Integrating Science Standards into EHOS Classes

A major focus in the Next Generation Science Standards (NGSS) is "phenomenon-based" learning. This means that a teacher would introduce a natural/scientific occurrence and then students would learn to ask questions about why this phenomenon is happening. The standards are then taught to answer the questions about the phenomenon.

Echo Hill Teachers focus on all of the natural phenomenon or "teachable moments" that occur here all the time. It is often difficult for a classroom teacher to plan or find a phenomenon that they will focus on because of the indoor classroom setting. If a standard focused on decomposition, for example, it would be really hard for a teacher to find a natural example of this in a well-manicured schoolyard. While at Echo Hill, all one needs to do is turn over a log and there is the phenomenon of decomposition! Echo Hill teachers take the time on class to get students to recognize these phenomenon and ask and answer questions about them.

General Notes Relative to the EHOS Experience

Elementary

- Evaluate solutions to environmental problems.
- Vocabulary Use: Atmosphere (air), Hydrosphere (water and water cycle), Biosphere (living things), Geosphere (Earth, rocks, land).
- The "sphere" vocabulary is introduced in 5th grade, but after discussion, use of the sphere language may be possible with younger students as well.
- Focus is on how organisms and their habitat make up a system in which all parts depend on each other to function. This is the definition of an ecosystem. Use of that term may begin with 3rd grade and above, but students may not be secure in the definition until Middle School.
- Focus is on how matter moves through ecosystems (habitats in younger grades) and that plants convert that matter into food. Special emphasis is on the fact that nearly every animals' food can be traced back to a plant.
- Focus is on how animals' and plants' body structures help them survive in their habitat. Adaptation is a term that may be used with 3rd grade and above-- though students may not be secure with that vocabulary until Middle School.
- Emphasize is on cause and effect relationships when showing students specific traits of animals or plants. Example: a bush with larger than normal

thorns is less likely to be eaten and will survive better than those with smaller thorns of the same species.
- Focus is on how life cycles of plants and animals of different species are similar to each other.
- "Sightings Lists" may be arranged by ecosystem rather than just a general list of all animals and plants.
- For very young students (K - 2nd grade): As opportunity presents itself, discussion revolves around how animal parents respond to their babies' needs to help them survive.

Middle

- One of the main themes for middle school is the cycling of matter and flow of energy. This focus should be on the formula for photosynthesis and cellular respiration and how they work together as a cycle and the impact this has on various ecosystems.
- Another main focus for middle school is how humans are impacting biodiversity. Using Echo Hill as an example of where there are many habitats with variation helps the students compare to other ecosystems where there may be more limitations.
- Students are beginning to create claims and support with evidence. There are many opportunities to have these types of discussions during the Echo Hill experience.

High

- Students at this level are challenged to draw connections between multiple concepts learned in lower grade levels.
- One of the main differences between high school and the younger grade levels is the idea of using mathematical and computational representations to support scientific ideas and findings. Any data that can be presented to students for analysis (verbally, through models/diagrams, or by student collection) is useful.
- Another big theme for high school is evaluating claims and evidence in science. It is important for students to understand that scientific findings are not set in stone, and are up for interpretation, debate, and advancements.
- Students should gain an understanding of human impact upon various ecosystems, and will strive to formulate their own opinion about the severity of the impact and if/how it should be reduced. Focus should be around environmental, societal, human health, and political impacts and solutions.