and evaluate science careers using the following criteria ▪ educational requirements ▪ salary ▪ availability of jobs ▪ working conditions	• identify science careers • apply the given criteria to the selected careers		Research activity	

Quarter 1

Strand: Physical Dynamics
Standard 1: Students shall understand the physical dynamics of Earth
Essential Question: How will my understanding of the Earth's physical dynamics increase my awareness of environmental science issues?

Student Learning Expectation	Task Analysis	Vocabulary/ Text Structure	Strategies/ Activities/Resources	Assessment
PD.1.ES.1 Describe the structure, origin, and evolution of the Earth's components: • atmosphere • biosphere • hydrosphere • lithosphere	•	Atmosphere Biosphere Hydrosphere Lithosphere	Semantic feature analysis	GIST
PD.1.ES.2 Relate eras, epochs, and periods of Earth's history to geological development	•	Era Epoch Period	Timeline	
PD.1.ES.3 Determine the relative and absolute ages of rock layers	• Identify relative age of rock layers • Identify absolute age of rock layers	Relative age Absolute age		
PD.1.ES.4 Categorize the type and composition of various minerals	• Identify category types • Categorize minerals according to type/ composition	Mineral		
PD.1.ES.5 Explain the processes of the rock cycle	• Identify stages in the rock cycle • Explain the processes for each stage	Rock cycle	Create model	
PD.1.ES.6 Describe the processes of degradation by weathering and erosion	• Describe the weathering process • Describe the erosion process	Degradation Weathering Erosion		

Student Learning Expectation	Task Analysis	Vocabulary/ Text Structure	Strategies/ Activities/Resources	Assessment
PD.1.ES.7 Describe tectonic forces relating to internal energy production and convection currents	• Identify tectonic forces • Describe how the tectonic forces relate to internal energy production and convection currents	Tectonic force Convection current		
PD.1.ES.8 Describe the relationships of degradation (a general lowering of the earth's surface by erosion or weathering) and tectonic forces: • volcanoes • earthquakes	•	Degradation		
PD.1.ES.9 Construct and interpret information on topographic maps	• Construct topographic maps • Interpret information on topographic maps	Topographic map	Construct topographic map	

Student Learning Expectation	Task Analysis	Vocabulary/ Text Structure	Strategies/ Activities/Resources	Assessment
PD.1.ES.10 Describe the characteristics of each of the natural divisions of Arkansas: • Ozark Plateau • Arkansas River Valley • Ouachita Mountains • Coastal Plain • Mississippi Alluvial Plain (Delta) • Crowley's Ridge	• Identify the natural divisions of Arkansas • Describe the characteristics of each natural division		Semantic feature analysis	
PD.1.ES.16 Explain heat transfer in the atmosphere and its relationship to meteorological processes: • pressure • winds • evaporation • precipitation	• explain heat transfer • relate heat transfer to meteorological processes	Heat transfer Pressure Evaporation Precipitation		
Strand: Biological Dynamics **Standard 2: Students shall understand the biological dynamics of Earth.** **Essential Question:**				
BD.2.ES.1 Compare and contrast biomes	• define biome • identify different biomes • identify the similarities and differences in biomes	Biome	Venn diagram Semantic feature analysis	

Quarter 2				
Strand: Physical Dynamics **Standard 1: Students shall understand the physical dynamics of Earth.** **Essential Question: How will my understanding of the Earth's physical dynamics increase my awareness of environmental science issues?**				
Student Learning Expectation	**Task Analysis**	**Vocabulary/ Text Structure**	**Strategies/ Activities/Resources**	**Assessment**
PD.1.ES.17 Compare and contrast meteorological processes related to air masses, weather systems, and forecasting	• identify the characteristics of air masses • identify the characteristics of weather systems • identify the characteristics of forecasting • identify the similarities and differences of meteorological processes related to air masses, weather systems, and forecasting	Air mass Weather system Forecasting	Venn diagram	
PD.1.ES.18 Construct and interpret weather maps	• identify the elements found on a weather map • construct a weather map • interpret a weather map	Weather map	Construct weather map	
PD.1.ES.19 Describe the cycling of materials and energy: • nitrogen • oxygen • carbon • phosphorous • hydrological • sulfur	•		Written descriptions of cycles w/ illustrations	

Strand: Biological Dynamics **Standard 2: Students shall understand the biological dynamics of Earth.** **Essential Question: How do the biological dynamics of Earth impact the world we know today?**				
Student Learning Expectation	**Task Analysis**	**Vocabulary/ Text Structure**	**Strategies/ Activities/Resources**	**Assessment**
BD.2.ES.1 Compare and contrast biomes	• define biome • identify different biomes • identify the similarities and differences in biomes	Biome	Venn diagram Semantic feature analysis	
BD.2.ES.9 Explain how limiting factors affect populations and ecosystems	• identify limiting factors • explain how limiting factors affect populations and ecosystems	Limiting factors		
BD.2.ES.10 Describe the natural selection process in populations	• define natural selection • describe the natural selection process in populations	Natural selection		

