

Hellgate Native Medicinal Plant Garden 2006-2007 Final Report

Hellgate Elementary School
2385 Flynn Lane
Missoula, MT 59808

ECOS Team

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ABSTRACT

The Hellgate Intermediate School ECOS team has successfully completed an outdoor study area focused around a native medicinal plant garden and an accompanying student-written nature guide. This project encompassed this year's theme of *Seeding Diversity* by using a variety of native plants and emphasizing the range of uses they have had for Native Americans. Plants were moved from an existing garden as well as purchased new. Additionally, two work tables and a picnic table were installed in the courtyard. The fifth and third grade students spent several months researching and writing descriptions, and drawing pictures of the plants in the garden and this information was incorporated into a printed guide available to all elementary school classrooms.

INTRODUCTION

Hellgate has completed its second year as an ECOS school. Last year's fellows worked with 3rd and 7th grade classes to establish four learning centers on the schoolyard. This year's demonstration project was designed to build upon one of those learning centers – a native medicinal plant garden – to create an exciting outdoor learning environment in the 3rd-5th grade building's entry courtyard.

In order to accomplish this task, our original proposal consisted of three primary goals:

- 1) Enhance and build upon the native medicinal plant garden established last year by third-grade ECOS teacher Jo Fix by relocating the garden to a more suitable location at the entryway of the school and planting additional plant species.
- 2) Install student work stations to make the courtyard usable as an outdoor classroom.
- 3) Create a guide appropriate for all grade levels that includes ecology investigations designed for the garden and outdoor classroom.

The garden established by the 2005-2006 ECOS team was located at the south side of the school (Figure 1). However, construction plans for a new road have rendered this location unsuitable over the long term. Our proposal therefore described relocating the garden to a courtyard area at the main entrance to the school (Figure 2). During this move, we proposed to add several species to the new garden if space was available. The decision of when, how and which plants to relocate was to be made after consulting with landscaper Madeline Marzurski.

In order to enhance the courtyard's infrastructure, we proposed to build two 3.5 x 3.5 foot tables in the courtyard where students can sit, sort plants, and work on data sheets (figure 3). These tables, modeled after those at Lewis & Clark Elementary School's Outdoor Discovery Core, were to be made from Trex decking material and 4" x 4" treated wooden beam legs, making them a permanent addition to the schoolyard. When combined with a new picnic table purchased with PTA money, we were confident that this would create enough workspace for an entire class to use the garden area any time of the year.

A central goal of our demonstration project was to ensure that the garden becomes a usable resource for other teachers in the school, whether they have been involved in ECOS or not. To accomplish this, we proposed to produce educational materials including signs (showing common and scientific names), field guides and lesson plans as complements to the garden.

As an educational component to the native plant garden, we proposed to create a series of scientific lesson plans and student-friendly plant guides. These would include student-written descriptions of each species. In order to do this, our fifth grade students would research other published plant guides and the *ECOS Guide to the Ecology of the Northern Rockies* (<http://www.bioed.org/nhguideweb/>). We planned to work with teachers and students to write species descriptions in language accessible to students in the 3rd-5th grade age groups. This guide would also include inquiry-based lesson plans to be used in the garden and surrounding schoolyard. Some of these lessons were also intended to focus on the ways these plant species are and have been used by Montana's Native American tribes, making it an excellent resource for helping meet the goals of Montana's Indian Education for All Act.

SCHOOLYARD DEMONSTRATION PROJECT DESCRIPTION

During the 2006-2007 academic year, the Hellgate ECOS fellows have worked with Colleen Cooper's and Kathy Meyers' 5th grade classes. Our approach to teaching science has been structured around the progression of scientific ideas from detailed observation and description, to asking questions, and finally to conducting experiments to answer those questions. We emphasized this process using stories of actual scientists (figure 4). In order to build student skills in these areas, we have relied on the previous garden, other areas of the schoolyard, and will begin to use the new native medicinal garden this spring. A description of the ECOS project at Hellgate Elementary School can be found on-line at:

<http://www.hellgate.k12.mt.us/9171042616461730/blank/browse.asp?A=383&BMDRN=2000&BCOB=0&C=53175>

This year's Hellgate science theme was "Seeding Diversity." While we worked primarily with the fifth grade classes, the garden is intended to be used by the entire elementary school, grades 3-5. Jo Fix, a third grade teacher at the school, pioneered last year's garden, and she intends to remain involved with Colleen Cooper and Kathy Meyers in maintaining the new garden. The student guide books and lesson plans will be made available for each classroom in the school, thereby increasing the likelihood that the garden will be used by others.

