

1/20/14

EASTERN LEBANON COUNTY SCHOOL DISTRICT  
STUDENT LEARNING MAP

**Key Learning**

Ecology is a science that attempts to quantify the relationships between organisms and between organisms and their environment.

**Unit Essential Question**

Why is Ecology regarded as a Science?

<b>Concept</b> Biomes, Habitats, Organismal Behaviors	<b>Concept</b> Ecological Relationships/Adaptations	<b>Concept</b> Energy Flow
<b>Standards:</b> S11.B.3.1.2 S11.B.3.1.4 S11.B.3.1.2 S11.B.3.1.5	<b>Standards:</b> S11.B.3.1.1 S11.B.3.1.3 S11.B.3.2.1	<b>Standards:</b> S4.1.10.C
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<b>Lesson Essential Question</b> How do the physical components of the ecosystem affect the way that organisms look and behave?	<b>Lesson Essential Question</b> Describe and evaluate the interdependence of organisms within a food web to each other and their ecosystem.	<b>Lesson Essential Question</b> How is the flow of energy related to the populations of organisms.
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<b>Vocabulary</b> Biosphere, biomes, ecology, climate, weather, adaptations, sexual dimorphism, home ranges, survival and reproduction, fitness, permafrost, natural selection, sociobiology, bioethics, limiting factors, carrying capacity, biotic, abiotic	<b>Vocabulary</b> Food chain, food web, autotrophs, heterotrophs, detritivores, omnivores, carnivores, herbivores, predator, prey, migration, decomposers, biodiversity	<b>Vocabulary</b> r/K strategists, trophic levels, pyramids of numbers, energy, biomass, 10% rule, populations, communities, ecosystems

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<b><u>Concept</u></b>	<b><u>Concept</u></b>	<b><u>Concept</u></b>
<b><u>Standards:</u></b>	<b><u>Standards:</u></b>	<b><u>Standards:</u></b>
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<b><u>Lesson Essential Question</u></b>	<b><u>Lesson Essential Question</u></b>	<b><u>Lesson Essential Question</u></b>
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<b><u>Vocabulary</u></b>	<b><u>Vocabulary</u></b>	<b><u>Vocabulary</u></b>

<b><u>Additional Information/Resources:</u></b>
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**Key Learning**

Cycling of Matter and Succession



**Unit Essential Question**

How do biogeochemical cycles relate to the succession of ecosystems?

<b>Concept</b> Biogeochemical Cycles	<b>Concept</b> Succession	<b>Concept</b> Lakes and Bogs
<b>Standards:</b> <b>S11.B.3.1.2</b> <b>S11.B.3.1.4</b> <b>S11.B.3.1.2</b> <b>S11.B.3.1.5</b> <b>S4.1.10.B</b> <b>S11.B.3.3.1</b>	<b>Standards:</b> <b>S11.B.3.1.1</b> <b>S11.B.3.1.3</b> <b>S11.B.3.2.1</b> <b>S11.B.3.1.2:</b>	<b>Standards:</b> <b>S11.B.3.2.3</b> <b>S11.B.3.2.1</b>
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<b>Lesson Essential Question</b> How do the biogeochemical cycles affect ecosystems directly and indirectly, with respect to the flow of matter and energy?	<b>Lesson Essential Question</b> Describe the process of succession as it applies to particular climatic and geographic conditions.	<b>Lesson Essential Question</b> How have climatic events of the past influenced the formation and destruction of geologic structures and ecosystems?
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<b>Vocabulary</b> Biogeochemical cycles, combustion, condensation, erosion, evaporation, fossil fuels, ground water, leaching, nitrogen fixation, denitrification, precipitation, respiration, photosynthesis, weathering transpiration, legumes, nodules	<b>Vocabulary</b> Succession, humus, pioneer stage, Submerged plant stage, emerging plant stage, marsh, swamp, forest, prairie, climax community	<b>Vocabulary</b> Bog, boreal, eye of the bog, glaciers, kettle lakes, lactic acid, tannic acid, carbonic acid, peat, watershed, sphagnum moss, hardwoods, softwoods, carnivorous plants

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<b><u>Concept</u></b>	<b><u>Concept</u></b>	<b><u>Concept</u></b>
<b><u>Standards:</u></b>	<b><u>Standards:</u></b>	<b><u>Standards:</u></b>
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<b><u>Lesson Essential Question</u></b>	<b><u>Lesson Essential Question</u></b>	<b><u>Lesson Essential Question</u></b>
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<b><u>Vocabulary</u></b>	<b><u>Vocabulary</u></b>	<b><u>Vocabulary</u></b>

<b><u>Additional Information/Resources:</u></b>
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**Key Learning**

Understanding the importance of the forest ecosystem, its' value as a natural resource, the diversity of life within it and how it is being threatened.

**Unit Essential Question**

How is the forest ecosystem vital to species diversity and valued as a natural resource?

