Introduction

Earthkeepers as a program was developed over many years by Steve Van Matre and the Institute for Earth Education (I.E.E). Its purpose is to offer an alternative to the scare-tactic "environmental education" that is so widely touted by environmentalists. Instead of focusing on issues such as acid rain and the greenhouse effect, Earthkeepers teaches knowledge of systems ecology and natural balance, and fosters an affection for the outdoor world in its young participants. Students learn to understand connections and see that their own actions have consequences; they leave the program feeling that they can make a difference rather than simply learning that there are environmental problems in the world which are largely out of their control. Earthkeepers programs are presently being taught in Australia, Canada, Finland, Germany, Italy, Japan, The Netherlands, the United Kingdom and the United States.

The Byron Forest Preserve District feels that this is a program that should be available to as many participants as possible. To that end, the District has made Earthkeepers a very affordable field trip for schools whose budgets are already strained, and whose cuts might likely include both environmental and outdoor education. Classes are able to enjoy this three-day field trip at a cost that covers the purchase of items from the I.E.E. for the program; our own budget supplies the paper for the booklets, copying costs, staff wages, and other necessary expenses. Over 400 students visit each year to take part in the Earthkeepers program.

Materials and Methods

During the three days in which the fourth-grade students participate in the Earthkeepers program, activities are focused on earning two keys: Knowledge and Experience. Upon return to school, students are encouraged to earn another two keys: Yourself and Sharing. These are real, working brass keys that the students take home with them. Each is embossed with its own letter that represents what they've done to earn it, and at the end the students possess a key ring with four keys: K, E, Y, S. With each key the student also earns a memento– a key ring, an Apprentice Earthkeepers card, a button, and a yellow bead to hang from the key ring. Upon completion of the program, a student receives a certificate from the I.E.E.

In addition, students receive a Training Manual and a Diary for use in the program, also theirs to keep. The Training Manual is about 30 pages, the Diary about 20. Both are used every day during the field trip.

The first day and a half focuses on Knowledge activities. Each of these lasts about two hours. Students begin by learning about cycling of materials. They are introduced to the concept of "specks," (molecules) and that there are liquid, gas, and solid specks everywhere. Outside students are given laminated books to use during the activity which tell the stories of each of these kinds of specks. They follow individual soil, water, and air molecules through plants, animals, rivers, humans, and more. At each point along the trail (which matches the pages in the books), they are encouraged to find evidence of the specks' travels: a feather from a hawk, a chewed leaf, a rock, animal waste, and other things. Students may have learned about the water cycle, but it is rare that they ever connected themselves to the new big words that they learn. Part

of this activity is to emphasize that the water that comes from their sinks is the same water that has been in glaciers, clouds, oceans, dinosaurs, plants, and other people. They are personally connected to the lesson, given a larger understanding.

The afternoon activity follows the flow of energy through a "munch line" (food chain) from the sun to a "sun-muncher," to a "plant-muncher," and on to an "animal-muncher." Students comb the woods for evidence that the flow of energy is going on all around them. They collect leaves, bugs, scat, and other objects and separate them into the different categories of munchers. They also follow the energy flow using a chart to see how much energy it takes to support animals at the top of the food chain, and learn why those animals are limited in number. Part of this exercise firmly places the students in the munch line as well; they are asked to identify the kinds of plants and animals they eat and where they fit in the energy flow.

With this knowledge the students earn their first key and learn the first Earthkeepers passwords: Energy and Materials. They hook the K key onto their bags and are told they will use their knowledge and the keys in the activities that will follow.