Planning for the project was extensive, and involved several meetings with Doug Reisig (Superintendent), Bruce Whitehead (Principal), and Bruce Parks (Head Custodian). We also consulted with local native landscaper Madeline Marzurski and decided to relocate plants in the spring. We broke ground on the new garden in November, digging up an approximately 30 m² area. Students from both fifth grade classes participated in the preparation of the garden area (Figures 6 and 7). Compost purchased from Ibey Nursery and Garden Center in Missoula was mixed with the soil, and the ground was covered with wood chips for over-winter protection.

We began purchasing supplies in January 2007. This included construction materials for the student work tables (figure 3), student supplies (including magnifying glasses, basic bird guide books, and thermometers).

In early February 2007, we attended a PTA meeting to ask for additional funding for our demonstration project. We specifically asked for funding to cover materials that were not part of our original proposal (e.g. bird feeders) and additional materials suggested by the school administration (e.g. weed cloth). We also asked the PTA to pay labor costs for table construction. After submitting our proposal, the PTA agreed to fund \$1500 towards the project. This funding also covered a sign advertising the "Hellgate Native Plant Garden" (figure 8).

The student work tables were constructed and installed in early spring, and a picnic table was installed with PTA money.

The majority of garden work was conducted during April. All transplanting was done during two class periods on one day. Three graduate student volunteers from the University of Montana joined us to help coordinate the students' work. Students worked in groups of six, uprooting plants from the original garden, digging holes in the new garden, or transplanting the plants to the new garden. All of the plants were successfully moved during this period, and the two classrooms agreed to hand-water the plants until we could install a drip irrigation system. The weed cloth was installed the week following transplanting. During the third week, we purchased hoses and emitters for the drip irrigation system, coordinated with Bruce Parks (Head Custodian) to change the sprinkler heads, and installed the irrigation. Students were not involved in the weed cloth or irrigation installation because we felt that the work was too delicate for more than two people.

Students were brought back to complete the final phase of the garden at the end of April. Additional wood chips were purchased and students spread these across the surface. The "fine detail" aspect of this final phase was emphasized, with small groups of students making sure all hoses and bare ground was covered (figures 9 - 11).

An important sustainability component of our demonstration project was the creation of a student-friendly plant guide and suggested schoolyard activities. We intended to produce six books, two for each grade level. Over the winter we began to introduce students to their role in this process. We called for volunteers to research and write plant descriptions. A small group of ten fifth graders from both classes gave up several of their lunch/recess times to work on this guide. They conducted most of their research using the ECOS Guide to the Ecology of the Northern Rockies (<http://www.bioed.org/nhguideweb/>), although other field guide books were also used. Students worked in pairs to fill out data sheets for each species in the garden. A writing team of seven students then took those data sheets and re-worded the descriptions into a readable narrative. Finally, in order to ensure that the field guide could be understood by third grade students, our writing team worked with ten “third grade writing consultants” from Jo Fix’s classroom. Until this joint meeting, we were unsure if two separate versions of the guide would be necessary for upper and lower grade levels. However, the third graders were able to understand the majority of the work, and only a few changes were necessary. Having students directly involved in writing the entries for the guide is an addition to the original proposal that is generating excitement among the students and gives them additional ownership in the project.

While we relied on teams of volunteers for research and writing, all students (both fifth grade classes and Jo Fix’s third grade class) were asked to provide artwork for the guide. Students based their drawings on images from the ECOS Guide to the Ecology of the Northern Rockies, other guide books, and direct observations of the plants in the garden.

