

Science on the Slopes

Environmental Education & Wellness Program



Life Science

Life Science

Molecules to Organisms: Structures and Processes

8LS1-5 Gather evidence of how environmental factors (& genes) influence the growth of organisms.

Examples at Wachusett: different varieties of same plant species growing at different rates in different conditions (elevation, east vs west side of mountain, etc.)

Ecosystems Interactions: Energy and Dynamics

5LS2-1 Identify a model of matter moving throughout an ecosystem in the form of producer, consumer and decomposer.

Examples at Wachusett: identify a simple habitat with rotting fallen logs, mushrooms, shelf fungi, etc. Make note of environmental conditions..shade, elevation, moisture?

5LS2-2 Although composter designs are mentioned here, students could look at nature's way of composting (rotting logs) and identify successful components to help with design back in school.

7.MS-LS2-1. Analyze and interpret data to provide evidence for the effects of periods of abundant and scarce resources on the growth of organisms and the size of populations in an ecosystem.

Examples at Wachusett: Tree ring data shows years of good growing conditions and unfavorable years. Acorn abundance as a food source

7LS2-2 Describe relationships that are competitive, predatory, parasitic and mutually beneficial and show they occur in multiple ecosystems.

Examples at Wachusett: *Raccoons, skunks, foxes, snakes, heron- eat turtle eggs; turtles eat worms; Hawks eat snakes and frogs then some migrate when season changes to winter.*

Mutualism- lichen (algae and fungi); bees and flowers; mycorrhizae with trees and plants (root fungus helps transport nutrients (P and N) from soil to plant. Root fungus uses sugar made by the plant for its energy.



7LS2-5 Evaluate competing design solutions for protecting an ecosystem.

The ability of an ecosystem to both resist and recover from change is a measure of its overall health.

Examples at Wachusett:

- ski area installed water bars diverting melting snow and rain vs allowing it to run down the ski slope
- holding ponds along the way down the mountain vs just having a pond at the bottom;
- Fencing off - DCR just installed a type of new barrier at the summit for unique grass species vs. putting up signs to stay off trails or an area
- ? waste management more to come

High School

HS-LS2-1. Analyze data sets to support explanations that biotic and abiotic factors affect ecosystem carrying capacity. (consider using [My Tree data](#))

- Examples of biotic factors could include relationships among individuals (e.g., feeding relationships, symbioses, competition) and disease.
- Examples of abiotic factors could include climate and weather conditions, natural disasters, and availability of resources. (hurricane, fire & ice storm data available at Wachusett mountain)
- Example data sets can be derived from simulations or historical data. (use [My Tree data](#))

HS-LS2-5. Use a model that illustrates the roles of photosynthesis, cellular respiration, decomposition, and combustion to explain the cycling of carbon in its various forms among the biosphere, atmosphere, hydrosphere, and geosphere.

- The primary forms of carbon include carbon dioxide, hydrocarbons, waste (dead organic matter), and biomass (organic materials of living organisms).
- Examples of models could include simulations and mathematical models.

Examples at Wachusett: (take a photo to sketch back at school or make a sketch on site Biosphere, atmosphere, hydrosphere and geosphere) maybe near Bolton Pond or the forest floor. Choose a tree on site (use [My Tree data](#))

HS-LS2-6. Analyze data to show ecosystems tend to maintain relatively consistent numbers and types of organisms even when small changes in conditions occur but that extreme fluctuations in conditions may result in a new ecosystem. Construct an argument supported by evidence that ecosystems with greater biodiversity tend to have greater resistance to change and resilience.

See [The Lost Forests of New England](#)



- 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, fires, the decline or loss of a keystone species, climate changes, ocean acidification, or sea level rise.

Biological Evolution: Unity and Diversity

3LS4-3 Look for evidence that in a given environment some species survive better than others

3LS4-4 Use **simple data** to show how changes in a habitat (could be seasonal, rainfall) affects the ability of organisms to survive and reproduce.

Examples at Wachusett: seasonal changes on the mountain allow meadows to grow on the ski trails allowing pollinators, birds and small predators to thrive. Hawks migrate in the fall.

Herbivores (mice and voles) are preyed on by birds of prey and foxes.

Sample Field Trip Question Could Be: What organisms on the mountain do you think could have been impacted by a recent weather event, or trend over the past few months, such as drought, excessive wind, rain or frost?

[MA Climate Clearinghouse interactive map](#) Good resource for analyzing local, historical data on precipitation, temperature, etc.