

Rebuilding Ecosystems

Classroom Grant

Meadowlark Elementary

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Application Form

Report Fields

Project Name*

Name of project

Rebuilding Ecosystems

Amount Requested

Amount requested on application.

\$1,000.00

Grade Level

Please select grade level below.

Intermediate (4-6)

Primary Subject Area

Please select the primary subject area of your grant.

Science

School

Please select your school from the list below

Meadowlark Elementary

Number of Students Served

Please enter the number of students that will be served by this grant.

300

Project Cost

What is the total cost of your project?

1310.09

Statement of Need

Please describe the need for this project. For example, how will this project impact student learning?

When I first became a teacher, I noticed a need for a way to really “grab” the kids’ interest; a way to help them become vested in their work, and see the benefits of their efforts. I noticed that my instruction was particularly lacking in the area of science. Much of this was due to the tools and resources, which I had available to me, and some of it was my own lack of enthusiasm. In the spring of 2011, I dreamt up an

ecosystem project that would encompass nearly all of the scientific curriculum areas that I was teaching. It was something I personally had a lot of experience with, and something that I was deeply interested in. This led me to the “Underwater Ecosystems” project. I applied for a grant from the Education Foundation, and upon selection, was excited to see my dream become a reality.

Over the past 3 years, the Education Foundation has allowed me the opportunity to bring science to the forefront of my instruction. Through a series of various ecosystem projects, I have been able to target the growing deficit in science instruction that we are seeing across the nation. These projects have allowed me to keep the outdated science textbooks in the storage cupboard, and to keep students looking forward to science. With the ecosystem project, my students have set up and maintained a 125-gallon saltwater reef aquarium, a 33-gallon coral propagation tank, and a 75-gallon tropical plant and poison dart frog terrarium. Each year I have been able to expand the project to include a new ecosystem for the students to construct from the beginning bare tank, to a thriving ecosystem. The impact this hands-on learning opportunity has already had on my students is tremendous. Students have learned an appreciation for not only science in general, but for environmental awareness, and the thrill of learning something by doing it. Students today need this type of inquiry in their learning. It is important for them to take an idea, form a question about it, and work through possible solutions. It involves research, group work, experimentation, observation, and presentation. This style of learning encapsulates what science is all about. As a teacher, I have gone from dreading the lessons out of the book, to running out of time in the school year to get in all that we can. Students are able to see how skills in other subject areas really mesh with each other, and it gives them a way to practice those skills in a more real-world application.

The need for this grant is to provide the students of the 2014-2015 school year with the same opportunities for inquiry-based learning. This grant will allow me to start the ecosystem project again next year, expand the scope of the project, and maintain the systems for the school year. Ultimately, my goal is to inspire curiosity, build scientific knowledge, and produce aspiring scientists.

Please also see my previous grant proposals to see just how useful these projects have been to my teaching. I emphatically thank the Education Foundation and the private supporters that have allowed me these opportunities over the years.

Primary Goal

Please describe the primary goal of the project and how it blends with School District 2 goals and curriculum.

With the size my project has grown to, it is difficult to determine one primary goal. Narrowed down dramatically, I would say that my goal is to encourage students to explore different scientific principles by presenting them with an opportunity in which their own personal inquiry and output drives the success or failure of an end goal. All the while, igniting a passion for science as an interest, hobby, or possible career. I want to show my students that science, math, and reading are not just subjects in school, but are skills needed to address and explain life’s challenges and opportunities.

Various curriculum areas that this project targets are: ecosystems, life cycles, the nitrogen cycle, photosynthesis, the properties of light, oceanography, the water cycle, water chemistry, graphing, data analysis, research writing, reading expository text, presenting, the scientific process, states of matter, geography, using technology, and many others.

Project Description

Briefly identify the major activities and materials involved in your project.

Throughout the last 3 years, I have been fortunate enough to leave all of the ecosystems up through the summer for the next class to use as well. Former students have volunteered to come in to feed fish, top off tanks, and perform simple maintenance that they learned from the project. Unfortunately, I will not be able to leave any of the ecosystems in place this summer. Our school is scheduled to have new lighting, plumbing, and electrical work done over the summer break. This means that I will not be able to enter the building for the majority of the summer, and electricity may be on and off intermittently. Therefore, the students of the 2014-2015 year will have to set up all 3 of the ecosystems instead of just one as in prior years. Most all of the equipment can be reused. The need of this grant is to provide the funding for livestock for all 3 of the ecosystems, supplies to continue the project for the 2014-2015 year, and expansions to the projects.

The 125-gallon full reef setup must be taken down this summer. All of the lights, filters, heaters, and pumps, as well as the tank and stand will still be usable when school starts in the fall. I intend to keep the sand in the tank to reuse as well. What will really need to be replenished are the live rock, corals, and fish. Live rock is a cornerstone of the project. Living on the rock are thousands of microscopic bacteria that filter out toxic waste that fish produce. It is with this example that students are able to see the nitrogen cycle at work. The corals in the tank show students the symbiotic relationship between plant and animal as each of them has a strain of algae growing inside the living coral polyp. Fish not only look amazing in the tank, but they are an important link in both the nitrogen cycle of the tank, and the food chain within the ecosystem.