The second morning the students are introduced to the Connector Inspector, who shows them how the cycling of materials and flow of energy fit together to form a web of connections. Students play the parts of various plants and animals, donning belts with brightly colored ropes attached to them. The ropes represent their creature's needs: water, soil, air, and energy. Each belt also has a padlock hanging from the metal loop, which opens with the K key they have earned. Outside, the "plant" students connect to posts (using their ropes and padlocks) representing the sun, soil, and water. "Herbivores" connect to the plants and to the water, and "Carnivores" connect to the animals and water. Finally everyone finds a source for Oxygen or Carbon Dioxide in another plant or animal student. Although the connections are a complete tangled mess, students can easily see how many connections there are just with a few plants and animals. The second part of the lessons occurs when one of the water sources becomes polluted. Some plants become contaminated and are removed from the web; the animals that ate those plants lose their connections, and so on. Although only three "plant" students were removed at the start, fully half the class has been affected– driving home the idea that all things are connected. As a final lesson, students use the chart from the day before to trace the path that a pollutant might take through a food chain. Although smaller words are used, the students learn the concept of bioaccumulation. They are also made official "Inspectors" and told that they can watch for breaks in connections in their own area.

The final Knowledge activity asks the students to look at the larger view. They are given maps to "time capsules" containing evidence that all of the processes they've learned about so far are constantly changing the world around them. Inside the nine time capsules the students find fossils, pictures, models, and animal parts from the past. Each group, starting with the time capsule from 3,500,000,000 years ago, shows what they found and how the environment was unique during that time. Some special attention is paid to the dinosaurs and their extinction, and the students readily parallel the falling of the dinosaurs with the breaking of connections they witnessed that morning. They also are asked to think about the future and how plants, animals, and the landscape might change in time.

In the spaces between the Knowledge activities, students are completing Experience activities as well. Each day the students are given time to sit in a quiet spot outdoors to write in

their diaries. On the second day they participate in a sensory hike, finding things that smell and have interesting textures, listening to the sounds around them, and even using their sight in different ways. This is one of the most popular activities, and it is amazing to see the joy students have in finding a tiny dried flower head that smells like mint or the soft feel of milkweed down.

On the third day we finish our Experience activities, heading out for a very long hike through the woods to follow a diary written by the mysterious Earthkeepers mentor, E.M. Students are given maps while the leader reads the diary out loud. Students take turns being in the front of the group and leading the way, finding the landmarks written about in the diary. These landmarks might be an interesting tree, a pile of turkey feathers, an owl pellet, or a scattering of fossils. By now students have learned the rules for showing respect for nature, and know not to crush plants, pull down branches, or chase after animals, and this hike is usually very relaxing (and tiring at the same time). Even in the winter, students rarely complain about the cold and are eager to find as many interesting things as they can. For many this is the first exposure to a "wild" natural area and students are delighted just to hear the sound of a woodpecker.

After the hike, students earn their Experience key. They will use the key in one final activity in the afternoon.

Our last Experience activity is a "seasons play." Students divide into two groups, and open boxes using their keys to find an assortment of tactile, auditory, and olfactory "props." Each group practices their play, and join together again in the classroom in pairs. One student is blindfolded, the other student has his props laid out between them. A story is read out loud, and as the narrator describes the outdoor setting, the student performer uses his props to make his blindfolded audience experience the story as she hears it. He might place a feather in her hand, crush a bergamot leaf near her nose, or tap sticks together to mimic a woodpecker. Then the students switch places and blindfolds, and a different story is read using different props.

When the students return to school, they must earn their final two keys. The first is the key representing "Yourself," and must be earned by pledging to change two negative behaviors for a month and adding two positive behaviors. The former might include remembering to turn the lights off when leaving a room; bringing recyclables home from a bag lunch instead of throwing them out at school (as most cafeterias do not even recycle aluminum cans); offering to sweep the driveway instead of using a gas powered blower, and so on. Positive behaviors include continuing to write in the Earthkeeper's Diary; visiting new natural areas; writing about newly visited habitats, and finding a place outdoors near home to spend some quiet time in touch with the earth. The teacher is given "Y" keys to give out to each student as he brings in a signed paper confirming that he has fulfilled his pledges.

The Sharing key is earned by teaching others about what was learned at Earthkeepers. Students may pick any person (who is old enough to understand) to teach Knowledge and Experience activities to. Students must choose two Knowledge and two Experience activities. Teachers are given kits with miniature versions of the activities for the students to check out and take home. After completing these tasks, each student earns an "S" key and is given a certificate.

Results

Of all the students that participate in the Earthkeepers program each year at the Byron Forest Preserve, every one receives his K and E keys. In order to earn them, the student must show that he has acquired knowledge of energy and materials and that he has spent time experiencing the natural environment. Simply by participating in the activities, each student has met these requirements.

In order to earn the second set of keys at school, the student must fulfill pledges to use less energy and fewer materials, and must teach someone else about the things they have learned during the program. Generally about half the class earns his or her Y key, and about a third continues on to earn the S key.

This means that of 400 students each year, all of them have at the very least spent time out of doors, learning to enjoy the natural environment. Many of them have also gained knowledge of living and non-living systems. Perhaps 200 of those go on to alter their behavior for a month (or more) in pledging to recycle more, make less waste, save energy, and to continue spending time outdoors. Of those, about 150 will also teach others at home about what they have learned– sharing both the Knowledge and Experience activities.

Discussion

Each student is required to show a basic knowledge of systems ecology (energy flow, cycling of materials, interconnectedness of living things and their environment, and effects of change on the environment) in order to earn their first key. Obviously some students absorb more than others, but in general most of the students retain a simple understanding of the basic principles of ecology. When in future years the students begin to learn about the more substantial aspects of environmental science, they will already have the ground work for realizing the connections between harmful effects to the environment and changes that can happen as a result.

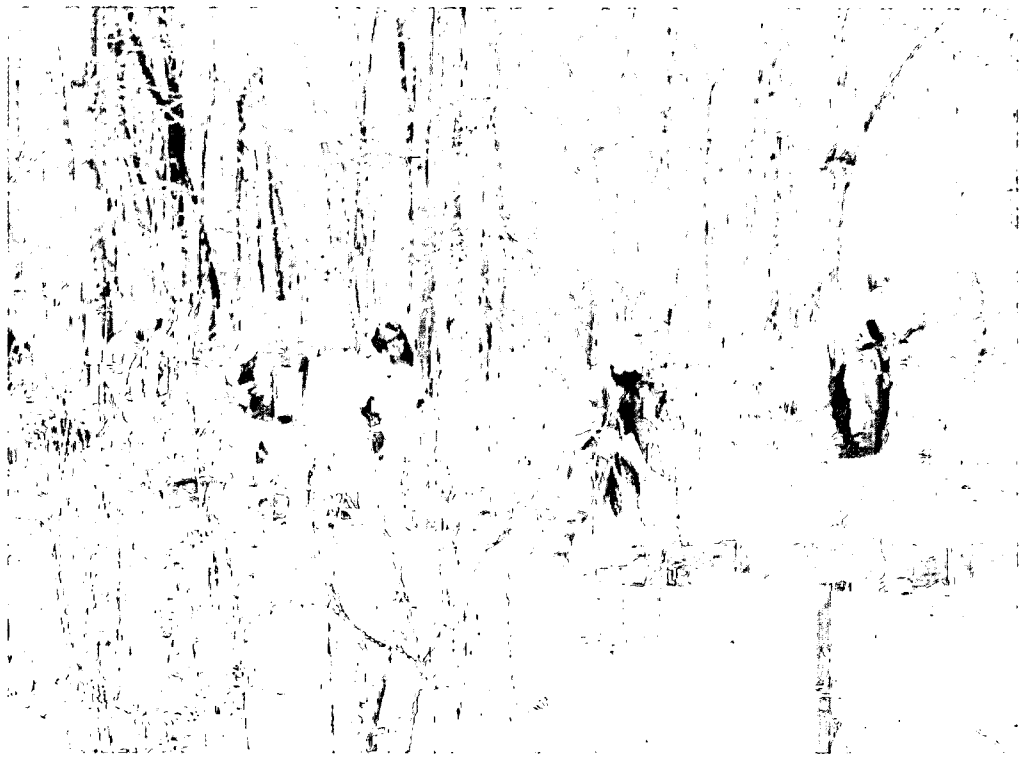
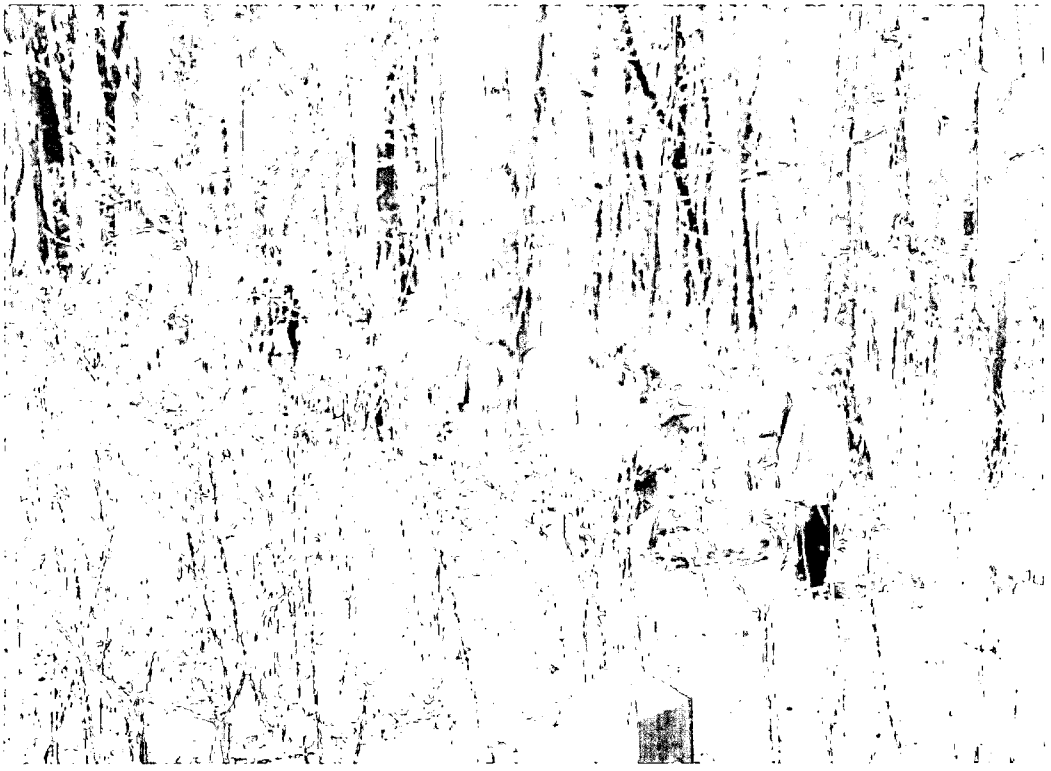
Teaching the Knowledge and Experience activities together also makes for a stronger impact on the students. In school, students learn about the destruction of the rainforests– but the rainforests are very far away; there is little that a student can do to have an impact. However, students who have learned about the woods in their own backyard and come to care about it can see more directly how their own behaviors affect their immediate environment.

In addition, through earning their Y key and pledging to change behaviors, students feel that they are having a positive impact on the earth close to home. And when students teach others about the importance of connections and experiences, the positive impact of this program spreads a little farther.

Summary

Earthkeepers is an international program taught at the Byron Forest Preserve to about 400

students each year. The focus of the program is on earning keys representing Knowledge, Experience, Yourself, and Sharing. For each key, students complete a set of activities based around the key that they are earning.

Knowledge activities include learning about the cycling of materials, the flow of energy through systems, the connections between living things and their environment, and how change occurs over time. Experience activities bring the students closer to the earth, giving the students safe and positive exposure to the out of doors. Activities focusing on Yourself ask students to make a small lifestyle change that will benefit the environment. By completing Sharing tasks, students spread the impact of the program to those at home.

Because the program was developed to be a comprehensive and step-by-step introduction to the principles of ecology, its lessons flow smoothly, and each activity builds upon the knowledge or experience the students have gained. Rather than the environmental education taught in schools, which is often added to other subjects and therefore somewhat piecemeal, Earthkeepers can be seen as training– training to understand how the earth works, to appreciate the natural spaces around us; training to see how our own actions on the earth make a difference, and to see that teaching others about the earth is an urgent task.