

## Living Environment: Grades 5-8

**Standard 4:** Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

**Key Idea 1:** Living things are both similar to and different from each other and from nonliving things.

**Performance Indicator 1.1:** Explain how diversity of populations within ecosystems relates to the stability of ecosystems.

Plants are part of our eco-system. Homegrown Mini-golf is an artful display of plants that are part of our food. Students have the chance to observe all stages on the plant's life, from budding flowers, to ripening fruit, and then to seeds, and the various ways that plants propagate.

Various growing environments are recreated, including water plants.

**Key Idea 2:** Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.

**Performance Indicator 2.1:** Explain how the structure and replication of genetic material result in offspring that resemble their parents.

Most plants replicate by seeds. Some plants are self-pollinating, some rely on outside vectors to transfer pollen (ex: insects, animals, wind), and some plants replicate through their root system. Homegrown Mini-golf the students can see examples of all these types of replication.

**Performance Indicator 2.2:** Explain how the technology of genetic engineering allows humans to alter genetic makeup of organisms

Homegrown Minigolf has multiple varieties of many species, including beans, tomatoes, sunflowers, cucumbers, cabbage, just to name a few. The students can see how they have been bred to ripen at different times, grow in a variety of colors, and display other unique features.

**Key Idea 5:** Organisms maintain a dynamic equilibrium that sustains life.

**Performance Indicator 5.1:** Explain the basic biochemical processes in living organisms and their importance in maintaining dynamic equilibrium.

**Major Understandings 5.1a:** The energy for life comes primarily from the Sun. Photosynthesis provides a vital connection between the Sun and the energy needs of living systems.

Homegrown Minigolf is an excellent place to see photosynthesis at work. Not only are the edible plants throughout the links a lovely display, the 300 acres of fields at Kelder's farm is also a visual display of the many acres it takes to grow the food we need for both ourselves and our livestock.

**Key Ides 6:** Plants and animals depend on each other and their physical environment.

**Performance Indicator 6.1:** Explain factors that limit growth of individuals and populations.

**Major Understanding 6.1a:** Energy flows through ecosystems in one direction, typically from the Sun, through

photosynthetic organisms including green plants and algae, to herbivores to carnivores and decomposers.

Fruits and vegetables are an important part of the human diet, as well as the diet of the animals we raise as livestock. Homegrown Minigolf and Kelders farm are a fun and interactive way for students to experience where our food comes from.

**Major Understanding 6.1e:** In any particular environment, the growth and survival of organisms depend on the physical conditions including light intensity, temperature range, mineral availability, soil/rock type, and relative acidity (pH).

Ulster County has much fertile farmland, and a good growing season. But there are also many fruits and vegetables in our diet that do not grow here, for example oranges, mangos, coffee, cocoa. At Homegrown Minigolf, students can observe the growing environment that exists here. Classroom work could include what conditions are absent that prevent us from growing other plants in our diet.

**Key Idea 7:** Human decisions and activities have had a profound impact on the physical and living environment.

**Performance Indicator 7.1:** Describe the range of interrelationships of humans with the living and nonliving environment.

A planned garden or farm is a perfect example of how plants rely on humans to tend their home, and humans rely on plants for nutrition.

**Performance Indicator 7.2:** Explain the impact of technological development and growth in the human population on the living and nonliving environment.

A visit to Kelder's Farm and Homegrown Minigolf is a perfect example of how humans use machinery to harness the opportunity to till large blocks of land. We drain wetlands to expand the land available for farming, we irrigate fields that are dry. All of this has made it possible for one farmer to grow more food than he needs for himself and his family. Technology makes it possible for us to ship food from rural areas to urban areas, where the density of population makes it impossible for people to grow their own food.

**Performance Indicator 7.3:** Explain how individual choices and societal actions can contribute to improving the environment.

A visit to Kelders Farm and Homegrown Minigolf is also a perfect opportunity to talk about the pros and cons of organic cultivation, and the importance of choosing locally produced foods with respect to global warming.