While the plant descriptions were designed to be read by students, we also wished to include a selection of ECOS inquiries for teachers at the school. The ECOS fellows worked with their partner teachers to select the inquiries from the ECOS website that were most likely to be used by teachers at Hellgate Elementary School. The following inquiries were included in the guide:

- Testing Hypotheses About Plant Diversity
- Winter Animal Adaptations: What Body Shape Stays Warmest?
- Sussex School Spider Investigation
- Knapweed in the Web
- Isolation of Microbes from the Environment
- Classification Using Insects
- Echolocation Marco Polo
- Energy in Suspension
- Phases of Matter: Understanding the Chemistry Behind Water Quality
- “Saving Klondike and Snow”: How Scientists Rescued 2 Baby Polar Bears
- Brewing Rootbeer
- Phases of the Moon
- Float or Sink?
- Composting 101- It’s the Microbes
- Pipe Cleaner Animal Camouflage
- Track Mysteries

Additionally, the ECOS fellows wrote up small paragraphs describing ways in which teachers could use the garden and other areas of the schoolyard. Our rationale for this was that our partner teachers felt many of the more lengthy inquiries would not be read by the majority of teachers, and so we decided it would be appropriate to write these mini-activities.

The final version of this guide is attached as Appendix 3.

Additional components of the demonstration project included engraved plant labels (figure 12), and six “field kits” assembled in backpacks donated by REI. The backpack field kits included a set of magnifying lenses (one per student per classroom), one thermometer, a basic bird guide book, and the student-created “Hellgate Native Garden and Ecology Guide”

The demonstration project was completed and presented to the school on 18 May 2007 during a school-wide assembly in the courtyard (figures 13-14). Those present included Bruce Whitehead (Principal), Bruce Parks (Head Custodian), and a member of the PTA.

Our demonstration project deviated in a few minor aspects from what we had planned in our original proposal. One change was that the school administration asked us to install weed cloth after we had broken ground. This was not an item in the original proposal, but we were able to purchase it because the PTA agreed to cover other expenses. Additionally, our original proposal stated that several “garden-appropriate” inquiries would be written to provide teachers with age-appropriate curricula for this setting. After further consultation with our ECOS partner teachers, however, we determined that teachers would be more likely to get ideas from short paragraphs describing ideas for activities, rather than following the ECOS inquiry format. These activities are included in the Hellgate Native Garden and Ecology Guide (Appendix 3).

CONTRIBUTERS

Hellgate Parent Teacher Association (PTA)—provided a grant of \$1500 to aid in construction of the Hellgate demonstration project.
Hellgate Elementary School
2385 Flynn Lane
Missoula, MT 59808

REI—Donated six backpacks to hold demonstration project supplies for each classroom.
2230 N Reserve St # 300
Missoula, MT

Ibey Nursery and Garden Center—provided a 20% discount on compost and bark mulch
6170 Butler Creek Road
Missoula MT 59808

BMC West Building Materials—provided a “contractor discount” on building supplies for student work tables.

7320 Expressway
Missoula, MT 59808

Caras Nursery & Landscape—provided a school discount on landscaping material
2727 S 3rd St W.
Missoula, MT 59804

Madeline Mazurski—provided advice on layout of the new garden, and timing and methods of moving the plants from the old garden.
Montana Native Landscapes
542-0262, mmazurski@montana.com

SUSTAINABILITY

We feel that there is tremendous support for this project. This was evident after the “presentation to the school”, where teachers, their classes, the principal, custodian and PTA were present and very impressed. The principal has told us first hand that he is impressed with the garden, and many teachers are already talking about adding either directly to the garden in future years, or constructing other outdoor “hot spots” in the courtyard in future years.

The greatest asset to ensuring sustainability of this project is its prominent location in the schoolyard. We placed it at one of the main entryways to the school, and it is clearly visible from the main office window. Because of this prominent location, we feel that the garden will remain protected from vandalism and neglect.

The greatest challenge will be weeding and watering during the summer when the irrigation system is turned off. However, so many teachers are so supportive of the project and they have expressed interest in maintaining the garden during the summer months.

Most importantly, the Hellgate Native Garden and Ecology Guide given to each class provides teachers and students with a reason to go outside and explore the garden. This means that the garden will serve as more than a pretty backdrop. Rather, together with the labeled plant signs, the garden is likely to serve as an educational resource for years to come.

SUMMARY

The 2006-2007 ECOS team at Hellgate Elementary School set out this year to move a native plant garden and create an outdoor learning area in the school’s main courtyard. We have received tremendous support from several organizations in the project, most notably the Hellgate PTA. Along with help from the students and volunteers from University of Montana, we were able to transplant plants, install weed cloth and a drip irrigation system, and create a student plant guide. The entire project was unveiled to the school in May of 2007 with a great deal of support and excitement.

APPENDIX 1: Curricula

No inquiry-based curricula was developed for our classrooms between January and May of 2007 (curriculum pieces developed during the first half of the school year were submitted with the “Mid-Term Report” and therefore are not included here.

Rather, most of January through March was spent modifying activities from the book *Eco-Inquiry*. April and May were devoted solely to completion of the demonstration project.

APPENDIX 2: PHOTOS AND FIGURES



Figure 1. Native medicinal plant garden established by 2005-2006 ECOS team. New construction at the school threatens the plants in this location.

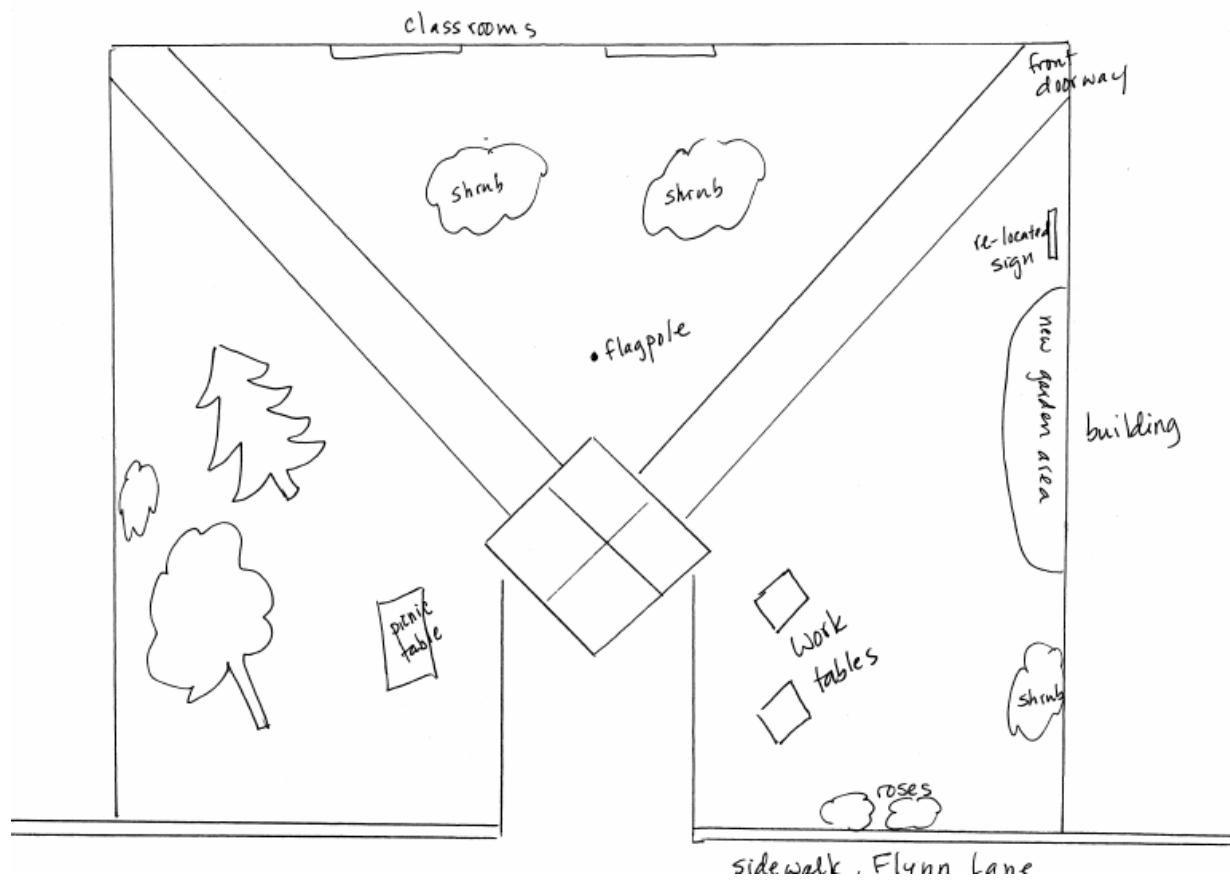


Figure 2. Layout of garden and work tables in school entry courtyard that will become the outdoor classroom.

