Next Generation Science Standards Addressed by Vermont Envirothon		
HS. Structure and Function		
HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	Emphasis is on functions at the organism system level such as nutrient uptake, water delilvery, and organism movement in response to neural stimuli.	**Aquatics** - excessive nutrient uptake by aquatic plants in freshwater ecosystems leading to algae blooms, other effects of eutrophication. **Soils** - soil structure affecting movement of soil water and uptake of water via roots. **Forestry** - nutrient and water uptake in forest systems. **Wildlife** - hibernation and other winter survival adaptations.
HS. Matter and Energy in Organisms and Ecosystems		
HS-LS2-3. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.	Emphasis is on conceptual understanding of the role of aerobic and anaerobic respiration in different environments.	**Aquatics** - decomposition of aquatic plants, decomposer's oxygen consumption leading to anoxic water quality conditions. **Soils** - identification and understanding of reduced or oxidized iron in soil profiles.
HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	Emphasis is on using a mathematical model of stored energy in biomass to describe the transfer of energy from one trophic level to another and that matter and energy are conserved as matter cycles and energy flows through ecosystems. Emphasis is on atoms and molecules such as carbon, oxygen, hydrogen and nitrogen being conserved as they move through an ecosystem.	**Aquatics** - determination of trophic conditions in lakes and associated level of productivity. **Forestry** - plants are at base of trophic pyramid, competition for resources within forest systems, carbon cycle in forest systems. **Wildlife** - students complete trophic pyramid, also address quantitative wildlife management model, carbon cycle.
HS. Interdependent Relationships in Ecosystems		
HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.	Emphasis on quantitative analysis and comparison of the relationships among interdependent factors including boundaries, resources, climate and competition.	**Aquatics** - impacts of invasive species on biodiversity in aquatic systems; impacts of water quality parameters on habitat conditions and species diversity. **Forestry** - impacts of invasive species on biodiversity in forest systems. **Wildlife** - graph representation of carrying capacity and population dynamics of white tailed deer and other species.
HS-LS2-6. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.	Examples of changes in ecosystem conditions could include modest biological or physical changes, such as moderate hunting or a seasonal flood, and extreme changes, such as volcanic eruption or sea level rise.	**Aquatics** - importance of habitat connectivity to maintain integrity of ecosystem; analysis of benthic community to changes in water quality conditions. **Soils** - soil management affects biodiversity of soil microorganisms. **Forestry** - active forest managment affects biodiversity in an ecosystem. **Wildlife** - examination of strategic conservation of habitat to address changing climate, effects of hunting, direct management practices to maintain or manipulate ecosystems such as deer yards, selective cutting or burns.

HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activites on the environment and biodiversity.	Examples of human activities can include urbanization, building dams, and dissemination of invasive species.	**Aquatics** - analyze current impacted environmental conditons and propose implemetation practices to mitigate impacts. **Current Issue** - students are asked to propose solutions to mitigate the impacts of human activities on natural resources including wildlife, soils and water quality.
HS-LS2-8. Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.	Emphasis is on : (1) distinguishing between group and individual behavior, (2) identifying evidence supporting the outcomes of group behavior, and (3) developing logical and reasonable arguments based on evidence. Examples of group behaviors could include flocking, schooling herding, and cooperative behaviors such as hunting, migrating, and swarming.	**Wildlife** - addresses migration and consumptive outdoor recreation activities.
HS. Natural Selection and Evolution		
HS-LS4-5. Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.	Emphasis is on determining cause and effect relationships for how changes to the environment such as deforestation, fishing, application of fertilizer, drought, flood, and the rate of change of the environment affect distribution or disappearance of traits in species.	**Aquatics** -analysis of changes in community structure due to pollutant load. **Forestry** - effects of deforestation and forest management on habitats. **Wildlife** - effects of habitat changes and hunting/fishing on species. **Soils** - impact of soil management on biodiversity of soil organisms.
HS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.	Emphasis is on designing solutions for a proposed problem related to threatened or endangered species, or to genetic variation of organisms for multiple species.	**Aquatics** - determine best practices to addess altered habitat conditions that are adversely impacting aquatic species. **Current Issue** - students are asked to propose solutions to mitigate the impacts of human activities on wildlife habitats.