<b>Concept</b> Forestry	<b>Concept</b> Invasive/Endangered Species	<b>Concept</b> Environmental Philosophies
<b>Standards:</b> S11.B.3.1.2 S11.B.3.1.4 S11.B.3.1.2 S11.B.3.1.5 S4.1.10.B S11.B.3.3.1 S.4.1.10.D S4.1.10.E	<b>Standards:</b> S11.B.3.1.1 S11.B.3.1.3 S11.B.3.2.1 S11.B.3.1.2: S11.B.3.1.5 S11.B.3.2.3	<b>Standards:</b> S11.B.3.2.3 S11.B.3.2.1 S11.A.1.2.1 S11.A.1.3.4
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<b>Lesson Essential Question</b> How is the forest ecosystem vital to all organisms?	<b>Lesson Essential Question</b> How do invasive species affect ecosystem stability?  What roles do endangered species have in ecosystems and how can we save them?	<b>Lesson Essential Question</b> How do personal philosophies and ideologies affect environmental policy?
↓	↓	↓
<b>Vocabulary</b> Canopy, understory, clear-cutting, selective cutting, shelterwood cutting, seed-tree logging, intensive management, mast, duff	<b>Vocabulary</b> Indicator species, indigenous, threatened, endangered, extinct, biodiversity, recovery plan, Game species, wildlife management	<b>Vocabulary</b> Stewardship, Traditional Conservationism, Preservationism, Exploitationism, Multiple use, sustainability

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<u>Concept</u>	<u>Concept</u>	<u>Concept</u>
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<u>Lesson Essential Question</u>	<u>Lesson Essential Question</u>	<u>Lesson Essential Question</u>
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<u>Vocabulary</u>	<u>Vocabulary</u>	<u>Vocabulary</u>

<u>Additional Information/Resources:</u>
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**Key Learning**

Soil is a valuable natural resource that affects the world's ability to produce food globally.

**Unit Essential Question**

Why is soil considered a natural resource and how is society and technology contributing to both the destruction and preservation of it?

<b>Concept</b> Formation and properties of soil types	<b>Concept</b> Agriculture and Technology	<b>Concept</b> Erosion
<b>Standards:</b> S11.A.1.3.1 S11.D.1.1.1 S4.4.12.A S4.4.12.B S4.4.12.C S4.4.12.D	<b>Standards:</b> S11.B.3.3 S11.D.1.2.1 S4.3.10.B S4.3.12.A S4.3.12B S11.D.1.2.2	<b>Standards:</b> S11.B.3.3 S11.B.3.2.3 S4.1.10.E
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<b>Lesson Essential Question</b> Describe the process of soil formation and the unique properties that differentiate soil types from each other.	<b>Lesson Essential Question</b> How has technology and agricultural practices affected the soil quality and preservation efforts?	<b>Lesson Essential Question</b> How can erosion be controlled to preserve the integrity of ecosystem stability, ecologically and agriculturally?
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<b>Vocabulary</b> Aeration, bedrock, crumb, granular, humus, hydroponics, infiltration, leaching, loam, mineral, muck soil, parent material percolation, platy, soil, stalactites, stalagmites, structure, subsoil, texture, topsoil, weathering, water	<b>Vocabulary</b> Leaching, agriculture, technology, parching, winnowing, plow, radiocarbon dating, half-life, hunters, gatherers, archaeologist, crop rotation, contour planting, methane digestion, no-till planting, wind breaks	<b>Vocabulary</b> Black blizzards, cover crops, wind breaks, drought-resistant, Dust Bowl, gully erosion, legumes, mass erosion, monoculture, productivity, rill erosion, sheet erosion, slumping, Soil Conservation Service, soil

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<u>Concept</u>	<u>Concept</u>	<u>Concept</u>
<u>Standards:</u>	<u>Standards:</u>	<u>Standards:</u>
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<u>Lesson Essential Question</u>	<u>Lesson Essential Question</u>	<u>Lesson Essential Question</u>
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<u>Vocabulary</u>	<u>Vocabulary</u>	<u>Vocabulary</u>

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**Key Learning**

The increasing human population of the world is placing a great strain on natural resources.









**Unit Essential Question**

How can we, as a Global Community, continue to feed the world as the human population continues to grow?

<b>Concept</b> Population growth	<b>Concept</b> Natural Resource Distribution	<b>Concept</b> Case Studies
<b>Standards:</b> S11.B.3.2.1 S11.A.1.3.3: S4.1.10.E	<b>Standards:</b> S11.B.3.1.2 S11.B.3.1.5 S11.D.1.2.1	<b>Standards:</b> S11.B.3.3.2 S11.B.3.3.1 S4.3.12B
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<b>Lesson Essential Question</b> What societal factors can influence the growth or decline of populations?	<b>Lesson Essential Question</b> How is the distribution of natural resources related to the societal, economic and population growth of a region?	<b>Lesson Essential Question</b> What policies, technologies or legislation have other nations employed to deal with population growth?
↓	↓	↓
<b>Vocabulary</b> Population growth rate, zero population growth, age structure diagrams, birth control, population growth curve, fertility rate	<b>Vocabulary</b> Topography, geography, famine, political instability, climate, soil types	<b>Vocabulary</b> Recharge rate, development rights, salinization, green revolution, genetic resistance

