

**ENVIRONMENTAL EDUCATION REGIONAL GRANT**  
**RECYCLING EDUCATION CENTER - RAPID CITY, SOUTH DAKOTA**

**PROJECT SUMMARY:**

Rapid City Solid Waste Division will be constructing a Recycling Education Center as part of a Citizen Campus. This construction is limited to the foundation only, funds to furnish the facility need to be secured by outside sources. The Education Center will be filled with hands-on learning tools, education lessons, garden supplies and tools, and service learning activities that will be used to increase knowledge and awareness of the three R's: reduce-reuse-recycle and environmental sustainability. South Dakota Education Standards along with the South Dakota Tribal Communities of the Lakota Nation for third grade science, technology, environment and society 3.S.1.1 focus is on students recognizing ways to reduce reuse recycle and reduce consumption of natural resources. The above mentioned education standards will be the main emphasis of the Education Center. This grant will focus on third grade students from the area along with established partnerships with the Oglala Sioux Tribe from the Pine Ridge Reservation, the Rosebud Indian Reservation and North Rapid Community Education. Future focus will include preschool thru fifth grade students. There are fifty eight classes totaling approximately 1160 students with an eight percent variance. In the mid to long term classes will be expanded to include preschool thru fifth grade levels.

This level of education is needed because solid waste amounts continue to rise. The average amount of garbage produced per person on a daily basis is 4.5 pounds. Comparing this rate to past years, in 1960 the average American produced 2.66 pounds of garbage. This amount only includes residential garbage of the average American and does not take into consideration business and manufacturing. Education and follow through of the three R's will be a priority in the Rapid City and surrounding areas to help control the solid waste issues, an example is a large amount of waste and recyclables are going into the landfill that could be diverted (the amount of garbage diverted from the landfill for other uses). Rapid City currently has a diversion rate of 9.4 percent, which substantially falls behind the 14.3 percent national average. The Education Center is needed to support teachers in their lessons and to change students recycling behaviors.

The Education Center will be overseen by the Recycling Educator. The present recycling educator has a Bachelors Degree in Marketing from the Slippery Rock University, an MBA from National American University and a Substitute Teaching Certification from the University of Utah. The Recycling Educator is currently teaching English as a second language to Korean Students through Eleutian Inc.

Without this grant Rapid City will have a lengthy delay with this site and its support for the education of students and teachers by field trips that would provide hands on learning tools and activities to increase students' knowledge in recycling, environmental sustainability, stewardship and its importance.

## **PROJECT DESCRIPTION**

Under the direction of the Rapid City Department of Public Works, the Solid Waste Division is a full service regional solid waste operation that serves Rapid City and the surrounding area. Rapid City has provided solid waste disposal to the city and surrounding region for 52 years. Recycling began in 1995 and has experienced a slow growth. The City provides for solid waste management through the operation of various solid waste facilities and programs. These facilities include a Material Recovery Facility (MRF) and Municipal Solid Waste (MSW) Co-Compost Facility, Rapid City Landfill, and yard waste composting area, all located at the Rapid City Landfill site. Rapid City also operates waste reduction and recycling programs including the residential curbside collection of recyclables, seasonal curbside yard waste collection, and three drop-off sites for recyclables and yard waste. The three drop off sites are available to Rapid City residents and those living outside City limits. While no formal planning agreement exists with communities outside of Rapid City, the City's facilities receive waste from the surrounding communities. The Solid Waste Division operates solely on revenues from landfill tipping fees, sale of recyclables, and payment for residential collection fees. The Solid Waste Division operates as an Enterprise fund meaning Solid Waste provides services to the public for a fee, thus the entity is self-supporting.

Rapid City Solid Waste Division will be constructing a Recycling Education Center that will be incorporated within a consumer citizen campus for landfill use and education in the spring of 2013. Future references to the Recycling Education Center will be the Education Center. Construction of the foundation for the Education Center will be funded by the Solid Waste Division. The intent of this grant is to furnish the building and gardens with hands-on learning tools and activities that will be used to increase the knowledge of our youth on the subjects of reduce reuse recycling and environmental sustainability. Initially the audience will consist of third grade classes in Rapid City and surrounding areas including Rosebud Indian Reservation and Pine Ridge Indian Reservation. There are fifty eight classes totaling approximately 1160 students with an eight percent variance. This education precedence is in alignment with the EPA's educational priority.

Without this grant Rapid City will have a lengthy delay with this site and its support for the education of students and teachers by field trips that would provide hands on learning tools and activities to increase students' knowledge in recycling, environmental sustainability, stewardship and its importance. The need for this facility is to increase environmental stewardship in young people in Rapid City and the surrounding areas along with the Rosebud and Pine Ridge Indian Reservations.

The funding provided by this grant will be used for the following hands-on learning tools and materials:

- Entrance will be a walk-through sculptural display that will act as a threshold for the exhibit area and introduces the concept of recycling and waste decomposition. The students will uncover graphic elements that reveal information about trash, decomposition, methane gas, lechate, recycling, and others.
- A hands-on exhibit will invite kids to try their hand at playing the role of a worker at the Materials Recovery Facility (MRF). These roles will sort plastics, glass and aluminum from a mixed pile and deliver recyclables to further processing such as bailing and shipping. This exhibit will work as a loop that will allow students time to work sorting, bailing and shipping and studying why.
- A series of props, graphics, and displays that describe what Rapid City's recycled plastics, corrugated cardboard, newspaper, aluminum, copper, brass, steel, and glass will ultimately be manufactured into and how this is done.
- A Computer Interactive that will take the visitors through the Rapid City Landfill and the Rapid City Materials Recycling Facility. Scenarios will challenge the user to solve problems concerning the landfill, recycling and collection. This will show how the Education Center is heated by the methane gas from the landfill and how the MRF manufactures co-compost from household garbage, and a computer interactive of the history of garbage and recycling.
- A hands-on version of Rapid City's garbage and recycling trucks filled with props to take to the landfill or the materials recycling facility. The students will need to make the decision as to where the waste is to go that would be best for environmental sustainability. The children will be able to crush the garbage for fill in the landfill.
- Take home educational kits and instructions.
- A collection of books for the younger readers on recycling and garbage.
- Craft items for students' learning projects.
- Garden tools and supplies for creating gardens and greenhouse plants.

South Dakota Education Standards along with the South Dakota Tribal Communities of the Lakota Nation for third grade science, technology, environment and society 3.S.1.1 focus is on students recognizing ways to reduce reuse recycle and reduce consumption of natural resources. The above mentioned education standards will be the main emphasis of the Education Center. This center will provide education with a concentration on community projects through hands-on learning. This will increase children's knowledge of the three R's: reduce-reuse-recycling and reducing consumption of the lands natural resources. It is with credence that participating in hands-on learning students will be better able to make decisions that will affect the future of the environment. According to the National Assessment of Educational Progress (NAEP) students who are participants of hands-on learning out-perform their peers by more than 70% in math and 40% in science. The Education Center's hands-on learning activities will require students to think and solve problems. Students who participate will be provided with the

knowledge and opportunity to create hypothesis, make observations and perform investigative inquiries.

Environmental stewardship will be addressed in formal and informal education and the learning will be enhanced by using indoor and outdoor settings and hands-on experiences. Service Learning is a teaching strategy that will be offered by the Education Center. There will be an integration of meaningful community service with instruction, analysis, and a call to action with the support of a projects final result. One example of a Service Learning teaching project will be performing a Waste Audit. The students will audit their school or household garbage at the site of the Education Center by dividing the contents into categories. They will study and analyze the contents by recyclable and non recyclable. Waste habit results will be reviewed and possible solutions will be determined to reduce certain waste then present solutions to the audited facility such as the school or house. Service Learning will focus on the use of critical thinking skills for third grade by the use of multiple projects and hands-on learning tools.

Other Service Learning projects will focus on community gardens, both at the Center and in the community. Some examples of community gardens include Lemmon Street Gardens, General Beadle Gardens and gardens planted at the Education Center. These gardens are located in communities and will involve participants who are disadvantaged economically or academically and the students will gain from these activity-based programs. Studies have shown that hands-on learning is the key to successful education, and students are motivated to learn. A hands-on service learning project example will be the planting of a Three Sisters Garden, a tradition among the Native American people. These gardens consist of corn, beans, and squash that when grown together supports and nourishes each other and provides a more efficient way of cultivating the crops. Corn is planted a few weeks ahead of the beans and squash which becomes the support for the bean vines. Then the low-growing squash's wide leaves prevent weeds from growing around the plants and help retain soil moisture. The beans fix nitrogen in the soil which benefits all three plants. The use of compost manufactured by students and the material recovery facility will be used to enrich these crops with its nitrogen enriched soil. Teaching of this garden will be done at the Education Center's gardens and transported back to the reservation or kept at the center as the participating groups project. As a result of this planning a partnership has been secured with Oglala Sioux Tribe – Environmental Protection Program from Pine Ridge, South Dakota.

Creating excitement to keep our communities clean in the short run is very important but to keep up the momentum and increase in this knowledge is vital for environmental stewardship. Incorporating service learning with hands on projects, students will develop the skills needed to address safe and environmentally friendly practices through community service, hands-on classroom instruction, critical and reflective thinking as well as personal and civic responsibility. Rapid City promotes safe and environmentally friendly practices in waste management and the Education Center will provide this education for children and make them aware of the waste

management processes. The children will be provided the knowledge and tools to reduce waste and conserve energy. Teach our children about conservation and waste reduction and promote action that should be taken to better the environment. By solidifying classroom teachings with a hands-on approach to critical-thinking and problem-solving will be an educational benefit to our students.

Critical thinking and problem solving skills supported thru hands-on learning tools and service learning projects will be needed because solid waste amounts continue to rise. The average amount of garbage produced per person on a daily basis is 4.5 pounds. Comparing this rate to past years, in 1960 the average American produced 2.66 pounds of garbage, 1970 produced 3.27 pounds of garbage, 1980, produced 3.61 pounds and in 1988, 4.0 pounds produced. This amount only includes residential garbage of the average American and does not take into consideration business and manufacturing. Education and follow through of the three R's will be a priority in Rapid City and surrounding areas to help control the solid waste issues, an example is the large amount of waste and recyclables that currently are being buried in the landfill that could be diverted (the amount of garbage that should be redirected from the landfill for other uses). Rapid City currently has a diversion rate of 9.4 percent, which substantially falls behind the 14.3 percent national average. By educating the students and changing behaviors Rapid City's diversion rate would increase.

This grant will focus on students from the third grade classes from the area along with established partnerships with the Oglala Sioux Tribe from the Pine Ridge Reservation, the Rosebud Indian Reservation and North Rapid Community Education. Future focus will include preschool thru fifth grade students.

The distribution of Education Center information and the scheduling of tours for school will be distributed to third grade classrooms throughout Rapid City and the surrounding areas public, private and home schooling along with the American Indian tribal schools. Third grade classes that participate in the field trips will be provided with information that corresponds with the South Dakota Education Standards and Oceti Sakowin Essential Understandings and Standards. Prior to the students' field trip to the Ed Center, a quiz to identify specific recycling knowledge will be distributed by their teacher for the students to complete. If a visit is unplanned, resources will be available at the Center. Students will be asked questions concerning their current recycling habits, view different options, then come up with their own solutions to reduce the amount of garbage and recyclables in landfills, reduce energy usage, and eliminate pollution of water. Students will be encouraged at the end of their visit to pledge what they will do personally at home or for the community. Student visits to the Education Center will give a realistic view of what happens with the trash thrown into the trash bin. Giving students the opportunity to visit and watch the workings of a landfill and recycling facility develop an understanding of waste and its decomposition. Following the field trip another test of knowledge will be given to measure the students understanding and retention of studied information. These

quizes will be collected by the Education Coordinator then tallied, collated, and analyzed to measure the Ed Centers success. The measurements will be used for the quantitative and qualitative outputs that will show increase knowledge in third grade students on the topics of the three R's: reduce reuse recycle, consumption of natural resources and environmental sustainability.

The City of Rapid City has secured a recycling educator to perform the duties necessary to successfully manage and implement the education environment for the Education Center. Presently the recycling educator promotes environmental stewardship by reaching out to schools and the community, and educating on environmental sustainability. During the summer of 2012 the Recycling Educator instituted a very successful kid's camp, kids were given the opportunity to visit the landfill and observe the process of how a landfill works, what can and cannot be recycled and how to reuse waste. At the end of the day the students were questioned, they each retained a large amount of information and shared this information with their families. The success of the camp became the foundation for the Education Center; others are scheduled for the summer of 2013 and will be incorporated with the Education Center.

This facility will be a permanent Education Center that will be available for all citizens' use. After careful observation and study it is found there is a need for this facility. There are numerous tours given at the landfill but they are restricted. The Education Center will give participants first hand view of how this facility operates and will be given the opportunity to work by virtual participation. The models, displays and learning tools created for the Education Center can be developed and duplicated by any community throughout the United States as an educational foundation for environmental stewardship and sustainability. The interactive learning and hands-on projects from the education center can be adapted by any community.

## PROJECT EVALUATION PLAN

The goal of the Education Center is to increase knowledge of third grade students concerning the 3 R's: reduce – reuse – recycle, and consumption of natural resources. Create awareness of environmental sustainability and environmental stewardship. This will be done by the development of an onsite Education Center filled with hands on learning activities, service learning projects and classroom education. Monitoring and evaluating this project on a consistent basis will provide for a solid measurement to achieve the centers goals. The Education Center will meet its goals and strengthen itself by these objectives:

- The development of a consulting board.
  - This board will consist of three teachers, one parents of elementary school students, one community education coordinator, and the recycling education coordinator, and two from the sustainability committee.
  - The board will meet on a quarterly basis.
  - The board will be responsible for reviewing the results of the pre and post visit quizzes to verify the Education Center is achieving its goal.
  - This board will adjust teachings, hands on displays and service learning projects to achieve Education Centers' goals.
- Quiz development and review:
  - Questions similar both pre and post testing with same concept but different wording.
  - The board will monitor the questions.
  - Recycling Education Coordinator will compile scores of both pre and post tests then present these to the board along with finding and recommendations.
  - Board will review and make future recommendations.
- Consistent update of education tools:
  - Education Coordinator will update education tools for successful achieve of the Education Center goal upon recommendation of board.

## APPENDICES

### TIMELINE

Implementation Activities	One Year				Year 2	Potential Resource
	Qrt 1	Qrt 2	Qrt 3	Qrt 4	Qrt1	
Design of four exhibits: Walk through Display and MRF, Landfill	X	X				Education Coordinator
Manufacturing of hands-on exhibits		X	X			Manufacturer/ Education Coordinator
Delivery and set-up of displays			X	X		Manufacturer/ Education Coordinator
Creation of Computer Interactive Learning	X	X	X			Manufacturer IT Dept and City of Rapid City IT Dept/Education Coordinator
Delivery and set up Computer Interactive				X		Manufacturer IT Dept and City of Rapid City IT Dept/Education Coordinator
Design Greenhouse and Gardens	X	X				Education Coordinator/ Compost Director/ Master Gardners
Set up of Greenhouse and Gardens		X	X	X		Education Coordinator/ Compost Director/ Master Gardners
Purchase Greenhouse and Garden displays		X	X			Education Coordinator/Compost Director



Collection of books		X	X	X		Education Coordinator
Creation of Elementary School Learning tools	X	X	X			Education Coordinator/ Education Partners
Contact made to Elementary Schools		X	X	X		Education Coordinator/ Education Partners
Creation of outreach gardening lesson plans			X	X		Education Coordinator/ Education Partners/ Master Gardner's
Prepare monitoring results and evaluations				X	X	Education Coordinator
Prepare final closeout reports				X	X	Education Coordinator

The interactive learning displays, library, pre and post visit materials, gardens along with educational program development will begin in the spring of 2013 and be completed by the summer of 2014. The interactive learning tools both hands on and computer generated will begin to be formulated in April of 2012. This development phase should take approximately 3 – 6 months with the production phase approximately an additional 3 to 6 months. The library of children's books to reinforce Reduce Reuse Recycling and Sustainability will take a year. Program and lesson development will begin July of 2013 with a completion date of July 2014. Upon completion the Education will continue through funding from the Rapid City Landfill.

**LOGIC MODEL**

Outputs	Outcomes		
	Short-term	Medium-term	Long-term
Development and Implementation of Educational lessons	Increase environmental knowledge of third grade students	Increased environmental knowledge of K thru 5 <sup>th</sup> grade	Students make decisions to improve the environment
Develop hands-on learning tools	Increased and diversified resources for the program	Integration of educational lessons into third grade classrooms	Responsiveness to decisions that positively affect the environment
Field Trips	Increase knowledge of Reduce – reuse – recycle waste	Identify waste and recyclables properly	Organize environmental sustainability projects
Camps	Increase knowledge of using available items for garden growth	Become a steward of environmental projects	Establishing community garden
Service learning projects		Students begin to understand the benefits of composting	
Gardens		Assessment of responsiveness to increased	
Meetings with teachers to present results of quizzes	Assessment of results and measurement of success		Increased environmental stewardship in schools and communities.

		environmental education in the classroom	
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