

## APPLICATION ID #6250 (Grade Band K-2)

### Step 1: Learn

#### TASK

What issue are you and your students going to address (e.g., topics to consider include transportation, material resources, green space and energy use) and why? Discuss any data collected that demonstrates this topic is an issue. The topic you choose should impact your classroom or school.

Limit your response to 250 words.

#### TEAM RESPONSE:

Each classroom in our school has a garden. School also has many common areas full of plants. One morning it was raining. At the same time, sprinklers were going on! In the news, we heard a lot about water shortage and how we need to conserve water. We decided to investigate. We investigated to find out how much water is used for the yards. We used checklist to find out the sprinkler schedule. We found out that they are set automatically and go on even if plants do not need any watering. Some of them were even watering sidewalks! We also analyzed our gardens. We looked at the type of plants and did a survey to find out why the plants were selected. We found out that most of the plants were chosen because they were pretty and than no one chose plants because they use less water. We also analyzed soil. It was very sandy, which means that it did not keep much water. We went to the SWIFTMUD web site and learned that water shortage is a serious issue in our area. In some counties there are even water restrictions and people can water their yards only on some days. After looking at our research and data we decided that our school needs to change the way we use water outdoors and begin responsible behavior. Then, we need to inform our community about this problem and help them conserve. Our essential question was: How can we conserve water outdoors?

#### CITATION:

*Southwest Florida Water Management District*. Retrieved from <http://www.swfwmd.state.fl.us/>

Southwest Florida water agency issues shortage alert. (2010, November 17). *St. Petersburg Times*.

*Florida Department of Environmental Protection - water conservation*. Retrieved from <http://www.dep.state.fl.us/water/waterpolicy/conservation.htm>

### Step 2: Plan

#### TASK

How will your class address this issue? Include an overview of your plan, a description of the data that will be collected, and a prediction about how your class plan will impact the issue.

Limit your response to 800 words.

#### TEAM RESPONSE:

It took us a long time to make our plan because we first had to learn about water conservation. Our plan includes investigations and solutions.

Our class first spent two weeks learning about this issue. We learned about water in our environment and why is water important to plant life and agriculture. We also learned about where water in Florida comes from. We investigated Florida aquifer and had a person from SWFTMUD talk to us about a problem of water shortage. We also learned that there are ways to use less water and still have beautiful plants and gardens. We investigated how to create a xeriscape, a type of garden that uses less water. After we learned this, we developed our plan of action.

#### STEP 1:

**Study where the water is lost outdoors at our school.** To do this we will map the school ground and find out where the sources of water for outdoor are. We will also map to see where the water runoff goes to find out where the water flows after the rainfall. To do this, each class will be assigned one part of school campus. There will be four groups in each class to map a part of their area. This will help us better understand how much water is wasted and where.

#### STEP 2:

**Study the soil in our gardens.** In our research we learned that different types of soil are better for retaining water than others. We

will take samples of soil in different gardens and samples of soil that we can get in nursery. We will observe the properties of soil and find out which soil retains most water. We knew that there was school garden day coming. This is the day when each class takes care and plants their garden. Our data will help us select the best soil for our garden so that it conserves most water.

### STEP 3:

**Study plants in our gardens.** In our research we learned that some plants need less water. When those plants are arranged together we can make a xeriscape which is a type of garden that conserves water. Each class will identify plants in their garden. We will use plant identification web site. Then we will make a list of plants that we will keep. We will donate other plants.

### STEP 4:

**Make rain barrels.** We will paint and put together rain barrels that can collect water. We will use these rain barrels to collect rain water and water our plants. We will also make some for businesses and families, so that they can conserve too.

### STEP 5:

**Make a xeriscape.** On our garden day, each class will make their garden a xeriscape. This will help us conserve water because our gardens will need less water.

### STEP 6:

**Educate our school.** We will make a video our school TV about water conservation. We will also make a presentation to other grades. We will show them how to conserve water and make their gardens xeriscapes.

### STEP 7:

**Educate community.** We will give tours of our xeriscape to people who live in our school community. We will also make a how to brochures that help people make their own xeriscape.

### Conclusion:

We think that our plan will have big impact on water conservation at our school and community. Right now we are wasting a lot of water for our gardens. We can make better choices. We can use soil that retains water and xeriscape plants. We can water our gardens using rain water collected in our rain barrels. So, first we will change our behavior and that will help conserve water. Then, we will help the rest of our school learn about outdoor water conservation. Finally, we will help our community learn about water conservation.

### CITATION:

USDA, *Plants database*. Retrieved from <http://plants.usda.gov/java/>

*Florida friendly landscaping*. Retrieved from <http://www.swfwmd.state.fl.us/yards/>

## Step 3: Act

### TASK

What did your class do? How did you work with your class to create and implement your plan? Be sure to describe what data was collected and if the data reflected the predicted change.

Limit your response to 450 words.

### TEAM RESPONSE:

First, we mapped the school to find out water goes. We mapped where sprinklers were, where runoff goes and where there is a lot of mud or lot of dry spots. We found out that many sprinklers did not even help plants. They were watering sidewalks, fences and rocks!

We found out that a lot of water that comes as rain is washed off in drains. Finally, we found five leaky outside faucets. After we talked to our principal, our sprinklers are now turned on when needed. Our checklist shows that they are now running only once a day for 30 minutes. Principal also asked that some sprinklers that are not really watering plants are taken out.

Next, we studied the soil. We found out that gardens had very sandy soil. It had small grains. Water ran through it very fast. This means that we had to keep adding water. We analyzed a soil that we bought in nursery. This soil had larger pieces and kept water in longer. We did the experiment to compare these two soils. We put 2 cups of sandy soil in a coffee filter. We placed a coffee filter with soil over a beaker. We put 400 ml water in it slowly. We timed it for 5 minutes. After five minutes, 287 ml of water was in the beaker under the filter. We did this with other soil. After 5 minutes, 127 ml of water was in the beaker under the filter. We decided to use this soil for our gardens.

Next, we identified plants in our gardens. When we charted the plants, we found out that only 11 out of 73 were good for xeriscape. We decided to keep those. Some other plants were annual, so they needed to be replanted. We recycled other plants by putting them in pots. Then we send home a note that we will make xeriscape for our garden day and a list of xeriscape plants for families to donate. As a result, we made five xeriscape gardens.

We also found out that school did not collect rain water. We made 10 rain barrels. to water 10 gardens. We donated several rain barrels to businesses and families so that they can use rain water for watering. We plan to continue making rain barrels for community.

#### **CITATION:**

## **Step 4: Reflect and Extend**

### **TASK**

What did your class learn? Explain how challenges were addressed, how what has been put into place will be sustained, and how others could replicate your work.

Limit your response to 650 words.

### **TEAM RESPONSE:**

### **STUDENT LEARNING:**

One of the amazing outcomes of this project was that every 2nd grader at our school contributed to making difference. What began as a question and concern by a small group of students evolved into a seven week unit in which students learned many standard based science and mathematics concepts. But the greatest learning came from students themselves. They guided the inquiry and came up with creative solutions to a serious problem.

### **CHALLENGES**

One of the challenges was providing young students with adequate background knowledge to tackle the questions while thinking as scientists. Therefore, I developed inquiry based lessons to explore the importance of water and properties of soil and plants. Equipped with that knowledge students were able to brainstorm ideas, predict outcomes and develop a plan of action. Additional challenge was translating Siemens challenge to the entire grade level. This meant planning for scaffolds, accommodations and assuring that all students successfully participate. To address this issue, I used cooperative group structure to guide team work. Before we even started, each of the five classrooms brainstormed and developed their own rules. The whole project was implemented during the school day, through science, social studies and some mathematics classes. I chose this approach to give all students an opportunity to participate, realizing that if the project is after school or special activities many of my lower socio economic students would miss this experience.

