

Please type or use black ink when filling out the application. Inks of other colors do not always copy clearly. Please do not write on the back of the application.

1. Title and one paragraph description of the project: *(Provide a clear, student-focused concept of what the project intends to accomplish. The project, in abstract, will be well-thought out and organized.)*

TITLE of project: **Put Some Light on The Subject!**

One paragraph description:

This is the continuation of last year's project "Alternate Energy Cycle of Life: Complimenting Life Cycles with Solar Energy". With our current funding we have created a biofilter, a solar panel setup, and a sustainable aquatic ecosystem in a 300 gallon aquarium. Now that we have the ecosystem and filtration in place, the next step is to maximize the solar panel efficiency with two more deep cycle batteries for chemical energy storage. Two more batteries will essentially triple the "fuel" capacity of our solar panel setup.

Next, we need to put some light on the subject. The subject at hand is the 300 gallon aquarium ecosystem. Our goal is to use Light Emitting Diode (LED) illumination. The correct combination of lighting on the ecosystem will promote the growth of beneficial flora and provide better viewing of fish and plants. LED lighting is ideal for our purposes because of the overall efficiency of LED lighting to fluorescent lighting. LED lighting provides better illumination per watts and less heat energy loss than fluorescent lighting. Building an LED display will provide students with hands on real life experiences in energy efficiency and basic circuitry. Adding two more deep cycle batteries further illustrates the use of energy conversion and energy loss in a system.

2. Total cost of the project: \$ _____ 525 _____ *(The project cost is appropriate for the scope of the grant.)*

Amount requested from BCFFC: \$ _____ 525 _____ *(Typical amount awarded is \$500)*

List additional funding anticipated and/or received from other sources for this project:

\$ _____

\$ _____

3. A. What is the goal of this project? *(The goal will be strong and clearly stated and include activities related to the Kentucky Core Academic Standards – cite the standard here – for the targeted students.)*

This project continuation consists of two specific goals. The first goal is to continue providing students with exposure to STEM (Science, Technology, Engineering, and Math) goals as prescribed by the state and reinforced by Boyd County Schools. Building a more efficient solar energy system, students create realistic uses of technology and engineering.

The second goal of this project is to further reinforce the importance of renewable energy and its impact on the environment. Environmental engineering and science careers are in demand more than ever from auto manufacturers to wind turbine farms. Introducing applied environmental science early to young students may create interest to perform well in science and math and pursue post graduate careers in this discipline.

3. B. Why do you think there is a need for this project? *(Provide evidenced need for the project, which is justified by data or other factual means.)*

The need for this project is evidenced by the use of Individual Learning Plans and development of more specific career path education at the high school level. Exposing students to more hands on science opportunities and science that is sustained through regular maintenance as in our aquatic ecosystem allows them to explore interests in science in a more tangible way and provide more informed decisions for possible career paths as they explore them with the ILP program in middle school and specialized academic areas in high schools.

The Next Generation Science Standards also specifically emphasizes the use of practical hands on and inquiry based science content. This project reinforces areas of science from chemistry (checking ammonia levels, dissolved oxygen, and pH), biology (flora and fauna, protists and fungi), physics (energy conversion, fluid dynamics), and environmental science (energy system efficiency and renewable energy).

3. C. How will students benefit from participating in this project? *(Clearly relate the anticipated student benefit to the project activities and articulate by what measurable means the students will be assessed.)*

Students benefit from this project by applying core content science standards to practical real life applications. The unit, as presented in last year's grant application, will continue to be taught and modified to reflect this project and better prepare students for future scientific endeavors and testing situations regardless of whether students pursue vocational or four year college careers.

I expect every student to be able to provide at least a general description of the project setup and elaborate to that student's ability level how each of the components of this ecosystem works and the impact of each component on the entire system. The ability of a student to provide this description is a measurable goal and allows me decide how and where to place more emphasis on each of the content areas this project covers.

4. Describe your project. Include materials you will need and the methods you will use. *(Describe the materials and methods for this project making certain you are well-organized, student-focused and appropriately guided by the goals of this grant.)*

The first step in this project is to purchase two more 12 volt deep cycle storage batteries to store the solar energy as electrical energy. Living in our area, more storage will be necessary to compensate for days of less sunlight and less favorable solar angles in the winter months.

The second step is to capitalize on this extra stored solar energy by purchasing aquarium grade LED lighting and placing it over the aquarium at the optimal height to maximize the ideal wave lengths of light for the flora and fauna in the aquarium.

Finally this lighting setup will be place on a day/night cycle with a simple adjustable electrical timer. This cycle will be regulated to optimal levels of day (lighted) hours and night hours. Algal growth and water parameters will decide this cycle.

5. What grade(s) will this project benefit? *(Clearly state the targeted grades(s) for this project.)*

This project primarily focuses on 6th grade but will also be used with students attending the WOW afterschool program and any other students in enrichment and intervention classes as prescribed by RTI (Response to Intervention).

6. Give a detailed chronological schedule of events. Include an approximate date when Foundation Board Members may visit this project. *(Provide a realistic and well-organized timeline for the project which includes objectives, activities and dates.)*

1. Purchase deep cycle batteries

2. Install batteries and monitor the amount of gain and loss using standard lighting fixtures

3. Purchase LED lighting

4. Install LED lighting

5. Install day/night timer and monitor and regulate light exposure and LED lighting distance from the water to find the optimal combination for the specific ecosystem.

7. Approximately how many students will be participating in this project? *(Provide a clear response outlining the number of students who will participate in this project.)*

I typically work with 110-125 students on my sixth grade team as well as the same number of students from the other team over nine week intervals.

8. Will this project be continued in future years? *(Will the materials be able to be reused and/or will the project be ongoing?)*

Since this project is centered on maintaining an aquatic ecosystem as well as renewable energy, this project could continue to benefit students for years with its only limitations being the purchase of parts to replace worn or damaged components over the years. All components in this system are readily available and easy to purchase.

9. How will you determine whether your objectives have been achieved and whether your project has been successful? *(Provide a clear and reasonable descriptor of how progress toward outcomes will be measured and assessed.)*

As I stated earlier, I consider this project to continue to provide an effective tool for my students' science education when all of my students of all ability levels can provide a verbal or written description of the components of this system and how each component contributes to the entire system. Higher functioning students should provide details from the specific science disciplines involved while lower functioning students should be able to provide a general description of the components and their purpose within the system.