Quarter 3				
Strand: Biological Dynamics **Standard 2: Students shall understand the biological dynamics of Earth** **Essential Question: How do the biological dynamics of Earth impact the world we know today?**				
Student Learning Expectation	**Task Analysis**	**Vocabulary/ Text Structure**	**Strategies/ Activities/Resources**	**Assessment**
BD.2.ES.2 Describe relationships within a community: • predation • competition • parasitism • mutualism • commensalism	• define terms • identify relationships	Predation Competition Parasitism Mutualism Commensalism	Semantic feature analysis	
BD.2.ES.3 Differentiate between primary and secondary succession	• define primary succession • define secondary succession • identify the differences between primary and secondary succession	Primary succession Secondary succession		
BD.2.ES.4 Construct a trophic-level pyramid (energy level)	• identify the levels for a trophic-level pyramid • construct a trophic-level pyramid	Trophic-level pyramid	Construct pyramid	Trophic-level pyramid
BD.2.ES.5 Construct a food chain	• identify the elements in a food chain • construct a food chain	Food chain	Construct food chain	Food chain

Student Learning Expectation	Task Analysis	Vocabulary/ Text Structure	Strategies/ Activities/Resources	Assessment
BD.2.ES.6 Diagram a food web	• identify elements in a food web • diagram a food web	Food web	Diagram food web	Food web
BD.2.ES.7 Compare and contrast food webs and food chains	• identify the similarities and differences between food webs and food chains	Food web Food chain	Venn diagram	
BD.2.ES.8 Describe biodiversity	• define biodiversity • describe biodiversity	Biodiversity	Frayer model	

Strand: Social Perspectives **Standard 3: Students shall understand the impact of human activities on the environment.** **Essential Question: How do my actions impact the environment?**				
Student Learning Expectation	**Task Analysis**	**Vocabulary/ Text Structure**	**Strategies/ Activities/Resources**	**Assessment**
SP.3.ES.2 Investigate the relationships between human consumption of natural resources and the stewardship responsibility for reclamations including disposal of hazardous and non-hazardous waste	• discuss human consumption of natural resources • discuss stewardship	Human consumption Stewardship Reclamation Hazardous waste Non-hazardous waste	Class discussion	
SP.3.ES.3 Explain common problems related to water quality: • conservation • usage • supply • treatment • pollutants (point and non-point sources)	• identify common problems to water quality • explain why those are problems	Water quality		
SP.3.ES.4 Explain problems related to air quality: • automobiles • industry • natural emissions	• identify common problems to air quality • explain why those are problems	Air quality		
SP.3.ES.9 Evaluate personal and societal benefits when examining health, population, resource, and environmental issues		Personal benefit Societal benefit		

Student Learning Expectation	Task Analysis	Vocabulary/ Text Structure	Strategies/ Activities/Resources	Assessment
SP.3.ES.10 Predict the long-term societal impact of specific health, population, resource, and environmental issues				
SP.3.ES.11 Investigate the effect of public policy decisions on health, population, resource, and environmental issues		Public policy		
SP.3.ES.12 Explain the impact of factors such as birth rate, death rate, and migration rate on population changes	• identify/explain how birth rate impacts population changes • identify/explain how death rate impacts population changes • identify/explain how migration rate impacts population changes	Birth rate Death rate Migration rate		
SP.3.ES.13 Distinguish between developed and developing countries	• identify characteristics of a developed country • identify characteristics of a developing country • identify the differences between developed and developing countries	Developed country Developing country	Venn diagram	

Quarter 4				
Strand: Physical Dynamics **Standard 1: Students shall understand the physical dynamics of Earth.** **Essential Question: How will my understanding of the Earth's physical dynamics increase my awareness of environmental science issues?**				
Student Learning Expectation	**Task Analysis**	**Vocabulary/ Text Structure**	**Strategies/ Activities/Resources**	**Assessment**
PD.1.ES.11 Describe the physical and chemical properties of water	• identify the physical properties of water • identify the chemical properties of water • describe the physical and chemical properties of water	Physical property Chemical property	Science notebook	
PD.1.ES.12 Compare and contrast characteristics of the oceans: • composition • physical features of the ocean floor • life within the ocean • lateral and vertical motion	• identify the characteristics of oceans • identify the similarities and differences of the oceans	Composition Ocean floor Lateral motion Vertical motion	Venn diagram Semantic feature analysis	
PD.1.ES.13 Investigate the evolution of the ocean floor		Evolution Ocean floor	timeline	

Student Learning Expectation	Task Analysis	Vocabulary/ Text Structure	Strategies/ Activities/Resources	Assessment
PD.1.ES.14 Investigate the stratification of the ocean: • *colligative* properties (depends on the ratio of the number of particles of solute and solvent in the solution, not the identity of the solute) • biological zonation (distribution of organisms in biogeographic zones)	•	Stratification Colligative properties Biological zonation		
PD.1.ES.15 Predict the effects of ocean currents on climate		current	Prediction based on evidence	

Strand: Social Perspectives
Standard 3: Students shall understand the impact of human activities on the environment.
Essential Question: How do my actions impact the environment?

Student Learning Expectation	Task Analysis	Vocabulary/ Text Structure	Strategies/ Activities/Resources	Assessment
SP.3.ES.1 Explain the reciprocal relationships between Earth's processes (natural disasters) and human activities		Reciprocal relationship		
SP.3.ES.5 Evaluate the impact of different points of view on health, population, resource, and environmental issues: • governmental • economic • societal				
SP.3.ES.6 Research how political systems influence environmental decisions				Research project
SP.3.ES.7 Investigate which federal and state agencies have responsibility for environmental monitoring and action		Environmental monitoring		
SP.3.ES.8 Compare and contrast man-made environments and natural environments	• identify man-made environments • identify natural environments • identify the similarities and differences between man-made and natural environments	Man-made environment Natural environment	Venn diagram	