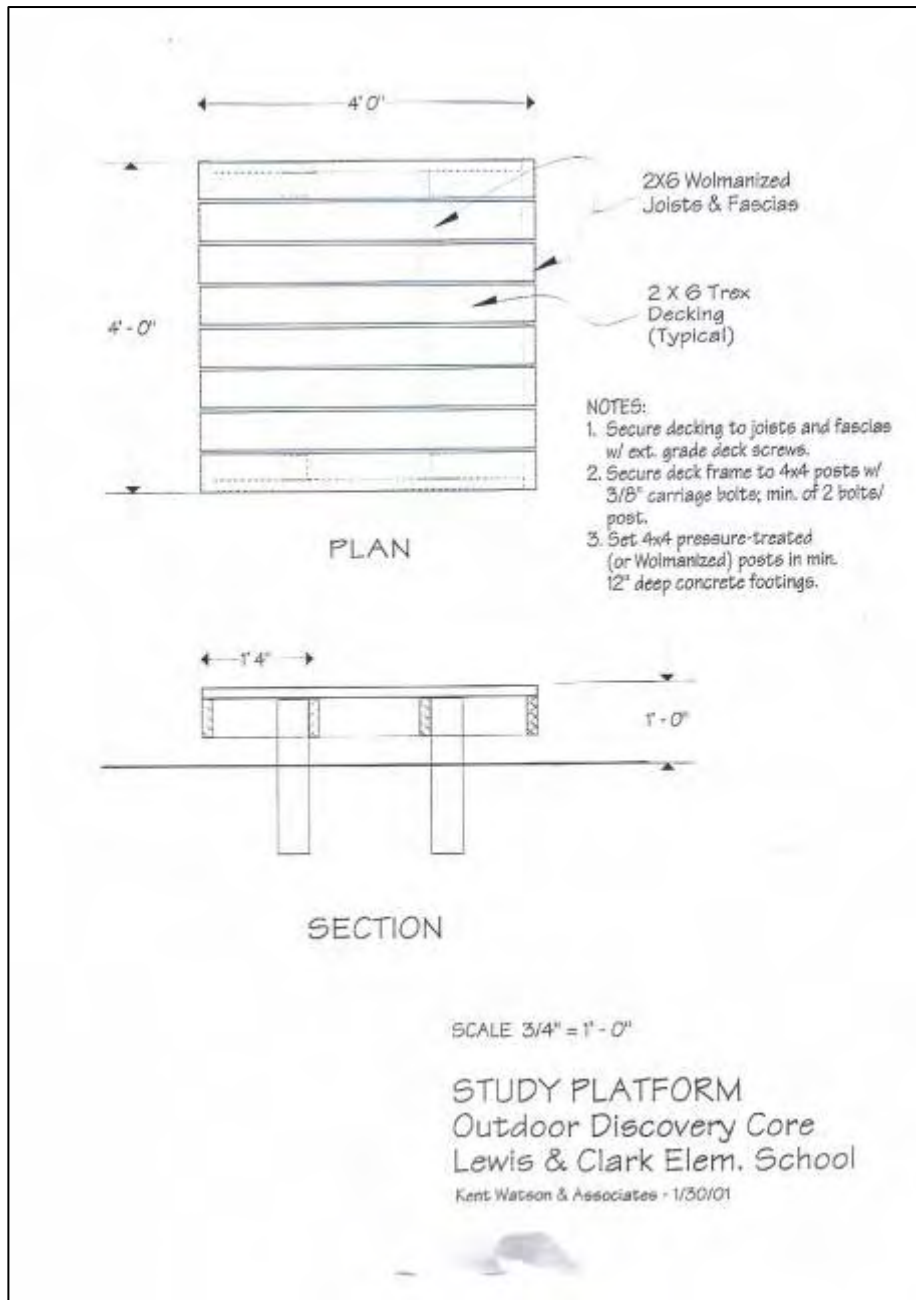


Figure 3. Construction plans for the student work tables.

**The Scientific Process:
The Story of a Scientist and a Weed**



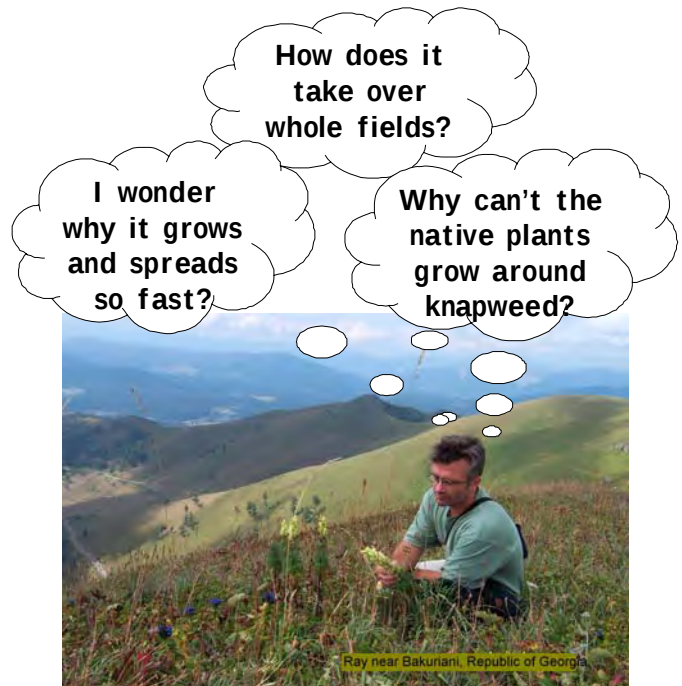
**Dr. Ray Callaway:
A good observer.**



**Spotted knapweed: a
new invader**



**Dr. Callaway starts to ask questions
about what he sees.**



**Can you think of reasons why
knapweed might grow so well in
Montana?**

Figure 4. A story of a real scientist used to illustrate the scientific process.



Figure 5. Students Eric Williams and Connor Campbell work with the fellows to dig up sod, work the soil, and add compost and bark mulch to prepare the garden for spring planting.



Figure 6. Student Eric Williams empties a bag of compost into the new garden.



Figure 7. Students work on the new garden in the entryway to Hellgate Intermediate School.



Figure 8. Brass sign welcoming visitors to the garden. Artwork was drawn by Bruce Whitehead, Principal.



Figure 9. Kate Zimmer spreads wood chips to cover all bare spaces in the garden.



Figure 10. Sandy Johnson puts the finishing touches on the garden, removing wood chips that have fallen onto plants.



Figure 11. The garden is just about finished.



Figure 12. Each species was labeled for easy identification.



Figure 13. Hellgate ECOS teachers Kathy Meyers and Colleen Cooper describe the demonstration project to the other third through fifth grade students and teachers.



Figure 14. The Native Plant Garden is unveiled to the school.

APPENDIX 3

See additional power point file: "Garden Guide."