The 33-gallon coral propagation tank will also need to come down for the summer. To set it back up requires more of the same live rock. I will not need corals for this tank as the purpose of this ecosystem is to take coral fragments and cuttings from the 125-gallon tank, and propagate them in a shallower tank. All filters, lights and equipment will be reused.

The 75-gallon tropical plant and poison dart frog terrarium is a new project this year. Because this system does not require heat, or running water that depends on electricity, I am planning to leave this one intact over the summer break. A light timer and hydroponic root system should keep the plants healthy and thriving over the break. For this system, I only need to replenish the supplies needed to take the project into another year.

All of the ecosystems will need some supplies to make them as effective as they have been for the past 3 years. This includes salt, fish food, test kits, water additives, filter material, cleaning supplies, fruit fly media, and replacement bulbs. These are things that are used up every year that are vital to the ecosystem's survival. I would like to expand the project to include 2 new books for research, more test kits for water chemistry testing, and a digital pH probe.

All of this does not even scratch the surface of what I use the individual ecosystems for. Student inquiry drives the entire project. We research what equipment our ecosystems will require to be successful. The students learn about water quality, the nitrogen cycle, and how it affects our ability to keep fish and corals alive and healthy. We delve into plants, and we look at the relationship terrestrial and aquatic plants have, and how each coral relies on a symbiotic plant to survive. This leads us to the sun's role in life, and the life cycles of various living organisms. From here, we begin looking at the taxonomy of living things, habitat design, and fish/coral selection. Virtually all aspects of my science curriculum, and many in my math are addressed with these 3 ecosystems. There are so many applications that I cannot fit them all here.

Professional Development

If your project includes professional development how will it improve student performance?

I am a firm believer that for this project to work, I, myself, must continue to learn. Over the past 3 years, I have learned a lot from the books that I have been able to purchase, the observations of the ecosystems, and various independent research. This year, for instance, I led students into the Krebs's Cycle. To do this, I first had to research and learn as much as I could about it. I will continue this type of professional development through my own curiosity, reading, and research. I will continue to model my own learning to students to show them how to be lifelong learners, and that I am learning from them as well.

Project Timeline

When will you implement your project?

This project will begin the 2nd week of school of the 2014 school year. First, we will get the larger 125-gallon tank up and running. By Thanksgiving, we should be ready for fish in that ecosystem. At that point, we will begin setting up the 33-gallon tank. By winter break we should have 2 stable saltwater ecosystems. The larger will have fish and coral, and the smaller will be nearly ready to put propagated coral frags into out of the larger tank. The 75-gallon terrarium will already be set up to start the year. We will begin using it right after the first fish enter our large tank in November to see how plants live and thrive. This is an especially important link between fish and corals. We will continue to use it for the entire year with various plant activities. These ecosystems will be in use for the entire year until the end of May. In the middle of October, I will begin Saltwater Club, which is a club of students who meet after school to do routine maintenance on the ecosystems.

Plan for Evaluation

How will you evaluate student outcomes for your project?

As has been used in the past, the evaluation for this project will be the end result of the ecosystems. If by the end of the year we have three thriving ecosystems with fish, corals, plants, and frogs, the project will again be a success. However, I also assess how well my students are comprehending the difficult science concepts that are being covered. This is done through short answer quizzes, response papers, individual and group presentations, models, and science notebooks. At the end of the year, I hold a "science night" where parents and teachers come to hear presentations about the different science principles students have been learning about all year. Success of the project can be based on the accuracy of these presentations, as well as the understanding the students show within their specified area.

Project Budget

Please explain how the funds from this grant will be spent to support your project goal. You can either type or upload a project budget to show how funds will be used. Please identify other funding sources if applicable.

Rebuilding Ecosystems Budget.docx

Please see the attached budget. There is a difference of \$310.09 from the total cost of this project and the amount of this grant. Also, there are always unforeseen costs that come up during the year. I plan to do some light fundraising with the class, as well as donate my own funds for this project. Also, occasionally we have "extra" coral fragments that a local pet store will purchase and allow to be put towards other supplies.

Supervisor Approval*

I have received approval from my supervisor to apply for this grant.

yes

Attachment 1

Please attach any photos, pages from catalogs, or other documents below. This is completely optional.

Attachment 2

Attachment 3

File Attachment Summary

Applicant File Uploads

- Rebuilding Ecosystems Budget.docx

Rebuilding Ecosystems Budget

Live Rock	70 lbs @ \$4.99/lb	\$349.30
Salt Bucket	1 @ \$49.99	\$49.99
Ammonia Test Kit	2 @ \$15.99	\$31.98
Nitrite Test Kit	2 @ \$13.99	\$27.98
Digital PH Meter	1 @ \$24.99	\$24.99
Conscientious Mariner Aquarist (book)	2 @ \$35.99	\$71.98
Carbon Replacement Media	6 @ \$12.99	\$77.94
Coral Budget		\$300.00
Approximately 10 corals		
Fish Budget		\$200.00
Approximately 5 fish		
Fruit Fly Media	2 @ \$21.99	\$43.98
Replacement T8 Bulbs	2 @ \$24.99	\$49.98
Algae Scrubber	1 @ \$5.99	\$5.99
B-Ionic Calcium Additive	1 @ \$39.99	\$39.99

Total= \$1310.09