Title

Vermicomposting and science backpacks

Lewis and Clark elementary
2901 Park st
Missoula, MT 59801
Kathy Dungan, Jane McAllister, Tammy Mildenstein, Jeff Piotrowski, Hollie Sexton

Abstract

Our project was two-fold: Creation of a worm composting system and "science backpacks." Students choose a worm composting system to reduce lunch wastes and provide compost for their outdoor classroom; fellows saw this as a vehicle to teach nutrient cycling. Missoula has an environment ideal for ecology field trips, hence the ECOS committee decided to create "science backpacks" to aid in observing local ecology. We introduced the composting project to the school and began composting. The worm bins have been used in classroom investigations. We anticipate implementation of the composting systems in the lunch room by early next school year. The "science backpacks" will be ready to use early next year as well.

3. INTRODUCTION

BACKGROUND

In the past couple of years Lewis and Clark Elementary School has made significant steps in initiating a school-wide focus on the local ecology and environmental conservation and incorporating these into their academic curricula at all levels. Teachers have promoted learning about the local environment through field trips to nearby natural areas like Mt. Sentinel and Bancroft Pond and by participating in national programs such as Birds Beyond Borders. The school has further encouraged classes in the outdoors by creating a natural area with planted habitat for birds and butterflies on the school campus, called the Outdoor Discovery Center (ODC).

As a needs assessment of what additional projects may further Lewis and Clark's commitment to ecological learning, we conducted interviews with key players at the school. We discussed ideas with teachers and students and developed a list of potential school demonstration projects that would serve to move Lewis and Clark forward in their pursuit of bringing outdoor ecology into their regular curricula. We then created a steering committee of teachers and a few students from each grade, who together chose and developed the demonstration projects that we would work on.

GOALS

Our vision for sustaining the influence of ECOS on Lewis and Clark Elementary is the creation of ecologically-minded demonstration projects that can remain at the school after the ECOS project has expired. Our demonstration projects are three-fold and have been decided on by a steering committee of elementary students, teachers, ECOS fellows, and ECOS teachers. We propose:

1) Creation of a school-wide worm composting system to reduce lunchroom wastes and provide compost for our outdoor discovery core
2) Construction of a bird blind to allow observation of birds, butterflies, and mammals in the ODC
3) Creation of "Science Backpacks" for students to use during field trips and outdoor activities in the ODC

RATIONALE

These three projects were chosen as demonstration projects by the ECOS steering committee because of the opportunities they offer to students to interact with and learn from the ODC and other natural areas near Lewis and Clark. While many students and teachers show a sincere interest in doing outdoor lessons, one of the things holding them back is the lack of materials and/or ideas for how they can learn about local ecology. The three demonstration projects we aim to develop will provide tools and interactive ideas for learning about local ecology and ultimately make it easier for students and teachers to take advantage of the special outdoor classrooms near the school.

The worm composting project not only provides nutrients that can be reintroduced into the ODC and limit the amount of chemical fertilizers that are needed, but also shows students how their own natural waste can be broken down and used ecologically rather than added to ever growing solid waste piles in the local dump.

Bird blinds in the ODC, will provide for observation of wildlife using the habitat that has been created for them. This will also improve the current bird count efforts by creating a venue where students can identify and record birds that show up in the ODC as well as note departure dates and earliest return dates of seasonal migrants.

Finally, the "Science Backpacks" will be made available for teachers to borrow for outdoor field trips and for students interested in investigating the ODC over their recess and/or lunch time breaks. These will have an assortment of tools useful for ecological observation and investigation and are designed to make it "easier" for teachers and students to get outside and get started learning about the environment they live in.

4. PROJECT DESCRIPTION

The bulk of our work this year on our demonstration project focused on the worm composting bins, so this project description will focus predominately on that part of our proposed project.

a. The main ***scientific theme*** of the worm composting bin project is nutrient cycling. Because we are composting school lunch leftovers and using the resulting soil to fertilize the school's outdoor discovery gardens, the students also learn about important aspects of environmental conservation such as solid waste reduction and organic fertilization.

b. The *target grade levels* of the project were the whole school. Since we were working with $1^{st}/2^{nd}$ combined and 4 grades as a part of ECOS, we focused our complementing inquiries on these grades.

c. We purchased the following for our demonstration project (includes both worm composting and science backpack projects)

BUDGET

Worm Composting Project		
Quantity	Item	Description
1	Outdoor Worm composting bin	A large format outdoor worm bin with plexiglass viewing window worm activity and decomposition
2	Indoor Stackable worm chalet	The workhouses of our worm composting project. These will be in the lunchroom and may compost 10 lbs of waste daily
1	10 pounds live vermiculture worms	The real work horses
3	Book- “Worms eat my garbage”	Essential resource book for worm composting project appropriate for upper elementary students and beyond
3	Book- “Worms eat my garbage workbook”	Companion workbook to “Worms eat my garbage,” provides exercises for students
2	Book- “Diary of a Worm”	A elementary level book on worms

Science Backpacks		
Quantity	Item	Description
30	Science Backpacks materials	
	Rulers Tweezers Bug boxes Waterproof notebook Droppers Hand lenses Thermometers Montana field Guide Backpacks Compass Measuring cup Soil test kit Clinometer Berlese appratus	These material will be included in "science backpack" that classes will be able to check out for field trips and other outdoor activities

d. Our actual demonstration project was basically what we had proposed in our grant proposal with the exception of two parts. The outdoor worm bin that we intended to install and begin using was on back order, and we are still awaiting its arrival. Additionally, we chose to focus our efforts first on our demonstration project, which ended up taking up much more time than we anticipated and left no time for any of the bird blind work.

5. Sustainability

We approached this project with sustainability as a defining objective, even before we decided on the exact nature of the projects. With this in mind, we created the ECOS committee of students from all grade levels. We believed if students were allowed to design the projects in part, then they would have a greater interest in their success. Moreover, younger students on the committee would be present through the projects evolution for several years before they progressed to another school. Finally, we involved the entire school in the project through a series of presentations. Given these approaches we feel the Lewis and Clark elementary composting project and science backpacks will be a lasting result of ECOS for many years.

The next Lewis and Clark ECOS cohort will have the interests and assistance of students, teachers, and us in maintaining our worm decomposition project and science backpack system. The students involved with the ECOS committee during the past year are knowledgeable of the composting process and what is necessary to implement it in the lunch room. These individuals will be crucial to the new fellows in easing the transition and continuation of our project. The continuation of an ECOS committee is of utmost importance to facilitate communication regarding the project, but this should not

be difficult give the enthusiasm the project has generated. We may be required to hold a few sessions on worm maintenance for the new cohort. The science backpacks will be a great asset to all teachers, who will likely take great care of them and use them well. In the coming year our cohort and the new cohort will help add materials to the backpacks, tailoring them more to the school and its goals.

6. Summary

The Lewis and Clark elementary worm composting project has been very successful during its first year despite some small setbacks. Through the ECOS program we have established a school-wide committee of committed students, educators, and scientists unified towards the success of this project. The project itself was decided upon by the group, not just by the scientists and teachers. With the aid of teachers and fellows, the students eagerly took on the responsibility of researching systems of worm composting and how to implement these systems at the level of an entire school. Moreover, the student members of the ECOS committee gave a presentation to the entire school to introduce the project and its goals. The genesis of our project was amazing in that it allowed students to experience and help create this project, fostering their interests in sustainability.

While we were not able to install the compost bin in the lunchroom by the end of this school year, we were able to start processing wastes in certain classrooms. More importantly, the worm bins were able to serve as teaching tools during the final months of school. These aided in a school-wide assessment of inquiry versus traditional teaching methods, which helped measure the effect of the ECOS program on this school.