<b>Concept</b> Fertilizers	<b>Concept</b>	<b>Concept</b>
<b>Standards:</b> S11.B.3.2.3: S11.B.3.3.3: S.4.4.10B	<b>Standards:</b>	<b>Standards:</b>

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<b><u>Lesson Essential Question</u></b> How does the use of fertilizers impact ecosystems and society?	<b><u>Lesson Essential Question</u></b>	<b><u>Lesson Essential Question</u></b>
		
<b><u>Vocabulary</u></b> Compost, fertilizer, manure, micronutrients, primary nutrients, organic fertilizers, synthetic fertilizers, pH, urea, superphosphate, humus	<b><u>Vocabulary</u></b>	<b><u>Vocabulary</u></b>

**Additional Information/Resources:**

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**Key Learning**

Pesticide use can be an effective method of pest control if responsibly used in coordination with other methods.



**Unit Essential Question**

What are some potential environmental consequences associated with pesticide use?

<b>Concept</b> Types of Pesticides	<b>Concept</b> Advantages/Disadvantages of Pesticide Use	<b>Concept</b> Risk Analysis
<b>Standards:</b> S11.A.1.2.2 S4.1.12.B	<b>Standards:</b> S11.B.3.2 S11.B.3.2.3 S4.4.12.C	<b>Standards:</b> S11.B.3.3.2
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<b>Lesson Essential Question</b> Describe the types of pesticides that have been used in the world.	<b>Lesson Essential Question</b> Why are pesticides useful/harmful to humans?	<b>Lesson Essential Question</b> What factors are considered when determining the risk/reward of pesticide use?
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<b>Vocabulary</b> Avicide, broad spectrum pesticide, carbamate, chlorinated hydrocarbon, DDT, fungicide, herbicide, insecticide, nicotine sulfate, organophosphate, organic pesticide, pest, pyrethrum, selective pesticide	<b>Vocabulary</b> Monoculture, bioaccumulation, biomagnification, resistant, agriculture,	<b>Vocabulary</b> Biodegradeable, tolerance level, risk management

<b>Concept</b> Integrated Pest Management (IPM)	<b>Concept</b>	<b>Concept</b>
<b>Standards:</b>	<b>Standards:</b>	<b>Standards:</b>

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<b>S11.B.3.3.3</b> <b>S4.5.10.B</b>		
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<b><u>Lesson Essential Question</u></b> Why is an IPM a more ecologically sound method of pest control?	<b><u>Lesson Essential Question</u></b>	<b><u>Lesson Essential Question</u></b>
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<b><u>Vocabulary</u></b> IPM, sex attractants, pheromones, resistant varieties, genetic engineering	<b><u>Vocabulary</u></b>	<b><u>Vocabulary</u></b>

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**Key Learning**

Water is essential to all life, yet it is a resource that requires a management protocol. This includes the hydrologic cycle, preservation and monitoring of our waterways and pollution management.









**Unit Essential Question**

How is the precious natural resource, water managed and recycled?

<b>Concept</b> Aquatic Environments	<b>Concept</b> Water Quality	<b>Concept</b> Water Flow/Pollution
<b>Standards:</b> S4.2.10.B S11.D.1.3.2 S11.D.1.3.1	<b>Standards:</b> S11.D.1.3.3 S.4.2.10.C S11.B.3.1.2 S4.2.12.A S4.2.12.B S4.2.12.C	<b>Standards:</b> S11.D.1.2.2 S.4.5.10.C S.4.5.10.D S.4.5.10.E S11.D.1.3
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<b>Lesson Essential Question</b> Describe the differences between the varieties of aquatic environments.	<b>Lesson Essential Question</b> How does the quality of water affect the aquatic ecosystem as well as surrounding ecosystems?	<b>Lesson Essential Question</b> How has society altered the natural flow of waterways and for what reasons?
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<b>Vocabulary</b> Watershed, drainage basin, floodplain, headwaters, lake, mouth, pools, ponds, riparian zone, rivers, tributary, streams	<b>Vocabulary</b> Algal blooms, alkalinity, dissolved oxygen, hardness, nitrates, pH, phosphates, turbidity, solubility,	<b>Vocabulary</b> Channels, dams, fish ladders, wetlands, point, nonpoint source, estuary, U.S. Army COE, flash flood, topography, effluent, septic tank, sludge, N-P-K,

<b>Concept</b>	<b>Concept</b>	<b>Concept</b>
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<u>Lesson Essential Question</u>			<u>Lesson Essential Question</u>			<u>Lesson Essential Question</u>		
								
<u>Vocabulary</u>			<u>Vocabulary</u>			<u>Vocabulary</u>		

Additional Information/Resources: