WHAT ARE THE ELEMENTS OF A STRONG RATIONALE TO SUPPORT THE
DEVELOPMENT AND CREATION OF A RAIN GARDEN IN MY SCHOOL DISTRICT?

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A capstone submitted in partial fulfillment of the requirements for the degree of Master of Arts
in Education: Natural Science and Environmental Education

Hamline University, Saint Paul, Minnesota

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Primary Advisor: Susan Manikowski
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Peer Reviewer: Britney House
My research question is “What are the Elements of a Strong Rationale to Support the Development and Creation of a Rain Garden in my School District? This question and topic became important to me through my personal teaching experience. After completing my biomes class in Natural Science and Environmental Education (NESS), I found myself wanting to learn more about what is in rain gardens; their benefits and the environmental impacts of having one on school grounds. I realized that I have not seen a rain garden at the schools in my district, which inspired me to create this proposal. The outcome of this question was creating a proposal. The proposal is to create a rain garden on the school grounds to be utilized by staff and students to extend learning beyond the classroom.

I created a rain garden proposal for my project. This question is supported through the literature review. Environmental education is changing the way education is looked at. After completing my literature review, I am confident that I have enough support to back my research question and provide solid evidence of its importance and need. The proposal is a printable PDF providing a link to a presentation to go hand in hand with the written proposal. In this proposal it outlines the rationale, cost, completion timeline, and project description timeline. It ends with a rain garden design. The components of the proposal layout how to create a rain garden, the supporting evidence, and final design concept. This project examines the elements of a strong rationale to support the development and creation of a rain garden in my school district. A proposed location will first be determined along with the dimensions of the rain garden, description of the plant and grasses selected, estimated cost chart, timeline of completion and participants, will be discussed.
The participants of my project span across the school community. The participants that I will be presenting my proposal to will be the following; building principal, Head of Grounds Crew, member of the Early Childhood Advisory Council, a fellow nature preschool teacher, the district naturalist, and a K-5 representative. Each plays a different role in the process and represents the school community. The building principal and the head grounds crew are the only two that can officially make the decision to accept the proposed idea or not. The Early Childhood Advisory Council can offer help by providing funding that is needed for the project to be able to be implemented. The fellow nature preschool teacher and a K-5 representative can provide support and background knowledge about the health benefits of children utilizing this space. The district naturalist can help in the implementation process as well as providing follow up lessons with it for teachers.

After the completion of reading the proposal you should have the knowledge needed to understand the “Why”, behind my rationale as well as a strong idea of what a rain garden is, its purpose, and how it can stimulate learning in all children as well as helping the environment. This proposal will outline the next steps and how to implement the rain garden in the proposed location.
Rain Garden Proposal

What are the elements of a strong rationale to support the development and creation of a rain garden in my school district?

Submitted to: School District
Submission date: Summer 2018
Submitted by: Amanda Sterna
Thank you for your time on (date/day). The proposal is extensive and covers most aspects of the site design. The site I developed for you, would be, I’m sure an asset to the school’s building while contributing to the ESTEM philosophy as well as contributing to the Green Ribbon Award.

I would be delighted to work with you on this design and implementation process. I can assure high quality research has gone into this proposal. If you would like to move forwards with this design please contact me (phone number).

Thank you again for the opportunity to present this proposal. If you have any further questions please contact me.

Thank you,

Amanda Sterna
Project Proposal Outline

Project Name: Rain Garden
Project Manager: Amanda Sterna
Projected Start date: Spring of 2019
Project Completion date: Fall 2019
Project projected cost: $480-500

Project Rationale: “What are the elements of a strong rationale to support the development and creation of a rain garden in my school district?”

Project Location: Drainage location by north entrance of school, in between upper and lower parking lot.
Project Description:
A rain garden is a shallow depression, typically 6” to 8”, which mimics the natural environment by allowing water that runs off impervious (hard) surfaces to soak into the ground. The rain garden Edgewood will be located in between two parking lots and it will gently slope towards the existing storm sewer grate inlet. A rain garden allows water that would otherwise build up and cause flooding or carry pollutants into local streams, lakes, and rivers to gradually soak into the soil. Water from the gutter and parking lots will assist in directing rain water from roof and parking lot into rain garden. Plants have a deep root system that encourage the infiltration and help to absorb nutrients. There is a berm in the rain garden whose function is to hold water during heavy rain to reduce flooding. Native plants adapt to local conditions and have been selected based on what thrives best in the environment. They are easy to maintain and attract bees, birds, butterflies and other pollinators.

Project Description:
To increase student engagement in my classes, the creation and use of an rain garden can be used as a strategy. This project will provide a rationale and design for an rain garden on school property that will be utilized by preschool- 5th grade. The proposed location will be behind at the north entrance of the school between to two parking lots. (site location pictures included at the end).

Project Rationale:
At our school, there is not a garden location and or many outdoor spaces to extend learning on school grounds. Research has shown that spending time outside and conducting class instruction outside can benefit students as a whole, physically, emotionally, and socially.