### **SUSTAINABILITY**

This project has been embraced by our school. Administrators have taken an active role in responding to students and addressing the issue. Each of 28 classrooms in our school has a small garden. In addition, common grounds have always been maintained as large gardens, both for esthetics and for student science learning. This project resulted in 5 gardens turned into xeriscapic landscape, requiring significantly less watering. We now have ten gardens whose main source of water are collection rain barrels. The goal is to have all 28 watered from this source. As the video of this project was shown on school wide TV, other grade level are embracing the change, using the 2nd grade gardens as a model. The project has now become a school wide effort, and we hope that in the next year we can significantly reduce the outdoor water use school wide. Our PTA and School Advisory committee have also taken interest and support the effort. We have secured several business partners to provide resources for further implementation.

Academically, this project is also very sustainable. In the second grade, this unit will now become a regular component of the curriculum. Assessment data show student mastery of mathematics, social studies and science standards. Furthermore, checklists of

NETS technology standards and 21st century skills show that students are making significant growth. In the future, we hope that students will not only continue the effort above, but also develop other creative solutions to the water conservation issue.

#### REPLICABILITY

This project is highly replicable at all grade levels. The process in which we engaged to develop a unit is simple and applicable to all ages. The unit could be taught as is with students allowed creativity to determine their own solutions. Or, the process of finding a problem, researching and then figuring out a solution could be applied to any environmental problem.

#### CONTINUATION

Development of xeriscape, rain barrels for community and public service campaign across our school were just the beginning. To continue this project, students plan to develop a full length ( 15 minutes) documentary that will be broadcast on Brighthouse school board channel. Students also plan to give tours and place brochures in nurseries around town encouraging people to conserve outdoors water. Finally, students plan to introduce their plan to the district's school board and campaign to reduce outdoors water waste at all schools around the district .

#### CITATION:

## Step 5: Teacher Sharing

### TASK

How did it go? Were you able to effectively support your students' efforts to make a sustainable change that benefits the environment? Why or why not? Would you and your class have done anything differently if given the opportunity?

Limit your response to 400 words.

### TEAM RESPONSE:

Our project grew from an initial small group idea to a whole grade effort. Project started with students questioning the (mis)use of water for our classroom gardens. They noticed sprinklers turned on during rain and excessive watering. Using student questions, teachers located resources to help them better understand the issues. This included many technology tools such as scientific probes, cameras, Ipads and laptops. The investigation resulted in a student generated plan of action including turning each of five 2nd grade gardens into xeriscape, ideas for a more efficient irrigation system that includes student built barrels, colored barrels to distribute to community and public awareness campaign. While at the beginning, students asked teachers many questions and needed guidance and encouragement, as the project progressed students became more assertive and readily shared ideas. They became engaged and interested and very motivated to solve the problem. Investigations were guided by student's questions and research. Student's excitement and motivation made project easy to implement. Teachers guided students through some fairly simple experiments - such as investigating how different soils absorb water, measuring the amount of water that can be collected from rain, and mapping the school grounds to understand where runoff goes. We were able to connect math by having students investigate the cost of watering the gardens at our school. They also did checklist of yard water use at their homes. Students truly became agents of change. They begun by making changes themselves, such as checking each morning to make sure water hoses and sprinklers are off and not dripping. They spread the word throughout the school by presenting the problem and solutions to different grade levels and by video clips on the school TV. They talked to other grade levels as well as administrators about the way to stop water waste in our yards. In addition to the campaign around the school, students assembled and painted rain barrels for businesses in our city, so that they can collect rain water for yard watering. As a result, school has made some significant changes in choice of plants and watering of gardens. We are hoping that their educational campaign will also affect community as they give tours and post fliers about xeriscapes and water conservation. Majority of our project was done during school day. However, we needed some after school time for development of public service materials ( brochures etc). In the future we will integrate this through language arts.

#### CITATION:

## Step 6: Attachments

### TASK

- You may include attachments to provide more information.

- Up to 5 images (.jpg, .gif, or .png) or pdf or ppt
  - [classgarden.JPG](#)
  - [computers1.JPG](#)
  - [probes1.JPG](#)
  - [garden1.JPG](#)
  - [barrel1.JPG](#)
- 1 video - 1 minute or less (Videos will be reviewed for content, not the aesthetic quality of the video (.wmv, .mov, .flv))
  - [xeriscape.mov](#)