Project Objectives:
Present a rain garden design plan, based on prior research, that could be implemented into existing landscape (at proposed location) that will reduce flooding, absorb pollutants and provide a home for bees, butterflies and birds. It will also provide teachers and students with the opportunity to use this rain garden space for math, science, literacy investigation and studies helping to promote getting children outside.
Project Materials:
The American Meadows provides the ability to search native plants that work in your area as well as the cost. The following native plants will need to be purchased: Butterfly milkweed, Golstrumm Black-eyed Susan, Swamp Milkweed, Purple Coneflower, White Coneflower, Meadow Blazing Star, Blue Gamma Grass, Little Bluestem Grass. The other materials needed, outside of the native plants are: shovels, brown wood mulch, and the soil is already provided.

Possible Fundraising Options:
There are two main fundraisers that are already in place that could help fund this project. Those two fundraisers being: The Boo Dash and FunRun. These two fundraisers take place in the fall allowing planning time to purchase materials and have ready by Spring for implementation. An event to inform community members would also be incorporated into the fundraising process. A focus on applying for local grants will be implemented.

- Local community members
- Shopko foundation
- CERTs Seed Grant Projects
- Lowe's Small Toolbox for Education Grant

Planting Budget for Rain Garden

<table>
<thead>
<tr>
<th>Type</th>
<th>Price</th>
<th>Total # needed</th>
<th>Total Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butterfly Milkweed</td>
<td>$14.98 per plant</td>
<td>12</td>
<td>179.00</td>
</tr>
<tr>
<td>Goldsturm Black-eyed Susan</td>
<td>$4.00 per plant</td>
<td>12</td>
<td>48.00</td>
</tr>
<tr>
<td>Swamp milkweed</td>
<td>$8.49 per plant</td>
<td>10</td>
<td>84.90</td>
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<tr>
<td>Purple Coneflower</td>
<td>$19.95 ¼ lb seeds</td>
<td>1</td>
<td>19.95</td>
</tr>
<tr>
<td>White Coneflower</td>
<td>$5.95 per plant</td>
<td>10</td>
<td>50.95</td>
</tr>
<tr>
<td>Meadow Blazing Star</td>
<td>$4.95 seed packet</td>
<td>2</td>
<td>9.90</td>
</tr>
<tr>
<td>Blue Gamma Grass</td>
<td>$11.95 ¼ lb seeds</td>
<td>1</td>
<td>11.95</td>
</tr>
<tr>
<td>Little Bluestem Grass</td>
<td>$9.95 ¼ lb seeds</td>
<td>1</td>
<td>9.95</td>
</tr>
<tr>
<td>Brown Wood Mulch</td>
<td>$3.00 2 cubic ft bag</td>
<td>25</td>
<td>$25.00 (2 in=12 sq feet divided by 300)</td>
</tr>
</tbody>
</table>

Total cost: 489.60
**Student and Teacher Benefits:**
Teachers and Student benefits from outdoor learning are endless with many studies to support student benefits. Studies have shown that spending time outside and learning outdoors can increase a student’s social skills, physical health, and emotional health. Students’ stress levels are decreased when they spend time outside. By providing outdoor learning opportunities to students it increases; melatonin, creativity, mood, and self-esteem. Getting students outside positively impacts health along with creating and providing hands on learning for students. With increased engagement, teachers spend less time redirecting students. It has been shown that spending time outside also decreases ADD/ADHD symptoms and restores directed attention. Providing a rain garden on school grounds also provides many environmental benefits. These environmental benefits are, but not limited too:

- Increased knowledge and awareness of watershed and stormwater issues
- Ecological learning opportunities
- Incorporate native vegetation that can help support wildlife and reduce habitat loss for extended learning
- Reducing flooding
- Pollution control
- Water conservation
- Habitat contribution

**Maintenance and Green Design:**
I want to native plants that require minimal maintenance. This will reduce the amount of time spent on maintenance of the space. Custodial staff and grounds crew will not be held responsible for maintaining the space. The main planting of the rain garden will be done by myself, my students, and any other volunteers that want to help in this process. The materials used will need to be water and weather resistant for prolonged use.

**Teacher Interest:**
From the teachers I have spoken with, they have indicated a strong interest in having this space present at school to extend learning and provide wildlife sightings. There is a few teachers who love gardening and have offered to help maintain the space if needed. There is interest from other grade teachers of incorporating the rain garden into their science curriculum.
**Design Plan:**

**Rain Garden Design - Not to Scale (300 sq feet)**

- **Butterfly Milkweed** (12)
- **Goldsturm Black-eyed Susan** (12)
- **Little Bluestem Grass** (10)
- **Swamp Milkweed** (10)
- **Purple Cone Flower** (8)
- **White Cone Flower** (10)
- **Meadow Blazing Star** (8)
- **Blue Gamma Grass** (10)
Connection concepts:
Teachers will be able to use the rain garden for teaching hands on connection concepts in the areas of science, engineering, and math, and social studies. Some of those concepts that can be taught through the use of a rain garden for upper elementary grades are: Water cycle, plant identification and ecosystem, water conservation, water quality research, protection of natural spaces, Clean Water Act, slope, irrigation, soil testing, and design concepts. Concepts that could be taught to lower elementary to preschool age are: Plant identification, Wildlife identification, observation, colors, water usage, bees, butterflies, pollination.

Presentation link to go with Project:
https://docs.google.com/presentation/d/1Tlb2bCXV-crUEqKAZMvwgWYCZe2LTf0sJb_DwIP6rG4/edit?usp=sharing

Resources:


